

HIRING PREFERENCES OF EMPLOYERS OF ENTRY-LEVEL BIOMEDICAL
EQUIPMENT TECHNICIANS IN TEXAS

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This study examined the signaling strength, or marketing power, of the most common qualifications of entry-level biomedical equipment technicians (BMETs) in Texas, based on stated hiring preferences of BMET managers, using order ranking of fictitious resumes. This study also sought to determine whether certification status, education background, military training background as a BMET, or type of employer [hospital or ISO] of the hiring manager had an effect on hiring preference for applicant qualifications of associate degree, military training as a BMET, or certified biomedical equipment technician (CBET) certification candidacy.

Participants were asked to rank 16 fictitious resumes representing the most common qualifications of entry-level BMETs and to fill out a background questionnaire regarding their education, military, certification, and employer. The number of times each resume ranked in first place was tabulated and inter-rater reliability was calculated. Resumes with qualifications of associate degree versus military training as a BMET were compared at three levels of work experience. A chi-square test for independence was conducted for the comparisons to determine whether work experience influenced preference. Chi-square tests were also conducted for comparisons of associate degree with candidacy for CBET certification versus associate degree and military training with CBET candidacy versus military training. No statistically significant results were found for the chi-square tests, indicating that work experience did not significantly influence participant preferences for the compared

qualifications. BMET hiring managers indicated a preference for combinations of qualifications rather than any single qualification.

Correlations in hiring managers' educational background, certification status, military training as a BMET, type of employer, and preference for applicant qualifications were examined. Statistically significant correlations were found between participants' preference for associate degree or military training and level of education, military training background, and type of employer. Statistically significant correlations were also found between participants' preference of military training with CBET candidacy over military training alone and military training as a BMET background as well as certification background.

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CHAPTER 1

INTRODUCTION

Background

One of the fastest growing segments of the workforce in the United States is the service industry. Workers entering the service sector will need to enter the labor market with high technology skills and maintain these skills as technology continues to change on almost a weekly basis (Bartlett, 2004; Carnevale & Desrochers, 2001). In the past, employers accepted a 2-year degree as a good indication that the applicant could perform the job. However, the complexity of today's technical work is forcing some employers to call for more specific skills. In some fields, degrees appear to be less important than the specific knowledge and skills the worker can offer an employer (Carter, 2000). For example, in the information technology (IT) industry, employment rose by 34% between 1994 and 1998. Among young workers aged 25 to 34, IT workers with an associate degree declined from 12 to 8% between 1994 and 1999, while the share with some college but no degree increased from 11 to 14%. (Carnevale & Desrochers, 2001).

In fact, some question whether students are seeking degrees as often as colleges would like (Flynn, 2001). Increasing numbers of employers are looking to certifications rather than degrees as a means of verifying occupational knowledge and skill (Cantor, 2002).

Flynn (2001) strongly recommended that community colleges become active participants in the certification and credentials field and offer noncredit, industry certification courses not tied to state subsidized tuition. More than \$720 billion is spent

on education and training annually (Carnevale & Desrochers, 2001). With funding becoming tighter for community colleges and with corporations looking for ways to document skills for workers, collaboration could benefit both 2-year schools and industry (Carnevale & Desrochers, 2001; Carter, 2000;).

Highly technical fields usually have strong, widely accepted certification programs in place (Bartlett, 2002, 2004; Carnevale & Desrochers, 2001; Mehrsa, 1999; Wonacott, 2000). In a study of manager preferences in the hiring of automotive technicians and information technology (IT) technicians, Bartlett (2004) found that automotive technician managers ranked certification over a degree if a candidate had less than 2 years experience. In a sample of 95 automotive technician managers, 56 managers preferred certification over an associate degree if the candidate had less than 2 years experience. However, for IT technicians with the same experience, 90 hiring managers preferred the degree over an industry certification. Preferences of both automotive and IT managers changed when the level of experience either increased or decreased (Bartlett, 2004).

Biomedical equipment technology is a field that fits somewhere between the automotive field and the IT field in terms of both age and pace of development. Biomedical equipment technicians (BMETs) lack uniform state or national knowledge or skill standards, and this been a major problem within the field (Lozano-Nieto, 2004; Mehrsa, 1999; Smith, 2004). However, BMETs have a national voluntary certification program that is gaining attention. A national biomedical group is trying to standardize the educational curriculum with a relevant connection to certification (Forrest, 2003).

BMET employers are concerned with academic credentials and assume that their candidates will at least be trained in the specific skills needed (Lozano-Nieto, 2004).

Significance of the Study

In an informal survey, Gater (2005) found a variety of preferences in preferred credentials of entry-level BMETs. One company preferred an associate degree and certification over an associate degree only; another major employer preferred military-trained BMETs. One employer preferred to recruit and train its own entry-level BMETs. Lozano-Nieto (2004) also found differences in preferred credentials for BMETs in a study of 219 job advertisements. In a recent salary survey, Baker (2004) found some variety in the backgrounds of BMETs.

Career and technical educators, as well as students, need up-to-date information about credentials and employer hiring preferences to assist students in making informed decisions (Wonacott, 2000). The value that recruiters and hiring managers place on different qualifications can act as a signal to applicants as to the worth of attaining them (Barlett, 2002). Because of this, more understanding is needed about how education, work experience, and other applicant attributes signal suitability for entry-level positions in the labor market (Bartlett, 2004). Findings from Bartlett's (2004) study on the hiring preferences of automotive and IT technician managers suggest that further research is needed to explore what drives managerial perception about different qualifications. This study added to the understanding of how education, training, work experience, and certification signal or present suitability for entry into the labor market of a high technology field in healthcare. Results of this study should also provide opportunity for

national, state, and local training and professional organizations to collaborate to improve the biomedical equipment technology profession and training methods used to train entry-level BMETs

Theoretical Framework

The theoretical foundation for this study was based on the value employers place on credentials, or what these credentials mean to an employer, when hiring entry-level BMETs. Much evidence exists on the return that certain credentials such as education, certifications, work experience, and specialized training bring in the workplace (Baker, 2004; Campbell, Piotrowski, & Diez, 2003; Pacela & Brush, 1993; Wonacott, 2000, 2003). Attainment of education and other credentials serves as a signal to employers about the productive ability of an individual (Killeen, Turton, Diamond, Dosnon, & Wach, 1999; Soldatos, 1999).

According to Spence (1973), an employer is unsure of the capability of a candidate at time of hire. Hiring is therefore considered an investment decision. Candidates have observable characteristics and attributes such as previous work experience, education, gender, and race. Unalterable attributes, such as gender and race, are called “indices.” Alterable or changeable items, such as education, work experience, and other qualifications, are called “signals” and can be manipulated by the applicant (Spence, 1973; Weiss, 1995). The value or strength of a signal, or its marketing power, to an employer determines whether an applicant will use it (Aksoy, 1998). Signaling theory is the theoretical framework for this study.

Signaling theory is also used in marketing products to consumers. Kirmani and Rao (2000) stated that “different parties to a transaction often have different amounts of information regarding the transaction, and this information asymmetry has implications for the terms of the transaction and the relationship between the parties” (p. 66). This lack of information between parties may exist in several situations including between health insurance providers and purchasers, between employers and candidates for employment, and between vendors and consumers of products. Kirmani and Rao described quality signals regarding product quality, giving the examples of brand name, price, and warranty. Because of a buyer’s uncertainty about a product, he or she must rely on signals by the vendor or producer as to the quality of a product (p.66). Signaling, according to Kirmani and Rao, is “particularly effective in markets for relatively new products or products about which consumers are relatively uninformed but quality sensitive” (p. 72).

When applied to job seekers, firms use an applicant’s education choices and other signals to draw inferences about an individual’s unobserved attributes (Weiss, 1995). Boesel and Fredland (1999) suggested that credentials serve to identify productive people. Other researchers have described attainment of education as a signal to an employer about the ability of an individual (Killeen et al., 1999; Soldatos, 1999). Employers also learn from their experiences in hiring individuals with certain degrees, certifications, and training as to which attributes signal productivity and to adjust their view of these signals accordingly (Spence, 1973). These signals can vary in opportunity cost. “Individuals are assumed to select signals so as to maximize the difference between offered wages and signal costs” (Spence, 1973, p. 357).

Spence (1973) stated that signals also change over time through informational feedback to the employer. An employer hires an applicant based on signals and observes that employee's productivity over time. An employer's beliefs about the signals that an applicant displayed during the hiring process are either reinforced or adjusted depending on the observation. Subsequently, the wage schedule for new entrants is adjusted based on an employer's belief about signals displayed by the previous applicant. Future applicants' behavior with regard to signal choice changes until an equilibrium is reached between signals and wages (Spence, 1973).

The reverse of signaling theory is called *screening theory*, in which organizations have certain attributes that provide candidates with information about what it would be like to be a member of that organization and about the working conditions in that organization (Greening & Turban, 2000). Screening theory was beyond the scope of this study.

Because occupational certification and some other technical qualifications, for example, military training, frequently fall outside the realm of formal education, and because some employers may be willing to pay higher wages for these certifications or other skill sets, it is unclear whether degrees or other qualifications are recognized as higher credentials (Bartlett, 2004). "To date, signaling theory has not played a major role in career and technical education, despite its apparent utility" (Bartlett, 2004, p.6). This study attempted to add to Bartlett's work in exploring the roles of signals in technical, predominantly service-oriented, occupations.

Purpose of the Study

The purpose of this quasi-experimental study was to determine the signaling strength, or marketing power, of the most common qualifications of entry-level BMETs in Texas based on the stated hiring preferences of managers using order ranking of fictitious resumes. The study also sought to determine whether certification status, education background, military background, or type of employer of the hiring manager has an effect on hiring preference for applicant qualifications of associate degree, military training as a BMET, or certification.

Research Hypotheses

Four research hypotheses were formulated for this study:

H₀1: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with the qualifications of 2-year associate degree or military training, based on working experience as a BMET.

H₀2: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with the qualifications of 2-year associate degree or 2-year associate degree with candidacy for CBET certification, based on working experience as a BMET.

H₀3: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with the qualifications of military training or military training with candidacy for CBET certification, based on working experience as a BMET.

H₀4: There are no significant correlations in hiring managers' educational background, occupational certification status, military training background, or type of employer and their preference for applicant qualifications of associate degree, military training as a BMET, or certification.

Delimitations

The research was delimited in three ways. The first delimitation of this study was managers hiring entry-level BMETs in Texas. The second was to limit the scope of the

study to hiring managers of entry-level BMETs for independent service organizations and hospitals. The third was that entry-level BMETs had less than 4 years of experience.

Limitations

There were two major limitations in conducting this study. First, because the population was limited to participants in the state of Texas, including a wide geographical area, and because of the limited time frame and budget of the study, the sample was limited to a convenience sample using email, a meeting, and the U.S. Postal Service. Using these methods could possibly have affected the size of the sample and the ability to generalize results to all hiring managers in Texas. A second possible limitation was that participants might have been biased against graduates of the researcher's biomedical equipment technology program, depending on past experiences with its graduates.

Definition of Terms

Associate degree: A 2-year college degree (occupationally focused degree in this study) preparing students for a career upon graduation (Crosby, 2002).

Biomedical equipment technician (BMET): A technician trained to maintain and repair and to train others in the use of technical equipment used in patient monitoring, clinical laboratories, radiology departments, surgery, anesthesia, respiratory therapy, and other hospital departments. These individuals are highly specialized repair and maintenance technicians (Croswell, 1995).

Candidate for CBET certification: A BMET who has not completed the required work experience, but who has passed the Certified Biomedical Equipment Technician Examination and has an associate degree in biomedical equipment technology; or has an associate degree in electronics technology and 1 year work experience as a BMET; or has completed a U.S. military biomedical equipment technology program; or has 2 years work experience as a BMET (Association for the Advancement of Medical Instrumentation [AAMI], 2005).

Certification: “A qualification earned requiring passage of a professional, industrial, occupational, or vendor-sponsored examination tied to fixed standards. Some but not all certifications require prior education and experience” (Carnevale & Desrochers, 2001, p. 19).

Certified biomedical equipment technician (CBET): A BMET who has met the required education and work experience requirements established by the International Certification Commission for Clinical Engineering and Biomedical Technology (ICC), and who has passed an exam demonstrating a competent level of knowledge in: medical equipment function and operation; safety; medical equipment problem solving; electricity and electronics; and anatomy and physiology. (Pacela & Brush, 1993, p. 15)

Credentials: “A broad array of qualifications for work including degrees, certificates, certifications, and work experience” (Carnevale & Desrochers, 2001, p. 19).

Entry-level BMET: A beginning BMET. Works under close supervision. Usually has less than 4 years experience (Campbell et al., 2003).

Independent service organization (ISO): A company that contracts with a hospital or several hospitals to perform the hospitals' medical equipment service. Sometimes called "third-party service" (Cram, 2004).

