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MANUFACTURING MISSISSIPPI'S WORKFORCE: AN ASSESSMENT OF EMPLOYABILITY SKILLS AS PERCEIVED BY FACULTY AND SENIOR STUDENTS OF FOUR YEAR MANUFACTURING RELATED DEGREE PROGRAMS

by

Mamie Yvette Griffin

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

May 2012

ABSTRACT

MANUFACTURING MISSISSIPPI'S WORKFORCE: AN ASSESSMENT OF EMPLOYABILITY SKILLS AS PERCEIVED BY FACULTY AND SENIOR STUDENTS OF FOUR YEAR MANUFACTURING RELATED DEGREE PROGRAMS

by Mamie Yvette. Griffin

May 2012

A worldwide concern exists that undergraduate programs are not producing graduates with the kind of lifelong learning and professional skills needed for workplace success. Numerous research studies indicate new employees lack needed employability skills such as teamwork, decision-making, and communication.

Similarly, recent national and state findings suggest that graduates of Mississippi's manufacturing-related degree programs may not be fully prepared to meet the needs of manufacturers in the state. Hence, this research proposes to determine the degree to which Mississippi's four-year manufacturing-related degree programs address employability.

To answer this question, the present study utilizes descriptive non-experimental research to assess the perception of senior students and faculty in four key areas: 1) the level of importance attached to employability skills; 2) the integration of employability skills in the classroom; 3) students' possession of identified employability skills; and 4) strategies used by faculty to integrate employability skills into academic courses.

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A Dissertation
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ACKNOWLEDGMENTS

Developing a dissertation is an arduous journey that requires patience, determination, and commitment as well as the support of others. I would like to thank my Committee Chair, Dr. Heather Annulis, for fueling my optimism while keeping me grounded in reality. I would also like to thank my other committee members, Dr. Cyndi Gaudet, Dr. Brian Richard, and Dr. Patti Phillips for their advice and support throughout this process. Appreciation must also be expressed for the faculty, staff, and students of the Human Capital Development doctoral program. I was unsure when I began this journey, but soon learned that I could not have chosen a better program of study.

I would also like to acknowledge my Advanced Technologies family at Alcorn State University. Special thanks go to Dr. Steve Adzanu and Ms. Denease Moore for their assistance when program studies called me away from work. I must also thank Dr. Napoleon Moses, who first urged me to pursue a doctoral degree, and Dr. David Addae for his encouragement. Last, but in no way least, I would like to thank my parents, Earl and Eva Griffin, who perhaps have not always understood me but supported me anyway. In addition, for anyone and everyone who ever inspired me, perhaps knowingly or unknowingly, I say thank you.

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CHAPTER I

INTRODUCTION

Background of the Study

Uni Courses Off Mark, Say Employers (Cole, 2000)

Why Aren't Colleges and Universities Preparing the Workforce of Tomorrow? (Fenster, 2005)

Manufacturers' Dilemma: Finding Workers with High-Tech Skill Sets (Mississippi Business Journal, 2007)

US Manufacturers Bracing For Skills Shortages (Financial Times, 2010)

These media headlines indicate an alarming trend. University graduates are entering the labor market ill-prepared (Bridgestock, 2007). Over a decade ago, De la Harpe (2000) identified a worldwide concern that undergraduate programs do not produce graduates with the kind of lifelong learning and professional skills needed for workplace success. Numerous research studies continue to highlight a skills gap between the demands of employers and the level of workforce preparedness of university graduates. Despite current high unemployment rates, employers continually report an inability to find qualified workers (Weitmen, 2010). Fenster (2005) paradoxically asks, "How can we have too few jobs for our workers and yet have too few workers for our jobs?" (p. 100). This gap directly impacts the stability of human capital development within the U.S.

Human capital development as explained by Becker (1993) links economic success to the education of the workforce. Maintaining or increasing the level of economic productivity requires a workforce with higher skills. Higher skills in turn create greater income potential at the individual level, which ultimately impacts state and

national economies. However, education remains the critical factor. Human capital development highlights a strong correlation between education, proper skill development, and economic prosperity. Understandably, governments around the world recognize the challenge of maximizing human capital. Failure to meet this challenge jeopardizes one's competitiveness in the global economy (Bennett, 2006).

President Barack Obama alluded to this challenge in his 2011 State of the Union address stating, "at stake is whether new jobs and industries take root in this country, or somewhere else" (Obama, 2011). President Obama highlights several factors. Competition is no longer limited to one's neighbors but to the world. The advent of technology and the Internet changes the nature of business. Countries such as China and India capitalize on these changes to compete in the global market, primarily by investing in research, technology, and human capital. President Obama challenges America to do the same by taking steps to "to out-innovate, out-educate, and out-build the rest of the world" and by "winning the race to educate our kids." He emphasizes that winning this race remains vital to maintaining leadership in research, technology, and innovation in order to produce jobs and ultimately "win the future" (Obama, 2011).

In addition, President Obama's comments address changes in the workplace. The prospect of finding a good lifelong job at the local factory without a degree no longer exists. Today's workplace requires highly skilled professionals prepared to meet the challenges of increased global competition. Bailey (1997) describes the current workplace as one in which jobs integrate through cross-functional teams, workers receive more responsibility, employees solve non-routine problems, organizations emphasize continuous improvement, and workers understand their jobs within broader

organizational purpose and context. Therefore, organizations need professionals responsive and flexible enough to navigate economical, social, cultural, technical and environmental change (Precision, 2007). Meeting the need requires more than technical skills. Research findings identify employability skills as a possible solution.

Employability skills denote essential competencies needed for worker success on the job (Carnevale, Gainer, & Meltzer, 1990). Overtoom (2000) further defines employability skills as "transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes required by the 21st century workplace" (p. 2). Examples of employability skills include communication, teamwork, problem solving, and work ethic. According to Evers, Rush and Berdow (1998) "the skills most in demand are least in supply" (p. 16). The researchers further explain their concept of supply and demand. Supply refers to skills such as writing, interpersonal, and positive attitudes, whereas demand deals with leadership and critical thinking (Evers, et al., 1998). Candy & Crebert (1991) report a complaint among employers includes "new employees tend to emerge from university with their heads full of theories, principles, and information but are often ill-equipped to deal with aspects of the workplace such as problem-solving, decision-making, working in a team, and learning for themselves" (p. 572).

Schmidt (1999) states organizations expect graduates entering the workforce to "solve complex, multidisciplinary problems, work successfully in teams, and exhibit effective oral and written communication skills, and practice good interpersonal skills" (p. 31). Similarly, Brown, Hesketh, and Williams (2003) state that a consistent cry exists

among employers that college graduates lack adequate preparation for the workforce. This cry reverberates across multiple industries including manufacturing.

In a 2003 study investigating workforce issues in manufacturing, the National Association of Manufacturing (NAM) and the Society of Manufacturing Engineers (SME) found more than 80% of manufacturers surveyed reported a "moderate to serious" shortage of qualified job applicants (NAM, 2003). The study highlights a mismatch between the competencies employers expect of employees and the competencies employees possess. As a follow-up study, The *Skills Gap Report* (2005) reveals an increasing need for an appropriately prepared workforce to help maintain United States' manufacturing companies' competitiveness in the global marketplace. Key issues cited include inadequate problem solving skills, poor communication skills, and a lack of strong supervisory and managerial skills within the workplace. Furthermore, 65% of respondents report competency deficiencies in engineers and scientists. Some 83% of respondents note that the skills gap affects the ability to meet customer demands and maintain or increase production levels (NAM, 2005).

In Mississippi, the situation mirrors national findings. A 2007 study conducted for the Mississippi Manufacturer's Association (MMA) concludes that the state's workforce remains inadequately prepared for the manufacturing industry and employers expect a skills shortage. Based on the perception of Mississippi manufacturers, the MMA study found that approximately 46% of employers express dissatisfaction with the workforce preparedness of college graduates, and 20% expect a shortage of workers holding bachelor's degrees or higher in the coming years. Specifically, the MMA study states that employees lack adequate preparation for the workforce in the areas of

teamwork, problem solving, verbal communication, customer service, supervision and management, and soft skills (MMA, 2007).

Statement of the Problem

Both national and local studies indicate graduates of Mississippi's manufacturing-related degree programs may not be adequately prepared to meet workforce demands. Employers believe that higher education does not adequately develop employability skills of graduates in general (Evers et al., 1998; Houghton & Proscio, 2001; Martin, Milne-Home, Barrett, Spalding, & Jones 2000; Robinson, 2006). A consistent mismatch exists between what employers expect of graduates and what graduates entering organizations are prepared to offer. The skills gap impacts productivity levels and the ability of organizations to meet customer demands (Cebesi, 2003). Consequently, previous studies call upon higher education to improve the employability skills of the workforce. This call presents an opportunity to determine the degree to which Mississippi's manufacturing-related degree programs focus on developing graduates' employability skills. An assessment of upcoming manufacturing graduates and their faculty will provide insight on the status of employability skills in Mississippi's related programs.

A review of the literature produces several concerns including the identification of employability skills important to manufacturing education in Mississippi. Furthermore, an opportunity exists to determine the level of effort and strategies implemented to integrate employability skills within the university classroom.

Purpose of Study

The purpose of this study includes assessing the status of employability skills in the undergraduate experience of students enrolled in manufacturing-related degree

programs in Mississippi public universities. This study seeks to assess the perception of senior students and teaching faculty regarding identified employability skills in the areas of importance, integration, and student possession. In addition, both faculty and students will identify existing strategies used to integrate employability skills into academic courses.

Significance of the Study

"It has to be recognized that the demand for graduates to use their subject knowledge in subsequent employment is minimal, but the opportunity to utilize their employability skills is tremendous" (Fallows & Steven, 2000, p. 82). A number of research studies establish the importance of employability skills (Bailey, 1997; Brown, et al., 2003: Burghardt, 2009; Candy and Crebert, 1991; Carnevale, et al., 1990; Evers, et al., 1998; Robinson, 2006). Often, the studies indicate the perception of employers and typically address the employability skills of high school students or community college graduates. In comparison, a limited number of studies center solely on the employability skills of U.S. university graduates. The studies usually focus on the perception of employers or graduates. However, studies often omit current students' perceptions of employability skills (Hindmarch, Warren, & Johnson, 2004) as well as the perception of teaching faculty. This information would be helpful to students, faculty, and potential employers. Few studies examine the employability skills of university students enrolled in manufacturing-related degree programs. Furthermore, an exhaustive review of the literature reveals no study to date within the state of Mississippi specifically capturing the perception of the students and faculty of manufacturing-related degree programs. A need exists to determine if Mississippi's related academic programs integrate the employability

skills expected of manufacturing degree program graduates. Six Mississippi public institutions of higher learning offer undergraduate degrees related to manufacturing.

In addition, a review of the literature reveals very little on teaching strategies utilized by manufacturing faculty to integrate employability skills within courses. This study attempts to answer the skills gap questions and contributes to the literature by focusing on the employability skills of manufacturing undergraduates as perceived by students and faculty.

Considering the large number of potential workers enrolled in universities, employers, college bound students, educators, policymakers, and parents could benefit from knowing how well Mississippi's manufacturing-related degree programs prepare students for the workforce. Universities want to produce skilled graduates highly regarded by employers and able to contribute to the country's prosperity and social capital (Precision, 2007). Faculty can increase awareness of teaching strategies to transfer employability skills to students. Lastly, this study provides a demographic view of Mississippi manufacturers' potential bachelor's degree holding workforce. This information can be used to positively impact the long-term viability of students to future employers and contribute to planning for Mississippi's economic growth and outlook in the manufacturing industry.

Manufacturing serves as a vital factor to Mississippi's financial outlook. Mississippi Manufacturer's Association describes manufacturing as the bedrock of the state's economy (MMA, 2011). In 1965, manufacturing surpassed agriculture as Mississippi's primary source of income and remains the principal economic activity in terms of value of production. By 1997, manufacturing accounted for almost a quarter of

a million jobs in Mississippi. As of 2008, approximately 15 percent of the state's employees worked in manufacturing. Primary manufacturing industries include apparel, lumber and wood products, food products, electrical equipment, rubber products, and automobiles (Economy Watch, 2011). In recent years, the most publicized manufacturing industries to locate in Mississippi include Nissan Motor Company and the Toyota Motor Company.

Industries traditionally move to Mississippi because of tax advantages, a large labor supply, weak and restricted unions, and nearness to raw materials (Photographic Book, 2010). However, economic challenges and the flattening of world markets potentially threaten Mississippi's manufacturing industry. The state faces competition for industries both domestically and abroad. Manufacturers must be efficient and profitable to succeed in the global competitive market (Tisdale, 2010). As the worldwide workplace continues to change, Mississippi's manufacturers require workers with advanced skills beyond traditional manufacturing. According to Sarah Welker (2010) of the Mississippi Economic Policy Center, educational systems must prepare to "equip the state's workforce with new skills, and adapt quickly to employer's labor force demands" (p. 1). Such factors further quantify the need for this study.

Limitations

This study analyzes the perceptions of students and faculty using a post-test only design instead of a longitudinal approach. The intent of this study is to measure students' perceptions during their senior year of studies without accounting for perceived changes or growth over the course of complete matriculation. The six institutions were chosen for their availability and representative traits, thus serving as a convenient sample.

Additionally, this study bases findings on the self-perception of respondents, which may or may not produce accurate data. People tend to reflect positively on personal knowledge, attitudes, and behavior when self-reporting (Cook & Campbell, 1979). Therefore, caution should be exercised in generalizing findings to manufacturing programs beyond the scope of this study.

Delimitations

Several factors delimit this study. This study focuses on manufacturing faculty and senior undergraduate students enrolled in manufacturing-related degree programs within six Mississippi universities. This study does not measure the perception of manufacturing employers regarding employability skills. Rather, the study relies on the results of previously published national and state studies including the Secretary's Commission on Achieving Necessary Skills Report (SCANS) (U.S. Department of Labor, 1991), NAM/SME Report (2005) and the MMA Report (2007). Lastly, this study analyzes the self-perceptions of senior students and professors of major courses within manufacturing-related degree programs. The study does not consider any analysis of the entire undergraduate curriculum. Therefore, caution should be exercised in generalizing findings for the general undergraduate curriculum.

Research Questions

The study addresses the following research questions:

1. What employability skills found as important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs?

2. What employability skills found as important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?
3. What employability skills found as important for industry do students possess as perceived by senior students and faculty of manufacturing-related degree programs?
4. What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing-related degree programs?

Theoretical and Conceptual Framework

A theoretical framework helps explain the relationships and connectedness of variables in a study (Cresswell, 2003). Marshall and Rossman (2006) highlight theoretical frameworks counter threats to external validity and illustrate how concepts and models guide data collection and analysis. The framework for this study centers on human capital theory, expectancy theory, and soft skills theory.

The conceptual framework explains the information under consideration in graphical form. This explanation includes key factors, variables, or constructs. The conceptual framework serves as a "current version of the researcher's vision of the territory being investigated" (Miles & Huberman, 1994, p. 20). Figure 1 contains the conceptual model developed from existing literature related to employability skills. The literature presents several factors justifying the need for this study. A number of research reports and studies indicate a lack of workforce preparedness among college graduates.

Research also indicates a skills shortage for the manufacturing sector nationally and within the state of Mississippi. These factors present an opportunity to examine the employability skills of university students within manufacturing disciplines in Mississippi's universities. A review of the literature further identifies key factors addressed within the study including the importance of employability skills, integration of employability skills, skills students possess, and strategies used to integrate employability skills within coursework. Measuring the perception of faculty and senior students, the study will result in several anticipated outcomes. Outcomes include the identification of employability skills recognized as important for manufacturing students, the level of skills integration by faculty, skills students currently possess, and strategies faculty use to address employability skills. The conceptual framework also highlights a theoretical framework. As illustrated, the conceptual framework drives the focus of the study, and the researcher anticipates that the study's outcomes will add to the theoretical framework and existing literature.

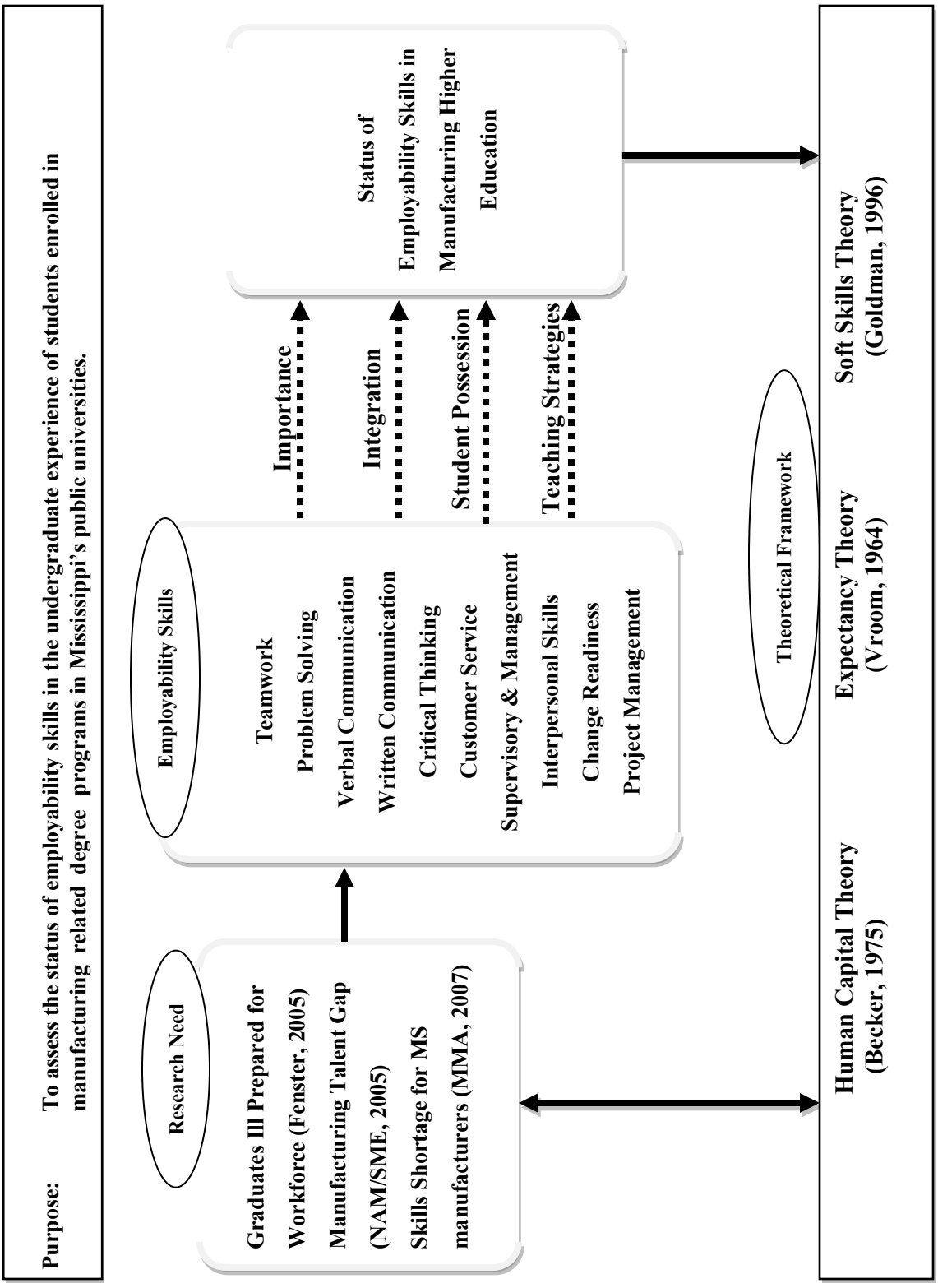

Figure 1. Conceptual Framework.

