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Measuring employability among college students: A validity study

Megan Rodgers
James Madison University

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Measuring Employability among College Students: A Validity Study

Megan Rodgers

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

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Finally, I would like to thank my partner, A.J. Thank you for being patient and understanding, and for encouraging me to relax on occasion. You helped me keep a focused outlook on what’s truly important in life.
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Abstract

The practice of assessment in higher education is often focused on measuring outcomes of student success. However, the potential for a student to obtain a job (i.e., their employability) after graduation is often not directly measured. This reality is unfortunate given the competitive job market and rising cost of an education. One scale, the *Employability Skills Inventory* (ESI) has been identified as a potential assessment instrument that purports to measure skills necessary for employment in most occupations. Before deciding to use any scale for a particular purpose, one must establish that the scale is both reliable and valid. The focus of this thesis was to gather validity evidence for the ESI, paying a particular emphasis on the Thinking Skills subdomain. Use of a survey to employers, content alignment activities, and structural equation modeling were used to gather construct validity evidence. The results of this thesis suggest that the ESI is not an appropriate instrument for assessing employability among college students. A new model of employability and a process by which an appropriate employability measure can be developed are discussed.
CHAPTER 1

Introduction

Student Success

“Student Success” receives much attention in higher education, especially in the current age of accountability and after recent public scrutiny regarding the value of higher education. Across the globe, a movement to provide evidence of student success through assessment has flourished (Shavelson, 2010). The meaning of student success varies by institution reflecting specific educational mission statements and thus there is no universal definition (Kuh, Kinzie, Schuh, Whitt, & Associates, 2005; Ewell & Wellman, 2007). One institution may emphasize learner engagement because that is pertinent to their mission, while another may focus on measuring student learning outcomes.

The mission of James Madison University is to prepare students to be “educated and enlightened citizens who lead productive and meaningful lives.” To measure this vision of success, the institution assesses key knowledge, skills, and abilities aligned with their interpretation of what creates an educated and enlightened citizen. By nature, institutional missions vary, and subsequently their definitions of student success also differ.

There are some institutions that regard student success mainly in terms of retaining students rather than emphasizing the key knowledge, skills, and abilities they obtain. From this perspective, assessing “student success” only requires calculating the percentage of students that graduate within six years. Obviously, it is valuable for an institution to retain students, and retention is certainly a component of institutional
effectiveness. For example, people who possess a degree may have more occupational opportunities than those who do not complete this degree. Indeed, the unemployment rate for job seekers with only a high school degree is 22.9%, and for high school dropouts, rates are as high as 31.5%. On the other hand, the unemployment rate for recent college graduates is approximately 10%, although there is variability depending on the major of the job seeker (Carnevale, Cheah, & Strohl, 2011).

While retention is important within higher education, it is not a sufficient measure of student success. Retention measures alone do not demonstrate the knowledge, skills, or abilities of a student, nor do they suggest that the graduate will be a productive citizen. Retention only reflects completion of requirements within an institution, not completion of an institution’s mission or the achievement of any particular educational goals.

Better measures of student success focus on specific outcomes regarding student growth as a result of college. These might include increased knowledge and skills or post-graduation employment. A general definition from Messersmith (2007) suggests: “Most Americans, I believe, would define student success as the ability of a student to support himself or herself in this society after completing the educational process.” This broad definition goes beyond retention, focusing on a successful life after college.

Global Accountability

Preparing individuals to live successfully in, and contribute to, the modern world is a global objective. Providing evidence for the commonly held belief among educators that students who complete college are better prepared for life is a worldwide educational priority. As globalization makes education more accessible there has been a substantial
increase in enrollment rates, increasing the need for quality assurance (Altbach & Knight, 2007; Altbach, Reisberg & Rumbley, 2009; Schofer & Meyer, 2005).

In Europe, the Bologna Process is seeking to help more students become successful by ensuring quality educational experiences. The Bologna Process is an example of academic institutions responding to demands for increased social mobility, equivalent degree structures, and academic quality driven by globalization (Altbach & Knight, 2007). The Bologna Process is a collaborative initiative comprised of most countries in Europe that has made significant progress in achieving its goals. The Bologna Process aspires to 1) award comparable degrees across countries, 2) promote college access and student mobility, 3) embrace the need for increased degree attainment, and 4) ensure quality educational experiences (Lumina Foundation for Education, 2010).