In-house BMET: A BMET employed by a hospital (Cram, 2004).

Military-trained BMET: A BMET trained at the Department of Defense Biomedical Equipment Maintenance Training Facility at Sheppard Air Force Base in Wichita Falls, Texas, for 41 continuous weeks (Gregory, 2004; Larkin, 2000).

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" (Bartlett, 2004, p. 3).

Summary

Many highly technical service industries are looking for the documentation of specific skills before hiring entry-level technicians. Some employers prefer an associate degree in the specified technical field. Some industries and professional organizations have established highly respected and highly sought after certifications for personnel in their respective fields. In many industries, however, recruiters and hiring managers have mixed opinions on proper qualifications required of entry-level technicians. Biomedical equipment technology is just such a field.

As tuition, equipment, and training costs continue to rise, it is increasingly important to students, colleges, and even professional associations to determine the qualifications most sought after by employers in high-tech service-related industries.

Some credentials provide stronger signals, or have more marketing power, to hiring managers than others. By determining hiring manager preferences, colleges can better align themselves with industry preferences and perhaps find new ways to collaborate in documenting the skills that employers demand.

Chapter 1 provides a general overview of the study. This chapter discusses the background for the study, the purpose of the study, the research hypotheses, the delimitations and limitations, and the definition of terms. Chapter 2 contains the literature review, including a brief explanation of signaling theory, a brief explanation of human capital theory, articles and studies on credentials and qualifications, the background and evolution of the BMET, and entry-level requirements for BMETs. Chapter 3 describes the research population and sample, along with the design of the study, instrumentation used, the data collection procedures, and treatment of the data. Chapter 4 contains the findings of the study, and, in Chapter 5, findings of the study are discussed and recommendations are made for future research on this topic.

CHAPTER 2

LITERATURE REVIEW

Introduction

Whether they are graduating high school seniors entering the workforce for the first time, mid-life career changers seeking retraining after a reduction in their current industry, or technical workers seeking to increase their current skill level, students need to have updated information about the kinds of credentials needed in the job market (Wonacott, 2000). In many highly technical service industries, the array of credential choices and alternatives can be confusing. Employers in these industries must also face these constantly changing qualifications because the recruitment and screening practices adopted by an organization or company can have a significant impact on the level of talent in that organization (Bartlett, 2002).

Ultimately, the value of a credential depends on its utility to the person seeking or holding it. One way to discover value is to look at how different qualifications influence the hiring and/or recruitment process of job candidates, or its signaling strength (Bartlett, 2002). The purpose of this study was to determine the signaling strength, or marketing power, of the most common qualifications of entry-level biomedical equipment technicians (BMETs) in Texas based on the hiring preferences of hiring managers. The four qualifications examined in this study included (a) an associate degree in biomedical equipment technology, (b) professional association certification, (c) military training as a BMET, and (d) work experience as a BMET.

Signaling Theory

Before examining the importance of credentials and qualifications in any field, it is important to look at the significance of the same from different viewpoints. Many theories could be used to explain significance of credentials in the workplace (Bartlett, 2004). Only two were reviewed in this study, signaling theory and human capital theory, with signaling theory providing the theoretical framework.

Signaling theory was discussed in more detail in chapter 1, and therefore, only a brief explanation is provided here. According to Spence (1973), job applicants have observable attributes such as education, experience, and training that can be manipulated. These are called signals, and they vary in opportunity cost. “Individuals are assumed to select signals so as to maximize the difference between offered wages and signal costs” (p. 357). Individuals will choose length of education and training that “equates their marginal rate of return from schooling to their cost of schooling” (Weiss, 1995, p. 136). These signals also change over time through informational feedback to an employer, who hires an applicant based on signals and observes that employee’s productivity over time. An employer’s beliefs about signals that an applicant displayed during the hiring process are either reinforced or adjusted depending on observation. Subsequently, the wage schedule facing new entrants is adjusted based on an employer’s beliefs about signals displayed by the previous applicant (Spence, 1973).

Human Capital Theory

A competing theory to signaling theory is human capital theory (Weiss, 1995). Human capital theory states that education contributes to an individual’s subsequent

productivity. In turn, profit-maximizing firms pay higher wages to more productive employees. In short, schooling adds to productivity (Schultz, 1971). In addition, attainment of education implies trainability, so educated individuals are more likely to acquire further skills in the future, making them even more productive (Killeen et al., 1999). However, Hlavna (1992) differentiated between general training or education and firm-specific training by stating that firm-specific training increases the productivity of the employee at the organization where he or she is currently employed while general training increases the productivity of an individual to current and future employers.

Several studies and articles on human capital theory focus on the effect of education on productivity and earnings (Becker, 1994; Schultz, 1971; Weiss, 1995). Human capital theory argues that education alters the productive ability of individuals and that an employer can expect a certain volume of output or productivity based upon a degree and grade transcript (Becker, 1994). Therefore, companies have an incentive to hire workers who are likely to remain on the job longer. Also, wages rise with length of time spent on a job because workers learn on the job (Weiss, 1995). However, Hlavna (1992) pointed out that companies have no incentive to pay for general training for an employee that may benefit a competitor in the future.

On a larger scale, more highly educated people contribute more to a country's economic development; therefore, nations with larger pools of human capital resources are more competitive in the global market economy (Krumboltz & Worthington, 1999; Lyall, 1999). One of the fundamental beliefs of proponents of human capital theory is that increases in education are responses to an increased demand for skilled labor. Proponents of human capital theory believe that those with limited levels of education

enter the labor market destined to remain in lower level jobs, thereby restricting economic growth (Walters, 2004).

Human capital theory also has its critics. Many have challenged the human capital theory argument that education generates skills and increases productivity (Boesel & Fredland, 1999; Collins, 1979; Walters, 2004). Boesel and Fredland (1999) pointed out that many college graduates are not doing well in the job market and that often graduates find themselves in low-paying service jobs. Collins (1979) saw only a weak connection between educational credentials and skills required on the job, which might explain differences in earning power among groups of college graduates. Walters (2004) observed that overqualification of workers is a major social phenomenon and perhaps a challenge to human capital theory.

Since the 1970s, some critics of higher education have maintained that college is not a worthwhile investment for everyone. These critics have pointed out that, although noncompleters of college typically earn less than college graduates because they have fewer years of education, those who acquired learning in vocational programs seem to be an exception. Although the benefits of occupational programs in public technical colleges and proprietary institutions seem to be unclear, short-term occupational training such as that provided by the military seems to be beneficial (Boesel & Fredland, 1999). As more employers are demanding postsecondary credentials for entry-level positions, many are concerned about whether educational credentials are actually needed to perform the job and whether postsecondary education provides the necessary skills (Walters, 2004).

Credentials and Qualifications

Carnevale and Desrochers (2001) noted that in common usage, “credentials refer to a broad range of qualifications for work including degrees, certificates, and even work experience” (p.19). However, they observed that educators and other professionals regard only degrees and other types of formal learning as credentials. In the literature review, credentials, qualifications, and requirements were used interchangeably when referring to the education, training, certification, and work experience of employees (Gater, 2005; Lozano-Nieto, 2004; Wonacott, 2003). Therefore, in this study, credentials, qualifications, and requirements refer to the alterable attributes a candidate may present to a potential employer.

According to the U.S. Bureau of Labor Statistics, occupations in which workers are often required to have an associate degree are growing faster than occupations that require other types of training (Crosby, 2002). Associate degrees are thought to provide a solid base of general knowledge along with current occupational knowledge, giving workers more portable, transferable skills (Carnevale & Desrochers, 2001). In occupationally oriented or applied associate degree models, students spend at least some time in facilities that resemble the workplace (Crosby, 2002). They work on equipment used in the workplace, and many complete cooperative education (co-op) or internship programs as a part of their degree plan. The best associate degree programs tailor their curricula to industry standards, making the associate degree the most significant source of training for many technically-oriented occupations. Community and technical colleges make up the majority of associate degree providers in the U.S. (Carnevale & Desrochers, 2001; Carter, 2000; Crosby, 2002).

The fact that higher education can provide economic benefits is well established (Athey & Hautaluoma, 2001; Becker, 1994; Schultz, 1971). Athey and Hautaluoma's (2001) study found that applicants who had 12 years of education were more likely to be hired for low-status jobs than for high-status jobs. In their study, employment preferences of personnel representatives in electronics firms were studied regarding job applicants who had varying levels of education. "Applicants who had more education were evaluated more positively and, in general, employers preferred overeducated applicants to undereducated applicants" (p.450).

Highland (1993) performed a study that looked at how employers evaluated entry-level job candidates in simulated hiring decisions. Specifically, his study examined how employers distinguished among various educational credentials for specific kinds of jobs. Participants were asked to match resumes to job descriptions. The only significant difference on the resumes was educational background. Results indicated that employers consistently selected applicants with specific training for the type of job presented.

Bartlett's (2002) study on the influence of credentials in the Information Technology (IT) industry found that human resources executives rated degrees higher than industry-sponsored certifications. However, IT employees themselves preferred the certifications.

Carnevale and Desrochers (2001) maintained that employers associate general cognitive and behavioral skills with educational attainment and, as a result, American employers use the degree as the standard by which to screen job applicants. However,

Killeen et al., (1999) warned of past empirical evidence concerning the tendency of employers to use education as a “cheap screen” for recruitment purposes.

Despite evidence regarding the benefits of education, some experts suggest that associate degrees might be losing ground as the credential of choice in some highly technical industries (Carter, 2000; Harkins, 2002). In the past, employers accepted an associate degree as an indication that one could perform on the job. With the increasing complexity of today’s technical environments, employers feel that degrees no longer convey what the degree holder knows or is able to perform in any precise way (Carter, 2000). Employers are demanding enhanced outcomes from graduates, leading to a performance crisis that educators are currently unable to solve (Harkins, 2002).

Across the United States, millions of students enroll in community and technical colleges each year. Many, however, are attending college to gain relevant occupational skills and not merely degrees. There is some indication that students are not staying for the full associate degree (Cantor, 2002). Carew and Flynn (2002) noted that returning adult students, especially those in transition from one career to another, want to speed up the educational process at the local community college and prefer faster methods to document their skills. Many are pursuing certifications. According to Cantor (2002), more employers are turning to certifications as a way of ensuring that prospective employees actually do have the skills for an occupational specialty. Depending on the industry, many types of certifications may be available. Two common types of certification are *proprietary* and *industry-based*. Proprietary certifications are typically offered by proprietary organizations such as Microsoft, Cisco, and Novell. Other

certifications are industry-wide and may be operated or sponsored by professional associations (Wonacott, 2000).

Some certifications are based on completion of a prescribed amount of instruction or education, followed by passing a comprehensive examination. Still others require a documented amount of work experience in a profession. According to Wonacott (2003), the certifications that mean the most to employers are ones that require the most preparation or documented hours of work experience. In any case, validation of certain knowledge or ability conferred by certification examinations attracts many employers, leading to a proliferation of certification programs in many professions (Carnevale & Desrochers, 2001).

Perceptions about the value of certifications vary. As indicated above in Bartlett's (2002) study on the influence of credentials in the IT industry, IT employees perceived certifications to have more influence in advancement and training than did degrees, although human resource executives disagreed.

Bartlett (2004) also performed a study on the signaling power of occupational certification in the automotive service and IT industries. In this study, hiring managers from the two industries were given 12 fictitious resumes of entry-level applicants from their respective industries with various qualifications, including work experience, education, and certification, and combinations of the qualifications. Both automotive and IT managers ranked a degree more desirable than certification, but work experience was a factor in this ranking. For IT managers, there was a uniform preference for the degree, regardless of work experience. The automotive section had mixed results.

Certification ranked higher than the associate degree when the applicant had less than 2 years of work experience as an automotive technician.

In a study on BMETs, Mehrsa (1999) found that certified biomedical equipment technicians (CBMETs) perceived themselves to be more committed to their careers than noncertified BMETs. CBMETs also perceived more self-confidence and credibility than noncertified BMETs. Mehrsa also suggested that CBMETs with higher career commitment generally had more skill development competencies than noncertified BMETs.

Work experience also seems to be a common and important qualification for entry-level workers in highly technical fields (Bartlett, 2002, 2004). Klein (1990) conducted a study in which three resumes were examined by 56 businesses. The resumes differed in part-time work experience of students while in college. The two work experience categories were a part-time, work-related internship and a nonwork-related job. The study concluded that work-related experience could increase chances of landing full-time employment upon graduation.

However, a study by Aksoy (1998) suggested that education and experience are somewhat exchangeable in the hiring process for entry-level applicants. Aksoy found that employers are looking for “employability skills” more than education or experience. He also suggested that students will not value academic success if the workplace does not value it.