Definition of Terms

The following definitions provide context for this study:

1. Employability skills: Competencies considered essential for a worker to possess in order for him/her to be successful on the job (Carnevale, et al., 1990, p.255). This term also refers to "transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes required by the 21st century workplace… for career success at all levels of the workplace" (Overtoom, 2000, p. 1).
2. Manufacturing-related degree programs: Academic programs of study aimed at preparing graduates for jobs in the manufacturing sector. Such programs of study include Industrial Technology, Industrial Engineering, Manufacturing Engineering, Engineering Technology, Manufacturing Management, and Robotics and Automation.
3. Senior: Students who have completed the number of academic credits required for senior status as defined by the respective university. This term includes graduating and non-graduating seniors.
4. Manufacturing Faculty: Faculty members teaching at least one course in the major curriculum of a manufacturing-related degree program. This term refers to full-time and adjunct instructors.

Summary and Organization of the Study

Chapter I provides an introduction to the issue of employability skills among entry-level employees. In recent years, both researchers and industry representatives voiced complaints about the preparation of university graduates for the workforce.

Typical complaints indicate university graduates lack adequate preparation in skill sets such as problem solving, decision making, and working in a team, to name a few. A number of research studies examine employability in various academic subjects and settings. Therefore, complaints regarding employability skills demand attention. A review of the literature indicates an opportunity to further investigate employability skills in the area of manufacturing education within the state of Mississippi. This study capitalizes on this opportunity.

This study is organized into five chapters. Chapter I introduces the problem and addresses the theoretical framework for the study. Chapter II presents an overview of relevant literature. Chapter III outlines the research methodology. Chapter IV consists of analysis of findings related to the study, and Chapter V provides research results along with recommendations for future studies.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Research consistently identifies a mismatch between industry needs and workforce preparedness systems. Employers contend that university graduates lack employability skills. As Osterman, Kochan, Locke & Piore (2001) explain, "Employees need new and higher skills in order to cope with the changed environment" (p. 29). To develop human capital effectively, educational institutions must offer instruction that reflects employer needs (Shafer, 2005). This study examines the employability skills of university graduates within Mississippi's manufacturing degree programs. Specifically, the study assesses the integration of employability skills within major courses as perceived by senior students and faculty. However, it is important to first consider the changing workplace and the concept of employability skills as described in current literature.

This chapter reviews literature relevant to employability skills of university graduates. The information is divided into eight sections. Part one presents a historical view of manufacturing and the changing workplace. Part two highlights an overview of employability skills and the need for employability skills. Part three presents significant reports and studies related to employability. The fourth section examines the role of universities in developing the employability skills of graduates. Section five discusses strategies to address employability skills in the university classroom. The sixth section provides a theoretical framework for this study. Section seven presents previously completed research related to the employability skills of university students. Lastly,

section eight highlights the relationship between employability skills and manufacturing education.

The Historical Workplace

The American workplace has experienced significant shifts over the past hundred years. As a result of societal and economical changes, the workplace evolved from agricultural to industrial and to one that is now knowledge-based. These changes resulted in several implications for the American worker.

The move from an agricultural based society to manufacturing altered both the workplace and landscape. Citizens left farm life to pursue production positions in city factories. The workplace required physical labor, repetitiveness, and the ability to follow management's directions. Gee, Hull, and Lankshear (1996) describe the typical workplace as one that followed a command-and-control approach. Workers were "hired from the neck down to engage in tasks they did not necessarily understand or have control over" (p. 17). Furthermore, organizations utilized a hierarchical workplace structure in which middle managers passed information from top management to subordinates. This system appeared effective as the American economy prospered for many decades. Jobs were readily available and offered long-term employment. Furthermore, U.S. industries remained unchallenged by foreign competitors.

However, beginning in the early 1970s, foreign competition began to surface. Particularly Japan, once known for cheap low quality products, began to emerge as a potentially strong competitor. Other nations followed suit. Galagan (1994) observes that by the 1980s, it became apparent that production efficiency was no longer enough to maintain competitiveness. Order winners now included quality, convenience, timeliness

and price. U.S. companies faced intense competition at home and abroad. Therefore, by the 1990s organizations turned their attention toward restructuring, reengineering, and other innovation practices. Organizations were compelled to rethink management practices, the traditional hierarchal structure, and employee skill sets. As a result, the demand for low skilled jobs began to decrease. These changes appear increasingly evident in the modern workplace.

The Modern Workplace

Over the past few decades, the workplace has changed dramatically. Prior to the 1980s, the American Management Association defined management as working through other people to get things done (Montana & Charnov, 2008). This definition epitomizes Frederick Taylor's widely practiced approach to managing organizations. Supervisors expect workers to simply follow instructions and provide little or no input.

Organizations now maintain a different viewpoint as suggested in the current definition of management which is "working with and through people to achieve the goals of both the individual and the organization" (Montana & Charnov, 2008, p. 1). Various organizational changes reflect this view such as the use of groups and self-directed teams to accomplish organizational goals. These and similar processes deviate from the traditional workplace which place decision-making solely in the hands of higher management. Today's knowledge workers have far fewer individual repetitive tasks, much more autonomy, and far more need to work with and through people at every level of the organization (Overtoom, 2000; Smith, 2002).

Furthermore, factors such as globalization, technological innovations, and more mobile and better-informed workers, drive massive organizational changes (Burghardt,

2009). Timm (2005) maintains that the advent of technology and globalization creates the need for a new type of employee. Kilcoyne and Redmann (2006) agree that the appearance of technology, globalization, and flattening organizational hierarchy act as contributing factors. People no longer work in silos. Often, their very jobs depend upon working with and interacting with colleagues at all levels of the organization. These changes as summarized in Table 1 result in a need for flexible, interpersonal, and innovative employees. In short, organizations require employees with proficient employability skills at all levels.

Table 1 summarizes changes in organizational life. This chart highlights the idea that "modern workers must be able to function in teams, have multiple responsibilities, and play a significant role in how the organization functions and achieves its goals" (Burghardt, 2009, p. 35). Other aspects highlighted within the table include changes in workplace organization, job design, and employee responsibilities. Modern organizations exist in flatter and highly flexible formats. As a result, employers expect employers to possess multifunctional skill sets in order to perform multiple jobs. Workers should manage themselves and engage in decision-making. These features of the modern workplace contrast sharply with the old system.

Table 1

Changes in Organizational Life

ELEMENT	OLD SYSTEM	NEW SYSTEM
Organization	Hierarchical	Flat
	Function Specialized	Networks of multifunctional teams
	Rigid	Flexible
Job Design	Narrow	Broad
	Do One Job	Do many jobs
	Repetitive/standardized	Multiple responsibilities
Employee Skills	Specialized	Multi/cross skilled
Workforce Management	Command/control systems	Self-management
Communications	Top Down	Widely Diffused
	Need to know	Big Picture
Decision-making	Chain of command	Decentralized
Direction	Standard operating procedures	Procedures constantly changing
Worker autonomy	Low	High
Employee knowledge of organization	Narrow	Broad

Adapted from 21st Century Skills for 21st Century Jobs (1999)

Evers, Rush, and Berdow (1998) further explain this organizational shift:

> Society, now more than ever, needs college graduates who question the motives and ideas of politicians, government officials, business leaders, and professors. We need graduates who criticize in constructive ways and do not assume that we should do things in a certain way because that is the 'way it has always been done.' We need graduates who want to work in organizations that strive to connect past mistakes, not contribute to new ones. (p. 135-136)

Employers also recognize the impact of employability skills on the bottom line. Glenn (2008) identifies hiring individuals with soft skills as instrumental for high-performing organizations to retain a competitive edge. Likewise, Timm (2005) found that businesses seek employees with the proper skill set to maintain competitive edge. Towner (2005) asserts companies desperately seek individuals with the right mix of technical and soft skills because it can make a real difference to the bottom line of the business.

Impact of Modern Workplace on Manufacturing Graduates

The realities of the modern workplace affect all members of the workforce. For manufacturing workers, the traditional rigid structure of command and control contrasts sharply with contemporary standards of flexibility and responsiveness (Ichniowski, Kochan, Levine, Olson, & Strauss, 1996). The modern workplace requires employees that can make decisions, solve problems, and work in diverse environments. Such skills reach beyond traditional educational processes. Therefore, in addition to gaining the required technical skills, adequate attention must also be given to the development of employability skills.

Employability Skills

Employability skills refer to "transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes required by the 21st century workplace for career success at all levels of the workplace" (Overtoom, 2000, p. 1). Other terms sometimes used to describe employability skills include core, transferable, soft, non-technical, generic, and general.

Traditionally, employability skills receive far less attention than technical or hard skills. However, an increasing number of employers realize the value of employability skills (Hewitt, 2005). Atkins (1999) highlights the "steady stream of reports and papers urging the higher education sector to take key, core, transferable, and employability skills into the heart of students' learning experiences" (p. 1356). Many of these reports emphasize and explain the need for employability skills.

Significant Employability Skills Reports

As a result of changing trends, employability skills have increasingly gained attention, particularly since the early 1990s. The following section discusses four significant reports often cited in current literature.

Secretary's Commission on Achieving Necessary Skills Report

In 1991, the U.S. Department of Labor released the Secretary's Commission on Achieving Necessary Skills (SCANS) Report *What Work Requires of Schools* (US Department of Labor, 1991). The SCANS report examines key skills needed by employees for the workplace from the perception of both employers and employees in fifty different occupations. (Echternacht & Wen, 1997). SCANS commissioners collected data by interviewing U.S. employers, managers, and front line workers at various jobs.

Commissioners also reviewed research on related subject areas and visited two large corporations emphasizing skill development (Robinson, 2005).

The outcome of the SCANS report identifies three foundation skills and five workplace competencies. The three foundations skills include 1) basic skills including reading, writing, arithmetic, listening, and speaking; 2) thinking skills in regards to creativity, problem solving, learning, and reasoning; and 3) personal qualities of responsibility, self-esteem, self-management, social ability, and integrity.

Workplace competencies consist of resource management, information management, interpersonal skills, an understanding of systems, and technical competence. Resource management includes selecting, organizing, and allocating resources. Information management pertains to acquiring, using, and communicating information effectively. Interpersonal skills refer to the ability to work with, lead, serve, or teach others. Understanding systems addresses one's ability to recognize, analyze, and improve performance standards. Technical competence refers to the ability to identify and apply the proper technology for executing job tasks.

The SCANS Report serves as an important milestone for workplace skills development as it provided insight into skills needed by employees. However, researchers express concerns over the report's findings. Overtoom (2000) notes three misconceptions about SCANS as identified by Arnold Packer, former Executive Director of SCANS. These misconceptions include: 1) SCANS relates primarily to entry-level employment; 2) SCANS refers to only soft skills; and 3) SCANS conflicts with rigorous academic work. Competencies identified in the SCANS report require application throughout one's academic and workplace career. Competencies addressed in the

SCANS report include technology and systems understanding, thus going beyond soft skills (Packer, 1998). Lastly, skills identified by SCANS apply to all educational levels. Despite these and other potential misconceptions, the SCANS report remains highly recognized by both industry and education and serves as a reference in a number of studies to date.

American Society for Training and Development Study

Another significant report is the American Society for Training and Development (ASTD) study (Carnevale, Gainer, & Meltzer 1990) which explains the changing needs of the workforce. The ASTD study began in 1986 through a U.S. Department of Labor sponsored grant. The ASTD study identifies basic skills employers consider necessary for workplace success. The skills group into six job families: (1) Basic Competency Skills--reading, writing, computation; (2) Communication Skills--speaking, listening; (3) Adaptability Skills--problem solving, thinking creatively; (4) Developmental Skills--self-esteem, motivation and goal-setting, career planning; (5) Group Effectiveness Skills--interpersonal skills, teamwork, negotiation; and (6) Influencing Skills--understanding organizational culture, sharing leadership (Overtoom, 2000). ASTD's study highlights the need for workers at all levels to be able to solve problems and interact effectively with coworkers (Packer, 1998).

Much like the SCANS report, the ASTD study often serves as a foundation for other studies addressing employability skills. Both of these early studies indicate the need to produce adaptable, effective decision-making, problem solving, communicative, and engaging employees. Therefore, more is needed than just technical or discipline

specific knowledge (Evers, Rush, & Berdow, 1998). Employees must supplement technical knowledge with soft skills.

The SCANS report and ASTD studies remain important to the modern view of employability skills. As employers continue to express dissatisfaction with the workforce including new college graduates, employability skills demand greater attention. Two more recent national reports highlight this fact.

Conference Board Report

In 2006, the Conference Board released a report on workforce readiness of entry-level U.S. employees by educational level. This report examines survey results and interviews with over 400 Human Resource and other senior executives to determine employers' perspectives on the basic knowledge and skills of new workforce entrants. The study addresses several questions including the skills necessary for workplace success and the possession of necessary skills among high school and college students. (Casner-Lotto & Barrington, 2006).

The report identifies desired skills for each educational level. The top desired skills for high school students include professionalism, teamwork, oral communications, ethics, and reading comprehension. Over 40% of respondents rate the overall workforce preparation of high school students as deficient. The workforce requirements of two-year college graduates mirror that of high school students with one exception. Employers also expect two-year college graduates to possess critical thinking skills. Regarding possession of skills, respondents view two-year college students more favorably than high school students. Only 10.8% of respondents rate two-year college students as deficient. Desired skills identified for four-year college graduates include critical

thinking, problem solving, teamwork, creativity, oral communications, and leadership, to name a few. Overall, respondents rate the workforce preparedness of college graduates higher than lower educational levels. Only 8.7% of respondents consider four-year college students as deficient. Yet, only 23.9% rank such students as excellent (Casner-Lotto & Barrington, 2006). These findings are in a keeping with the Spellings Report also published in 2006.

Spellings Report

The second recent report, Spellings Report on Higher Education (U. S. Department of Education, 2006), also addresses workforce readiness. The Spellings Report findings indicate that unacceptable numbers of U.S. college graduates enter the workforce without skills employers need for the new economy. Specifically, the report states, "Employers complain that many college graduates are not prepared for the workplace and lack the new set of skills necessary for successful employment and continuous career development" (p. 12).

In addition to the aforementioned studies, Burghardt (2009) identifies several other reports investigating employability skills needed for the workplace. The following discussion provides an overview of each report.

Association of American Colleges and Universities Report

In 2002, the Association of American Colleges and Universities (AACU) released its panel report, *Great Expectations: A New Vision for Learning as a Nation Goes to College.* Over a two-year period, a national panel of educational, private sector, public policy, and community leaders analyzed U.S. higher education. Citing the inadequate performance of university students, the report recommends that universities educate and

develop students as intentional learners (AACU, 2002). The panel describes intentional learners as integrative thinkers able to practically apply and adapt learned skills in multiple environments. The report further highlights the need for employability skills including effective communication, problem solving, and working with diverse teams. These recommendations mirror the findings of another report, Association to Advance Collegiate Schools of Business.

Association to Advance Collegiate Schools of Business Report

In 2006, the Association to Advance Collegiate Schools of Business's (AACSB) Alliance for Management Education Task Force examined the skills businesses most desire in business graduates. Business leaders participated in a special focus group designed to capture business perspectives on management education. The task force used focus group comments to develop the final report. The report notes that business school graduates excel in technical analysis, but often lack in application of analysis for effective organizational decision-making. Other notable comments include the need for graduates to act as agents of change and work with global constituents. The task force lists a number of desirable traits including the ability to work in teams, interpersonal skills, and communication (AACSB, 2006). Report findings appear consistent with other surveys of business disciplines including the Graduate Management Admission Council report.

Graduate Management Admission Council Report

The Graduate Management Admission Council (GMAC) compiled and released its survey *Corporate Recruiter* in 2010. The report identifies skills employers most often request of Master of Business Administration (MBA) graduates. Skills include leadership, communication, and interpersonal skills. The report notes the importance of

graduates developing soft skills. Although quantitative and technical skills offer a measure of attractiveness, soft skills such as leadership give graduates a greater edge. The report also includes an MBA skills gap analysis. Analysis findings indicate that leadership and interpersonal skills remain highly attractive to employers. These findings reflect findings of other national testing agencies such as Education Testing Service.

Educational Testing Service Report

In 2006 the Education Testing Service (ETS) developed *A Culture of Evidence: Postsecondary Assessment and Learning Outcomes*. This report examines postsecondary education's effectiveness in preparing students for the workforce. Report recommendations include developing a comprehensive national system for determining the nature and extent of college learning. The proposed national system focuses on four dimensions: (1) workplace readiness and general skills; (2) domain-specific knowledge and skills; (3) soft skills, such as teamwork, communication and creativity; and (4) student engagement with learning (Dwyer, Millett & Payne, 2006). The report also notes that today's knowledge economy requires skills beyond basic cognitive skills and discipline specific competencies. The workplace requires employees able to function creatively and collaboratively in diverse environments. Similar findings exist abroad as noted in the most recent Learning & Skills Report (2009).

Learning & Skills Report

A comprehensive study titled *The National Employers Skills Survey* (Learning and Skills Council, 2009) investigates skills deficiencies of employees in England. The study, conducted every two years since 2003, surveys over 79,000 employers across all sectors. Key findings of this study identify the main skills lacking among employees as

problem solving, teamwork, and customer handling. The report also cites oral communication as a problem issue. Similar findings exist in the Hart Report.

Hart Report

In 2007, Peter D. Hart Research Associates conducted a series of focus groups and a national survey of employers for the Association of American Colleges and Universities (AACU). Hart interviewed 305 company executives. Each selected company had a minimum of 25 employees and 25% of new hires held at least a bachelor's degree (Hart Research Associates, 2006). Business executives reveal the most desired skills of potential new hires. Desirable skills include the ability to work in teams, diversity, communication, and critical thinking. In addition, employers desire innovative thinking, the ability to organize excessive data, and creativity. Interestingly, the respondents recognize the importance of quantitative and foreign language skills. However, these hard skills rank low in comparison to soft skills (Hart Research Associates, 2006).

Table 2 provides a summary of all nine employability skills reports. As the reports indicate, concerns regarding employability skills persist over the last two decades. Consistent findings within many of the studies include communication, teamwork, problem solving, and people skills. Outside the U.S., researchers discover similar findings. According to Hasketh (2000) a recent, comprehensive research study of United Kingdom employers shows that "while the social and economic world has been transformed in recent years, the demands made of graduates by employers still largely revolve around age-old concerns of the ability to learn new material and to apply it to workplace scenarios" (p. 268).

Table 2

Employability Skills Highlighted in Nine Major Reports

Employability Skills Studies/Reports	Communication	Interpersonal	Problem solving	Adaptability	Creative thinking	Decision-making	Leadership	Working with diverse teams	Teamwork
ASTD (1990)	X	X		X	X	X	X		
SCANS (1991)	X	X							
AACU (2002)	X		X					X	
GMAC (2010)	X	X					X		X
AACSB (2006)	X	X							X
Conference Board (2006)	X						X	X	
ETS (2006)	X				X				X
Learning & Skills (2009)	X		X						X
Hart (2006)	X							X	X

While some variation exists in terms of specific skills required by employers, clearly organizations remain concerned about the employability skills of workers. Therefore, a need continues to discuss and examine the issue of graduates' employability skills. Invariably, such discussions often give rise to the question of whom the responsibility lies with for developing the employability of workers. A number of

researchers and industry representatives suggest the preparation of employees at the university level.