The Bologna Process’s first goal has been completed, with comparable degrees being awarded across Europe through an effort called the “Qualifications Framework.” This framework defines the knowledge, skills, and competencies a student should obtain at each degree level (i.e., Bachelor’s, Master’s, Doctoral). Completion of the first goal enabled the second and third goals to occur. First, comparable degrees allow for increased student mobility across country borders. Prior to the Qualifications Framework, degrees had varying requirements and length across borders making comparisons difficult. Second, implementation of the Bologna Process has significantly increased college enrollment rates in Italy, especially for “marginal” students (Cappellari & Lucifora, 2009). Unfortunately, effects have been undeterminable in Germany (Horstschraer & Sprietsma, 2010). Thus, results are mixed, and no holistic studies have
been performed to determine the overall effect of the Bologna Process on enrollment rates.

The fourth component, Quality Assurance, is driven by the global need to provide evidence of quality in academic degrees and this is the Bologna Process’s current focus. This final component regards assessing student success and is largely implemented by “tuning” academic degrees. Tuning is a process where multiple stakeholders (e.g., students, employers, the public at large, and policymakers) discuss the skills a student should demonstrate after earning a degree. The European Commission supports “tuning programs” in an effort to “harmonize” degrees. The harmonizing effort seeks to sync student outcomes not only with particular academic programs, but with employers and community members that could potentially interact with the student after graduation. Essentially, this process provides benchmarks for institutions (Matthews, 2009). Benchmarks are made public so that institutions can be compared by stakeholders.

After outcomes are defined by the Tuning Process they are mapped back to the overarching Qualifications Framework. The goal is to ensure that graduates are qualified to enter relevant disciplines given their particular degree (Lumina Foundation for Education, 2010). By defining outcomes in terms of student preparation benchmarks, rather than specific educational processes, faculty within the 49 nations participating in the Bologna Process have the capacity and liberty to develop a wide range of educational experiences that meet the benchmarks (European Higher Education Area, 2010).

Quality assurance is a priority within the United States as well. An institution’s demonstration of outcomes assessment is a vital part of the accreditation process and accreditation is aligned with federal funding (Eaton, 2010). Students seek to attend
colleges and universities that are accredited. In the United States, accreditation occurs at the regional level, and there is no universally endorsed framework for quality assurance like there is in Europe. Each institution must show evidence of student success as defined within their institution, and this interpretation must include evidence of student learning outcomes.

**Degree Qualifications Profile**

Recently in the United States, the Lumina Foundation has created a “Degree Qualifications Profile (DQP)” that mirrors the Bologna Process’s degree qualifications framework. This document outlines learning outcomes for three levels of degree attainment (i.e., Associates, Bachelors, and Masters) in five areas of learning: Broad, Integrative Knowledge; Specialized Knowledge; Intellectual Skills; Applied Learning; and Civic Learning. Interestingly, these areas are defined as key outcomes that graduates need for “work, citizenship, global participation, and life” (Lumina Foundation for Education, 2011, p.1). Like the Degree Qualifications Framework within the Bologna Process, the outcomes of the DQP were created to provide summative benchmarks across institutions. The DQP is an attempt to connect the value of college to external stakeholders by publicizing the competencies a student should possess after attaining a certain US degree.

**The Liberal Arts Tradition and Economics**

The liberal arts tradition spans back to ancient Greece and Rome. There, education was reserved for elite members of society who learned about logic, grammar, rhetoric, arts, mathematics, music, and astronomy (Liberal Arts, 2012). These subjects comprised a liberal arts education thousands of years ago and are still found in the heart
of most general education programs in colleges and universities in the United States. A key purpose of a liberal arts education is for students to learn how to learn (Weingartner, 2007).

Following the liberal arts tradition, most American colleges have sought to teach students to become lifelong learners. This tradition focuses on acquiring knowledge, but not necessarily on developing key skills that are relevant for the workforce. In fact, some faculty who are serious about liberal arts education find employability to be a “tableau of disaster” (Goldman, 2000, p.152).

Recently, economic hardships across the world have created skepticism about the value of college. Specifically, citizens want to know that college is a worthwhile investment. People want a tangible beneficial outcome in return for their investment. With increased unemployment rates and record levels of debt among graduates, “student success” is unclear to the general public. Further, many employers express concern that college graduates do not possess skills necessary to thrive in the workplace (Johnson, 2011). This new emphasis on operationally defining student success as a matter of employment diverges from the liberal arts tradition. While a segment of American society still values learning for learning’s sake, many Americans want to focus their energy (and money) on skills and knowledge that are of clear and immediate importance.