Military training is not a factor in every high technology field, but because of its status and respect in the field of biomedical equipment technology, and many others, it is included in this study. Cody, Adamson, Parker, Morrey, and Maxwell (2004)

compared national certification pass rates for military-trained physician assistants with those of accredited civilian programs. Graduates of military-trained programs had significantly higher pass rates and higher average scores. Results, according to Cody et al. suggest that military-trained physician assistants continue to outperform their civilian counterparts.

However, military training is not always perceived as highly in the civilian sector. Laurence (1994) did a study of employers' perceptions of military veterans within a sample of job types. Laurence's study asked participants to evaluate resumes as to suitability for three jobs, based on military veteran status. Significance was found in main effects of job type, with veterans rated lower than nonveterans for a computer programming job but higher for a police officer job.

Background and Evolution of BMETs

A BMET is defined as "an engineering technician, or technical medical equipment specialist, who is trained to maintain and repair the instruments and high technology equipment used in patient monitoring, clinical laboratories, radiology departments, surgery, anesthesia, respiratory therapy, or other high-tech hospital departments" (Croswell, 1995, p. 231). During the 1960s, Ralph Nader and several other researchers claimed that thousands of people were being accidentally electrocuted by medical equipment in hospitals across the country. Articles published by Nader and others demanded the use of highly trained technicians to test and verify the safety of these devices used for patient care (Croswell, 1995). BMETs are sometimes called medical equipment repairers (U.S. Bureau of Labor Statistics, 2004).

Before these articles were published, only the military trained BMETs, because no civilian training existed. In 1966 the Technical Education Research Center (TERC) at Cambridge, Massachusetts, began a project in conjunction with the Veterans' Administration to determine the proper curriculum for a civilian BMET school (Croswell, 1995). Two-year programs in biomedical equipment technology were established at technical institutes and community colleges as a result of this project. As of 2005, an estimated 55 programs nationwide offered associate degrees and certificates in biomedical equipment technology (Lozano-Nieto, 2004). One report listed 25 programs nationally (Smith, 2004).

The military continues to train BMETs at its combined Department of Defense Biomedical Equipment Maintenance Training Facility at Sheppard Air Force Base in Wichita Falls, Texas. Over 500 active military and reservists pass through the 41-week course annually (Larkin, 2000). Many military-trained BMETs believe that the training they receive in the military is better than most college-based programs (Gregory, 2004). In any case, the sheer volume of graduates of this program makes it one of the largest, if not the largest, producer of BMETs in the United States.

A voluntary certification, certified biomedical equipment technician (CBET), is available to BMETs through the International Certification Commission (ICC) and is administered through its secretariat, the Association for the Advancement of Medical Instrumentation (AAMI). ICC certification for BMETs is "a formal recognition by the International Certification Commission for Clinical Engineering and Biomedical Technology (ICC) that individuals have demonstrated excellence in theoretical as well as practical knowledge of the principles of biomedical equipment technology" (AAMI,

2005). The CBET certification has two classifications: full certification and candidate status. These two classifications are explained in the AAMI (2005) handbook:

Full Certification

Applicants must meet one of the following eligibility requirements:

1. Associate's degree in biomedical equipment technology and 2 years full-time BMET work experience; or
2. Associate's degree in electronics technology and 3 years full-time work experience; or
3. Four years full-time BMET work experience.

Candidate Status

Applicants desiring full certification, but who do not yet meet the eligibility requirements, have the opportunity to apply through candidate status. Candidates have the opportunity to take the examination, and if successful, are given 5 years to meet the minimum eligibility requirements and be awarded full certification.

To test as a candidate for the certification, an applicant must meet one of the following minimum eligibility requirements:

1. Associate's degree in biomedical equipment technology; or
2. Associate's degree in electronics technology and 1 year full-time BMET work experience; or
3. Completion of a U.S. military biomedical equipment technology program. (Applicants qualifying under this route must still complete one of the three eligibility requirements for certification in addition to the U.S. military biomedical equipment technology course before being awarded full certification.); or
4. Two years of full-time BMET work experience. (p. 2)

The certification exam has an approximate first-time pass rate of 50% (Forrest, 2003).

Although certification in this field has been a source of debate since the mid-1990s (Forrest, 2003), recent compensation studies have shown certification to have a positive effect on the wages of BMETs (Baker, 2004; Campbell et al., 2003; Stephens, 2004).

Entry-Level Requirements of the BMET

According to the Occupational Employment Statistics produced by the U.S. Department of Labor's Bureau of Labor Statistics (2004), there are currently 23,750 medical equipment repairers in the United States and 2,500 in Texas. The Career Development Resources unit of the Texas Workforce Commission listed BMET as an emerging and evolving occupation in 1999, 2000, and 2001, with an estimate of 1,350 BMETs/medical equipment repairers in Texas in 1998 and a projected growth rate of 22% through 2008 (Career Development Resources, 2001).

In a study analyzing the professional marketplace for BMETs, Lozano-Nieto (2004) investigated nationwide demands for biomedical equipment technology programs by collecting and analyzing 219 job advertisements during a 12-month period. He found that hospitals are still the main employer for BMETs, with Independent Service Organizations (ISOs) following closely. In Lozano-Nieto's study, over 53% of advertised positions stated specific requirements for the candidates to be considered for employment, and the vast majority of employers who specified a minimal education requirement required an associate degree. However, some employers were concerned with specific knowledge rather than a degree. Also, of the jobs analyzed, 57% required a minimum number of years of experience, with 51% requiring less than 4 years. Ten jobs required certification.

In a recent article, national employers of entry-level BMETs stated a variety of preferences in qualifications for entry-level hires. Some preferred an associate degree in biomedical equipment technology, and others required an associate degree and certification. One preferred work experience over a degree or certification. One

employer preferred the military for its recruits (Gater, 2005). In the Mehrsa (1999) study, most of the BMET participants received their training either in the military or on the job.

Summary

Students and career changers entering new career fields face an increasingly confusing array of choices in credentials and qualifications. The occupationally oriented associate degree, long a standard for entry into many technical fields, is losing some of its appeal as employers endorse new forms of skill and ability documentation such as professional certifications. For many industries, including biomedical equipment technology, work experience still plays a major role in qualifying for a position. Military-trained candidates continue to be highly sought after in this field as well. Whatever the industry, the need for the workforce to continually update their skills and knowledge to meet the changing requirements of today's economies will continue the interest in credentials and credential refinement (Bartlett, 2004).

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

The purpose of this study was to examine the signaling strength, or marketing power, of the most common qualifications of entry-level biomedical equipment technicians (BMETs) in Texas based on the stated hiring preferences of managers using order ranking of fictitious resumes. This study also sought to determine whether certification status, education background, military background, or type of employer of the hiring manager had an effect on hiring preference for applicant qualifications of associate degree, military training as a BMET, or certification.

Research Design

This study used a quasi-experimental design, similar to the design used by Bartlett (2004) in a study involving automotive technicians and IT technicians. In this study, a 16-cell matrix of the most common qualifications for BMETs (see Appendix A) was used, based on the literature, to design 16 fictitious resumes (Appendix B). The resumes were developed using several resume guidebooks (Bernard Haldane Associates, 1999; Block & Betrus, 2003; Pontow, 1998). The resumes were pilot tested with local BMET managers and BMET instructors and revised according to their recommendations.

Several other similar studies using fictitious resumes were found in the literature. Jury (1993) examined the effects of age, type of academic preparation, and level of degree on employment screening decisions made by high school principals using

resumes of hypothetical teacher candidates. Cole, Field, and Giles (2003) looked at the validity of influences from resumes regarding an applicant's mental ability and personality, and Stallard (1990) investigated factors in resumes that influence selection of teachers as well. Farr (2003) studied the role of race in source credibility ratings by using fabricated jobs and fictitious resumes.

The resumes in this study were ranked in order of preference by hiring managers, depending on suitability for employment of the fictitious candidate with the hiring manager's organization. The results of the ranking were then compared at three levels of work experience. Results were also checked for bias based on participants' backgrounds and type of employer.

Population

According to the U.S. Bureau of Labor Statistics (2004), there are approximately 2,500 BMETs in Texas. Estimating the population of hiring managers of BMETs is extremely difficult because of disagreement about how many full-time BMETs should make up a department at a hospital (Cram, 2002). This estimation is made more difficult by independent service organizations having different staffing models depending on size of accounts, types of equipment, and size of companies. For example, one healthcare organization in Houston might have 65 BMETs servicing several hospitals but only one hiring manager. A small independent service organization in Tyler might employ only 5 full-time technicians and have one hiring manager, the owner. Therefore, for this study, an initial estimate of 100 hiring managers of BMETs was used as the population, based on the researcher's experience as department placement officer for

the Biomedical Equipment Technology Department at Texas State Technical College – Waco. This population estimate is based on an average of 25 BMETs per hiring manager.

Sample

Because of geographical dispersion of the population in Texas, a convenience sample using the BIOMEDTALK-L listserv, telephone contacts, and attendance at a regional biomedical equipment technician professional association was used to attain a sample size as close to an estimated population size of 100 as possible. A total of 86 BMET hiring managers in Texas were identified, and 65 agreed to participate in the study.

Instrumentation

Background Questionnaire

A background questionnaire (Appendix E) was used to gather specific information about hiring managers, including age, education, certification, work experience, BMET military training, type of employer, and size of employer. The survey was pilot tested with 3 local hiring managers of BMETs and 2 BMET instructors to ensure content validity, and it was revised according to recommendations. Responses to the background questionnaire along with respondents' rankings of the fictitious resumes were used to answer research hypothesis H₀₄: There are no significant correlations in hiring managers' educational background, occupational certification status, military training background, or type of employer and their preference of

applicant qualifications of an associate degree, military training as a BMET, or certification.

Fictitious Resumes

The 16 fictitious resumes in this study represent 16 hypothetical entry-level BMET candidates. These resumes are based on the 16-cell formal qualification matrix (Appendix A) representing the most common formal qualifications of BMETs and combinations of those qualifications. The resumes are listed four to a page in this dissertation, and in the order listed in the qualification matrix, for easier reading. For participants in this study, the resumes were printed on separate pages for easier ranking. Resumes were placed in a mailing packet in the same order for each participant. The resumes were assigned a letter from A through P using a simple computer randomizing number generator program with the numbers 1 through 16 (Urbaniak & Plous, 1997).

Dependent Variable

The dependent variable in this study was suitability for employment in the respondent's firm, as perceived by the hiring manager, based on the ranking of the fictitious resumes.

Independent Variables

The independent variables in this study were educational qualifications, military training qualifications, CBET certification, work experience as a BMET, and

combinations of the above. The treatment conditions were 16 possible combinations of these qualifications as represented in the qualification matrix in Appendix A.

Pilot Study

A pilot study was conducted to verify appropriateness of the fictitious resumes and the background questionnaire used in the study. A panel consisting of all 3 hiring managers of BMETs from the Waco area and 2 BMET instructors from Texas State Technical College in Waco was selected for the pilot study, and they agreed to participate. Wording on 2 of the 16 fictitious resumes and the background questionnaire was revised as recommended by the panel. Data from the pilot study were not included in the results of the main study.

Data Collection

Upon approval from the University of North Texas Institutional Review Board (IRB), an email was sent out on the BIOMEDTALK-L listserv, to the officers of the North Texas Biomedical Association, to known BMET hiring managers in Texas, and to recruiters for independent service organizations represented in Texas, explaining the purpose of the study and requesting their participation. Telephone calls to known hiring managers in the population were also made. A total of 86 BMET hiring managers were identified and contacted in the state of Texas through email and telephone. Of the 86 BMET hiring managers contacted, 65 agreed to participate in the study. A spreadsheet was constructed to record the responses of each participant as forms and questionnaires were returned.

Upon their agreement to participate, hiring managers were mailed a packet consisting of a letter (Appendix C) explaining the purpose of the study and instructions regarding ranking of the fictitious resumes (Appendix B) and two copies of the IRB consent form (Appendix H). The participants also received 16 fictitious resumes and a form (Appendix D) to list the resumes in order by preference. The 16 fictitious resumes were lettered A through P, but in random order of qualifications, using a simple computer randomizing number generator (Urbaniak & Plous, 1997). On the second page of the ranking form were three open-ended questions regarding participants' preferences for contents of entry-level BMET resumes, whether or not certification should be incorporated into 2-year college curricula, and a space for general comments. Included in the packet were a background questionnaire for each participant to complete (Appendix E), a stamped return envelope, and an appreciation gift of a newly designed BMET patch. The researcher also attended a scheduled meeting of the North Texas Biomedical Association and recruited 2 hiring manager participants at that meeting. Participants receiving a mailed packet returned the ranking form, a signed copy of the IRB consent form, and background questionnaire in the stamped envelope provided. Meeting participants received the same packet except for a different IRB form signed by the researcher, as shown in Appendix H.