Role of Universities in Addressing Employability Skills

New graduates entering today's workplace face a number of challenges. Apart from making the transition from university to the workplace, graduates must also learn to work in environments requiring multi-skilled, multi-national project teams, collaboration, cooperation, flexibility, and inter-cultural awareness (Harvey, 1999). Employers repeatedly cite a mismatch between the demands of organizations and graduates preparation for the workforce.

This lack of preparedness is often attributed to inadequate preparation by universities. As Crebert, Bates, Bell, Patrick & Cragnolini (2003) state, universities are often criticized in media articles with titles such as: "Little accounting for generic skills" (Healy, 1996); "Employers lament inability to write" (Spencer, 1998); and "Uni courses off mark, say employers" (Cole, 2000). Such headlines highlight the assumption that universities are responsible for providing graduates with all the skills and knowledge necessary for the workplace. While this remains an ongoing debate, research indicates that the role of universities in developing employability of graduates warrants consideration.

More students enroll in U.S. institutions of higher learning today than ever before, and researchers expect the number of university students to rise. For the first time, more college students exist in the U.S. than high school students (Burghardt, 2009). Clearly, universities prepare a large portion of the workforce. Most employees recognize the importance of universities in driving innovation and competition in the global economy;

however, they often cite a need for universities to improve the level of preparedness that college graduates bring to the workforce (Burghardt, 2009).

For instance, the Spellings Report (2006) calls on the higher education system to provide U.S. citizens the workplace skills necessary for adapting to a rapidly changing economy. Numerous scholars echo this call. A report by the American Association of Colleges and Universities (AACU) highlights the need for students to improve learning in the areas of communication (oral and written), problem solving, understanding of complex systems, and diversity (2002). This report asks "higher education to help college students become intentional learners who are empowered through mastery of intellectual and practice skills…" (p. 1).

Likewise, Peddle's (2000) study examines the results of nearly a dozen employer-based education and training needs assessments conducted by The Center for Governmental Studies (CGS) at Northern Illinois University (NIU) over an eight-year period. According to the report, employers expect educators (especially colleges and universities) to accept the responsibility of instilling a corporate culture into students. Employers want graduates that know "how to do work, how to work with other people, and how to operate in a business setting" (Peddle, 2000, p. 7). Recommendations for higher education include emphasizing development of basic skills and workplace behaviors.

In addition, Candy and Crebert (1991) conclude that "major differences or discontinuities between the learning environments of the university or college and the world of work" remain (p. 589). To counteract the discontinuity, Candy et al. (1991)

suggests that universities provide students with practical skills to put their technical skills to work. Students should work on real life problems.

Clearly, a number of individuals advocate the role of universities in developing graduates' employability skills. However, in a follow-up to Candy's 1991 study, Bates, Bell, Cragnolini, Crebert, and Patrick (2004) find graduates still face many of the same challenges as in the previous decade. The researchers attribute findings to several reasons: 1) university education provided a theoretical knowledge base, without regard to practical application; 2) disagreement existed among employers themselves, and universities, as to what that theoretical knowledge should be; and 3) expectations following employment, between employers and graduates were not necessarily aligned (Robinson, 2005).

Strydom, Zulu, and Murray (2004) identify other potential barriers for universities. They argue that universities cannot respond to the changing needs of the workforce due to understaffing, poor resourcing, or an embedded practice of focusing on technical content. Owen (2001) also suggests that faculty appears out-of touch with the changing requirements of the workplace (Robinson, 2005).

Some critics believe developing employability skills falls completely outside the parameters of higher education. In a 1999 study, Atkins concludes that addressing employability skills is not cost-effective for universities, and as such, universities should not be responsible for developing such skills. Instead, he argues that industry bears the responsibility for its own needs and wants, therefore employers should develop the employability of students post graduation.

Atkins's views contrast directly with that of Morley and Tiechler. Morley (2001) suggests industry influences higher education's role. Tiechler (1999) identifies training for industry as one of the three functions of higher education as described below.

1. The educational function: to stimulate the cognitive, intellectual and systematic abilities and to convey knowledge which is conceived as broad, general, or the core of cultural and civilization competencies;
2. The training function: to foster knowledge and competencies provided in order to prepare students for future professional practices in related areas of specialization;
3. The socialization function: to shape the values, attitudes, social behavior and the communication skills relevant for action in socio-communicative contexts (p. 183).

While differing views subsist on the intent of higher education, the reality exists that employers continue to lament the skills gaps of graduates entering the workforce. Most researchers indicate that to a degree, higher education should prepare students for future employment (Cole & Thompson, 2002; Evers et al., 1998; Martin et al., 2000; McLaughlin, 1995; Peddle, 2000; Wilhelm, 2002). Industry and researchers continue to call upon universities to close the skills gap. John Clendenin, President Emeritus of BellSouth, states, "The bottom line in America's fight for long-term competitiveness ultimately will be won or lost not in the halls of Congress, not in the boardrooms around the world, but in America's classrooms" (Healy, 1998, p. 6).

Therefore, understanding the skills and abilities necessary for success in the workplace remains necessary for universities. "American workers must now be capable of learning new skills and adapting their abilities as jobs are redefined and typically

expanded by the economic and organizational models of the times" (Nash & Korte, 1997, p. 79). However, the question invariably arises as to how university faculty can best address the employability skills of students.

Strategies to Address Employability Skills

Many employability skills studies encourage universities and faculty to integrate employability skills within the classroom. Yet, few studies provide details on strategies for integration. Evers et al. (1998) state that "teaching styles have to give students the opportunity to engage in the learning process and to solve problems by working the mental muscles within the class contexts, rather than just memorizing what is given to them" (p. 68). However, teaching faculty sometimes describe teaching employability skills as a challenge.

One of the most common strategies for university teaching includes the lecture method. Williams (1998) explored other methods for integrating employability skills within university business programs. These strategies include case-based instruction, team learning, and internship programs. Cassidy (2006) identifies peer assessment as a possible strategy for developing employability skills. Problem-based learning and faculty internships provide additional strategies identified in the literature. The following section provides discussion on each of these strategies as identified within the literature.

Case Studies

The case study method began in the 1870s with its earliest applications in law, business, and teacher education (Borden, 1998). Case study method remains useful for illustrating practical and theoretical areas of learning (Scott, 2007). Case study exists in various forms. According to Heath (2002) six types of case studies exists: (1) the single

incident case; (2) the background case; (3) the exercise case for which students apply a specific analysis technique; (4) the situation case; (5) the complex case; and (6) the decision case.

Researchers identify several outcomes from the use of case studies including increased knowledge, use of analytical techniques, management insight, and improved problem solving (Scott, 2007). Heath (2002) further notes the effectiveness of case studies in developing analysis skills, critical thinking, and decision-making.

Likewise, Savagery (2006) explains case based instruction aids in promoting active learning and engaging learners in higher-order thinking. Well-constructed cases help learners prepare for similar cases in the real world (Scott, 2007). Cases provide students an opportunity to develop critical thinking skills and correct flawed thinking and assumptions, thus increasing knowledge of their respective discipline. The case study approach remains an important tool for faculty. However, some faculty prefer the closely related strategy of problem-based learning.

Problem-based Learning

Dunlap (2005) describes problem-based learning as an "apprenticeship for real-life problem solving" used to "help students acquire the knowledge and skills required in the workplace" (p. 66). Likewise, Boud & Feletti (1991) define problem-based learning as an instructional approach that uses real world problems of practice. This instructional method allows learners to apply critical thinking, problem-solving skills, and content knowledge to real-world problems and issues (Levin, 2001). Instruction encourages more student-centered and less teacher-directed learning, and students assume considerable responsibility for their own learning.

As a practice, problem-based learning involves presenting students with "an issue, case or ill-structured problem that can be researched" (Levin, 2000). Students conduct research to solve the problem. Therefore, learning is active rather than passive as students are "actively involved in the learning process from problem introduction to solution implementation and process reflection" (Dunlap, 2005, p. 66).

Traditionally, problem-based learning occurs within the academic fields of law and medicine. However, use of this strategy now exists in other fields including architecture, engineering (Cawley, 1989), and psychology (Reynolds, 1997). Problem-based learning presents several benefits including the acquiring of expert knowledge, problem solving skills, team skills, and lifelong learning skills. Engel (1991) identifies several lifelong learning skills including the ability to adapt to change, decision-making, critical and creative reasoning, and empathy.

Bell (2010) supports the use of problem-based learning for the teaching of employability skills. Bell alludes to the workforce of the future stating that students will be evaluated on "their collaborative, negotiating, planning, and organizational skills" (Bell, 2010, p. 43). Problem-based learning affords students the opportunity to become "proficient communicators and advanced problem solvers" (Bell, 2010. p. 39). Clearly, problem-based learning presents opportunities for imparting employability skills, much like the closely related technique of project-based learning.

Project-based Learning

Savage, Chen, & Vanasupa (2007) highlight another notable strategy for imparting employability skills – project-based learning. This instructional method, based on the practice of solving problems, involves mastering skills needed to implement a

design solution. This method involves exploring the sequence of tasks needed to reach an objective. As such project-based learning typically benefits engineering education.

Typically, projects are complex, challenging activities that allow students to work autonomously over extended periods of time. At the conclusion, students develop realistic products or a presentation as a solution. Over the course of the project, students develop various skills including design, problem solving, and decision-making (Jones, Rasmussen, & Moffitt, 1997). In addition, Savage, et al. (2007) note the development of skills such as teamwork, communication, decision-making, and problem solving (Savage, et al., 2007). These employability skills can also be developed using another teaching strategy, team learning.

Team Learning

Learning and working within the framework of a team typifies one of the most essential skills required by industry (Cheng & Warren, 2000). Team learning within the classroom gives students the opportunity to hone team skills. Furthermore, team learning presents students with an opportunity to develop interpersonal relationships (Oldfield, MacAlpine, & Mark 1995), communication skills, problem solving, delegation, and leadership (Buthcher, 1995), all of which qualify as important skills for the workplace. Newstrom & Davis (1995) further note that employers seek workers with the ability to communicate and work within teams. This requires strong interpersonal skills and flexibility. To further develop such skills sets, employers and academics encourage students to pursue another beneficial approach, internships.

Internship Program

Internships serve as one of the most popular methods identified within the literature to address employability skills. Researchers highlight the use of internships to increase students' marketability. Internships help students develop essential skills such as critical thinking, communication, and problem solving. Internships also provide students the opportunity to apply knowledge gained from the classroom as well as receive practical experience (Raymond, McNabb & Matthaei, 1993). The benefits of internship are well documented by researchers.

Hasbullah and Sulaiman (2002) conclude that employability skills are best gained "through collaboration and strategic partnership with industry" (p. 5). These researchers maintain that while the university can provide students with technical knowledge and a degree of soft skills, soft skills are best addressed through interaction within real industry settings. Beck (2001) notes that good preparation for the workplace should include industry experience. As an added benefit internships provide students an opportunity to interact with others that can assess their abilities and performance. However, this opportunity also exists in the classrooms utilizing the peer assessment approach.

Peer Assessment

Life-long learning involves both the ability to work independently and assess one's individual performance (Stefani, 1993). Cassidy (2006) supports the use of employability peer assessment exercises within courses to help students develop evaluative skills. Cheng & Warren (2000) add that assessment offers the potential to help students make rational and objective judgments about personal skill sets. Other benefits of peer assessment include the development of responsibility, enterprise (Goldfinch &

Raeside, 1990) maturity, and confidence (Cheng & Warren, 2000). Peer assessment also exposes students to reflective learning, critical thinking, and collaborative learning, important skill sets for the workplace.

Faculty Internships

Some critics suggest that university faculty appear out-of touch with the changing requirements of the workplace (Owen, 2001). Faculty internships present a unique opportunity for faculty to gain current real-world experience and the ability to better educate students. Faculty receive an opportunity to apply theory to reality. Bermudez (2005) identifies several benefits of faculty internships. Students receive a more practical education, advisement, and counsel from faculty. Futhermore, faculty increase the ability to enhance lectures and create environments that motivate students.

Harris (2004) highlights the success of faculty internships by summarizing the personal experiences of faculty in the hospitality discipline. Faculty interned with various hospitality properties including hotels and restaurants. Feedback from faculty and company respresentatives indicates that participants found value in the internship process. Participants also stated a need to prioritize the continual development of internship opportunities for faculty. The article highlights several benefits of faculty internship including the ability gained by faculty to remain current and provide students with relevant practical knowledge.

Overall, each of the above instructional strategies presents options to integrate employability skills within the classroom. This is not an exhaustive list of instructional strategies. Table 3 lists all of the instructional strategies selected for this study. Each strategy appears prominently in literature.

Table 3

Eight Instructional Strategies Addressed in Study

Instructional Methods	
Lecture	Student Internships
Case Study	Faculty Internships
Problem-based Learning	Team Learning
Project-based Learning	Peer Assessment

Granted, all of the featured instructional methods may not be ideal for some courses. However, each method presents options beyond the traditional lecture method to help students better prepare for the workplace. Adequate preparation for the workforce remains central to the theoretical framework of this study.

Theoretical Framework

A theoretical framework helps explain relationships and connectedness of variables in a study. Marshall and Rossman (2006) explain that a theoretical framework counters threats to external validity. The theoretical framework also illustrates how concepts and models guide data collection and analysis. The framework for this study centers on human capital theory, expectancy theory, and soft skills theory.

Human Capital Theory

The economist Adam Smith argues in his book *Wealth of Nations* (1776) that the wealth of a nation depends upon its people. W. E. Deming, an American statistician credited with helping the Japanese improve their manufacturing standards, states in his

groundbreaking work *Out of the Crisis* (1982), "The wealth of a nation depends on its people, management, and government, more than its natural resources" (p. 6). Deming followed this statement with an interesting perspective of what he considered the world's most underdeveloped nation. He states:

> What is the world's most underdeveloped nation? With the storehouse of skills and knowledge contained in its millions of unemployed, and with the even more appalling under use, misuse, and abuse of skills and knowledge in the army of employed people in all ranks in all industries, the United States may be today the most underdeveloped nation in the world. (p. 6)

Each of these ideals supports Swanson's (2001) definition of human capital as an investment in people and van Loo's and Rocco's (2004) statement that it "is an… investment in skills and knowledge" (p. 99). This is not an arbitrary investment. The purpose includes increasing worker productivity. Van Loo and Rocco (2004) state that "in early human capital literature, educational background was considered one of the most important determinants of human capital" (p. 99). Likewise, Becker (1993) states, "Education and training are the most important investments in human capital" (p. 17).

Human capital development remains a critical factor for creating national and local stability (McLean, 2004). A workforce with higher skills results in increased economic productivity. The income potential and employability for workers increasingly depends upon the level of education and skills. The economy constantly shifts to one that demands knowledge workers. Productivity emerges as a function of what employees know and have the competence to do. Thus, the demand for education continues to increase. The attainment and retention of national and organizational well-being

continually depends upon one's human capital. Higher education systems can increase human capital by improving the skills of its graduates (Knight & York, 2003). However, the success of meeting human capital needs depends on the impact of another theory, Vroom's Expectancy Theory.

Expectancy Theory

Vroom's Expectancy Theory builds on the work of Maslow and Herzberg. Expectancy Theory allows for differences in individuals and holds that individuals will determine which outcomes they prefer and make realistic estimates of the chances of obtaining them (Barron's Management, 2007). Therefore, workers choose the degree to which they will become involved in their jobs. Employee's assets and the extent to which they invest in a job remain under the control of the employee (Barron's Management, 2007).

Expectancy theory maintains that motivation to perform depends on three factors: expectancy, instrumentality, and valence. Expectancy refers to the belief that a course of action will result in a desired outcome. Instrumentality refers to the perceived probability that meeting performance expectations will result in attainment of outcomes. Valence denotes the value an individual personally places on rewards (Vroom's, 1964). Therefore the extent to which faculty and students perceive the importance of and invest in employability skills depends on their belief that their effort will result in a particular outcome, the perceived probability of the success of their effort, and the desirability of the promised outcome (Bjorkquist & Lewis, 1994). Although expectancy theory remains an important concept for employability skills research, consideration should also be given to soft skills theory.

Soft Skills Theory

Soft skills theory emerges as a concept that goes beyond the traditional workplace theories to address the current needs of the workplace (Tribble, 2009). Empirical data continues to show that "such skills as listening and building consensus really do affect the bottom line" (Weisenger, 1999. p. 66). Numerous studies show the importance of soft skills for individual and organizational performance.

The publication of psychologist Daniel Goldman's (1995) bestselling book *Emotional Intelligence* gained considerable attention. Emotional Intelligence, or a person's ability to manage his or herself, includes a combination of soft skills. Goldman compiled years of research showing that Emotional Intelligence matters twice as much as technical skills for job success. In a follow up publication, Goldman (1998) provides data from studies of more than 500 organizations to demonstrate that factors such as self-confidence, self-awareness, self-control, commitment and integrity not only create more successful employees but also more successful companies. As the workplace changes, soft skills theory continues to evolve and organizations worldwide give attention to the importance of soft skills.

Each of the above theories – human capital, expectancy, and soft skills remain vital to the study of employability skills. However, other factors also play a role as discussed below.

Additional Framework

In addition to the aforementioned theories, this study is grounded in several key employability skills studies: the Secretary's Commission on Achieving Necessary Skills Report (SCANS) (U.S. Department of Labor, 1991), the American Society for Training

and Development (ASTD) study (Carnevale, Gainer, & Meltzer 1990), National Association of Manufacturers/Society of Manufacturing Engineers (NAM/SME) Report (2005), and the Mississippi Manufacturer's Association (MMA) Report (2007). Each of these studies identifies skills employers consider necessary for workplace success.

SCANS and ASTD studies address jobs across multiple industries. The SCANS report identifies three foundation skills and five workplace competencies necessary for employees. The three foundational skills include basic skills, thinking skills, and personal qualities. Each of these foundational skills encompasses employability skills including communication, problem solving, creativity, and self-management. Workplace competencies consist of resource management, information management, interpersonal skills, an understanding of systems, and technical competence (U.S. Department of Labor, 1991).

The ASTD study categorizes basic skills employers consider necessary for workplace success into six job families. The six job families include basic competency skills, communication skills, adaptability skills, developmental skills, group effectiveness skills, and influencing skills. These job families encompass employability skills such as listening, problem solving, creative thinking, teamwork, and interpersonal skills. Since their publications, the SCANS and ASTD studies continue to set the standard for numerous studies including the NAM and MMA studies (Carnevale, Gainer, & Meltzer 1990).

The NAM and MMA studies focus specifically on the manufacturing sector. National Association of Manufacturers (NAM) conducted several studies over the years in partnership with organizations such as Society of Manufacturing Engineers (SME),

The Manufacturing Institute, and Deloitte. Each study aims to examine the workforce needs of manufacturers. NAM's joint study with SME (2003) investigates the skill competence gaps of college manufacturing graduates based on the perception of training managers and executives of manufacturing companies. Findings show that more than 80% of manufacturers surveyed reported a "moderate to serious" shortage of qualified job applicants. Identified skill gaps include communication skills, teamwork, business skills, change management, and lifelong learning (NAM, 2003).