Employability

Employability as a measure of student success has recently become a topic of discussion in the United States (Arum & Roksa, 2011; Davidson, 2011; Hacker & Dreifus, 2010; Taylor, C., 2011; Webley, 2011). Learning for the sake of learning does not guarantee the sort of occupational success it once may have. Rather, students need to
garner skills, knowledge, and abilities while in college that will prepare them for gainful employment after graduation. Surely liberal arts should not be replaced by vocational emphasis, but vocational considerations should be taken into account in the design of the curriculum. The DQP provides a model connecting college success beyond graduation and may be a prime model for defining and assessing education in our changing world.

The DQP makes an implicit connection to employability as a measure of student success. In the United Kingdom (UK), however, measuring employability is explicit. As in the United States, there have been growing concerns regarding employment after graduation. In the UK these concerns have led to a special emphasis on employability as an indicator of student success (Rae, 2007; Wright, Brinkley & Clayton, 2010). Particularly, the focus is on employability skills, which is now a part of the UK’s Higher Education Institutions’ (HEIs) agenda (Fallows & Stevens, 2000; Morely, 2010; Rae, 2007; Wright, Brinkley, & Clayton, 2010).

Unfortunately, sufficient measurement instruments to assess employability skills are lacking. Many institutions administer alumni surveys to collect information about graduate employment but these measures are not adequate. Response rates to alumni surveys tend to be low and it is likely that more successful students reply more frequently, creating sampling bias. Additionally, individuals may choose to work at home in order to raise a family; this should not be seen as a negative outcome, especially if college contributed to increased life satisfaction, overall family success, or greater success among the children of college-educated parents. What is needed within higher education at a global level is an indicator of a student’s potential to be employed by reflecting the skills they possess that enhance their employability. A measure of
employability skills, with sufficient reliability and validity evidence, could be used for this purpose. Further, if positive results were collected through this instrument, colleges could assert value to the public.
CHAPTER 2

Literature Review

Liberal Arts Education

The liberal arts tradition involves teaching key knowledge and skills that enable students to learn how to learn. Chickering (1999) describes a series of objectives for higher education that originated in the 19th century. Such objectives evolved from the ancient philosophies that are the core of liberal arts. These outcomes generally relate to a student’s personal and skill development and include: communication skills, critical thinking skills, interpersonal competence, cross-cultural understanding, a sense of identity, and preparation for work. Indeed, these outcomes can be found in a number of current college mission statements including those from Harvard University, Bucknell University, and Dartmouth College (Bucknell University, n.d.; Dartmouth College, n.d.; Harvard University, 1997). American higher education is generally rooted in liberal arts education.

More recently, the American Association of Colleges and Universities (AAC&U; Association of American Colleges and Universities, 2005) defined a set of common core learning outcomes for students that include knowledge domains, practical and intellectual skills, and also individual and social responsibility. These outcomes are thought to influence a student’s success in life, career, and their community. Messersmith’s (2007) sentiments about student success regarding the ability of students to support themselves after graduation seems to relate to at least one component of a liberal arts education.

Under the AAC&U (2005) framework, students receiving a liberal arts education should be knowledgeable in the following domains: science, social science, mathematics,
humanities, and the arts. Likewise, they should develop certain intellectual and practical skills including the ability to write and orally communicate, think critically and creatively, obtain quantitative and information literacy, be a good team player, and be able to integrate learned knowledge. Students obtaining a liberal arts education should develop individual and social responsibility in the form of civic responsibility and engagement, ethical reasoning, intellectual knowledge and actions, and the propensity for lifelong learning. The same report that describes these objectives also points out the lack of adequate measurement in these domains. Though liberal arts education has been prominent for hundreds of years, measurement of these outcomes is still lacking.

While the meaning of a liberal arts education has evolved, the key goal for students to learn how to learn has not. Changes in education related to the liberal arts have occurred within the broader context of society. Specifically, society has become more skill focused rather than knowledge-based which is largely a result of changing economic demands and access to college for a greater number of students. Unfortunately, in its current state, the celebrated liberal arts tradition does not completely align with employability. Learning for learning’s sake does not equal obtainment of a quality life. Many of the skills listed by Chickering (1999) and AAC&U’s (2005) student success outcomes are included in institutional goals, but they may not be totally sufficient for the skills required by employers.

**Value of College**

Recently, there has been public discussion about whether students really are successful after college. Many students graduate from college with substantial debt and a significant period of unemployment is a real possibility (Webley, 2011). According to
Davidson (2011) “a bachelor’s degree on its own no longer conveys intelligence and capability” as it once did. Widely read books purporting that college has limited value such as *Academically adrift: Limited learning on college campuses* (Arum & Roksa, 2011) and *Higher education?: How colleges are wasting our money and failing our kids--and what we can do about it* (Hacker & Dreifus, 2010) have led some individuals to seriously consider if college is truly worth it (Taylor, 2011). Despite public debate, many others hold that higher education *is* worth the cost (R.A., 2011; Rotherham, 2011). Specifically, the skills obtained in college should enhance a graduate’s employability, that is, their potential to be employed (Rampell, 2011; Yorke, 2004).