After 3 weeks, participants who had not returned their forms and questionnaires were contacted by letter (Appendix G), phone, or email, reminding them and answering any questions. As forms and questionnaires were returned, responses were logged into a spreadsheet. After 4 weeks, another follow-up phone call or email was made. After 6 weeks, a final attempt was made by telephone to contact those who had not yet

returned the packet. At 8 weeks, the usable returned forms and questionnaires were used for analysis. A total of 48 usable sorting forms and questionnaires were returned, for a response rate of 73.8% of hiring managers initially agreeing to participate and 55.8% of the total number identified in Texas for this study. Data in the spreadsheet from the sorting form and background questionnaire were then imported into specific statistical analysis software and analyzed.

Treatment of the Data

For research hypothesis H_01 , "There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or military training, based on working experience as a BMET," resumes with these qualifications at three levels of experience, none, less than 2 years, and 2 years to less than 4 years of experience were compared by number and frequency followed by a chi-square test for independence. This test indicated whether different levels of work experience affected preferences of the associate degree over military training.

For research hypothesis H_02 , "There is no significance difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or 2-year associate degree with candidacy for CBET certification, based on working experience as a BMET," resumes with these qualifications at three levels of experience were compared by number and frequency followed by a chi-square test for independence. This test indicated whether different

levels of work experience affected preferences of associate degree with candidacy for CBET certification over the associate degree.

For research hypothesis H_03 , “There is no significant difference in hiring managers’ rank order preference of Texas entry-level BMET resumes with qualifications of military training or military training with candidacy for CBET certification, based on working experience as a BMET,” resumes with these qualifications at three levels of experience were compared by number and frequency followed by a chi-square test for independence. This test indicated whether different levels of work experience affected preferences of military training with candidacy for CBET certification over military training.

For research hypothesis H_04 , “There are no significant correlations in hiring managers’ educational background, occupational certification status, military training background, or type of employer and their preference for applicant qualifications of associate degree, military training as a BMET, or certification,” a correlation matrix of respondent characteristics and preferences for qualifications was used. To run the correlations, hiring managers’ rankings were coded for each pair of resumes compared as follows: -1 for lower, 0 for equal, and 1 for higher. For the associate degree versus military training, if the manager ranked the associate degreed candidate higher, it was coded as a 1, and if the associate degreed candidate was ranked lower it was coded as -1. If both were ranked equally, it was coded as 0. This was repeated for each comparison and at each level of experience. The appropriate correlation coefficient for ranked data is Spearman’s correlation, sometimes referred to as Spearman’s rho (Howell, 2002; Siegel, 1956).

To quantify the degree of consistency among managers' rankings of resumes, an inter-rater reliability index was computed. In this situation, where more than two raters are asked to rank items, Kendall's coefficient of concordance is most appropriate (Howell, 2002; Huck, 2000).

Participant responses to the open-ended questions on the second page of the sorting form were analyzed for common themes as well as unique statements for each question. These responses are reported in chapter 4.

Summary

The study examined hiring managers' preferences of the most common qualifications and combinations of qualifications for BMETs in Texas. The study used fictitious resumes as a tool for hiring managers to rank prospective employee preferences in order of suitability for employment. The possible influence of work experience on hiring preferences was also examined along with the possible influence of the hiring manager's background. Chapter 4 provides the findings of the study.

CHAPTER 4

FINDINGS

Introduction

The purpose of this study was to determine the signaling strength, or marketing power, of the most common qualifications of entry-level biomedical equipment technicians (BMETs) in Texas based on hiring preferences of managers using order ranking of fictitious resumes. The study also sought to determine whether certification status, education background, military background, or type of employer of the hiring manager correlates with hiring preference for applicant qualifications of associate degree, military training as a BMET, or certification.

Participant Demographics

A total of 86 BMET hiring managers in Texas were identified for this study, with 65 managers initially agreeing to participate. A total of 48 managers participated in the study, for a response rate of 73.8% of those initially agreeing to participate and 55.8% of the total number identified in Texas. The majority of the respondents identified themselves as managers (33.3%), followed by director (29.2%), supervisor (14.6%), president or vice president (10.4%), other (4.2%), recruiter (2.1%), senior BMET (2.1%), team leader (2.1%), and missing (2.1%). All indicated responsibility for hiring entry-level BMETs when contacted about the study. Mean length of time in the biomedical equipment technology field among participants was 23.83 years, with a median of 24.00 years and a range of 1 to 44 years. Participants managed a mean of 15.90 BMETs, with

a median of 10.00 and a range of 0 to 100 BMETs. Participants' level of education, certification status, military training, and employer type are summarized in Table 1.

Table 1

Hiring Manager Education, Certification, Military Training, and Employer Type by Frequency and Percentage

Category	Frequency (n=48)	Percentage
Level of education		
High School	6	12.5%
Associate degree	19	39.6%
Bachelor degree	13	27.1%
Graduate degree	10	20.8%
CBET certification		
Yes	23	47.9%
No	25	52.1%
Military trained as a BMET		
Yes	17	35.4%
No	31	64.6%
Employer type		
Hospital	24	50.0%
ISO	21	43.8%
Recruiter	1	2.1%
Govt. agency (VA)	2	4.2%

Rankings

Participants in the study were asked to rank 16 resumes representing entry-level BMETs in order of suitability, with 1 being most suitable and 16 being least suitable, for employment with participants' firms. Table 2 summarizes the rankings of the 16 fictitious resumes by the hiring managers. The number of times that each resume was ranked in first place is listed first, followed by percentage. Resume N, representing a BMET with military BMET training, candidacy for CBET certification, and 2 to 4 years of experience as a BMET was chosen first 12 times, or by 25% of participants. Resume E,

representing a BMET with an associate degree, CBET certification, and 2 to 4 years of experience as a BMET, followed closely, chosen 11 times, or by almost 23% of participants. Resume F, representing a BMET with a high school diploma and no work experience as a BMET was not ranked in first place by any respondent and was ranked last (16th) by 35 participants. Mean and median rankings of each resume are also listed, along with minimum and maximum rankings.

Table 2

Frequency Table of Number of Times Each Resume Ranked in First Place (n), Mean and Median Rankings, and Minimum and Maximum Rankings

Resume	n	%	Mean	Median	Min.	Max.
A	1	2.08	11.21	12.00	1	16
B	0	0.00	7.75	8.00	2	12
C	1	2.08	11.19	12.00	1	16
D	1	2.08	7.42	7.00	1	15
E	11	22.92	4.10	3.00	1	12
F	0	0.00	15.04	16.00	3	16
G	4	8.33	4.98	4.50	1	12
H	1	2.08	9.56	10.50	1	15
I	4	8.33	6.79	7.00	1	14
J	1	2.08	12.52	14.00	1	16
K	3	6.25	6.50	6.50	1	13
L	0	0.00	13.71	14.50	2	16
M	2	4.17	8.77	9.50	1	15
N	12	25.00	4.69	3.00	1	13
O	5	10.42	6.94	6.50	1	14
P	2	4.17	4.90	4.50	1	10
Total	48	100.00				

Inter-rater Reliability

In order to determine agreement between participants in their rankings of the resumes, Kendall's coefficient of concordance (W) was calculated. Kendall's coefficient of concordance is used when more than two judges are asked to rank the items being

evaluated and is a number between 0 and 1 (Howell, 2002). If judges are in complete agreement, the coefficient will equal +1.00. The more they disagree, the smaller the number (Huck, 2000). If the number of judges (k) is equal to or greater than 7, then statistical significance can be tested by using the chi-square distribution at $N-1$ degrees of freedom (Siegel, 1956). Kendall's coefficient of concordance for this study was calculated to be .51, which indicated a moderate level of agreement among participants and statistically significant, as presented in Table 3.

Table 3
Kendall's Coefficient of Concordance (n=48)

Coef (W)	Chi-sq.	df	p
.51	364.93	15	$p < .001$

Study Data and Analysis of Hypotheses

In the first analysis, participants' rankings of two resumes, one with an associate degree and no BMET work experience (Resume C) and one with military training and no BMET work experience (Resume A), were compared. In order to compare the rankings, if a participant ranked Resume C higher than Resume A, it was coded as 1; if it was ranked lower than resume A, it was coded -1. If both resumes were ranked equally, a code of 0 was used. As shown in Table 4, when BMET work experience is held constant at none, hiring managers had a slight preference for resume A, or the military-trained BMET.

Table 4

Comparison of 2-year Associate Degree and Military Training with No Previous BMET Work Experience (Resumes C vs. A)

Associate degree rank, compared to military training	<i>n</i>	%
Higher	21	43.75
Equal to	0	0.00
Lower	27	56.25
Total	48	100.00

The same qualifications, only with less than 2 years BMET work experience, were examined by comparing Resume I and Resume B. As shown in Table 5, with the level of BMET work experience held constant at less than 2 years, hiring managers preferred the associate degree resume over the military-training resume.

Table 5

Comparison of 2-year Associate Degree and Military Training with Less Than 2 Years BMET Work Experience (Resumes I vs. B)

Associate degree rank, compared to military training	<i>n</i>	%
Higher	30	62.50
Equal to	0	0.00
Lower	18	37.50
Total	48	100.00

When BMET work experience is held constant at 2 to less than 4 years, slightly more than half ($n=48$; 56.25%) preferred the military-trained BMET resume as shown in

Table 6.

Table 6

Comparison of 2-year Associate Degree and Military Training With 2 to Less Than 4 Years BMET Work Experience (Resumes K vs. O)

Associate degree rank, compared to military training	<i>n</i>	%
Higher	21	43.75
Equal to	0	0.00
Lower	27	56.25
Total	48	100.00

To determine significance of levels of BMET work experience in rankings for the qualification of associate degree versus military training as a BMET, a 2 X 3 chi-square test for independence was conducted using results from Tables 4, 5, and 6. This test was to indicate whether differences in work experience influenced preferences for qualifications of associate degree or military training. As shown in Table 7, a statistically nonsignificant result was found at the .05 level ($p=.105$) because the chi-square value was below the critical value of 5.99.

Table 7

Cross Classification of Preference for the Associate Degree and Work Experience Level

Preference for the Associate degree (n=48)	Work experience			χ^2	<i>df</i>	<i>p</i>
	No exp.	Less than 2 years	2 to 4 years			
Higher or equal to	21	30	21			
Lower	27	18	27	4.50	2	0.105

Note. $p=.105$, $p<.05$.

H₀1: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or military training, based on working experience as a BMET.

This study failed to reject the first null hypothesis that there is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or military training, based on working experience as a BMET. Although there was a shift in preference from military training to associate degree to military training as BMET work experience progressed, work experience itself was not a statistically significant influence on hiring manager preference for either qualification, and no clear preference for either qualification was established.

In the second analysis, participants' rankings of resumes with qualifications of associate degree with CBET candidacy and no BMET work experience (Resume M) versus only an associate degree and no BMET work experience (Resume C) were compared. The rankings were coded the same as they were in the first analysis in that if Resume M was ranked higher than C by a participant, it was coded as 1 and -1 if that participant ranked M lower than C. With BMET working experience held constant at none, hiring managers preferred the associate degree with CBET candidacy resume as presented in Table 8.

Table 8

Comparison of 2-year Associate Degree and 2-year Associate Degree with Candidacy for CBET Certification with No Previous BMET Work Experience (Resumes C vs. M)

Associate degree with CBET candidacy rank, compared to associate degree	<i>n</i>	%
Higher	37	77.08
Equal to	0	0.00
Lower	11	22.92
Total	48	100.00

Rankings for the same qualifications but at less than 2 years of BMET work experience were examined by comparing Resume G (with CBET candidacy) to Resume I (without CBET candidacy). Table 9 shows that with experience level held constant at less than 2 years, hiring managers indicated a preference for the resume with an associate degree and candidacy for CBET certification (n=48, 66.67%).

Table 9

Comparison of 2-year Associate Degree and 2-year Associate Degree with Candidacy for CBET Certification with Less Than 2 Years BMET Work Experience (Resumes I vs. G)

Associate degree with CBET candidacy rank, compared to associate degree	<i>n</i>	%
Higher	32	66.67
Equal to	0	0.00
Lower	16	33.33
Total	48	100.00

At 2 to less than 4 years of BMET experience, hiring managers again preferred the resume with an associate degree and CBET certification (Resume E) over the resume with an associate degree (Resume K), as shown in Table 10.

Table 10

Comparison of 2-year Associate Degree and 2-year Associate Degree with CBET Certification with 2 to Less Than 4 Years BMET Work Experience (Resumes K vs. E)

Associate degree with CBET certification rank, compared to associate degree	<i>n</i>	%
Higher	34	70.83
Equal to	0	0.00
Lower	14	29.17
Total	48	100.00

To determine the significance of the levels of BMET work experience in the rankings for the qualification of associate degree with CBET candidacy/certification versus an associate degree, a 2 X 3 chi-square test for independence was conducted using the results in Tables 8, 9, and 10. This test was to indicate whether differences in work experience influenced preferences for CBET certification. As shown in Table 11, a statistically nonsignificant result was found at the .05 level ($p=.52$) because the chi-square value was below the critical value of 5.99.