A follow-up study, The *Skills Gap Report* (2005) reveals an increasing need for an appropriately prepared workforce to help maintain the competitiveness of U.S. manufacturing in the global marketplace. Key issues cited include inadequate problem solving skills, poor communication skills, and a lack of strong supervisory and managerial skills within the workplace. Furthermore, 65% of respondents report competency deficiencies in engineers and scientists (NAM, 2005). As a supplement to the 2005 report, NAM developed a jointly commissioned report with Deloitte to analyze the people management practices in manufacturing organizations. Report findings indicate that manufacturers still face talent shortages. The report cites education, training, and workforce skills as priorities (NAM, 2009). Similar findings are noted in the MMA study.

In 2007, the Mississippi Manufacturer's Association (MMA) commissioned a study to investigate the workforce training needs of state manufacturers. Report findings indicate that the state's workforce remains inadequately prepared for the manufacturing industry. Approximately 46% of employers surveyed express dissatisfaction with the workforce preparedness of college graduates, and 20% expect a shortage of workers

holding bachelor's degrees or higher in the coming years. Specifically, the MMA study states that employees lack adequate preparation for the workforce in the areas of teamwork, problem solving, verbal communications, customer service, supervision, and management, and soft skills (MMA, 2007). Clearly, both studies indicate workforce training issues for manufacturing at the state and local levels.

Employability Skills Studies of College Graduates

A review of the literature reveals several research studies related to the employability of college graduates. An overview of these studies follows.

In a 1998 study, Williams measures the perceptions of business faculty and final year undergraduate students across five institutions to determine to what degree employability skills were integrated into the undergraduate business curriculum. Williams surveyed 293 undergraduate students and 45 business school professors from five tertiary institutions in the states of Michigan, Indiana, and Tennessee. Eight hypotheses were analyzed using descriptive statistics and the *t*-test of two independent means. Findings indicate that students and faculty within each of the institutions perceived employability skills as important. However, students and faculty differ on the degree to which most skills were integrated and the degree to which students possessed the skills. The study also assesses strategies used. Findings reveal that most institutions relied heavily on the lecture methods and to a lesser degree on group work.

Williams concludes that all five institutions were aware of the need for students to be both technically competent and equipped with employability skills. Although some efforts were made to integrate employability skills across the undergraduate business

curriculum, Williams found that a need for greater effort exists in the area of experimental learning strategies.

Recommendations for future research include replicating the study with graduates working in entry level positions, researching reasons why public institutions reported more differences in responses between students and faculty than private institutions within the study, investigating similarities among institutions in terms of teaching strategies, researching differences in responses of faculty based on tenure status, and researching the perceptions of students and faculty within other disciplines.

Like Williams (1991), Tanyel, Mitchell, and McAlum (1999) also studied the desired employability of business school graduates. However, the study relies upon the perceptions of business school faculty and employers of graduates. This study includes both domestic and international corporations. Using a mixed methods approach, the researchers surveyed participants and used focus group interviews to determine participants' perceptions. Findings reveal perceptions about the importance of seven defined skills sets were significantly different. Prospective employers perceive greater importance in oral communication, decision-making and analytical ability, written communication, and creativity. However, faculty members attribute greater importance to ethical values, project management, and persuasive ability.

Robinson (2005) assesses the employability skills of agriculture graduates at the University of Missouri-Columbia and their immediate supervisors using Borich's needs assessment model. Robinson's study addresses 67 different employability skills. Graduates were surveyed to determine their perceptions of the importance of the employability skills and their level of competence at performing the skills. Supervisors

completed surveys designed to assess their perception of the importance of employability skills and the competence level of graduates. Job satisfaction of graduates was also investigated.

Study findings indicate that all 67 skills evaluated by both graduates and their supervisors were perceived as moderately important to workplace success. However, a discrepancy exists between employers' and graduates' perceptions of important employability skills. Problem solving and motivation were perceived as the most important employability skills among graduates. However, supervisors rated working well with fellow employees, motivation, organization, and team management as highly important. There were also discrepancies regarding competence levels of employability skills. Newly hired graduates perceived themselves as most competent at working independently, while their supervisors perceived motivation as the newly-hired graduates' strongest skill. Both graduates and their supervisors saw "identifying political implications of the decision to be made" (p. 112) as the weakest skill new hires possess.

Robinson presents several recommendations for future study including replication of his study in order to uncover additional knowledge about what skills are needed by entry-level employees in the workplace. He suggests that the study's replication focus only on supervisors of entities that hire CAFNR graduates or focus on individual academic departments within CAFNR. Robinson also suggests studies further examine jobs satisfaction among graduates to determine why some graduates lack satisfaction with chosen careers.

In a follow-up to Robinson's study, Ogebeide (2006) developed a descriptive correlation study to examine the self-perceived employability skills of senior-level

hospitality management students at the University of Missouri-Columbia. Ogebeide (2006) found that respondents developed between moderate and major competence to serve as productive employees in the workplace. The study also addresses curriculum improvement. Although findings indicate that respondents are doing fine with problem-solving skills, Ogebeide (2006) concludes that curriculum improvement should include materials designed to improve the students' knowledge and understanding of the political implications of their decisions and interpersonal skills or human relation skills.

Ogebeide (2006) recommends that additional Hospitality Management programs as well as other disciplines conduct similar research. Stating that the findings of his study could not be generalized, Ogebide suggests replication of his study using a sample from which the results could be generalized. Furthermore, comparisons could be made among various Hospitality Management programs at different institutions. Ogebeide (2006) also recommends the development of a longitudinal study to describe correlations between students' level of competence and their job performance and job satisfaction.

Similarly, Alston, Cromartie, English, and Wakefield (2009) analyzed the perceptions of employers of land-grant college graduates regarding their preparation for entry-level positions in the agricultural sector. The study addresses specific competencies including interpersonal, communication, problem solving, technology, decision making, management skills, and technical competence. Overall, study findings indicate graduates' preparation in these areas. However, the researchers recommend curriculum revisions and that graduates develop higher levels of preparation in the identified competencies.

Alston, Cromartie, English, and Wakefield (2009) also recommend developing higher preparation levels of employability skills such as the creation of a leadership course. The researchers advise college administrators to incorporate a course in business or professional communication within existing curricula to provide even more specialized training. Researchers also conclude that universities have a primary responsibility to prepare students for the highly competitive global workforce of today and "every effort should be made to have in place curricula that ensure this mandate" (p. 5).

Burghardt (2009) investigates the relationship of soft skills gained to the amount of leadership education completed by Fort Hays State University graduates enrolled in a Leadership Studies program. Graduates of the leadership program and recipients of a bachelor's degree in Organizational Leadership were compared to students who received no leadership education. Using the Teamwork Skills Questionnaire (O'Neil, Lee, Wang & Mulkey, 1999), Burghardt (2009) sought to determine if academic leadership education enhances graduate's soft skill development. The study also investigates the impact of leadership education on graduates' perception of teamwork proficiency in the workplace.

Burghardt (2009) finds that the leadership certificate does not significantly change soft skill development in graduates' self-reported perceptions, as compared to students with no leadership coursework. However, findings indicate that the bachelor's degree does make limited significant changes in graduates' soft skill proficiency as compared with graduates who received the leadership certificate. Multiple significant changes were found in graduates with bachelor's degrees as compared with graduates who received no leadership coursework (Burghardt, 2009). Recommendations for further study include

conducting research using qualitative methodology, investigating more universities that offer a degree in Organizational Leadership, and measuring other soft skills beyond teamwork that the leadership coursework may produce.

In a subsequent study, Arensdorf (2009) examines the perception of employability skills transferred from leadership classes to the workplace. The study purposes to determine if students perceived themselves to transfer employability skills learned in the Fort Hays State University (FHSU) Leadership Studies Certificate Program to the workplace. Three groups were created for the purpose of the study. Group one served as a control group and consisted of participants who had not taken a leadership course at FHSU. Group two consisted of a sample of students who completed one or two courses out of the Leadership Studies Certificate Program. Participants who completed the entire Leadership Studies Certificate made up group three.

Participants provided their perceptions on the level of importance of identified employability skills, and their level of competence in performing each of the employability skills. Data was also gathered from supervisors regarding their perceptions of the study participants in each of the three groups. Specific employability skills studied included problem-solving skills, communication skills, teamwork skills, change and innovation behaviors, ability to manage self, and civic-mindedness.

Arensdorf (2009) finds that study participants and their supervisors both perceived the ability to manage self as the most important skill in the workplace. Study findings indicate no significant differences between participant groups with respect to the perceived importance and competence levels on each of the six employability skill constructs. However, supervisors of Leadership Studies Certificate recipients deem

communication skills as more important to their employee's job than supervisors who employed students who did not take an FHSU leadership course. Apart from communication, no differences were found between supervisor groups with respect to perceived importance and competence. Arensdorf (2009) presented a number of topics for future research such as obtaining data from different leadership programs and conducting a longitudinal study.

Each of the previously mentioned studies examines the employability skills of college graduates across several major degree programs including agriculture, hospitality management, business, and organizational leadership. The studies were developed from several perspectives. Williams examines the employability skills of business students from the perspective of final year students and faculty whereas Tanyel, et al. (1999) investigates the perspectives of faculty and employers. Robinson (2005) and Altson, et al. (2009) study the employability skills of agriculture students. Robinson considers the perspectives of graduating students and potential employers but Altson et al. (2009) looks solely at the perspective of employers. Within the hospitality industry, Ogebeide (2006) and Burghardt (2009) both address employability skills from the perspective of only the students in the fields of hospitality management and organizational development, respectively. Like Robinson, Arensdorf (2009) examined employability skills from both the perceptions of program graduates and their supervisors.

With the exception of Burghardt, each of the researchers considers a host of various employability skills. Burghardt focuses only on the aspect of teamwork. Also, Williams' (1991) study uniquely examines methods or strategies faculty use to integrate employability skills into the program. Although most studies support the need for

employability skills among college graduates, few discuss strategies and techniques used by faculty to implement the teaching of such skills. This presents a gap in the literature.

Other literature gaps exist as identified by recommendations within each study. Recommendations include replicating the studies in different environments including different universities or academic programs. Researchers also recommend the examination of employability skills from different perceptions such as that of students, faculty, or employers. These recommendations for future study present an opportunity to examine the employability skills of students enrolled in manufacturing-related degree programs. Table 4 provides a brief overview for comparison of each featured employability skills study. Categories of comparison include the author, discipline, and research prospective.

Table 4

Summary of Studies on Employability Skills of College Students

Author	Discipline	Perspectives Explored	Findings
Williams, 1999	Business	Senior Students & Faculty	Difference in perception of integration and possession
Tanyel, Mitchell, and McAlum, 1999	Business	Faculty & Employers	Difference in perception of importance
Robinson, 2005	Agriculture	Graduating Students & Employers	Difference in perception of importance and competence
Ogebeide, 2006	Hospitality Management	Students	Improvement needed in decision making, interpersonal skills
Alston, Cromartie, English, and Wakefield, 2009	Land Grant College Graduates	Employers	Higher preparation levels needed in defined skills
Burghardt, 2009	Leadership Studies	Students	B.S. degree enhances soft skill development
Arensdorf, 2009	Leadership Studies	Graduates & Supervisor	Ability to manage self perceived as most important skill

Employability Skills and Manufacturing Education

The literature shows that employability skills affect a range of academic programs and majors. Therefore, employability skills also apply to manufacturing education. Current literature suggests that the manufacturing workplace is experiencing a shift. This

shift results in a need for less traditional production workers and more skilled non-production workers (Sill, 2002). Employers want workers who can think critically, solve problems, and respond to customers' needs. This requires the ability to analyze operations, make decisions independently, and handle preventative maintenance independently (Kansas, 2005). Pagell, Hanfield, & Barber (2000) also denote the need to work in teams.

Employability skills remain critical to U.S. manufacturing operations. A study examining workplace skills for the 21st century indicates approximately 60% of new manufacturing positions will demand skills possessed by only 20% of the current manufacturing workforce. America will experience a shortage of over 35 million skilled workers for manufacturing positions by 2040 (Martinez, 2004).

Reflecting on the loss of U.S. manufacturing jobs, Martinez (2004) states that "every parent, worker, and student in America should be aware that if economic survival is to take place…our workforce must obtain all the necessary skills to do so" (p. 16). Research indicates that these skills include more than academics or technical skills (Gearhart & Holdsworth, 2002; Nippert, 2003). Essential skills include employability skills or soft skills (Healy, 1998). Several studies reflect existing skill needs.

Stier (2005) examines the essential knowledge, skills, and competencies required of graduates of Manufacturing Engineering and Technology at Midwestern University. Stier surveyed approximately 3,000 small and medium-sized manufacturers in Illinois. The survey includes a basic personal skills category reflecting employability skills. Findings show all basic personal skills rate highly with a mean score of 4 or above on a five-point Likert-type scale. This category includes "the ability to work effectively with

a team, willingness to learn and improve knowledge, communication, and ability to solve technical problems" (Stier, 2005). Clearly, Stier's study indicates the significance of employability skills to manufacturing education. Stier (2005) concludes, "Manufacturing faculty has many opportunities to provide students with these skills in an appealing manner" (p. 8).

Stier's study and similar studies largely reflect the findings of a national study conducted by the National Association of Manufacturers (NAM) and Society of Manufacturing Engineers (SME). The NAM/SME (2003) study identifies several skill gaps among college manufacturing graduates. These skills gaps include communication skills, teamwork, business skills, change management, and lifelong learning. Interestingly, follow up NAM/SME studies continue to show employability skills gaps within the manufacturing workforce.

The manufacturing skills gap remains a serious issue as it costs manufacturers time, money, and productivity. Cebesi (2003) notes the impact of inadequately skilled recruits on the manufacturing sector. Inadequately skilled workers pose potentially high expense. At times, companies pull higher skilled workers away from respective jobs to teach new recruits resulting in lost productivity and revenue (Cebesi, 2003). Babicz (2001) adds that although manufacturers do not expect college recruits to have the level of expertise as experienced employees, an expectation exists that recruits possess the basic fundamentals. In essence, manufacturers question the employability skills of college graduates.

In short, several studies discuss the employability skills of manufacturing graduates at the university level. As the manufacturing workplace shifts, employers want

workers who can think critically, solve problems, and respond to customers' needs. Despite the published findings of professional organizations such as NAM/SME and manufacturing companies, employability skills of U.S. manufacturing operations remains an issue. Unfortunately, as Martinez (2004) reports, the current status places American manufacturers at risk for a coming worker shortage within the next three decades. Consequently, employability skills remain vital to manufacturing education.

Summary

Over the past few decades the workplace experienced dramatic changes. Factors such as technology and globalization create the need for a new type of employee. Today's workplace requires flexible, interpersonal, and innovative workers. Therefore, organizations need employees with proficient employability skills at all levels.

Findings of several significant reports such as SCANS and ASTD validate the need for employability skills. The reports indicate a general expectation among employers that individuals enter the workplace with employability skills such as critical thinking, problem solving, teamwork, creativity, oral communications, and leadership. Although these reports began in the late 1990s, the groundbreaking results continue to serve as a foundation for many studies today. Organizations remain concerned about the employability skills of workers. Employers repeatedly cite a mismatch between the demands of organizations and the skills of graduates as they enter the workplace.

A number of researchers and industry representatives suggest that universities play a prominent role in closing the gap by developing students' employability skills. This view is not necessarily aligned with the traditional views of higher education. However, most researchers indicate higher education shares a role prepare students for

future employment (Cole & Thompson, 2002; Evers et al., 1998; Martin et al., 2000; McLaughlin, 1995; Peddle, 2000).

Consequently, several studies emerge that examine the employability skills of college graduates across several major degree programs including agriculture, hospitality management, business, and organizational leadership. While some researchers compare the perspectives of faculty and students, others consider the viewpoint of students and employers. Each of the studies explored within this chapter support the need for employability skills among college graduates. The studies also indicate successful integration of employability skills within major coursework. The literature reveals several available methods for the instruction of employability skills. These include case studies, problem-based learning, and project-based learning, student internships, peer assessment, and faculty internship.

Moreover, gaps and recommendations within the literature present opportunities for further research in several respects. Few studies discuss strategies and techniques used by faculty to implement the teaching of employability skills. Several researchers recommend replication of studies in different environments or academic programs from varying perspectives. Gaps in the literature present an opportunity to examine the employability skills of students enrolled in manufacturing-related degree programs. In doing so, this study contributes to the literature and lays the foundation for manufacturing programs to take a more proactive approach in remaining relevant to current and future industry needs.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Introduction

Chapter III describes the research design for this study. This chapter presents the selected methodology used for the study including the research design, the target population, the data collection method, the survey instrument, and the proposed analytical tools for examination of the data. This chapter also presents information on the validity and reliability of the survey instrument.

Purpose of the Study

The purpose of this study includes assessing the status of employability skills in the undergraduate experience of students enrolled in manufacturing-related degree programs in Mississippi's universities. This study seeks to assess the perception of senior students and faculty in several areas including the level of importance for identified employability skills, the competence level of students in performing each skill, and integration of such skills in degree programs. In addition, faculty and students identified existing strategies used to integrate employability skills into academic manufacturing-related courses. The study analyzes data from senior students and faculty. Senior students denote any graduating or non-graduating student that has attained senior level hours. Faculty includes full-time or adjunct individuals with a minimum status of instructor responsible for teaching at least one major course in the manufacturing-related curriculum.

Research Design

This study employs a descriptive non experimental research design using two groups. A survey research method was used to "obtain information about the preferences, attitudes, practices, concerns, or interests" (Gay & Airasion, 2003, p. 20) of students and professors regarding the extent to which employability skills are integrated into major coursework. Survey research design assists in collecting quantitative information. This method involves "collecting and analyzing numerical data from tests, questionnaires, checklists and surveys" (Gay & Airasion, 2003, p. 20). Gall (2003) further states, "The purpose of a survey is to use questionnaires or interviews to collect data from a sample that has been selected to represent a population to which the findings of the data analysis can be generalized" (p. 223).

Due to the nature of the sample, this study utilized a mixed mode survey (Dillman, Smythe, & Christian, 2008). This approach is used more often to improve survey data perhaps by mixing mail surveys with Internet or telephone surveys. Mixed mode is useful when "an organization has a variety of types of members" (Kennedy & Vargus, 2001, p. 491) that must be surveyed. In this case, the participants consisted of faculty, traditional students, and online students across several institutions. Two instruments- Survey of Employability Skills Student Copy and Survey of Employability Skills Faculty Copy- were used to collect data from students and faculty. Together, both instruments address the following questions:

1. What employability skills found as important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs?

2. What employability skills found as important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?
3. What employability skills found as important for industry do students possess as perceived by senior students and faculty of manufacturing-related degree programs?
4. What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing-related degree programs?

Population

This population for this study consists of faculty and senior students of undergraduate manufacturing-related degree programs across six Mississippi public institutions of higher learning. The total number of students and faculty in the population approximates to 209 and 30, respectively. The selected institutions and programs of study were identified using information provided by Mississippi's Institutions of Higher Learning (IHL) website. To verify information, the researcher visited each program website and gathered contact information for program chairs. To further verify the accuracy of information, the researcher emailed and phoned each department chair.

Institution A is a land grant institution located in a rural area. Manufacturing-related degree programs include Robotics and Automation Technologies, Technology Management, and Electro-Mechanical Engineering Technology. Programs consist of a total of 20 senior level students and five faculty members.

Institution B is a large urban university with programs of study in Technology and Engineering. The institution identifies its specific manufacturing-related degree program as Manufacturing Management. Programs consist of approximately 15 seniors and 7 faculty members.