**Employability Theory**

Employability theory and research is prevalent in the United Kingdom (UK). The UK Department of Education provides annual statistics on “Skills and Employment” to the public (U.K. Department of Education, n.d.). Likewise, the UK Commission for Employment and Skills (2010) is currently addressing skill development for employment. Graduate employability efforts are not as pervasive in the United States. However, the US Office of Vocational and Adult Education within the Department of Education has started an effort to study employability skills though this report has not yet been published (U.S. Department of Education, 2011).

The term “employability” has many definitions and uses. Decades ago, employability solely pertained to achieving gainful employment (Feintuch, 1955). This perception is no longer deemed sufficient. Yorke (2006) suggests a new definition of employability as “a graduate’s potential to obtain a ‘graduate job’, and should not be confused with the actual acquisition of a ‘graduate job’ (p.2).” As employability research
has grown in the last decade in the UK, four major theories have emerged. These theories define employability differently and include varying elements necessary for a student to be employable.

**Employability Assets.** In a report on employability prepared on behalf of the Department of Employment and Education, Hillage & Pollard (1998) defined employability as “…having the capability to gain initial employment, maintain employment and obtain new employment if required (p.2).” They describe four elements necessary for one to be employable: 1) employability assets, 2) use and deployment of one’s employability assets, 3) presentation of employability assets, and 4) the context within which one seeks work.

Graduate skills, knowledge, and abilities comprise “employability assets.” Employability assets are differentiated into three types: Baseline assets include “basic skills” and personal attributes such as integrity. Intermediate assets include “generic skills” such as the ability to problem solve and communicate effectively. High-level assets include the ability to work in teams and self-manage. In this model, skills are only useful if one is able to deploy them in employment situations and present them when seeking employment. Likewise, this model also considers personal circumstances that may affect their acquirement of a relevant position.

**Employability through Generic Skills.** Bennett, Dunne, & Carre (1999) created a model of employability that not only includes disciplinary content knowledge and skills, but recommends courses including workplace awareness and experiences, and help to develop generic skills such as self-management, and the management of others, information, and tasks. The generic skills within this model are operationally defined by
one’s ability to manage various tasks/people/items, which could provide fruitful opportunities to measure employability as a performance.

The USEM Model. Yorke & Knight (2004) acknowledge Bennett’s model, however, they deem it incomplete and present a new model: USEM. Underpinning the USEM model are four interrelated factors: 1) Understanding 2) Skills 3) Efficacy 4) Metacognition. “Understanding” refers to relevant subject knowledge and “Skills” are defined as “skills practiced.” Likewise, “Efficacy” refers to a student’s self-efficacy, specifically their belief that they can “make a difference.” Finally, “Metacognition” refers to self-acknowledgement of the student’s own knowledge. In this model these four constructs are necessary for one to be employable. Like the Employability Assets model, skills are only a component of employability and other factors are necessary (e.g., self-efficacy) for one’s skills to truly affect their life outside of college. The USEM model is intended to provide a global framework for understanding employability so that it may influence higher education curriculum.

The CareerEDGE model. Dacre-Pool & Sewell (2007) created a complex and comprehensive model referred to as “the key to employability.” This model was created by combining aspects of the aforementioned theories and adding additional components. At the core of this model is Career Development Learning, Experience through work and life, Degree Subject Knowledge, Generic Skills, and Emotional Intelligence. Career Development Learning refers to one’s self-awareness of the types of jobs they would enjoy and the opportunities available to them in the market. Work and life experience are also critical in this model, as many employers highly value individuals who have been employed before or who have unique life experiences. Degree Subject Knowledge is also
important; however, it is noted that this knowledge alone will not make an individual employable.

Generic Skills refer to one’s ability to be flexible, independent, capable of working in a team, communicating, etc. Finally, emotional intelligence entails reasoning with emotions, components of empathy, and reflecting on one’s development. In addition to demonstrating the CareerEDGE skills, students should also be self-efficacious, have high self-esteem, and be self-confident to be employable.

Unfortunately, models created in the UK are based on the assumption that students enter higher education to study a specific discipline in-depth in order to earn a degree and increase their probability of getting a good or better job (Dacre-Pool & Sewell, 2007). This assumption may not be appropriate for higher education in the United States.