Table 11

Cross Classification of Preference for the Associate Degree with Candidacy for CBET Certification and Work Experience Level

Preference for the Associate degree with CBET candidacy (or cert.) (n=48)	Work experience			χ^2	df	p
	No exp.	Less than 2 years	2 to 4 years			
Higher or equal to	37	32	34			
Lower	11	16	14	1.30	2	0.52

Note. $p=.52$, $p<.05$.

H₀2: There is no significance difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or 2-year associate degree with candidacy for CBET certification, based on working experience as a BMET.

This study failed to reject the second null hypothesis that there is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or 2-year associate degree with candidacy for CBET certification, based on work experience as a BMET. Hiring managers in this study indicated a preference for CBET certification or candidacy at all three levels of experience, but experience itself was not a statistically significant influence on their rankings.

In the third analysis, participants' rankings of resumes with qualifications of military training with candidacy for CBET certification and no BMET work experience (Resume D) versus military training and no BMET work experience (Resume A) were compared. The rankings were coded as before: If Resume D was ranked higher than Resume A by a participant, it was coded as 1, and -1 if the participant ranked D lower than Resume A. With BMET working experience held constant at none, hiring managers

strongly preferred (n=48, 89.58%) the resume with military training and CBET candidacy over military training alone as shown in Table 12.

Table 12

Comparison of Military Training and Military Training with Candidacy for CBET Certification with No Previous BMET Work Experience (Resumes A vs. D)

Military training with CBET candidacy rank, compared to military training	<i>n</i>	%
Higher	43	89.58
Equal to	0	0.00
Lower	5	10.42
Total	48	100.00

Rankings of resumes with the qualifications of military training with CBET candidacy and less than 2 years BMET work experience (Resume P) versus military training with less than 2 years BMET work experience (Resume B) were compared. With BMET work experience level held constant at less than 2 years, hiring managers once again indicated a preference for the resume with the CBET certification candidacy, as shown in Table 13.

Table 13

Comparison of Military Training and Military Training with Candidacy for CBET Certification with Less Than 2 Years BMET Work Experience (Resumes B vs. P)

Military training with CBET candidacy rank, compared to military training	<i>n</i>	%
Higher	38	79.17
Equal to	0	0.00
Lower	10	20.83
Total	48	100.00

At work experience levels of 2 to less than four years, participants again ranked the resume with military training and CBET candidacy (Resume N) higher than just military training alone as presented in Table 14.

Table 14

Comparison of Military Training and Military Training with Candidacy for CBET Certification with 2 to Less Than 4 Years BMET Work Experience (Resumes O vs. N)

Military training with CBET candidacy rank, compared to military training	<i>n</i>	%
Higher	38	79.17
Equal to	0	0.00
Lower	10	20.83
Total	48	100.00

To determine statistical significance of levels of BMET work experience in the rankings for the qualification of military training with CBET candidacy versus military training, a 2 X 3 chi-square test for independence was conducted using the results in Tables 12, 13, and 14. This test was to indicate whether differences in work experience influenced preferences for CBET certification. As shown in Table 15, a statistically nonsignificant result was found at the .05 level ($p=.30$) because the chi-square value was below the critical value of 5.99.

Table 15

Cross Classification of Preference for Military Training With Candidacy for CBET Certification and Work Experience Level

Preference for the military training with CBET candidacy (n=48)	Work experience			χ^2	df	p
	No exp.	Less than 2 years	2 to 4 years			
Higher or equal to	43	38	38			
Lower	5	10	10	2.42	2	0.30

Note. $p=.30$, $p<.05$.

H₀₃: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of military training or military training with candidacy for CBET certification, based on working experience as a BMET.

This study also failed to reject the third null hypothesis that there is no statistically significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of military training or military training with candidacy for CBET certification, based on work experience as a BMET. Hiring managers indicated a clear preference for the CBET candidacy qualification among military-trained candidates at all three experience levels, but BMET work experience itself was not a statistically significant influence on their rankings.

H₀₄: There are no significant correlations in hiring managers' educational background, occupational certification status, military training background, or type of employer and their preference for applicant qualifications of associate degree, military training as a biomedical equipment technician, or certification.

Several statistically significant correlations were found between hiring managers' backgrounds and their preference for applicants' qualifications; therefore, this study rejected the last null hypothesis. A correlation matrix is shown in Table 16, with Tables 17 and 18 being extensions of this correlation matrix. Tables 17 and 18 were listed

separately for easier reading. According to Huck (2000), a correlation matrix is an efficient way to present results of a correlational study in which there are three or more variables and a correlational coefficient is computed for each possible pair of variables (p. 263).

Direction and magnitude of significant correlations were assessed using Cohen's scale and are presented below. According to Cohen (1988), a correlation less than .20 indicates a slight relationship; .20 to .40 indicates a low correlation or small relationship; .40 to .70 indicates a moderate correlation or substantial relationship; .70 to .90 indicates a high correlation or marked relationship; and greater than .90 indicates a very high correlation or very dependable relationship.

For the resume ranking of associate versus military training with no experience, three correlations were statistically significant. The first statistically significant correlation was between the ranking of associate versus military training with no experience and level of education ($r = -.33, p < .05$). This indicates a small negative relationship between level of education and preference for the associate degree resume over the military training resume at the zero experience level. Education was coded as 1 = High School, 2 = Associate Degree, 3 = Bachelor Degree, 4 = Graduate Degree. As education level increased, preference for the associate degree decreased and vice versa.

Table 16

Correlation Matrix of Hiring Manager Backgrounds and Ranking of Associate Degree versus Military Training

	1	2	3	4	5	6	7
1. Education	1.00						
2. Military Trained	.28	1.00					
3. CBET Cert./Cand.	.09	-.11	1.00				
4. Type of Employer	.02	.15	-.06	1.00			
5. Assoc. vs. Mil. (no experience)	-.33*	-.39**	-.03	-.32*	1.00		
6. Assoc. vs. Mil. (<2 years exp.)	-.11	-.24	.07	.05	-.34*	1.00	
7. Assoc. vs. Mil. (2 to 4 years exp.)	-.25	-.48**	.05	-.09	.41**	.16	1.00

Note. * $p < .05$, ** $p < .01$.

The second statistically significant correlation was between the associate versus military ranking at the zero experience level and the respondent's background of military training as a BMET ($r = -.39, p < .01$). This indicates a small negative relationship between military training as a BMET and preference for the associate degree over a candidate with military training as a BMET. When military training as a BMET was present in the respondent's background, preference for the associate degree resume decreased. The final statistically significant correlation for the associate degree versus military training with no experience ranking was with the type of employer ($r = -.32, p < .05$). This indicates a small negative relationship between type of employer and preference for the associate degree over military training as a BMET. Types of

employers were coded as 1=Hospital, 2=ISO, 3=Recruiter, 4=Govt. Agency. As type of employer increased, preference for the associate degree resume decreased.

For the resume ranking of associate degree versus military training as a BMET at less than 2 years of experience, a small, negative, statistically significant relationship was found between this and the ranking of associate degree versus military ranking with no experience ($r = -.34, p < .05$). This correlation was not included in the research hypothesis.

For the resume ranking of associate degree versus military training as a BMET at 2 to 4 years of experience, two statistically significant correlations were found. The first statistically significant correlation was with the respondents' background of military training as a BMET ($r = -.48, p < .01$). This indicates a substantial negative relationship between the respondent's background as a military-trained BMET and preference for the associate degree resume over the resume with military training as a BMET. The second statistically significant correlation was between the associate degree versus military training at 2 to 4 years of experience ranking, and the ranking of associate degree versus military training with no experience ($r = .41, p < .01$). This moderate, statistically significant correlation indicates a substantial relationship between the respondents' ranking of associate degree versus military training at 2 to 4 years of experience and their ranking of associate degree versus military experience at no experience. This correlation was not included in the research hypothesis.

Table 17

Correlations of Hiring Manager Backgrounds and Ranking of Associate Degree With CBET_Certification/Candidacy versus Associate Degree

	Education	Military	CBET	Employer Type
Assoc. Degree with CBET Candidacy vs. Assoc. Degree (No experience)	.12	.09	.10	.15
Assoc. Degree with CBET Candidacy vs. Assoc. Degree (<2 yrs experience)	.20	-.03	-.06	.10
Assoc. Degree with CBET Certification vs. Assoc. Degree (2 to 4 yrs experience)	-.09	.00	-.04	-.01

Note. * $p < .05$, ** $p < .01$.

Table 17 is a continuation of the correlation matrix in Table 16. As shown in Table 17, no statistically significant correlations were found between hiring managers' backgrounds and their rankings of resumes with associate degree with CBET candidacy versus associate degree at all three levels of experience.

As presented in Table 18, two statistically significant correlations were found in the military training with CBET candidacy versus military training resume rankings. The first statistically significant correlation was between rankings of the military training with CBET candidacy resume versus military training only, at less than 2 years of experience, and presence of military training in the respondent's background ($r = .38$, $p < .01$). This indicates a small positive relationship between presence of military training as a BMET in respondents' background and their preference for the military trained

BMET with CBET candidacy over military training alone, at less than 2 years of experience. The second statistically significant correlation was between rankings of the military training with CBET candidacy resume versus military training only, at 2 to 4 years of experience, and presence of certification in the respondent's background ($r = -.30, p < .05$). This indicates a small negative relationship between presence of CBET certification in hiring managers' backgrounds and their ranking of military training with CBET candidacy resume over the military training resume. When CBET certification was present in the background of the hiring manager, ranking of military training with CBET candidacy decreased.

Table 18

Correlations of Hiring Manager Backgrounds and Ranking of Military Training With CBET Candidacy versus Military Training

	Education	Military	CBET	Employer Type
Military Training with CBET Candidacy vs. Military Training (No experience)	-.25	.25	.10	-.12
Military Training with CBET Candidacy vs. Military Training (<2 yrs experience)	.15	.38**	-.16	.20
Military Training with CBET Candidacy vs. Military Training (2 to 4 yrs experience)	-.02	-.11	-.30*	.24

Note. * $p < .05$, ** $p < .01$.

Additional Findings

Three open-ended questions were listed on the second page of the Sorting Form (Appendix D). These questions were posed to participants in order to clarify results of the rankings. The first question asked respondents, "What do you look for in an entry-level BMET's resume?" Responses to this question were hand-tabulated and analyzed for both common and unique answers. All 48 respondents answered this question. Some listed general key words and phrases while others wrote a full narrative describing specific items they seek in each section of a resume. Of 48 respondents, 35 of them mentioned "education"; 32 mentioned "work experience as a BMET"; 17 mentioned "military training as a BMET"; 14 mentioned "certification"; 9 mentioned "communication skills"; and 8 mentioned "willingness to learn." These answers were somewhat consistent with the preference for combinations of qualifications indicated by the resume rankings. Other answers included common sense, attitude, self-confidence, grade point average, customer service skills, proper spelling and grammar, people skills, ambition, integrity, job longevity, and problem-solving abilities. Some respondents had specific comments about certain types of qualifications:

Certification means about the same as one year in the field when evaluating candidates.

ISO experience is preferred over experience with a manufacturer;

Education should be hands-on.

Experience should be with different types of equipment.

Military training and duty usually corresponds to increased maturity and better decision making in stressful situations.

The second open-ended question asked, "Should community and technical college biomedical equipment technology programs incorporate CBET certification into

their curricula? Why or why not?" Of 48 respondents, 25 replied "yes," 20 said "no," and 3 indicated "maybe." Comments included the following:

Yes, wouldn't hurt. Could validate the curriculum but wouldn't validate the technician.

Yes, to professionalize the career field.

No, shows only initiative. Courses intended to assist the BMET in passing the test would lessen the impact of certification.

No, concentrate on hands-on material.

The third and final open-ended question simply asked for comments.

Approximately one-half (23) of the respondents left the comment block empty. Others left messages thanking the researcher for the patch and well-wishes for completing the study. Comments specifically regarding the study included the following:

Although resumes are important, it is important that they interview well in person. Internship should be mandatory.

Military experience includes leadership and maintenance management experience. With the civilian trained techs, it is a much higher risk on the character of the tech.

Can they fix things?

Summary

This chapter reported study findings concerning participant background, rankings of the resumes and analysis of hypotheses 1 through 4. Inter-rater reliability was tested through use of Kendall's coefficient of concordance. This study failed to reject Hypotheses 1, 2, and 3 but did reject Hypothesis 4. Additional findings from open-ended questions included in the study are also presented. Chapter 5 includes a discussion of these findings, conclusions, and recommendations for further research.