Institution C is a rural institution offering instruction in Applied Technology and Technology Management. Total senior enrollment equals approximately 20 students. Faculty members supporting the programs total five.

Institution D is a large land grant university with programs in Technology and Engineering. Manufacturing-related degree programs include Industrial Technology and Industrial Engineering. The Industrial Technology program reports approximately 40 seniors and three faculty members. Industrial Engineering maintains approximately 74 seniors and 12 faculty members. Therefore, the population for this institution totals 15 faculty members and 114 students.

Institution E offers one manufacturing-related degree program – Industrial Engineering Technology. The program uniquely differs from other degree programs participating in this study as students take coursework online. All other participating programs offer traditional face-to-face instruction. Institution E's Industrial Engineering Technology program includes approximately 40 seniors and two faculty members.

Institution F is a large rural university. In consultation with local industry, this institution developed a Center for Manufacturing Excellence. The center offers several degree programs aimed at providing students with both the technical and employability skills desired by industry (M. Kendricks, personal communication, March 17, 2011). Students have the option of majoring in General Engineering with a specialization in

Manufacturing or several Business tracks with a specialization in Manufacturing. This program is still in its infancy as the second freshman class is currently underway. A population of senior students does not yet exist. Therefore, this study excluded Institution F.

In summary, the six institutions selected for this study offer programs of instruction in Engineering, Industrial Engineering Technology, Manufacturing Management, Applied Sciences and Robotics and Automation Technology. Each program closely relates to the manufacturing discipline and presents opportunities for students to pursue manufacturing-related careers. In total, the programs consist of approximately 209 students and 30 faculty members. Table 5 provides a summary of all six institutions.

Sample

This study utilized convenience sampling. Faculty participating in the study had to teach at least one major course within the manufacturing-related degree program. Participants include full-time and adjunct faculty. Student's participation was restricted senior level students majoring in one of Mississippi's manufacturing-related degree programs. Based on the small total number of faculty and students (N=239) across the targeted institutions, the entire population was invited to participate in this study.

Instrument

The study employed the *Survey of Employability Skills* instrument originally developed by Williams (1998) to measure the perceived employability skills of students in business programs across five different institutions. The survey was modified to fit the needs of this study in several areas including employability skills and strategies.

Table 5

Summary of Participating Institutions

Institution	Description	Majors	Faculty Count	Senior Student Count
A	Small rural land grant	Robotics & Automation, Technology Management, Applied Sciences/Electro-Mechanical Engineering Technology	6	20
B	Large urban	Industrial Technology	3	15
C	Rural	Applied Technology, Technology Management	5	20
D	Large land grant	Industrial Technology Industrial Engineering	15	114
E	Online program	Industrial Engineering Technology	2	40
F	Large rural	General Engineering-Manufacturing emphasis Business – Manufacturing emphasis	-	0
Total			31	209

Several of the employability skills measured for this study differs from William's original set (1998). Williams addressed the following skills: numeracy, written and oral communication, interpersonal, ethical and moral values, thinking, lifelong learning, work ethic, leadership, problem solving, teamwork, and computer technology.

The current study adapts to more recent literature including published reports from the National Association of Manufacturing (2003, 2005, 2007, & 2009) and Mississippi Manufacturer's Association (2007). Employability skills addressed include the following: teamwork, problem solving, oral and written communication, critical thinking, customer service, interpersonal, supervisory and management, change readiness, and project management.

The survey also differs in the instructional strategies listing. Williams (1998) focused on lecture, team learning, student presentations, case studies, computer simulations, and internship. The present study reflects current literature. In addition to William's idea of lectures, case studies, team learning and internship, the present survey includes problem-based learning, project-based learning, peer assessment, and faculty internship. Table 6 provides a comparison of the original and adapted survey.

Additional changes address the demographics section. Minor changes were made to the demographics options for students and a demographics section was added to the faculty instrument. Furthermore, Williams addressed the level of employability skills within the business core and major coursework. This study considers the manufacturing major only.

The student survey instrument is divided into five sections. Section I asks for demographic information including gender, major, and employment status. Section II requests information on the extent to which students perceive employability skills as important for the workplace and should be addressed within their major. Specific employability skills are listed and defined within this section. Section III requests information regarding the degree to which students perceive the defined employability

Table 6

Comparison of William's (1999) Instrument and Adapted Survey Instrument

William's (1999) Survey Instrument		Adapted Survey Instrument	
Skills	Strategies	Skills	Strategies
Numeracy	Lecture	Teamwork	Lecture
Written Communication	Team Learning	Written Communication	Team Learning
Oral Communication	Student Internships	Verbal Communication	Student Internships
Interpersonal	Case Studies	Interpersonal	Case Studies
Ethical and Moral	Computer Simulations	Critical Thinking	Problem-based Learning
Thinking	Student Presentations	Customer Service	Project-based Learning
Lifelong Learning		Supervisory	Peer Assessment
Work Ethic		Project Management	Faculty Internships
Leadership		Change Readiness	
Problem Solving		Problem Solving	
Teamwork			
Computer			
Technology			

skills within their courses. Section IV addresses the extent to which students perceive their possession of employability skills, and Section V requests information about the instructional strategies faculty use to integrate employability skills within the manufacturing program. With the exception of Section I, each of the sections use a four-point Likert scale. Section II rankings are identified as Not Important to Very Important. Section III ranks from Not Integrated to Very Integrated. Section IV rankings are identified as Does Not Possess to Fully Possess. Finally, Section V ranks from Never Applied to Fully Applied.

The faculty survey instrument closely mirrors the student copy. Section I concerns demographic data including employment history, courses taught, and gender. Section II requests information regarding the extent to which faculty perceive defined employability skills as important for the workplace and should be addressed within major courses. Section III requests information regarding the degree to which faculty perceive they have integrated the defined employability skills within their courses. Section IV addresses the extent to which faculty members perceive students possess employability skills, and Section V requests information about the instructional strategies faculty use to integrate employability skills within the manufacturing program.

Table 7 defines the specific sections that correlate to each of the study's research questions. The final version of the modified instrument collapsed multiple questions into a single question. This change did not affect the content of the survey, but gave the appearance of fewer questions and became more user friendly. The faculty survey consists of 13 questions, and student survey consist 16 questions. To encourage higher response rates, the researcher chose to use this format. Williams (1998) conducted a pilot

Table 7

Survey Map of Research Questions and Corresponding Survey Questions

Research Element	Research Question	Survey Questions (Student Version)	Survey Questions (Faculty Version)
Importance of Employability Skills	Q1. What employability skills found important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs?	Section II: 8	Section II: 11
Faculty's Integration of Employability Skills	Q2. What employability skills found important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?	Section III: 9	Section III: 12
Students' Possession of Employability Skills	Q3. What employability skills found important for industry do students possess as perceived by senior students and faculty of manufacturing-related degree programs?	Section IV: 10	Section IV: 13
Instructional Strategies Utilized	Q4. What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing-related degree programs?	Section V: 11	Section V: 14

study of the original survey instrument and concluded that it took approximately 15-20 minutes for completion of the instrument. The researcher anticipates that similar timing

will be required of both faculty and students completing this survey instrument. A range of skills exists for employability skills surveys. However, the selected skills for this survey are based on the findings of the Mississippi Manufacturing Association (MMA) workforce needs study (2007) and the Society of Manufacturing Engineers/National Association (SME/NAM) skills study (2007). The items are also highlighted in current literature as important for preparing students for the workforce. The skills selected for this survey include (1) teamwork; (2) problem solving; (3) verbal communication; (4) written communication; (5) critical thinking; (6) customer service; (7) supervisory and management skills; (8) interpersonal skills; (9) change readiness; and (10) project management. Table 8 defines each skill as used within this survey.

Table 8

Skills Addressed in Survey of Employability Skills

Skill	Definition
Teamwork	The ability to work collaboratively with others from diverse backgrounds (Williams, 1999)
Problem Solving	The ability to recognize and define problems, invent and implement solutions, and track and evaluate results (Portway & Lane, 1998).
Verbal Communications	The ability to clearly express information in speaking (Williams, 1999)
Written Communication	The ability to clearly express information in writing (Williams, 1999)
Critical Thinking	The ability to make decisions, consider risks and generate alternative and innovative ideas

Table 8 (continued).

Skill	Definition
Customer Service	The ability to effectively assist and provide quality service to those who patronize a business
Supervisory & Management	The ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources
Interpersonal Skills	The ability to interact effectively with others with sensitivity and skill (Williams, 1999)
Change Readiness	The ability to accept, prepare for, and handle organizational change
Project Management	The ability to prioritize competing objectives and achieve project goals on time, within budget, and according to specifications

Validity and Reliability

Validity refers to the appropriateness, correctness, meaningfulness, and usefulness of the conclusions researchers make (Fraenkel & Wallen, 2006). Williams (1998) established validity for the original *Survey of Employability Skills* instrument. Williams utilized a two-part method to establish validity. First, a panel of faculty members and dissertation committee members reviewed the survey to ensure content validity. In the second pilot study, Williams used business students to identify "any ambiguities, inconsistencies, and lack of clarity in questions" (Williams, 1998, p. 67). A second follow-up study revealed no difficulty among students in understanding survey questions.

The current study varies in audience, but the purpose and directions remain the same as in William's study. However, to maintain validity, the instrument was shared

with selected faculty for an expert panel review. Members of the expert panel evaluated the instrument to ensure clarity of directions, concepts, definitions, and appropriateness of survey questions. Likewise, the student instrument was shared with a group of students to ascertain any difficulties in understanding the instrument. Both groups indicated no difficulty in understanding survey questions.

In addition to validity, it is necessary to establish reliability. Reliability refers to the consistency of an instrument and denotes "the degree to which scores obtained with an instrument are consistent measures of whatever the instrument measures" (Fraenkel & Wallen, 2003, p.166). Cronbach's Alpha is an appropriate test of reliability. Cronbach's Alpha describes "a general formula for estimating internal inconsistency based on a determination of how all items on a test relate to all other items and to the total test" (Gay & Airasian, 2003, p. 386). Huck (2004) agrees that this statistical method appears useful for assessing internal consistency or reliability of an instrument made up of items scored with a Likert-type scale using three or more possible values. Sections two through five of the survey instruments are scored using a four point Likert-type scale. According to Fraenkel & Wallen (2006), an alpha value of .70 is necessary for a scale to be considered reliable. Reliability for both instruments was calculated using Cronbach's alpha technique, which produced a reliability coefficient of .991.

Data Collection

The researcher obtained permission from university deans or department chairs (depending on university requirements) to conduct a survey of faculty and senior year students of manufacturing-related degree programs. The Institutional Review Board (IRB) also granted permission to conduct the study. Once required approvals were

granted, the researcher implemented the data collection plan for faculty and student instruments. Data Collection took place during the fall of 2011.

To maximize response rates, survey procedures reflected elements of Dillman's (2007) Tailored Design Method including multiple contacts and financial incentives. It should be noted that although the majority of targeted students meet in a traditional face-to-face format, a small portion of the population utilizes online courses. This required the use of a mixed mode survey utilizing both online and paper based surveys (Dillman, Smythe, and Christian, 2008). Therefore, the following provides a discussion of the data collection plan for all participant groups – faculty, online students, and traditional students.

Faculty Participants

The faculty survey was administered online using Survey Monkey. Survey Monkey, an online survey tool, allows users to design questionnaires, collect data, and perform analyses. Appropriate faculty members were identified using each university's website. This list was verified for accuracy and completion through the program chair or program coordinator for each academic program. All communication to faculty members was routed through the program chair or their appointees. Dillman (2007) suggests a maximum of five contacts with participants particularly in the case of mail surveys.

University faculty initially received a total of three email communications, which falls within Dillman's maximum range. The initial email invited faculty to participate in an upcoming Employability Skills survey. Details about the survey including its purpose, dates, and time commitment were provided. This step reduces non-response error (Dillman, 2007). The second email contact provided a link to complete the online

survey. The survey contains a message reminding participants about the study's purpose. The message also informed participants that participation is voluntary and all individual responses will remain confidential.

Two weeks were provided for the completion of the survey before the researcher sent a third and potentially final email. The email served as a thank you or reminder to participants expressing appreciation for completed responses and kindly asking participants to complete the survey if they had not done so already over a new two-week period. The survey link was also embedded in this third communication. As Dillman (2007) suggests, this final email was worded differently to reinforce previous messages while conveying to recipients that others had responded to the survey. This tactic was used to encourage remaining respondents to complete the survey. To encourage a higher response rate, the researcher decided to extend the survey by two weeks. Therefore, participants received a fourth and final email requesting their participation.

To encourage higher response rates, Dillman (2007) encourages the use of a token financial incentive that will be sent with the survey request. The survey message presented participants with an opportunity to enter a drawing of ten winners for a gift card or certificate. Complete instructions to obtain the gift card or certificate were provided at the conclusion of the survey. To maintain eligibility for the drawing, participants had to forward their email address and school name to a provided email address by a specified deadline.

Online Student Participants

The online student survey was administered similar to the faculty survey using Survey Monkey. This format was specifically designed for students of Institution E. All

communication to students was routed through the program coordinator. In accordance with Dillman (2007), participants received a total of three email communications. The initial email invited students to participate in an upcoming Employability Skills survey. This communication also provided details about the survey including its purpose, dates, and time commitment. This step reduces non-response error (Dillman, 2007). The second email contact provided a link to complete the online survey. Students were informed that participation is voluntary and all individual responses would remain confidential.

Two weeks were provided for the completion of the survey before a third and potentially final email was sent. The email served as a thank you or reminder to participants expressing appreciation for completed responses and kindly asked participants to complete the survey if they had not done so already over a new two-week period. The survey link was also embedded in this third communication. As Dillman (2007) suggests, this final email was worded differently to reinforce previous messages while conveying to recipients that others had responded to the survey. This tactic was used to encourage remaining respondents to complete the survey. To encourage a higher response rate, the researcher decided to extend the survey by two weeks. Therefore, participants received a fourth and final email requesting their participation.

A token financial incentive was also provided (Dillman, 2007) for online students. The survey message presented participants with an opportunity to enter a drawing of ten winners for a gift card or certificate. Complete instructions were provided at the conclusion of the survey. To maintain eligibility for the drawing, participants had

to forward their email address and school name to the provided email address by a specified deadline.

Traditional Student Participants

Data collection for traditional students initially differed as students completed a paper-based survey. A brief meeting was held with department chairs and program coordinators of each university program to gain support for the study and seek permission to distribute surveys during specified class meetings. Each university was asked to identify courses containing senior level students. Indentifying senior level courses increases the use of intact convenience samples (Williams, 1998). Furthermore, administering studies during class should lead to a higher return rate (Center for the Study of Higher Education, 2009).

Under each department chair's guidance, an associate faculty member was selected to coordinate the data collection process during a designated period. At some institutions, the chair coordinated the data collection. However, IRB restrictions and chair requests at two institutions required the researcher to personally administer the survey to students in selected classes.

To ensure consistency in the data collection process, facilitators received a script containing written instructions. The facilitator read these instructions to students before administering the survey. Facilitators distributed survey instruments in class and collected surveys before students exited the classroom. The survey cover sheet informed students that participation is voluntary and all responses would remain confidential.

Furthermore, the survey instrument contains questions designed to ensure that responses are captured from the correct student population. For example, Section I

questions students' classification and major. Any surveys completed by non-seniors or non manufacturing-related majors were discarded. To avoid selection error, the researcher requested via the faculty facilitator that students not complete more than one survey. Selection error occurs when a recipient is contacted via two addresses or locations (Ary et al., 2002). Therefore, if students completed the survey in one class, they were to refrain from completing the survey in another course. All completed surveys were administered within a one week period per institution using the voluntary allocation of faculty members' class time. In total, survey administration for traditional students were completed over the course of one month.

To encourage higher response rates, a token financial incentive was provided (Dillman, 2007). The survey cover sheet presented participants with an opportunity to enter a drawing of thirty winners for a gift card or certificate. Participants received complete written instructions at the conclusion of the survey. To maintain eligibility for the drawing, participants had to forward their email address and school name to the provided email address by a specified deadline.

It should be noted that after administering the paper-based survey to participants at Institution E, the researcher learned of an opportunity to increase the response rate for one academic program. This program utilizes a student list serve. The researcher in consultation with the program chair implemented the online survey to attract potential participants that had not completed the paper survey.

Data Analysis

Data collected was compiled and statistically analyzed using *Statistical Package for Social Sciences (SPSS 17.0) for Windows software*. This quantitative

nonexperimental research design utilizes descriptive statistics to analyze each of the study's research questions. Descriptive nonexperimental research primarily focuses on describing some phenomenon or its characteristics (Belli, 2009). Additional analysis details along with study findings are presented in Chapter IV.

Summary

The purpose of this study includes assessing the integration of employability skills in the undergraduate experience of students enrolled in manufacturing-related degree programs in Mississippi's universities. The study is based on the perceptions of faculty members and senior students. After obtaining IRB approval, the adapted Employability Skills Surveys were administered to faculty and students across five Mississippi universities using paper based and online formats. The data collected was compiled and analyzed using SPSS 17.0 software. Survey results and analysis of data are presented in Chapter IV.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This study assesses the status of employability skills in the undergraduate experience of students enrolled in manufacturing-related degree programs in Mississippi's universities. Chapter IV presents a description and statistical analysis of the data collected. The chapter is organized into two major sections. Section one presents a demographic description of participants. Section two provides the results and findings for each of the study's research questions:

1. What employability skills found as important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs?
2. What employability skills found as important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?
3. What employability skills found as important for industry do students possess as perceived by senior students and faculty of manufacturing-related degree programs?
4. What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing-related degree programs?

The population for this study consists of 30 faculty and 209 students of manufacturing-related degree programs in five of Mississippi's four year institutions. The entire population (N=239) was sampled. Two instruments- Survey of Employability Skills Student Copy and Survey of Employability Skills Faculty Copy- were used to collect data from both groups using online and paper based methods. Data were analyzed using *Statistical Packages for the Social Sciences (SPSS) 17.0 for Windows* software.

Descriptive statistics are used to address each of the individual research questions. Research questions one, two, three, and four are addressed by reporting the means and standard deviations. To address demographics results, means, frequencies, and percentages are reported. Table 9 defines the specific descriptive statistics that correspond to each of the study's research questions.

Table 9

Survey Map of Research Questions and Corresponding Descriptive Statistics Measures

Descriptive Statistic	Research Question	Survey Questions (Student Version)	Survey Questions (Faculty Version)
Mean, Mode, Standard Deviation, Frequency, Percentages	Demographics Questions	Section I: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Section I: 1, 2, 3, 4, 5, 6, 7

Table 9 (continued).

Descriptive Statistic	Research Question	Survey Questions (Student Version)	Survey Questions (Faculty Version
Mean & Standard Deviation	Q1. What employability skills found important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs?	Section II: 11	Section II: 8
Mean & Standard Deviation	Q2. What employability skills found important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?	Section III: 12	Section III: 9
Mean & Standard Deviation	Q3. What employability skills found important for industry do students possess as perceived by senior students and faculty of manufacturing-related degree programs?	Section IV: 13	Section IV: 10
Mean, Mode, Standard Deviation, Frequency & Percentages	Q4. What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing-related degree programs?	Section V: 14	Section V: 11

Demographic Results

Faculty

Tables 10 and 11 report the characteristics of faculty. A total of 18 faculty members completed the study yielding a response rate of 58%. Of the 18 faculty respondents, 14 (77.8%) identified themselves as male and 4 (22.2%) identified themselves as female. All respondents reported their faculty status as fulltime with the majority working at Institutions A and D. Faculty were asked to identify academic programs in which they taught. The top three responses were Industrial Technology (16%), Industrial Engineering (14%) and Robotics (14%). Reporting their years of experience at the collegiate level, 7 (38.9%) respondents indicated more than 10 years. Thirty-three (n=6) indicated 6 to 10 years of experience, and the remaining 5 respondents reported five or less years of experience.

The questionnaire also addresses the industry experience of faculty. Specifically, the survey asks faculty if they gained any manufacturing-related industry experience after entering academia. Twelve (66.7%) answered yes and six (33.3) answered no. Some faculty opted to further describe their industry experience. Descriptions included industry-based workshops, interactions with industry, consulting projects, and internships. Additionally, the survey questions faculty about affiliation with three manufacturing organizations – Society of Manufacturing Engineers (SME), Mississippi Manufacturers Association (MMA), and National Association of Manufacturing (NAM). Eight faculties (44.4%) indicated affiliation with SME, one (5.6%) with NAM, and one (5.6%) with MMA.

Table 10

Summary of Faculty Respondents by Institution

Institution	Description	Majors	Faculty Sampled	Valid Responses
A	Small rural land grant	Robotics & Automation, Technology Management, Applied Sciences/Electro-Mechanical Engineering Technology	6	6
B	Large urban	Industrial Technology	3	2
C	Rural	Applied Technology, Technology Management	5	3
D	Large land grant	Industrial Technology Industrial Engineering	15	6
E	Online program	Industrial Engineering Technology	2	1
Total			31	18

Table 11

Summary of Faculty Demographics

Characteristic	*f*	%
Gender		
Male	14	77.8
Female	4	22.2
Status		
Fulltime	18	100
Adjunct		
Years Teaching		
Less than 1 year	2	10.5
1 to 5 years	4	21.1
6 to 10 years	6	31.6
More than 10 years	7	36.8
Academic Program		
Industrial Technology	8	16
Industrial Engineering	7	14
Robotics	7	14
Applied Sciences	4	8
Applied Technology	5	10

Table 11 (continued).

Characteristic	*f*	%
Manufacturing Management	4	8
Industrial Eng. Technology	4	8
Technology Management	6	12
General Engineering	4	8
Other*	3	6
Program Format		
Primarily Face to Face	16	88.9
Primarily Online	2	11.1
Industry Experience (gained as faculty)		
Yes	12	66.7
No	6	33.3
Professional Organizations		
SME	8	44.4
MMA	1	5.6
NAM	1	5.6

*Other includes Production, Logistics, and Technology Education

Students

A total of 138 students responded to the survey. However, only 121 of the questionnaires were useable resulting in a response rate of 57.9%. Respondents consist of 94 (77.7%) males, and 27 (22.3%) females. All students hold senior standing, a

requirement for participants of this study, and 115 (95%) reported full-time status. Over half of the respondents (59.5%, n= 72) were enrolled at Institution D. Table 12 provides an overview of respondents based on institution.

Table 12

Summary of Student Respondents by Institution

Institution	Description	Majors	Student Count	Valid Responses
A	Small rural land grant	Robotics & Automation, Technology Management, Applied Sciences/Electro-Mechanical Engineering Technology	20	13
B	Large urban	Industrial Technology	15	8
C	Rural	Applied Technology, Technology Management	20	15
D	Large land grant	Industrial Technology Industrial Engineering	114	72
E	Online program	Industrial Engineering Technology	40	13
Total			209	121

The majority of respondents classified their academic majors as Industrial Technology (n = 42, 34.4%) and Industrial Engineering (n=41, 33.6%) One hundred seven respondents (88.4%) identified their academic programs as primarily traditional face to face formats.

The questionnaire also assesses students' professional experience, affiliation with professional organizations, and future employment plans. Sixty-eight students (56.2%)

reported having professional experience. Some of these students indicated their status as nontraditional working adults or retirees returning to school, which accounted for a mean of 39.6 months of experience among respondents. However, the median value reflects 9.5 months and the smallest mode equals 3 months. Sixty-five (53.7%) respondents are currently unemployed, and the remaining 35% (n=56) claimed an employment status of full-time or part-time.

Additionally, the survey questions students about affiliation with three manufacturing organizations – Society of Manufacturing Engineers (SME), Mississippi Manufacturers Association (MMA), and National Association of Manufacturing (NAM). Eight students (6.6%) indicated affiliation with SME, 5 (4.1%) with NAM, and 0 (0%) with MMA. Regarding future employment plans, 79 respondents indicated that they would seek employment in Mississippi upon graduation. Tables 13 provides an overview of student demographics.

Statistical Results

This study investigates the status of defined employability skills by assessing four areas: importance of skills, integration of skills, student possession, and teaching strategies. Each factor is based on the perception of faculty and students. The following presents results for each research question.

Research Question 1 Results

The first research question seeks to determine what employability skills found as important for industry are perceived as unimportant by senior students and faculty of manufacturing-related degree programs. Respondents were asked to select the number that best describes the degree to which they believe the defined skills are so important for

Table 13

Summary of Student Demographics

Characteristic	*f*	%
Gender		
Male	94	77.7
Female	27	22.3
Status		
Fulltime	115	95
Adjunct	6	5
Academic Program		
Industrial Technology	42	34.4
Industrial Engineering	41	33.6
Robotics	8	6.6
Applied Sciences	4	8
Applied Technology	5	10
Manufacturing Management	4	8
Industrial Eng. Technology	4	8
Technology Management	6	12
General Engineering	4	8
Other*	3	6

*Other includes Computer Technology, Construction Engineering Technology, Mechanical Engineering, and Logistics

Table 13 (continued).

Characteristic	*f*	%
Program Format		
Primarily Face to Face	16	88.9
Primarily Online	2	11.1
Industry Experience (gained as faculty)		
Yes	12	66.7
No	6	33.3
Professional Organizations		
SME	8	44.4
MMA	1	5.6
NAM	1	5.6

workplace success that they should be addressed throughout the manufacturing curriculum. Participants responded to questions using a 4-point Likert scale ranging from Not Important (1) to Very Important (4). A score of 1.00 denotes not important, 2.00 little importance, 3.00 somewhat important, and 4.00 very important.

Faculty as an overall group rated each of the employability skills as being somewhat important. All ten skills had a mean score of 3.00 and above. Customer service, written communication, and change readiness were rated the lowest with mean scores of 3.28, 3.44, and 3.50, respectively. Conversely, skills receiving the highest mean scores were problem solving (3.83), teamwork (3.78), and critical thinking (3.78). Table 14 provides a listing of the means for each skill in ascending order based on the level of importance attributed by faculty respondents.

Table 14

Manufacturing Faculty's Perceptions of Importance of Employability Skills (n=18)

Employability Skill	Mean	Standard Deviation
Problem Solving	3.83	0.38
Teamwork	3.78	0.43
Critical Thinking	3.78	0.55
Verbal Communication	3.72	0.46
Project Management	3.72	0.58
Interpersonal Skills	3.67	0.49
Supervisory Management	3.56	0.51
Change Readiness	3.50	0.61
Written Communication	3.44	0.61
Customer Service	3.28	0.75

Students also rated each of the employability skills as being somewhat important. Each skill resulted in a mean score of 3.00 and above. Written communication, customer service, and interpersonal skills were rated the lowest with mean scores of 3.41, 3.43, and 3.54 respectively. Students attributed the greatest importance to problem solving (3.84), critical thinking (3.80), and teamwork (3.79). Table 15 provides a listing of the means for each skill in ascending order based on the level of importance attributed by student respondents.

Table 15

Manufacturing Students' Perceptions of Importance of Employability Skills (n=121)

Employability Skill	Mean	Standard Deviation
Problem Solving	3.84	0.36
Critical Thinking	3.80	0.42
Teamwork	3.79	0.47
Project Management	3.75	0.52
Verbal Communication	3.71	0.52
Supervisory Management	3.64	0.61
Change Readiness	3.60	0.61
Interpersonal Skills	3.54	0.61
Customer Service	3.43	0.73
Written Communication	3.41	0.64

Research Question 2 Results

The second research question seeks to determine what employability skills found as important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs. Respondents were asked to select the number that best describes the degree to which they believe the defined skills are integrated throughout the manufacturing curriculum. Participants responded to questions using a 4-point Likert scale ranging from Not Integrated (1) to Very Integrated (4). A score of 1.00 denotes not integrated, 2.00 little integration, 3.00 some integration, and 4.00 very integrated.

Faculty as an overall group rated the majority of employability skills as having some integration. Nine of the ten skills had a mean score of 3.00 and above. Teamwork, problem solving and verbal communication had the highest mean scores. Both teamwork and problem solving received a mean score of 3.72, and verbal communication received a mean score of 3.50. Conversely, the lowest mean scores were reported for customer service, supervisory/management, and change readiness with scores of 2.72, 3.06, and 3.06 respectively. Table 16 provides a listing of the means for each skill in ascending order based on the level of integration attributed by faculty respondents.

Table 16

Manufacturing Faculty's Perceptions of Integration of Employability Skills (n=18)

Employability Skill	Mean	Standard Deviation
Problem Solving	3.72	0.46
Teamwork	3.72	0.46
Verbal Communication	3.50	0.71
Critical Thinking	3.44	0.78
Project Management	3.28	0.90
Written Communication	3.28	0.75
Interpersonal Skills	3.11	0.90
Change Readiness	3.06	1.06
Supervisory Management	3.06	0.94
Customer Service	2.72	1.07

Students also rated the majority of the employability skills as having some integration. Nine of the ten skills had a mean score of 3.00 and above. Problem solving,

project management, and teamwork were rated the highest with mean scores of 3.46, 3.45, and 3.43 respectively. Students attributed the lowest levels of integration to customer service (2.79), change readiness (3.12), and verbal communication (3.11). Table 17 provides a listing of the means for each skill in ascending order based on the level of integration attributed by student respondents.

Table 17

Manufacturing Students' Perceptions of Integration of Employability Skills (n=121)

Employability Skill	Mean	Standard Deviation
Problem Solving	3.46	0.67
Project Management	3.45	0.78
Teamwork	3.43	0.73
Critical Thinking	3.35	0.69
Interpersonal Skills	3.28	0.74
Supervisory & Management	3.21	0.78
Written Communication	3.17	0.75
Verbal Communication	3.16	0.87
Change Readiness	3.12	0.88
Customer Service	2.79	1.01

Research Question 3 Results

Research question number three investigates students' possession of employability skills found as important for industry as perceived by senior students and faculty of manufacturing-related degree programs. Respondents were asked to select the number that best describes the degree to which they believe students possess the defined

skills. To answer this question faculty reflected on their students, and students analyzed their self-possession of skills. Participants responded to questions using a 4-point Likert scale ranging from Does Not Possess (1) to Fully Possesses (4). A score of 1.00 denotes no possession, 2.00 little possession, 3.00 some possession, and 4.00 full possession.

Faculty perceived that their students had some possession of the majority of employability skills. Eight of the ten skills received a mean score of 3.00 and above. Teamwork, critical thinking, and problem solving had the highest mean scores of 3.50, 3.44, and 3.39, respectively. The lowest mean scores were attributed to customer service (2.72), change readiness (2.89), and written communication (3.00). Table 18 provides a listing of the means for each skill in ascending order based on the level of student possession attributed by faculty respondents.

Table 18

Manufacturing Faculty's Perceptions of Student Possession of Employability Skills (n=18)

Employability Skill	Mean	Standard Deviation
Teamwork	3.50	0.62
Critical Thinking	3.44	0.62
Problem Solving	3.39	0.61
Verbal Communication	3.28	0.67
Project Management	3.11	0.70
Interpersonal Skills	3.06	0.94
Supervisory/Management	3.06	0.94
Written Communication	3.00	0.77
Change Readiness	2.89	0.93
Customer Service	2.72	0.96

Students perceived themselves as having some possession of all employability skills. All ten skills received mean scores of 3.00 and higher. The highest scores were attributed to teamwork (3.58), critical thinking (3.44), and problem solving (3.42). Written communication, customer service, and supervisory/management received the lowest mean scores of 3.04, 3.18, and 3.27, respectively. Table 19 provides a listing of the mean scores for students' possession of each skill based on the perception of students.

Table 19

Manufacturing Students' Perceptions of Student Possession of Employability Skills (n=121)

Employability Skill	Mean	Standard Deviation
Teamwork	3.58	0.57
Critical Thinking	3.44	0.64
Problem Solving	3.42	0.54
Project Management	3.41	0.73
Interpersonal Skills	3.41	0.70
Change Readiness	3.38	0.71
Verbal Communications	3.31	0.73
Supervisory/Management	3.27	0.81
Customer Service	3.18	0.81
Written Communication	3.04	0.68

Research Question 4 Results

The fourth research question examines the teaching strategies used by faculty to address employability skills. Respondents were asked to select the number that best describes the degree to which they believe selected teaching strategies are applied by

major professors. To answer this question, faculty analyzed their own teaching methods and students reflected on their professors. Participants responded to questions using a 4-point Likert scale ranging from Never Applied (1) to Fully Applied (4). A score of 1.00 denotes never applied, 2.00 rarely applied, 3.00 sometimes applied, and 4.00 fully applied.

Faculty perceived themselves as sometimes applying the majority of identified teaching strategies. Five of the eight teaching strategies had a mean score of 3.00 and above. The highest scored teaching strategies were lecture, team learning, and project-based learning with mean scores of 3.83, 3.67, and 3.61, respectively. Conversely, the lowest mean scores were reported for faculty internship, student internship, and peer assessment with scores of 2.06, 2.56, and 2.94, respectively. Table 20 provides a listing of the means for each teaching strategy in ascending order based on the perception of faculty respondents. Table 21 presents the frequency and percentages for specific responses.

Table 20

Manufacturing Faculty's Perceptions of Teaching Strategies Applied (n=18)

Teaching Strategy	Mean	Standard Deviation
Lecture	3.83	0.38
Team Learning	3.67	0.59
Project-based Learning	3.61	0.70
Problem-based Learning	3.39	0.85
Case Studies	3.33	0.77
Peer Assessment	2.94	1.06
Student Internship	2.56	0.94
Faculty Internship	2.06	1.26

Table 21

Summary of Teaching Strategies Faculty Responses – Frequency and Percentages

Teaching Strategy	Valid	*f*	%
Lecture	3	3	16.7
	4	15	83.3
Team Learning	2	1	5.6
	3	4	22.2
	4	13	72.2
Case Study	2	3	16.7
	3	6	33.3

Table 21 (continued).

Teaching Strategy	Valid	*f*	%
	4	9	50.0
Student Internship	1	2	11.1
	2	4	44.4
	3	8	22.2
	4	8	22.2
Faculty Internship	1	9	50.0
	2	3	16.7
	3	2	11.1
	4	4	22.2
Problem-based Learning	2	4	22.2
	3	3	16.7
	4	13	72.2
Peer Assessment	1	2	11.1
	2	4	22.2
	3	5	27.8
	4	7	38.9

Students perceived faculty as sometimes applying five of the eight identified teaching strategies. The highest ranking strategies were lecture, team learning, and project-based learning. Lecture received a mean score of 3.71 as 70.2% (n=85) of

respondents selected a score of 4. Team learning was assessed at 3.35, and project-based learning received a score of 3.30. Students attributed the three lowest mean scores to faculty internship, peer assessment, and student internship with means scores of 2.49, 2.73, and 2.78, respectively. Table 22 provides a summary of the means for each teaching strategy based on the overall perception of students. Table 23 presents the frequency and percentages for specific student responses.

Table 22

Manufacturing Students' Perceptions of Teaching Strategies Applied (n=121)

Teaching Strategy	Mean	Standard Deviation
Faculty Internship	2.49	1.03
Peer Assessment	2.73	0.96
Student Internship	2.78	0.96
Problem-based Learning	3.03	0.84
Case Studies	3.12	0.80
Project-based Learning	3.30	0.76
Team Learning	3.35	0.72
Lecture	3.71	0.52

Table 23

Summary of Teaching Strategies Student Responses – Frequency and Percentages

Teaching Strategy	Valid	*f*	%
Lecture	1	1	.8
	2	4	3.3
	3	31	25.6
	4	85	70.2
Team Learning	1	1	.8
	2	16	13.2
	3	50	41.3
	4	54	44.6
Case Study	1	2	1.7
	2	24	19.8
	3	50	41.3
	4	45	37.2
Problem-based Learning	1	6	5.0
	2	25	19.8
	3	42	34.7
	4	48	39.7

Table 23 (continued).

Teaching Strategy	Valid	*f*	%
Peer Assessment	1	12	9.9
	2	43	35.5
	3	33	27.3
	4	33	27.3
Student Internship	1	17	14.0
	2	35	28.9
	3	36	29.8
	4	38	27.3
Faculty Internship	1	27	22.3
	2	44	36.4
	3	27	22.3
	4	23	19.0

To further elaborate on their responses, participants were presented two open-ended questions regarding employability skills and teaching strategies. The first question invited participants to share additional employability skills not addressed within the survey, which they believed to be important for workplace success. Faculty and students revealed several perceptions as outlined in Table 24. These perceptions varied in nature as responses include public speaking, industry partnerships, and practical application of

theory. No common themes were identified in faculty responses. However, several student responses center on real world application of theory.

Table 24

Additional Employability Skills Perceived as Important by Faculty and Students

Faculty	Students
1. Public Speaking 2. Machine Interface/Human Interface (Technology or Traditional Technical Skill) 3. Staying abreast (of) the latest technology 4. Partnerships with classroom and industry 5. Certifications and licenses 6. Virginia's Career and Technical Workplace Readiness Skills	1. I think it would be very beneficial for there to be more real-world application of the concepts learning in lectures. 2. We mostly work in theory, practical problem solving could be helpful. 3. Organization and patience 4. Co-op program or hands on experiences would greatly increase the understanding of material and help prepare the future workforce. 5. Project management software such as Prolog or Expedition training would be beneficial.

The second open-ended question centers on teaching strategies. Participants were invited to share additional teaching strategies not addressed in the survey, which they believed were applied in their major coursework. Faculty and students noted their thoughts. However, based on the wording of comments, some students may have shared strategies they believe should be in practice. Table 25 presents an overview of both faculty and student comments. These comments range in content. Responses include

demonstrations, independent studies, role playing, and open book tests. No common themes were identified. However, it is worth noting that both a faculty and student participant perceived independent learning as an additional teaching strategy.

Table 25

Additional Teaching Strategies Identified by Faculty and Students

Faculty	Students
1. Product Development. Concurrent Engineering	1. Learning on your own
2. Demonstrations	2. I'm not sure
3. Independent Studies	3. Follow up with tests results and explanation of mistakes that were made
4. Simulations, Role playing	4. Online courses are mostly enhanced correspondence courses with minimal interaction between professors and students.
5. Projects with industry for students to assist and solve problems	5. Proctored tests I feel should not be applied. In this industry you need to know how to locate material quickly, so open book tests would be beneficial.
6. Student led teachings	
7. Attracting their (students) attention through the realistic examples. Class attendance and collegiality.	

Summary

The population for this study consists of faculty and students (N=239) of manufacturing-related degree programs in five of Mississippi's state supported universities. The entire population of manufacturing faculty and students were sampled for this study. A total of 139 valid surveys were returned, yielding an overall response

rate of 58.2%. Faculty surveys totaled 18 (60%), and students' surveys totaled 121 (57.9%).