CHAPTER 5

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Students, educators, and career changers need current, up-to-date information on preferences of credentials in fast-growing high-technology occupations such as biomedical equipment technology (Wonacott, 2000). These preferences of credentials can serve as signals to future entry-level technicians as to which qualifications managers value most (Bartlett, 2002). Bartlett (2004) found differences in managerial perceptions of qualifications between two technical career fields and suggested that further research was needed to determine what drives these perceptions. This study sought to add to the body of research on how education, training, work experience, and certification signal suitability for employment in high-technology career fields. This chapter includes a summary of the study, discussion of findings of the study, conclusions, and recommendations for further research.

Summary of the Study

The purpose of this study was to examine the signaling strength, or marketing power, of the most common qualifications of entry-level biomedical equipment technicians (BMETs) in Texas, based on stated hiring preferences of BMET managers, using order ranking of fictitious resumes representing candidates with these qualifications. This study also sought to determine whether certification status, education background, military training background as a BMET, or type of employer of

the hiring manager had an effect on hiring preference for applicant qualifications of associate degree, military training as a BMET, or CBET certification candidacy.

A total of 86 BMET hiring managers in Texas were identified and contacted for this study, with 65 managers initially agreeing to participate. Of these 65 managers, a total of 48 participated, for a response rate of 73.8% of those initially agreeing to participate and 55.8% of BMET hiring managers identified in Texas for this study.

In January 2006, 63 of the 65 managers were mailed a packet containing 16 fictitious resumes representing 16 combinations of common entry-level BMET qualifications (Appendix B). The other 2 identified managers were recruited at a meeting of the North Texas Biomedical Association. Participants were asked to rank these resumes in order of suitability for employment with their firm and record this ranking on the accompanying Sorting Form (Appendix D). The packet also contained a Background Questionnaire (Appendix E), IRB consent forms, a BMET patch, and a stamped return envelope. After 3 weeks, participants who had not returned their forms and questionnaires were contacted by letter, phone, or email and reminded to participate. Nonparticipating managers were contacted again at 4 weeks and again at 6 weeks. Although a fair number of identified Texas BMET hiring managers agreed to participate, a higher number might have been possible had the study been Web-based with resumes and background questionnaire made available on a Web page.

At the end of 8 weeks, data from 48 returned forms and questionnaires were entered into a spreadsheet, coded, and transferred to a statistical software program. The number of times each resume was ranked in first place was tabulated, and inter-rater reliability was calculated. Resumes with qualifications of associate degree versus

military training as a BMET were compared at three levels of experience. A chi-square test for independence was conducted for the comparisons to determine whether work experience played a role in preference. Resumes with qualifications of associate degree with candidacy for CBET certification versus an associate degree at three levels of experience were also compared and a chi-square test for independence conducted, as well as for resumes with military training with CBET candidacy versus military training. No statistically significant results were found for the chi-square tests, indicating that work experience did not significantly influence participant preferences for the compared qualifications.

Overall, BMET hiring managers ranked the resume with military training with CBET certification candidacy and 2 to less than 4 years BMET work experience (Resume N) in first place 12 times. They ranked the resume with an associate degree with CBET certification and 2 to less than 4 years BMET work experience (Resume E) in first place 11 times. These two resumes also had the highest overall mean rankings at 4.69 and 4.10, respectively.

Correlations in hiring managers' educational background, certification status, military training background as a BMET, type of employer, and their preference for applicant qualifications of associate degree, military training as a BMET, and certification candidacy were examined. Statistically significant correlations were found between participants' preference for associate degree or military training and level of education, military training background, and type of employer. Statistically significant correlations were also found between participants' preference of military training with

CBET candidacy over military training alone and military training as a BMET background as well as certification background.

Participants' answers to the three open-ended questions on the Sorting Form were analyzed for both common and unique answers. Participants were almost evenly divided (25 – yes; 20 – no; 3 – maybe) but slightly in favor of incorporating CBET certification into community and technical college biomedical equipment technology program curricula.

Discussion of Findings

Aksoy (1998) suggested that education and experience are interchangeable in the hiring process for entry-level applicants. However, the rankings in this study did not support Aksoy's findings. Resume N and Resume E each had combinations of qualifications, including an associate degree or military training, certification or candidacy for certification, and work experience. These resumes had the highest mean rankings and were ranked in first place more times than any other resume. Resume J, with 2 to less than 4 years of work experience as a BMET, and no other qualification, was ranked in first place by only 1 hiring manager and had a mean ranking of 12.52. Resume L, with less than 2 years of work experience as a BMET and no other qualification, was not ranked in first place by any hiring manager and had a mean ranking of 13.71. This would indicate that work experience, while important, was not the most important factor to this group of hiring managers.

This study also failed to support Athey and Hautaluoma's (2001) findings that employers preferred more educated applicants to less educated applicants. Indeed, this

study seemed to more closely support Highland's (1993) findings that employers consistently select applicants with specific training for the type of job presented. One weakness of the present study is that it did not seek to discover the types of applicant backgrounds with which the hiring managers had experience. This, as well as the hiring managers' own background bias explored in Research Hypothesis 4, might have affected the rankings.

This study yielded statistically nonsignificant results for three of the four research hypotheses. The first three hypotheses compared pairs of qualifications, associate degree versus military training, associate degree with candidacy for CBET certification versus associate degree, and military training with candidacy for CBET certification versus military training, at three levels of experience. The fourth hypothesis explored hiring managers' backgrounds and preferences for significant correlations. The findings of each hypothesis are discussed in order.

H₀1: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or military training, based on working experience as a BMET.

Although only 17 of 48 hiring managers indicated a military training background on the background questionnaire, the military-trained BMET without certification resume was ranked higher than the associate degree without certification resume at both the no experience level and the 2 to less than 4 years experience level. This preference indicated a strong respect for the military BMET training program. Although the associate degree level was preferred at the less than 2 years experience level, work experience was not a significant influence, and the study failed to reject the null hypothesis.

The results of this study fail to support Laurence's (1994) findings that military veterans rated lower than nonveterans for high-technology positions. Several reasons might account for the difference found in the present study. First, the military biomedical equipment training program was one of the first of its kind in the country and still trains more BMETs per year than all public colleges combined. Second, public sentiment toward the military veteran could have changed in the past 12 years, especially in light of recent events in Iraq and Afghanistan. However, the strong reputation the military BMET training program has maintained over the years for training knowledgeable BMETs is most likely the reason this study did not support Laurence's findings.

Carter (2000) and Harkins (2002) both suggested that associate degrees might be losing ground as the credential of choice in some highly technical industries. The findings from this study seem to indicate that the associate degreed entry-level BMET has competition with the entry-level military-trained BMET in Texas but is certainly not losing any ground as a credential of choice in the field of biomedical equipment technology. This study suggests that both are well respected among BMET hiring managers in Texas.

H₀2: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of 2-year associate degree or 2-year associate degree with candidacy for CBET certification, based on working experience as a BMET.

Participants in this study were almost evenly split between certified BMETs (23) and noncertified BMETS (25). This split is not surprising due to some deeply divided opinions in the industry regarding certification. A growing number of employers are recognizing CBET certification by paying for their employers to take the test and giving pay increases upon successful completion of the certification. However, some

managers have stated on the questionnaire that certification does not ensure a technician is competent and refuse to recognize it.

Fourteen participants in this study indicated (in the first open-ended question) that they look for certification when evaluating entry-level BMETs. This indicates that CBET certification is still a sought after credential in the biomedical equipment technology field. Indeed, Mehrsa (1999) found that certified BMETs perceived themselves to be more committed to their careers, and he also suggested that BMETs with higher career commitment have more skill development competencies. BMET hiring managers in Texas, in this study, seem to agree with Mehrsa's findings, with a moderate majority preferring the associate degree with CBET candidacy or certification at all three levels of experience. However, because of all other qualifications involved in this study, and limited sample size, a generalization to all BMET hiring managers in Texas cannot be made. As before, work experience was not a significant influence, and the study failed to reject the null hypothesis. Managers did however seem to prefer a combination of qualifications.

H₀3: There is no significant difference in hiring managers' rank order preference of Texas entry-level BMET resumes with qualifications of military training or military training with candidacy for CBET certification, based on working experience as a BMET.

When resumes containing military training with CBET candidacy and military training only are compared, hiring managers in this study show a clear preference for military training with CBET candidacy at all three experience levels. Work experience again was not a statistically significant influence on rankings, and the study failed to reject the null hypothesis. However, these findings, along with the comparison of rankings between the associate degree with CBET candidacy and associate degree in Research Hypothesis 2, support Bartlett's (2004) suggestion that employers seek the

knowledge and skill that both types of credentials signal and as noted earlier, employers in this study have a preference for multiple qualifications.

It should be noted that Bartlett's (2004) study compared resumes with certification only against resumes with an associate degree at three levels of experience. The requirements for CBET candidacy made such a comparison at three levels of experience impossible in this study. However, as indicated earlier, Resume H, representing a candidate with CBET candidacy and 2 to less than 4 years of experience, was ranked first by only 1 hiring manager and had a mean ranking of 9.56. This is above the mean ranking of the associate degree with no experience resume (C) at 11.19, but below the associate degree with less than 2 years experience resume (I) at 6.79 and the associate degree with 2 to less than 4 years experience resume (K) at 6.25. Similar results are obtained comparing the certification resume (H) against the military resumes: The military training as a BMET with no experience resume (A) had a mean ranking of 11.21; the military training as a BMET with less than 2 years experience resume (B) a mean ranking of 7.75; and the military training as a BMET with 2 to less than 4 years of experience resume (O), a mean ranking of 6.94. This indicates that managers prefer some evidence of knowledge or skills in the absence of an associate degree or military training but certification by itself does not mean as much as it does when combined with an associate degree or military training. This finding matches the statements found in the open ended questions regarding certification validating the curriculum but not the technician. CBET certification, at least according to this study, doesn't seem to be as recognized or valued as much in the biomedical

equipment technology field as the Automotive Service Excellence (ASE) certification is in the automotive industry or the A+ certification in the Information Technology industry.

H₀4: There are no significant correlations in hiring managers' educational background, occupational certification status, military training background, or type of employer, and their preference for applicant qualifications of associate degree, military training as a BMET, or certification.

The study rejected this hypothesis because several statistically significant correlations were found. Gregory (2004) suggested that military BMETs believe that the training they received in the military is better than most college-based programs. The statistically significant correlations between a hiring manager's background as a military-trained BMET and his or her preference for military-trained BMET candidates over associate degreed candidates at the no experience level and the 2 year to less than 4 year experience level support this. Several answers to the open end questions also support this. However, Huck (2000) warned that correlation does not imply causation, and in this study, other variables, as well as limited sample size, may have had an influence on this preference. Nevertheless, this correlation suggests that the rankings may have been influenced by a hiring manager's military training background.

Hiring manager education and preference for associate degree over military training were also found to be negatively correlated, at a statistically significant level, at the no experience level. As the education level of the hiring manager increased, preference for the associate degree decreased and vice versa. As mentioned earlier, if this study had also explored hiring managers' past experiences with candidates of each background, perhaps the relationship could have been explained with better acuity.

A small negative relationship was also found between type of employer of the hiring manager and preference for the associate degree over military training as a

BMET. The majority of participants of this study were employed by a hospital (n=24) followed by ISOs (n=21). This ratio is similar to the findings in Lozano-Nieto's (2004) study. The results suggest a slight preference for military-trained BMETs by ISO hiring managers in Texas. The relationship is small, and because of limited sample size and inclusion of recruiters and government agencies as categories of employers in this study, results cannot be generalized to all Texas BMET hiring managers. A national study limiting participants to hiring managers in hospitals and ISOs might be more revealing. However, one factor that might influence this preference of military BMETs by ISOs is the national advertising and recruiting of military BMETs by large ISOs.

A small but statistically significant correlation was also found between military training as a BMET and preference for candidates with military training and CBET candidacy, at less than 2 years experience. Cody et al. (2004) found that military-trained physician assistants outperformed their civilian counterparts on a national certification exam. This correlation, while small, warrants future research and comparison with other certifications in other career fields having both a military and civilian training program. It should be noted that many public BMET colleges have no selection procedures in place to screen candidates wishing to enter a BMET training program. The military program however, is highly selective and competitive possibly affecting the initial quality of candidates gaining entrance to the program.

Conclusions

This study adds to others' findings (Gater, 2005; Lozano-Nieto, 2004) that the biomedical equipment technology field has many different preferences among hiring

managers of entry-level technicians. Although limited in scope, this study should open lines of communication among BMET hiring managers in Texas, training providers, and students of biomedical equipment technology. Although not everyone agrees with the merits of certification for BMETs (Forrest, 2003), findings from this study indicate a respect for its attainment. These findings also seem to validate CBET certification, as indicated by the rankings, as a viable and marketable commodity, serving as a signal to potential employers that the bearer has more career commitment. However, findings also suggest that the CBET certification alone is not as marketable as when combined with an associate degree or military training as a BMET. The findings from this study also indicate the accuracy of Boesel and Fredland's (1999) assertion that short-term technical occupational training, such as that provided by the military, seems to be beneficial.