Chapter IV presented an overview of the description, statistical analyses, and results of the study. Descriptive statistics including means and standard deviations were used for data analysis. The results of open-ended survey questions were also shared. Each of these elements allow the researcher to draw conclusions and recommendations as presented in Chapter V.

CHAPTER V

DISCUSSION

Introduction

Chapter V provides a summary of the research study. This chapter presents an overview of the collected data, analysis, and resulting conclusions. Recommendations for further research are also provided.

Summary

Recent research studies and reports highlight a "skills gap" between the demands of employers and the level of workforce preparedness of university graduates. Employers believe that higher education does not adequately develop employability skills of graduates in general (Evers et al., 1998; Houghton & Proscio, 2001; Martin, Milne-Home, Barrett, Spalding, & Jones 2000; Robinson, 2006). This belief is further supported by a number of studies examining employability skills in specific academic subjects and settings.

A review of the literature revealed an opportunity to further investigate employability skills in the area of manufacturing education within the state of Mississippi. Both national and local studies indicate graduates of Mississippi's manufacturing-related degree programs may not be adequately prepared to meet workforce demands. This study assesses the status of employability skills in the undergraduate experience of students enrolled in manufacturing-related degree programs in Mississippi's universities. Specifically, the study addresses the perception of faculty and senior students regarding employability skills in the areas of importance, integration,

and student possession. Insight is also provided on strategies used to integrate employability skills.

This study utilized a descriptive non experimental research design using two groups. The population for this study consisted of 30 faculty and 209 senior students of undergraduate manufacturing-related degree programs across five Mississippi public institutions of higher learning. All 239 individuals were invited to participate in the study. A total of 139 valid surveys were returned, yielding an overall response rate of 58.2%. Faculty surveys totaled 18 (58%), and student surveys totaled 121 (57.9%).

A survey research method was used to "obtain information about the preferences, attitudes, practices, concerns, or interests" (Gay & Airasion, 2003, p. 20) of students and professors regarding their perceptions of employability skills in manufacturing-related degree programs. Two instruments- *Survey of Employability Skills Student Copy* and *Survey of Employability Skills Faculty Copy*- were used to collect the data. Both instruments were modified versions of a survey originally developed by Williams (1998) to measure the perceived employability skills of business students. The original survey was modified to fit the needs of this study in several areas including employability skills and strategies.

Due to the nature of the sample, this study required the use of a mixed mode survey (Dillman, Smythe, & Christian, 2008) utilizing both online and paper-based surveys. Faculty and selected students completed an online survey using Survey Monkey. All other students completed a paper version of the survey during regular class meetings. All surveys were compiled in Survey Monkey and transferred into an electronic format.

The collected data were analyzed and interpreted using *Statistical Package for Social Sciences (SPSS) 17.0 for Windows*. Descriptive statistics analysis was used to address each of the research questions. Research questions one, two, and three were addressed by reporting the means and standard deviations. To address research question four and demographic results means, frequencies, and percentages were reported. Responses to open-ended questions from the survey were also examined.

Demographic Data

The findings revealed that of the 18 faculty respondents, 77.8% are male and 22.2% are female. All respondents reported fulltime status with the majority having more than ten years of university teaching experience primarily in the areas of Industrial Technology, Industrial Engineering, and Robotics. Other academic programs include Industrial Engineering Technology and Applied Sciences. Regarding industry experience post entry into academia, the majority of respondents (66.7%) responded yes. However, descriptions of the experiences include industry based workshops, interactions with industry, consulting projects, and one internship. Also of note, less than half of respondents (44.4%) reported affiliation with Society of Manufacturing Engineers and only 1% reported affiliation with Mississippi Manufacturers Association (MMA) and National Association of Manufacturing (NAM).

For student respondents, the 121 seniors consist of 77.7% males and 22.3% females with 95% claiming fulltime status primarily in the academic majors of Industrial Technology and Industrial Engineering. Other areas of study include Applied Sciences, Industrial Engineering Technology, and Robotics. Over half of the respondents (59.5%, n= 72) were enrolled at Institution D. The majority of students (88.4%) described their

academic programs as the traditional face to face format. Over half of respondents (56.2%) indicated some professional experience with the most frequent time length being three months. Approximately 53.7% are currently unemployed, and 65% will pursue employment in Mississippi after graduating. Regarding professional affiliations, 6.6% are affiliated with SME, 4.1% with NAM, and 0% with MMA.

The most significant aspect of these findings relate to professional development. Most faculty report industry experiences post entry into academia. However, the definition of industry experience varied among respondents based on their descriptions. Although a significant number of students report professional experience, it is not known how closely all experiences directly relate to their majors. Furthermore, it appears that both groups lack exposure to major manufacturing organizations.

Conclusions

Conclusions are presented based on the results of the individual research questions.

Research Question 1: What employability skills found as important for industry are perceived as unimportant by senior students and faculty of manufacturing related degree programs?

Based on the overall means, faculty and students rated each of the 10 employability skills as having some importance. Each of the skills received a mean score of 3.00 or above. Interestingly, the top three rated skills for both groups include critical thinking, teamwork, and problem solving. This suggests that course instruction places strong emphasis on these areas.

Conversely, the lowest ranking skills for both groups included customer service and written communication. Customer service was rated the lowest for faculty followed by written communication, whereas written communication was the lowest skill for students followed by customer service. This suggests that perhaps more emphasis could be placed on both skills.

In comparing the mean scores for the highest rated (problem solving, mean = 3.83, customer service, mean = 3.28) and the lowest rated skills reported by faculty, there is a range of difference of .55. For students, the range of difference is .43 as problem solving has a mean score of 3.84, and written communication amounts to 3.41. This suggests similarity in the perceptions of importance of skills for both faculty and students.

Research Question 2: What employability skills found as important for industry are integrated within major coursework as perceived by senior students and faculty of manufacturing-related degree programs?

Faculty perceived most of the employability skills as having some integration within major coursework. Nine of the ten skills had mean scores of 3.00 and greater, ranging from 3.06 to 3.72. The skills rated highest were problem solving, teamwork, and verbal communication. However, faculty perceived customer service to be only somewhat integrated as indicated by a mean of 2.72.

Students, likewise, perceived most of the employability skills as having some integration. Nine skills had mean scores of 3.00 and above, ranging from 3.12 to 3.46. The skills rated highest were problem solving, project management, teamwork. The lowest rated skill – customer service – had a mean score of 2.79.

The outcomes of this data present several implications. Both groups listed problem solving, teamwork, critical thinking, and project management within the top five integrated skills. This finding is similar to the scale of importance for employability skills. In comparing importance versus integration, faculty and students indicated higher means for problem solving, teamwork, critical thinking, and project management in both categories. This suggests that faculty are striving to address these employability skills in major courses. This is good news considering both national and local reports including the 2007 MMA report cite employers' dissatisfaction with employees in several of these areas.

Similarly, both groups listed customer service as the lowest skill. In comparing importance and integration scales, student means for customer service ranked ninth on the importance scale and tenth on the integration scale. For faculty, the means for customer service ranked last on the importance scale and ninth on the integration scale. In addition, both faculty and students rated change readiness as the second lowest skill. These factors further support the findings of Research Question 1. In addition, faculty rated supervisory/management the same as change readiness. These findings indicate an opportunity to increase the exposure of students to customer service, change readiness, and supervisory/management as employability skills.

Furthermore, there appears to be a disconnect between faculty and students in the area of verbal communication. Both groups rated verbal communication with a mean above 3.00. However, faculty placed verbal communication within the top five integrated skills whereas students rated verbal communication in the bottom three. This

suggests students do not believe verbal communication is sufficiently addressed in the manufacturing curriculum.

Overall, faculty had higher ratings for integration of skills than students. Considering skills that fall within the category of some integration, faculty ratings range from 3.06 to 3.72, and student ratings range from 3.12 to 3.46. The highest faculty rating is .28 less than the rating for full integration, whereas the student rating needs .54 to reach full integration. This suggest that students perceive more effort could be given to integrating employability skills in the curriculum.

The perception that customer service, supervisory/management, and verbal communication are not adequately integrated is supported by industry. These findings support data often cited within industry reports. The MMA report (2007) states that employees lack adequate preparation in the areas of verbal communication, customer service, supervision and management, and soft skills (MMA, 2007) in addition to other skills.

Research Question 3: What employability skills found as important for industry do students possess as perceived by senior students and faculty of manufacturing related degree programs?

Faculty perceived students as having some possession of all the employability skills except two. Eight employability skills received a mean score of 3.00 and above, ranking from 3.00 to 3.50. As in the case of results for Research Questions 1 & 2, the top five rated skills include critical thinking, teamwork, problem solving, and project management. Two skills, customer service and change readiness, fall below 3.00 with scores of 2.72 and 2.89, respectively. This again suggests a need to increase students'

exposure to both skills. Written communication received an exact mean score of 3.00. Supervisory/management and interpersonal skills both received a score of 3.06. It could be construed that faculty question students' possession of these three skills.

Contrary to faculty perceptions, students perceived themselves as having some possession of all ten employability skills with scores ranging from 3.04 to 3.58. This includes customer service and change readiness – a deviation from the patterns set in Research Questions 1 and 2 in which customer service and change readiness placed among the lowest. This difference could be attributed to the tendency of people to reflect positively on personal knowledge, attitudes, and behavior when self-reporting (Cook & Campbell, 1979). It is also worth observing that students barely rated written communication above the 3.00 level with a mean of 3.04. This corresponds to faculty's rating of written communication and is consistent with findings from Research Question 1 in which written communication rated among the lowest for both faculty and students. This information suggests an insufficient level of student competence in the area of written communication.

Research Question 4: What strategies are used to integrate employability skills in major coursework as perceived by senior students and faculty of manufacturing related degree programs?

Faculty perceived themselves as somewhat applying five of the eight teaching strategies. The highest rated teaching strategies were lecture, team learning, and project-based learning with mean scores of 3.83, 3.67, and 3.61, respectively. Each of these skills received the greatest frequencies for 4 (Fully Applied) on the Likert scale.

In comparison, students also perceived faculty as somewhat applying five of the eight strategies. The highest rated strategies were lecture, team learning, and project-based learning with scores of 3.71, 3.35, and 3.30. Similar to faculty, each of these skills received the greatest frequencies for 4 (Fully Applied) on the Likert scale.

These findings indicate that faculty continue to utilize the traditional lecture method. However, it is worth noting that neither group perceived lecture as being fully applied based on the mean scores of less than 4 (Fully Applied). The mean scores along with the high ratings for other strategies indicate that faculty are embracing less traditional teaching methods to engage students and integrate employability skills.

Additionally, the data reveals that faculty are also applying case study and problem-based learning. These strategies received a mean score of 3.33 and 3.39 respectively. For students the scores were 3.12 and 3.03. The figures suggest that faculty utilize both approaches, but not extensively. This view supports the literature. Case studies and problem-based learning are typically used within law and medicine. However, case study has expanded to business, and problem-based learning is used in other fields including architecture, engineering (Cawley, 1989), and psychology (Reynolds, 1997). Both approaches are important learning tools that encourage students to apply critical thinking, problem-solving skills, and content knowledge to real-world problems and issues (Levin, 2001). As advocated by Bell (2010) and Scott (2007) faculty would benefit from the use of these instructional methods.

Interestingly, the findings for the lowest means scores were consistent among faculty and students. For faculty, the lowest mean scores were reported for faculty internship, student internship, and peer assessment with scores of 2.06, 2.56, and 2.4,

respectively. Students also attributed the three lowest mean scores to faculty internship, peer assessment, and student internship with means scores of 2.49, 2.73, and 2.78, respectively. The data indicates that both groups perceive that these three strategies are rarely applied. There may be several reasons for this in the areas of student internship and faculty internship.

The programs in this study do not require students to complete internships although students may be encouraged to pursue them. In this case, not all students possibly will experience an internship. Internships are often competitive and selection may be influenced by factors such as G.PA. and classification. As for faculty, several potential barriers may prevent their pursuit of internships. These barriers include time, funding, and a lack of recognition from their universities during evaluation for rank, promotion, and tenure.

Summary of Research Conclusions

This study seeks to assess the status of employability skills in the undergraduate experience of students enrolled in Mississippi's manufacturing-related degree programs. Based on the perception of faculty and students in this study, the following conclusions were made:

1. Faculty and students have limited affiliation with professional manufacturing-related associations. Few faculty members gain manufacturing-related experience through industry after entering academia.
2. Faculty and students perceive each of the identified skills as having some importance. However, the data indicates that more emphasis could be placed on customer service and written communication.

3. Faculty and students agree that the following skills are highly integrated in the curriculum: problem solving, teamwork, project management, and critical thinking.
4. Faculty rated the integration of verbal communication noticeably higher than students, which suggests students do not perceive verbal communication as being sufficiently addressed in the manufacturing curriculum.
5. Faculty and students perceive a low level of integration for customer service and change readiness skills. Faculty perceive a low level of integration for supervisory/management skills.
6. The perception that customer service, supervisory/management, and verbal communication are not adequately integrated is consistent with findings from a 2007 Mississippi Manufacturing Association's research report on the state's workforce training needs.
7. Students perceived themselves as having some possession of all ten skills, whereas faculty perceived students as having some possession of all the employability skills except customer service and change readiness.
8. Based on the low mean scores, it could be construed that faculty question student's possession of written communication, supervisory/management and interpersonal skills. Further validating faculty responses, students rated written communication low.
9. Faculty continue to rely heavily on the lecture method. Faculty internships, student internships, and peer assessment are rarely applied.

10. Collectively, the results of Research Questions 1, 2, and 3 indicate a need to improve student's employability skills in the areas of customer service, written communication, verbal communication, change readiness, and supervisory/management.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are presented:

1. College faculty and administrators should continually improve efforts to prepare students for the workplace by implementing employability skills across all courses, and courses should be evaluated to ensure that content is relevant to industry needs. Employability skills should also be embedded in program competencies, objectives and outcomes.
2. Faculty of manufacturing-related degree programs should modify existing courses to address employability skill deficiencies in the areas of customer service, written communication, verbal communication, change readiness, and supervisory/management.
3. In departments where the option of adding new courses exists, faculty should consider developing a course that specifically focuses on professional development and preparation for the workforce such as a seminar or capstone courses.
4. The programs considered in this study do not currently require students to complete internships. However, departments should highlight the value of internships and establish an ongoing relationship with their university's Career

Services unit to assist students in pursuing internships. Students should be required to register with Career Services early in their academic careers. Perhaps all students can be required to engage in a full internship, or short-term shadowing assignment. As students obtain internships, faculty should be involved in some aspect of evaluation to gain feedback on industry needs and student performance.

5. Although results indicate that faculty are embracing teaching methods beyond the traditional lecture, an opportunity for greater effort exists. Workshops should be conducted to assist faculty in developing the teaching methods needed to improve students' employability skills. Administration should reward faculty for effective teaching equal to research efforts.
6. Administration should encourage faculty to pursue internship experiences by providing release time and recognizing their efforts during evaluations for tenure, rank, and promotion.
7. Faculty and students have limited affiliation with professional manufacturing-related associations. Departments should establish active campus chapters of Society of Manufacturing Engineers (SME). Doing so will increase students' awareness of industry needs and will further develop their employability skills outside of class.
8. MMA should consider developing a school/student branch for colleges and universities, whereby they could serve as a liaison between industry and higher education. This will help to lessen the gap between industry needs and education requirements.

9. NAM should consider developing a portal for educators to share best practices for implementing employability skills in the classroom.
10. Institutions need to maintain or develop close relationships with industry to stay abreast of industry needs. Curriculum developers and instructors must maintain awareness of industry needs. Implementing strong advisory councils will be helpful.

Limitations

As outlined in Chapter I, several limitations exist for this study. The study was limited to manufacturing-related degree programs in five of Mississippi's public universities. This study analyzes the perceptions of senior students and faculty using a post-test only design instead of a longitudinal approach. Caution should be exercised in generalizing findings to manufacturing programs beyond the scope of this study. In addition, the study did not generate an adequate response rate per school to allow for an analysis by school. It should also be noted that it was difficult to get an accurate count of the student population throughout this study. For example, before the start of the study, one institution reported 15 seniors, but once the study began the count was 40. Likewise, another department initially reported 35 seniors but the final count was 74.

Recommendations for Future Research

A review of the literature reveals no study to date within the state of Mississippi specifically capturing the perception of the students and faculty of manufacturing-related degree programs. In addition, very little research exists on teaching strategies utilized by manufacturing faculty to integrate employability skills within courses. This research adds to the body of literature regarding employability skills and fills a gap in the literature

regarding the status of employability skills in Mississippi's manufacturing-related degree programs. Future research should focus on the perception of program graduates and their immediate supervisors regarding their employability skills and preparation for the workforce. Additional opportunities for future research studies also include exploring 1) a replication of this study using a sample in which findings can be generalized; 2) a replication of this study using a qualitative or mixed method methodology; 3) best practices from faculty for integrating employability skills; and 4) how additional factors such as extracurricular activities, student groups, or program chair attitudes impact employability skills.

Conclusion

Employability skills are vital to the sustainability of human capital and economic development. However, employers believe that higher education does not adequately develop employability skills of university graduates in general. Both national and local studies indicate graduates of Mississippi's manufacturing-related degree programs may not be adequately prepared to meet workforce demands. This study presents an assessment of the current status of employability skills in Mississippi's manufacturing-related degree programs, and provides insight on both the skill deficiencies and instructional methods to address them.

Findings indicate that both faculty and students perceive all employability skills addressed in this study as important which coincides with findings of other employability skills studies. Contrary to much of the literature, Mississippi's manufacturing faculty and students appear to be doing well in the areas of problem solving, teamwork, critical thinking, and project management. However, the data suggests that less value may be

attributed to written communication and customer service skills. Faculty must also give greater attention to change readiness, supervisory/management, and verbal communication skills which rated low in the areas of integration and student possession. These findings concur with multiple studies that cite the need for employees that can speak and write effectively. Customer service and supervisory/management are cited in NAM/SME industry reports (2005, 2007, 2009) and the MMA study (2007).

Faculty must continue to embrace innovative teaching methods to impart employability skills to students. Although the lecture method remains popular, faculty also utilize team learning and project-based learning. Conversely, faculty rarely apply faculty internship, student internship, and peer assessment, all of which the literature supports as methods for imparting real world knowledge and practices. Williams (1999) also identified the need for faculty to increase use of experiential learning methods.

This research lays for the foundation for manufacturing programs to take a more proactive approach in remaining relevant to current and future industry needs. It is hoped that the findings of this study will assist institutions and academic departments in critically assessing the status of employability skills in their respective programs to improve course and curriculum outcomes. Research findings and recommendations are also informative for economic and workforce development agencies. Perhaps this research will lead to programs, processes, and practices that positively impact the employability of Mississippi's manufacturing graduates.