Because the rankings in this study indicate that both the associate degree and military training are well regarded, perhaps collaboration between military training providers and community and technical colleges, as well as BMET employers, is in order. This could capitalize on the best practices of each provider and produce an even stronger entry-level candidate. This might also lead to more opportunities for partnerships in other career fields. Community and technical colleges might also incorporate more of the content of the certification exam, though not necessarily the test itself, into their curricula and encourage students to pursue certification after graduation.

This study, while useful in examining the signaling power of credentials in the biomedical equipment technology field, had its weaknesses. The use of paper-based resumes and forms, using the United States Postal Service, probably limited response

rate because the package seemed bulky and time consuming at first glance. Similar studies in the future should probably be conducted using a Web-based methodology to shorten response time, reduce postage, and increase response rate so that results could be more generalized to BMET hiring managers in Texas. Also, future studies might also ensure that the background questionnaire determines hiring managers' experiences with candidates of each qualification.

The open-ended section of the study, especially the "comments" question, was too broad and perhaps left too much room for interpretation. Some chose not to respond to it at all. However, the first question about what hiring managers look for in an entry-level BMET's resume proved useful because several common themes appeared. These comments should provide topics of discussion for advisory committees of biomedical equipment technology programs and other technically oriented occupational programs.

Recommendations for Future Research

1. Repeat this study but on a national scale using BMET hiring managers from ISOs and hospitals across the United States. Future studies should also probably be Web-based so as to increase response rate and facilitate sorting of resumes and obtain a representative sample.
2. Similar research should be conducted with other career fields, especially 2-year career fields with a military training counterpart and a national certification to add to the field of knowledge about signaling power of credentials.
3. Future studies might also use a regression approach to predict hiring managers' preferences for candidate qualifications.

4. A study investigating the effect other certifications, such as A+ certification and other qualifications such as internship or other nonrelated military service have on hiring manager preferences for BMETs, would also be useful in comparison to this and previous studies.
5. A qualitative follow-up to this study could be done using the in-person interview approach with hiring managers, as used by Bartlett (2004).

APPENDIX A
FORMAL CREDENTIAL/QUALIFICATION CELL MATRIX FOR ENTRY-LEVEL
BIOMEDICAL EQUIPMENT TECHNICIANS

1 <i>Formal Qualifications:</i> None <i>Experience:</i> None	2 <i>Formal Qualifications:</i> None <i>Experience:</i> Less than 2 years	3 <i>Formal Qualifications:</i> None <i>Experience:</i> 2 to less than 4 years	4 <i>Formal Qualifications:</i> Associate Degree in BET <i>Experience:</i> None
5 <i>Formal Qualifications:</i> Associate Degree in BET <i>Experience:</i> Less than 2 years	6 <i>Formal Qualifications:</i> Associate Degree in BET <i>Experience:</i> 2 to less than 4 years	7 <i>Formal Qualifications:</i> Candidate for CBET Cert. <i>Experience:</i> 2 to less than 4 years	8 <i>Formal Qualifications:</i> Associate Degree in BET and Candidate for CBET Cert. <i>Experience:</i> None
9 <i>Formal Qualifications:</i> Associate Degree in BET and Candidate for CBET Cert. <i>Experience:</i> Less than 2 years	10 <i>Formal Qualifications:</i> Associate Degree in BET and CBET Cert. <i>Experience:</i> 2 to less than 4 years	11 <i>Formal Qualifications:</i> Military BMET Training <i>Experience:</i> None (i.e. Reservist)	12 <i>Formal Qualifications:</i> Military BMET Training <i>Experience:</i> Less than 2 years
13 <i>Formal Qualifications:</i> Military BMET Training <i>Experience:</i> 2 to less than 4 years	14 <i>Formal Qualifications:</i> Military BMET Training and Candidate For CBET Cert. <i>Experience:</i> None (i.e. Reservist)	15 <i>Formal Qualifications:</i> Military BMET Training and Candidate for CBET <i>Experience:</i> Less than 2 years	16 <i>Formal Qualifications:</i> Military BMET Training and Candidate for CBET <i>Experience:</i> 2 to less than 4 years

Figure 1. Credential/qualification cell matrix for entry-level BMETs.

APPENDIX B

SIXTEEN FICTITIOUS RESUMES OF ENTRY-LEVEL BIOMEDICAL
EQUIPMENT TECHNICIANS (RANDOMIZED ASSIGNMENT OF LETTERS)

BMET Resume F

OBJECTIVE:

An entry-level position as a Biomedical Equipment Technician

EDUCATION:

Robert E. Lee High School, Midland, TX (2003)

- High School Diploma
- 2 years of Electronics classes

EXPERIENCE:

Midland Memorial Hospital, Midland, TX (10/2003 – present)

Environmental Services Specialist

- Strip, wax, and buff floors in hospital
- Clean and sanitize all areas of hospital

BMET Resume J

OBJECTIVE:

Seeking a challenging position as a Biomedical Equipment Technician with a dynamic organization

EDUCATION:

Connally High School, Waco, TX (2002)

- High School Diploma
- Classes in Computer Networking

EXPERIENCE:

Advanced Biomedical Equipment Service, Abilene, TX (03/2003 – present)

- Responsible for providing maintenance and repair services at 2 small hospitals in Abilene, TX
- Repair, maintain, and calibrate medical equipment in all areas of the hospital
- Train hospital staff in proper usage and safety of medical equipment

BMET Resume L

OBJECTIVE:

A challenging position as a Biomedical Equipment Technician

EDUCATION:

West Columbia High School, West Columbia, TX (2004)

- High School Diploma
- Volunteer experience for 1 summer at Brazosport Memorial Hospital

EXPERIENCE:

Brazosport Memorial Hospital, Lake Jackson, TX (04/2005 – present)

Biomedical Equipment Technician

- Perform scheduled preventive maintenance on medical equipment in Central Supply and on patient floors
- Perform electrical safety checks and performance verification on medical equipment in all areas of the hospital
- Assist senior biomedical equipment technicians with repairs

BMET Resume C

OBJECTIVE:

A position as a Biomedical Equipment Technician

EDUCATION:

Texas State Technical College, Waco, TX (2006)

- Associate of Applied Science Degree in Biomedical Equipment Technology
- Dean's List for 3 semesters

EXPERIENCE:

Barnes and Noble Bookstore, Waco, TX (01/2004 to 01/2006)

- Assisted customers in locating and ordering books
- Operated cash register
- Restocked books and magazines

BMET Resume I

OBJECTIVE:

Biomedical Equipment Technician

EDUCATION:

Texas State Technical College, Harlingen, TX (2004)

- Associate of Applied Science in Biomedical Equipment Technology

EXPERIENCE:

St. Anthony Baptist Medical Center, San Antonio, TX (11/2004 – present)

Biomedical Equipment Technician

- Responsible for maintaining and repairing medical equipment in Labor/Delivery, Emergency Room, and Physical Therapy
- Order repair parts and maintain parts inventory
- Assist senior level technicians with dialysis and respiratory equipment repairs

BMET Resume H

OBJECTIVE:

A position as a Biomedical Equipment Technician

EDUCATION:

Cooper High School, Abilene, TX (2002)

- High School Diploma
- Medical Terminology and Pharmaceutical Courses

CERTIFICATION:

ICC CBET Candidate

- CBET Exam Passed (11/2005)
- Will receive full certification with 4 years of full-time BMET work experience

EXPERIENCE:

Rice Medical Equipment Services, Tyler, TX (06/2003 – present)

Biomedical Equipment Technician

- Install, service, and repair medical equipment in 3 dialysis centers and 4 surgical centers in East Texas
- Perform electrical safety inservices to staff

BMET Resume K

OBJECTIVE:

A challenging and rewarding position as a Biomedical Equipment Technician with opportunity for advancement

EDUCATION:

St. Philips College, San Antonio, TX (2003)

- Associate of Applied Science Degree – Biomedical Equipment Technology

EXPERIENCE:

Parkland Hospital, Dallas, TX (05/2003 – present)

Biomedical Equipment Technician

- Perform repair and maintenance on medical electronics equipment in all areas of the hospital
- Perform incoming inspections on new medical equipment
- Helped install new medical telemetry wing in hospital

BMET Resume M

OBJECTIVE:

Seeking a position as an entry-level Biomedical Equipment Technician

EDUCATION:

Texas State Technical College, Waco, TX (2005)

- Associate of Applied Science Degree – Biomedical Equipment Technology

CERTIFICATION:

ICC CBET Candidate

- Passed CBET Examination (11/2005)
- Will receive full certification with 2 years of full-time BMET work experience

EXPERIENCE:

United Parcel Service, Waco, TX (01/2003 – present)

- Unload incoming trucks and load outgoing trucks
- Inventory trucks using scanning device
- Upload scanner information into centralized computer system

BMET Resume G

OBJECTIVE:

A challenging position as a Biomedical Equipment Technician

EDUCATION:

Texas State Technical College, Waco, TX (2005)

- Associate of Applied Science Degree in Biomedical Equipment Technology

CERTIFICATION:

ICC CBET Candidate (11/2005)

- Passed CBET Certification Examination
- Will receive full certification with 2 years of full-time BMET work experience

EXPERIENCE:

Methodist Medical Center, Dallas, TX (11/2005 – present)

Biomedical Equipment Technician

- Perform electrical safety checks and performance verifications on medical equipment in ICU, CCU, OR, and Recovery
- Assist senior level BMETs in calibrations and repair

BMET Resume A

OBJECTIVE:

An opportunity as a Biomedical Equipment Technician in a dynamic organization

EDUCATION:

Monterrey High School, Lubbock, TX (2004)

- High School Diploma

TRAINING:

United States Air Force Reserve (01/2005 – present)

- Completed DoD Biomedical Equipment Maintenance Technician Training School (41 weeks) – Sheppard Air Force Base, TX (11/2005)

EXPERIENCE:

Home Depot, Lubbock, TX (11/2005 – present)

- Assist customers in locating correct paint for their applications
- Mix paint to customer specifications
- Restock paint and supplies

BMET Resume E

OBJECTIVE:

A dynamic Biomedical Equipment Technician position

EDUCATION:

St. Phillips College, San Antonio, TX (2003)

- Associate of Applied Science Degree in Biomedical Equipment Technology

CERTIFICATION:

ICC Certified CBET 11/2005

EXPERIENCE:

Capital Biomedical Services, Austin, TX (09/2003 – present)

- Responsible for the preventive and corrective maintenance of medical equipment in 4 hospitals
- Trained in Respiratory, Dialysis, and Ultrasound equipment
- Perform new equipment inservices

BMET Resume B

OBJECTIVE:

Position as a Biomedical Equipment Technician

EDUCATION:

Greenwood High School, Greenwood, TX (2002)

- High School Diploma

TRAINING:

United States Air Force Reserve (01/2003 – present)

- Completed DoD Biomedical Equipment Maintenance Technician Training School (41 weeks) – Sheppard Air Force Base, TX (11/2004)

EXPERIENCE:

St. Luke Episcopal Medical Center, Houston, TX (04/2005 – present)

Biomedical Equipment Technician

- Verified the performance and electrical safety of medical equipment in all areas of hospital
- Assist senior BMETs with repairs in Ultrasound
- CPR Certified

BMET Resume O

OBJECTIVE:

A Biomedical Equipment Technician position with opportunity for advancement

EDUCATION:

Early High School, Early, TX (2000)

- High School Diploma

TRAINING:

United States Air Force Reserve (11/2001 – present)

- Completed DoD Biomedical Equipment Maintenance Technician Training School (41 weeks) – Sheppard Air Force Base, Wichita Falls, TX (10/2002)

EXPERIENCE:

MasterPlan, Inc., Lufkin, TX (01/2003 – present)

Biomedical Equipment Technician

- Responsible for the maintenance, calibration, repair, and management of medical equipment at Memorial Medical Center in Lufkin, TX
- Performed staff training on new medical equipment

BMET Resume P

OBJECTIVE:

A position using my knowledge, and skills as a Biomedical Equipment Technician.

EDUCATION:

Waxahachie High School, Waxahachie, TX (2003)

- High School Diploma

CERTIFICATION:

ICC CBET Candidate, (11/2004)

- Passed CBET certification examination (11/2004)
- Will receive full CBET certification with 4 years of full-time BMET work experience

TRAINING:

United States Air Force Reserve (12/2003 – present)

- Completed DoD Biomedical Equipment Maintenance Technician School (41 weeks) – Sheppard Air Force Base, Wichita Falls, TX (11/2004)

EXPERIENCE:

Good Sheppard Medical Center, Longview, TX (11/2004 – present)

Biomedical Equipment Technician

- PM, repair, and calibrate medical equipment
- Inservice hospital staff

BMET Resume D

OBJECTIVE:

A Biomedical Equipment Technician position

EDUCATION:

Red Oak High School, Red Oak, TX (2004)

- High School Diploma
- Perfect Attendance Record

CERTIFICATION:

Candidate for ICC CBET Certification

- Passed CBET Certification Examination (11/2005)
- Will receive full certification upon 4 years of full-time BMET work experience

TRAINING:

United States Air Force Reserve (12/2004 – present)

- Completed DoD Biomedical Equipment Maintenance Technician Training School (41 weeks)- Sheppard Air Force Base, Wichita Falls, TX (11/2005)

EXPERIENCE:

Tyme Manufacturing Co, Waco, TX (11/2005 – present)

- Assembly line worker
- Solder electronics components to printed circuit boards.

BMET Resume N

OBJECTIVE:

A position as a Biomedical Equipment Technician

EDUCATION:

West High School, West, TX (2001)

- High School Diploma

CERTIFICATION:

ICC CBET Candidate

- Passed CBET Examination in 11/2003
- Will receive full certification with 4 years full-time BMET work experience.

TRAINING:

United States Air Force Reserve (05/2002)

- Completed DoD Biomedical Equipment Maintenance Technician Training School (41 weeks) – Sheppard Air Force Base, Wichita Falls, TX. (05/2003)

EXPERIENCE:

Texas Childrens Hospital, Houston, TX (05/2003 – present)

Biomedical Equipment Technician

- Repair, maintain, and calibrate medical equipment in hospital
- Update department service manuals

APPENDIX C

LETTER EXPLAINING THE STUDY AND INSTRUCTIONS

UNIVERSITY OF NORTH★TEXAS™

January 2006

Dear BMET Hiring Manager:

I am a doctoral student in the Department of Technology and Cognition at the University of North Texas, and a former biomedical equipment technician. I am conducting a study on the hiring preferences of employers of entry-level biomedical equipment technicians in Texas.

Your participation in this study is greatly appreciated and could make a difference in how entry-level biomedical equipment technicians are educated and/or trained in the future.

Your participation in this study is strictly *voluntary* and *confidential*. All of your information will remain confidential and will not be divulged in this study or in any future study. Generated data will be aggregated and not used individually.

In this study, BMET hiring managers, like yourself, will rank 16 fictitious resumes in the order of their suitability of employment as an **entry-level biomedical equipment technician** with your firm. After ranking the resumes, you will have the opportunity to answer a couple of questions and add your own comments. You will also complete a background questionnaire. Results of this study are expected to be used for feasibility studies on implementing certain certification modules and/or military training techniques into competency-based two-year college curricula.

Please follow the enclosed *Instructions* in completing the Background Questionnaire and sorting the resumes. The entire study, including completing the background questionnaire, and performing the sorting exercise should take **no longer than 30 minutes** of your time.

In appreciation for your time and effort in participating in this study, I have enclosed a new *complimentary BMET patch* for your use.

Please address any questions to me at: xxx-xxx-xxxx or at: xxxxxx@xxxx.net. You may also contact Dr. Jerry Wircenski, Applied Technology, Training and Performance Improvement Program, at 940-565-2714.

THANK YOU FOR YOUR TIME AND PARTICIPATION!

Sincerely,

Roger A. Bowles
XXXXXXXXXX.
XXXXXXXXXX

INSTRUCTIONS

Thank you for agreeing to participate in this voluntary study of hiring preferences of employers of entry-level biomedical equipment technicians in Texas. Please complete each step of the following instructions.

1. Remove the **Instructions**, the **Resumes**, the **Sorting Form** (2 pages), the **Background Questionnaire** (1 page), and the **Consent Forms** from the packet. Read and Sign one of the **Consent Forms**.
2. **Complete the Background Questionnaire.** Be sure and include your name and contact information. Your name and contact information will NOT be released in the study and will remain totally CONFIDENTIAL. The purpose of obtaining contact information is for follow up purposes only, if necessary.
3. Next, you will go through a sorting process of 16 resumes of applicants. Consider that you advertised an **entry-level biomedical technician position** with your organization last week. The 16 resumes are the resumes you received for your job announcement. In this case, we will only be considering resumes, not cover letters.

Lay out the **Resumes** in front of you. You will notice that each resume has a rectangular box in the upper left corner. You may use this box to help you sort these resumes from **most suitable (number 1)** to **least suitable (number 16)** for a position in your organization. **Rank the resumes, using the boxes in the corners of each resume from 1 (most suitable to 16 (least suitable).**

4. Using the resumes that you have now numbered, fill in the **Sorting Form** by listing the resumes in the order of suitability (1 being most suitable).

You may call me at xxx-xxx-xxxx at any time or email me at xxxxxxxx@xxxx.net if you have additional questions.

5. Answer the questions on page 2 of the **Sorting Form**.
6. Place the **Sorting Form**, the **Background Questionnaire**, and a signed copy of the **Consent Form** in the pre-addressed stamped envelope, seal, and mail. You may discard the resumes.

Thank you for your participation!

APPENDIX D
SORTING FORM FOR BMET RESUMES

SORTING FORM

Please list the resumes (Resume A – P in the packet) in the order of suitability for employment at YOUR firm, with that resume listed at **number 1 being most suitable**, and the resume at **number 16 being least suitable**.

For example:

1. Resume O
2. Resume A
3. Resume C

1. _____ (**most** suitable for employment at your firm)
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____ (**least** suitable for employment at your firm)

Please turn the page and answer the questions on the back.

What do you look for in an entry-level BMET's resume?

Should community and technical college biomedical equipment technology programs incorporate CBET certification into their curricula? Why or Why not?

Comments:

Thank you for participating in this study!

APPENDIX E

BACKGROUND QUESTIONNAIRE FOR BMET HIRING MANAGERS

BACKGROUND QUESTIONNAIRE FOR BMET HIRING MANAGERS

Name: _____ (Name, title, and employer are confidential information and will **NOT** be revealed in the study).

Title: _____

Name of Employer: _____

Type of Employer: _____ (Independent Service Organization, Hospital, etc.)

Email address: _____

Daytime telephone number: _____ Alternate Number _____

Length of time in current position: _____ years _____ months

Length of time in the BMET field: _____ years _____ months

How many BMETs do you manage? _____

How many BMETs does your company employ? _____

Your highest level of education: Check one:

- _____ High school diploma
- _____ 2-year degree
- _____ 4-year degree
- _____ Graduate degree

Military training as a BMET - Yes or No (circle one)

CBET certification - Yes or No (circle one)

How many months (0-48) of job experience is your company's **minimum** requirement for entry-level biomedical equipment technicians?

_____ months

How many months (0-48) of job experience does your company **prefer** for entry-level biomedical equipment technicians?

_____ months

APPENDIX F
FOLLOW-UP LETTER TO PARTICIPANTS

UNIVERSITY OF NORTH★TEXAS™

February 1, 2006

Dear BMET Hiring Manager:

If you have already completed the Sorting Form and Background Questionnaire that I sent in January, I truly appreciate your support and I hope you find the BMET patch, a small token of my appreciation, useful and unique!

If you have not yet had a chance to complete the information and return it to me, I hope you will be able to do so very soon. As you know, our field is very small so your participation is absolutely critical to this study and will potentially influence the nature of entry-level biomedical equipment technician education and training.

The time to complete the resume ranking and background questionnaire is approximately 30 minutes. Your responses will remain completely confidential.

Please complete the information and return the Sorting Form and Background Questionnaire to me in the self-addressed stamped envelope. If you have questions about the study or what is required, please don't hesitate to call or email me at: (xxx) xxx-xxxx or: xxxxxx@xxxx.net

Thank you for your time and support.

Roger A. Bowles
XXXXXXXXXXXX
XXXXXXXXXXXX

APPENDIX G
INSTITUTIONAL REVIEW BOARD CONSENT FORMS

UNIVERSITY OF NORTH TEXAS

Institutional Review Board Research Consent Form (Mailed)

Title of Study: HIRING PREFERENCES OF EMPLOYERS OF ENTRY-LEVEL BIOMEDICAL EQUIPMENT TECHNICIANS IN TEXAS

Principal Investigator: Roger A. Bowles

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Purpose of the Study

The purpose of this study is to examine the hiring preferences of employers of entry-level biomedical equipment technicians in Texas with regards to qualifications such as an associate degree, military training, CBET certification, and/or work experience. For the purposes of this study, hiring managers of BMETs in Independent Service Organizations (ISOs) and Hospitals, will order rank 16 fictitious resumes based upon their suitability for employment with the participant's firm.

Benefits of the Study

The results of this study will be used to enhance BMET education programs in Texas, nationally, and perhaps facilitate collaboration between industry and BMET education programs in producing BMET courses, certification modules and/or incorporating military training techniques into present competency-based two-year college curricula. The results of this study will also help add to the understanding of the value of credentials in technical fields.

Description of Procedure and Confidentiality

This sorting form and background questionnaire should take no longer than 30 minutes of your time to complete. Your participation in this study is completely voluntary and confidential. All of your information will remain confidential and will not be divulged in this study or in any future study. Generated data will be aggregated and not used individually. Individual forms will only be read by the researcher conducting this study and will be shredded immediately upon compilation of the data.

Description of Foreseeable Risks

There are no foreseen risks or discomforts related to this study.

over, please

Research Subject’s Rights

I have read or have had read to me all of the above. The researcher has explained the study to me and answered all of my questions. I have been told the risks and/or discomforts as well as the possible benefits of the study. I understand what the study is about, how the study is conducted, and why it is being performed.

I understand that I do not have to take part in this study and my refusal to participate or my decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop my participation at any time.

In case I have questions about the study, I have been told I can contact the Principal Investigator, Roger A. Bowles, or Dr. Jerry Wircenski, Applied Technology, Training and Performance Improvement Program at: 940-565-2093.

I understand my rights as a research subject and I voluntarily consent to participate in this study. I have received a copy of this consent form in the packet that I may keep.

By signing this form, I am not waiving any legal rights.

Signature of Subject

Date

This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at: 940-565-3940 or sbournes@unt.edu with any questions regarding the rights of research subjects.

UNIVERSITY OF NORTH TEXAS

Institutional Review Board Research Consent Form (Meeting)

Title of Study: HIRING PREFERENCES OF EMPLOYERS OF ENTRY-LEVEL BIOMEDICAL EQUIPMENT TECHNICIANS IN TEXAS

Principal Investigator: Roger A. Bowles

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Purpose of the Study

The purpose of this study is to examine the hiring preferences of employers of entry-level biomedical equipment technicians in Texas with regards to qualifications such as an associate degree, military training, CBET certification, and/or work experience. For the purposes of this study, hiring managers of BMETs in Independent Service Organizations (ISOs) and Hospitals, will order rank 16 fictitious resumes based upon their suitability for employment with the participant's firm.

Benefits of the Study

The results of this study will be used to enhance BMET education programs in Texas, nationally, and perhaps facilitate collaboration between industry and BMET education programs in producing BMET courses, certification modules and/or incorporating military training techniques into present competency-based two-year college curricula. The results of this study will also help add to the understanding of the value of credentials in technical fields.

Description of Procedure and Confidentiality

This sorting form and background questionnaire should take no longer than 30 minutes of your time to complete. Your participation in this study is completely voluntary and confidential. All of your information will remain confidential and will not be divulged in this study or in any future study. Generated data will be aggregated and not used individually. Individual forms will only be read by the researcher conducting this study and will be shredded immediately upon compilation of the data.

Description of Foreseeable Risks

There are no foreseen risks or discomforts related to this study.

over, please

Research Subject's Rights

I have read or have had read to me all of the above. The researcher has explained the study to me and answered all of my questions. I have been told the risks and/or discomforts as well as the possible benefits of the study. I understand what the study is about, how the study is conducted, and why it is being performed.

I understand that I do not have to take part in this study and my refusal to participate or my decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop my participation at any time.

In case I have questions about the study, I have been told I can contact the Principal Investigator, Roger A. Bowles, or Dr. Jerry Wircenski, Applied Technology, Training and Performance Improvement Program at: 940-565-2093.

I understand my rights as a research subject and I voluntarily consent to participate in this study. I have received a copy of this consent form in the packet that I may keep.

By signing this form, I am not waiving any legal rights.

Signature of Subject

Date

Principle Investigator:

I certify that I have reviewed the contents of the form with the subject signing above. I have explained the known benefits and risks of the research. It is my opinion that the participant understood the explanation.

Roger A. Bowles

This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at: 940-565-3940 or sbournes@unt.edu with any questions regarding the rights of research subjects.

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