APPENDIX A

IRB APPROVAL TO CONDUCT STUDY

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

TO: Mamie Y. Griffin
101 Rankin Road
Lorman, MS 39096

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 11041102
PROJECT TITLE: Manufacturing Mississippi's Workforce: An Assessment of Employability Skills as Perceived by Faculty & Senior Students of Four Year Manufacturing Related Degree Programs

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
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HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **11041102**
PROJECT TITLE: **Manufacturing Mississippi's Workforce: An Assessment of Employability Skills as Perceived by Faculty & Senior Students of Four Year Manufacturing Related Degree Programs**
PROPOSED PROJECT DATES: **04/05/2011 to 04/05/2012**
PROJECT TYPE: **Dissertation**
PRINCIPAL INVESTIGATORS: **Mamie Y. Griffin**
COLLEGE/DIVISION: **College of Science & Technology**
DEPARTMENT: **Department of Economic & Workforce Development**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **05/03/2011 to 05/02/2012**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

5-10-2011
Date

APPENDIX B

PERMISSION TO USE SURVEY OF EMPLOYABILITY SKILLS INSTRUMENT

Re: Employability Skills Dissertation
pawillia@wau.edu [pawillia@wau.edu]
Sent: Wednesday, December 08, 2010 9:43 AM
To: Griffin, Mamie Y

Dear Ms. Griffin:

Based on our conversation by telephone permission is hereby granted for you to use the two instruments on employability skills (student and faculty copies)that were developed by Patrick Antonio Williams.

I wish you success in your research and hope that your findings will provide meaningful recommendations to improve the curriculum in those manufacturing-related fields that will be the focus of the study.

Regards

Patrick A. Williams

APPENDIX C

SURVEY OF EMPLOYABILITY SKILLS

FACULTY INSTRUMENT WITH MESSAGES

1. Survey of Employability Skills - Faculty Version

Thanks for participating in the Manufacturing Employability Skills study. Once you complete the study you can enter a drawing to win one of fifteen gift cards/certificates (ex. McDonalds, Starbucks, Pizza Hut). Details to enter the drawing will be provided after you complete the survey. Your participation is voluntary and your identity will remain anonymous. If you have any questions about this research, you may contact me, Mamie Griffin, at 601-400-8203 or at Mamie.Griffin@eagles.usm.edu.

2.

1. What is your gender? Check one.

- [ ] Male
- [ ] Female

2. How long have you been teaching courses in a manufacturing related program? Check one.

- [ ] Less than 1 year
- [ ] 1 to 5 years
- [ ] 6 to 10 years
- [ ] More than 10 years

3. Please identify your university.

4. Which best describes your faculty status? Check one.

- [ ] Full-time
- [ ] Adjunct

5. In which of the following academic programs (majors) do you teach at least one course? Check all that apply.

- [ ] Industrial Technology
- [ ] Manufacturing Management
- [ ] Technology Management
- [ ] Applied Technology
- [ ] Robotics & Automation Technology
- [ ] Industrial Engineering
- [ ] Industrial Engineering Technology
- [ ] General Engineering – Manufacturing
- [ ] Applied Sciences - Electro-Mechanical Engineering Technology
- [ ] Other (please specify)

6. Have you had any manufacturing related industry experience since you started teaching manufacturing related courses? Check the appropriate response.

- [ ] Yes
- [ ] No
- [ ] If yes, how many months/years? Please briefly describe the experience.

7. Are you involved with the following organizations in any capacity? Check all that apply.

- [ ] Mississippi Manufacturers Association (MMA)
- [ ] Society of Manufacturing Engineers (SME)
- [ ] National Association of Manufacturing (NAM)

8. Select the number that best describes the degree to which you believe the following skills are so important for success in the workplace that they should be addressed throughout the manufacturing curriculum.

	(1) Not Important	(2)	(3)	(4) Very Important
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

9. Select the number that best describes the degree to which you integrate these skills across one or more of the courses you teach.

	(1) Not Integrated	(2)	(3)	(4) Very Integrated
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

10. Select the number that best describes the degree to which you believe your graduates as a whole possess the following skills.

	(1) Does Not Possess	(2)	(3)	(4) Fully Possess
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

11. Select the number that best describes the degree to which you apply the following teaching strategies across all the courses you teach.

	(1) Never Applied	(2)	(3)	(4) Fully Applied
Lecture: Traditional lecture method	◯	◯	◯	◯
Team Learning: Students are encouraged to work in groups	◯	◯	◯	◯
Case Studies: Students receive a real world case or situation to analyze during class	◯	◯	◯	◯
Problem Based Learning: Students receive a real world problem to analyze and solve over an extended period such as several days, weeks, or months	◯	◯	◯	◯
Project Based Learning: Students receive a project to develop over several days, weeks, or months	◯	◯	◯	◯
Peer Assessment: Students evaluate performance of other students and provide feedback	◯	◯	◯	◯
Student Internship experiences: The program of study requires students to complete work experiences	◯	◯	◯	◯
Faculty Internship: Faculty complete internships and refer to the experience in classes	◯	◯	◯	◯

12. What additional employability skills not addressed in this survey do you believe are important for workplace success and should be addressed in a manufacturing-related curriculum?

13. What additional teaching strategies not addressed in this survey do you apply in your courses?

3. Survey of Employability Skills - Faculty Version

Thanks for completing the survey! You are eligible to enter a drawing of fifteen winners for a gift card/certificate. To enter the drawing, you must send your e-mail address and university name only to Mamie.Griffin@eagles.usm.edu with the wording "Employability Faculty 15" in the subject line.

APPENDIX D

SURVEY OF EMPLOYABILITY SKILLS

STUDENT INSTRUMENT WITH MESSAGES

1. Survey of Employability Skills - Student Version

Thanks for participating in the Manufacturing Employability Skills study. Once you complete the study you can enter a drawing to win one of thirty gift cards/certificates (ex. McDonalds, Starbucks, Pizza Hut). Details to enter the drawing will be provided after you complete the survey. Your participation is voluntary and your identity will remain anonymous. If you have any questions about this research, you may contact me, Mamie Griffin, at 601-400-8203 or at Mamie.Griffin@eagles.usm.edu.

2.

1. What is your gender? Check one.

☐ Male ☐ Female

2. Are you a senior (includes graduating and non-graduating)? Check one.

☐ Yes

☐ No

3.

3. Please identify your university.

4. What is your program of study? Check at least one.

- [ ] Industrial Technology
- [ ] Manufacturing Management
- [ ] Technology Management
- [ ] Applied Technology
- [ ] Robotics & Automation Technology
- [ ] Industrial Engineering
- [ ] Industrial Engineering Technology
- [ ] General Engineering – Manufacturing
- [ ] Applied Sciences - Electro-Mechanical Engineering Technology
- [ ] Other (please specify)

5. Which of the following best describes the delivery format of your academic major?

- ◯ Primary traditional face to face courses
- ◯ Primarily online

6. Have you had any professional work experience (manufacturing related or non-manufacturing related)?

- [ ] Yes
- [ ] No
- [ ] If yes, how many months/years? Please briefly describe the experience.

7. Are you a fulltime or part-time student? Check one.

- ◯ Fulltime
- ◯ Part-time

8. What is your current employment status? Check one.

- ◯ Employed full- time
- ◯ Employed part-time
- ◯ Not employed

9. Upon completion of your degree, will you seek employment in Mississippi? Check one.

- ◯ Yes
- ◯ No

10. Are you involved with the following organizations in any capacity? Check all that apply.

- ☐ Mississippi Manufacturers Association (MMA)
- ☐ Society of Manufacturing Engineers (SME)
- ☐ National Association of Manufacturing (NAM)

11. Select the number that best describes the degree to which you believe the following skills are so important for success in the workplace that they should be addressed throughout the manufacturing curriculum.

	(1) Not Important	(2)	(3)	(4) Very Important
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

12. Select the number that best describes the degree to which you believe these skills are integrated throughout your major curriculum.

	(1) Not Integrated	(2)	(3)	(4) Very Integrated
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

13. Select the number that best describes the degree to which you believe you possess the following skills.

	(1) Does Not Possess	(2)	(3)	(4) Fully Possess
Teamwork: ability to work collaboratively with others from diverse backgrounds	◯	◯	◯	◯
Problem Solving: ability to identify and critically assess a problem and devise a plan of action for its solution	◯	◯	◯	◯
Verbal Communication: ability to clearly express information in speaking	◯	◯	◯	◯
Written Communication: ability to clearly express information in writing	◯	◯	◯	◯
Critical Thinking: ability to make decisions, consider risks and generate alternative and innovative ideas	◯	◯	◯	◯
Customer Service: ability to effectively assist and provide quality service to those who patronize a business	◯	◯	◯	◯
Supervisory & Management: ability to influence subordinates to enhance their productivity, also includes ability to effectively coordinate and control resources	◯	◯	◯	◯
Interpersonal Skills: ability to interact effectively with others with sensitivity and skill	◯	◯	◯	◯
Change Readiness: ability to accept, prepare for, and handle change	◯	◯	◯	◯
Project Management: ability to achieve project goals on time, within budget, and according to specifications	◯	◯	◯	◯

14. Select the number that best describes the degree to which you believe the following teaching strategies are applied by your professors across all your major courses.

	(1) Never Applied	(2)	(3)	(4) Fully Applied
Lecture: Traditional lecture method	◯	◯	◯	◯
Team Learning: Students are encouraged to work in groups	◯	◯	◯	◯
Case Studies: Students receive a real world case or situation to analyze during class	◯	◯	◯	◯
Problem Based Learning: Students receive a real world problem to analyze and solve over an extended period such as several days, weeks, or months	◯	◯	◯	◯
Project Based Learning: Students receive a project to develop over several days, weeks, or months	◯	◯	◯	◯
Peer Assessment: Students evaluate performance of other students and provide feedback	◯	◯	◯	◯
Student Internship experiences: The program of study requires students to complete work experiences	◯	◯	◯	◯
Faculty Internship: Faculty complete internships and refer to the experience in classes	◯	◯	◯	◯

15. What additional employability skills not addressed in this survey do you believe are important for workplace success and should be addressed in a manufacturing-related curriculum?

16. What additional teaching strategies not addressed in this survey do you believe are applied in your major courses?

4. Survey of Employability Skills - Student Version

Thanks for completing the survey! You are eligible to enter a drawing of fifteen winners for a gift card/certificate. To enter the drawing, you must send your e-mail address, major, and university name only to Mamie.Griffin@eagles.usm.edu with the wording "Employability Student 30" in the subject line.

5. Disqualification Page

Ooops... It appears you do not currently meet the qualifications to take this survey designed for seniors. Thanks for your time and consideration.

APPENDIX E

EMAIL COMMUNICATIONS FOR FACULTY SURVEY PARTICIPANTS

SURVEY OF EMPLOYABILITY SKILLS

FACULTY PARTICIPANT CONTACT NUMBER 1

Subject: Manufacturing Employability Skills Survey

Dear Faculty Member:

I am Mamie Griffin, a doctoral candidate at The University of Southern Mississippi. My research focuses on the employability skills of students enrolled in Bachelor's level manufacturing-related degree programs. I am seeking your help to complete a survey regarding your experience as a faculty member in a manufacturing-related degree program.

A number of research studies and reports identify the need for university graduates to improve their employability skills in various disciplines. Currently, very little research exists on the integration of employability skills in Mississippi's manufacturing-related degree programs. Your participation is this study could provide valuable input on the current status of employability skills in such programs. **Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)!**

During the week of XXX the web survey will be forwarded to you from your Department Chair. It will take approximately 20 minutes to complete. Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate. If you have any questions about this research you may contact me, Mamie Griffin, at 601-400-8203 or at Mamie.Griffin@eagles.usm.edu. Thanks in advance for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

FACULTY PARTICIPANT CONTACT NUMBER 2

Subject: Manufacturing Employability Skills Survey

Dear Faculty Member:

Your input and participation in this study of Manufacturing Employability Skills can help increase awareness about the integration of employability skills in Mississippi's manufacturing-related degree programs. It will take you approximately 20 minutes to complete the survey. **Your response is needed by 9/19/2011.**

Simply click on the link below, or cut and paste the entire URL into your browser to access the survey:

https://www.surveymonkey.com/s/EmployabilitySkills_Faculty

Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate.

Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)! Once you complete the survey, you will receive instructions for entering the drawing.

If you experience technical difficulties accessing or submitting the survey please contact Mamie Griffin at Mamie.Griffin@eagles.usm.edu. You may also contact me if you have questions regarding this research. Thanks for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

FACULTY PARTICIPANT CONTACT NUMBER 3

Subject: Manufacturing Employability Skills Survey

Dear Faculty Member:

Approximately two weeks ago, you received a link to the Survey of Employability Skills questionnaire. This survey measures the integration of employability skills in Mississippi's manufacturing-related degree programs.

If you have already completed the survey, thank you so much for your assistance. If you have not done so yet, please take a few minutes to complete the questionnaire. Your responses can assist in improving the employability skills of Mississippi's manufacturing-related degree program graduates. It will take you approximately 20 minutes to complete the survey. **Your response is needed by 9/19/2011.**

Simply click on the link below, or cut and paste the entire URL into your browser to access the survey:

https://www.surveymonkey.com/s/EmployabilitySkills_Faculty

Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate.

Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)! Once you complete the survey, you will receive instructions for entering the drawing.

If you experience technical difficulties accessing or submitting the survey please contact Mamie Griffin at Mamie.Griffin@eagles.usm.edu. You may also contact me if you have questions regarding this research. Thanks for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

APPENDIX F

EMAIL COMMUNICATIONS FOR ONLINE STUDENT SURVEY PARTICIPANTS

SURVEY OF EMPLOYABILITY SKILLS

ONLINE STUDENT PARTICIPANT CONTACT NUMBER 1

Subject: Manufacturing Employability Skills Survey

Dear Student:

I am Mamie Griffin, a doctoral candidate at The University of Southern Mississippi. My research focuses on the employability skills of students enrolled in Bachelor's level manufacturing-related degree programs. I am seeking your help to complete a survey regarding your experience as a student in a manufacturing-related degree program.

A number of research studies and reports identify the need for university graduates to improve their employability skills in various disciplines. Currently, very little research exists on the integration of employability skills in Mississippi's manufacturing-related degree programs. Your participation is this study could provide valuable input on the current status of employability skills in such programs. **Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)!**

During the week of XXX the web survey will be forwarded to you from your Department Chair or Instructor. It will take approximately 20 minutes to complete. Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate. If you have any questions about this research you may contact me, Mamie Griffin, at 601-400-8203 or at Mamie.Griffin@eagles.usm.edu. Thanks in advance for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

ONLINE STUDENT PARTICIPANT CONTACT NUMBER 2

Subject: Manufacturing Employability Skills Survey

Dear Student:

Your input and participation in this study of Manufacturing Employability Skills can help increase awareness about the integration of employability skills in Mississippi's manufacturing-related degree programs. It will take you approximately 20 minutes to complete the survey. **Your response is needed by XXX.**

Simply click on the link below, or cut and paste the entire URL into your browser to access the survey:

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate.

Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)! Once you complete the survey, you will receive instructions for entering the drawing.

If you experience technical difficulties accessing or submitting the survey please contact Mamie Griffin at Mamie.Griffin@eagles.usm.edu. You may also contact me if you have questions regarding this research. Thanks for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

ONLINE STUDENT PARTICIPANT CONTACT NUMBER 3

Subject: Manufacturing Employability Skills Survey

Dear Student:

Approximately two weeks ago, you received a link to the Survey of Employability Skills questionnaire. This survey measures the integration of employability skills in Mississippi's manufacturing-related degree.

If you have already completed the survey, thank you so much for your assistance. If you have not done so yet, please take a few minutes to complete the questionnaire. Your responses can assist in improving the employability skills of Mississippi's manufacturing-related degree program graduates. It will take you approximately 20 minutes to complete the survey. **Your response is needed by XXX.**

Simply click on the link below, or cut and paste the entire URL into your browser to access the survey:

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential. Your answers to questions confirm your consent to participate.

Once you complete the survey you will have an opportunity to enter a drawing for 1 of 10 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)! Once you complete the survey, you will receive instructions for entering the drawing.

If you experience technical difficulties accessing or submitting the survey please contact Mamie Griffin at Mamie.Griffin@eagles.usm.edu. You may also contact me if you have questions regarding this research. Thanks for your participation.

Best Regards,
Mamie Griffin
Doctoral Candidate
The University of Southern Mississippi

APPENDIX G

WRITTEN INSTRUCTIONS FOR PAPER-BASED STUDENT SURVEY

SURVEY OF EMPLOYABILITY SKILLS

SCRIPT FOR FACILITATION OF PAPER-BASED SURVEY
(To be read by facilitator)

Students:

This survey is presented to you by a doctoral candidate at The University of Southern Mississippi. This research focuses on the employability skills of students enrolled in Bachelor's level manufacturing-related degree programs. Your participation in this study can provide valuable input on the current status of employability skills in Mississippi's manufacturing-related programs.

Once you complete the survey you will have an opportunity to enter a drawing for 1 of 30 gift cards/certificates (ex. McDonalds, Pizza Hut, Starbucks)! You will receive written instructions for the drawing once you complete the survey.

Please be mindful of the following:

- The survey will take approximately 20 minutes to complete.
- Your participation is voluntary and your identity will remain anonymous. Individual responses are confidential.
- Your answers to questions confirm your consent to participate.
- If you have any questions about this research you may contact the researcher via contact information contained on the survey cover sheet.
- If you have completed this survey in a previous class, please refrain from completing a new survey.
- Once you have completed the survey, please turn it in to me before leaving the class. Thanks for your participation.

APPENDIX H

PERMISSION LETTERS

from Richard Maxwell <rmax@mvsu.edu>
to Mamie Griffin <mamie.griffin@eagles.usm.edu>

dateFri, Mar 11, 2011 at 10:36 AM
subjectRe: Manufacturing Programs in Your Department
mailed-bymvsu.edu

Hello Ms Griffin,

You have my permission to administer the Employability Skills Survey to students and faculty within the Department of Applied Technology and Technology Management.

Richard A. Maxwell, Ph.D., Interim Chair
Department of Applied Technology and Technology Management

from Royce Bowden <bowden@ise.msstate.edu>
to Mamie Griffin <mamie.griffin@eagles.usm.edu>

dateThu, Mar 10, 2011 at 5:26 PM
subjectRE: Manufacturing-related Degree Programs
mailed-byise.msstate.edu

Hi Mamie:

As discussed, I am comfortable with presenting our students and faculty with the opportunity to volunteer to take an IRB approved survey.

With cheerful service,
R. Bowden
- - -
Royce Bowden, Jr., Ph.D.
Professor and Head
Department of Industrial and Systems Engineering
Bagley College of Engineering
Post Office Box 9542
Mississippi State, MS 39762

Desmond Fletcher <Desmond.Fletcher@usm.edu>
to Mamie Griffin <mamie.griffin@eagles.usm.edu>

ccMD Sarder <Md.Sarder@usm.edu>

dateWed, Mar 16, 2011 at 12:01 PM
subjectRE: Manufacturing-related Degree Programs in Your Unit
mailed-byusm.edu

Hi Mamie,
As Director of the School of Construction, I have no problem with conducting this survey. However, I would also like the approval of Dr. MD. Sarder, coordinator for the IET program. He can be contacted at md.sarder@usm.edu.

Best regards,
Desmond Fletcher

from MD Sarder <Md.Sarder@usm.edu>
to Mamie Griffin <mamie.griffin@eagles.usm.edu>

ccDesmond Fletcher <Desmond.Fletcher@usm.edu>

date Wed, Mar 16, 2011 at 1:32 PM
subjectRE: IET Program
mailed-byusm.edu

I will be glad to help you with your dissertation. Let me know once you are done with your survey, I will distribute to our students.

****

MD Sarder, Ph.D.Assistant Professor & Program Coordinator
Industrial Engineering & Technology
University of Southern Mississippi
P:228.214.3237
F:228.214.3241
md.sarder@usm.edu

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