In the United States, many students do not consistently pursue degrees in domains that develop skills for a particular vocation (e.g., nursing, engineering) as they may in the UK. In fact, the second most popular U.S degrees are in the social sciences and history. These degrees comprise 11% of the total degrees granted in 2011 (National Center for Education Statistics, 2011). Degrees from these areas do not lead to discipline-specific career outcomes without post-graduate study. For example, a psychology major will not be able to become a “psychologist” after completion of their undergraduate degree. However, they will have developed and refined employability skills that will assist them in obtaining gainful employment in a wide range of fields, many of which expect applicants to have earned a bachelor’s degree. Thus, assessment of general employment skills that are developed in these types of majors are particularly important in the United States.
Employability Skills

Employability skills refer to generic and transferable skills that are essential to current workplace demands (Overtoom, 2000; Raybould & Sheedy, 2005). Employability skills go beyond merely being employed. Individuals with excellent employability skills will not only be more likely to obtain a job, but they will also retain their position because they will be a valued contributor to an organization (Buck & Barrick, 1987; Lowden, Hall, Elliot & Lewin, 2011; Saterfiel, & McLarty, n.d.).

Because many U.S. higher education institutions follow the liberal arts tradition, this thesis focused on employability skills, rather than the acquisition of employment. The liberal arts tradition aims to enhance at least some of the skills relevant to obtaining employment after graduation. Thus, if a student in the United States graduates from college, despite their degree, they should be better prepared to enter the workforce than they were prior to entering higher education.

What Do Employers Want?

When asked what factors employers seek in college graduates, employers typically present answers that can be categorized as skills and personal characteristics of the applicant. The current study is focused on employability skills rather than personal characteristics. Researchers investigating skills employers seek in the hiring process approach their research questions in one of three ways: by surveying, by interviewing, or by reviewing published job advertisements. Using these methods, many studies have investigated the skills employers seek. A review of the literature reveals some commonly identified employability skills: communication, ability to work in a team, critical

In the UK, where employability research is prolific, the Pedagogy for Employability Group (2004) summarizes a list of employability skills based on 25 years of research that include: creativity, flexibility, willingness to learn, autonomy, working with a team, ability to manage others, ability to work under pressure, oral and written communication skills, numeracy, attention to detail, time management, responsibility, planning, and use of technology. The only comparable document in the United States is the SCANS Report (U.S. Department of Labor, 1991).

**SCANS Report**

In the United States, the Secretary’s Commission on Achieving Necessary Skills (SCANS) sought to identify the skills needed for employment by young adults in the United States (U.S. Department of Labor, 1991). This task was commissioned in light of a changing and increasingly globalized workplace. The Commission interviewed business owners, employers, unions, supervisors, and workers in a variety of fields. These discussions with employment stakeholders led to the identification of eight required competencies and skills: Basic Skills, Information Skills, Thinking Skills, Interpersonal Skills, Personal Qualities, Systems Management, Resource Management, and Technology Use. Each general skill or competency includes a definition and a subset of components that are described in Tables 1 and 2.
Table 1

*Five Competencies Identified in SCANS Report*

<table>
<thead>
<tr>
<th>Competency</th>
<th>Definition and Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td>Definition: Identifies, Organizes, Plans, and Allocates Resources Components: Time, Money, Material and Facilities, Human Resources.</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Definition: Works with Others Components: Participates as a Member of a Team, Teaches Others New Skills, Serves Clients/Customer, Exercises Leadership, Negotiates, Works with Diversity</td>
</tr>
<tr>
<td>Information</td>
<td>Definition: Acquires and Uses Information Components: Acquires and Evaluates Information, Organizes and Maintains Information, Interprets and Communicates Information, Uses Computers to Process Information</td>
</tr>
<tr>
<td>Systems</td>
<td>Definition: Understands Complex Inter-Relations Components: Understands Systems, Monitors and Corrects Performance, Improves or Designs Systems</td>
</tr>
<tr>
<td>Technology</td>
<td>Definition: Works with a Variety of Technologies Components: Selects Technology, Applies Technology to Task, Maintains and Troubleshoots Equipment</td>
</tr>
</tbody>
</table>

(U.S. Department of Labor, 1991, p. x)
Table 2

*Three-Part Foundation in SCANS Report*

<table>
<thead>
<tr>
<th>Competency</th>
<th>Definition and Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Skills</td>
<td>Definition: Reads, Writes, Performs Arithmetic and Mathematical Operations, Listens and Speaks</td>
</tr>
<tr>
<td></td>
<td>Components: Reading, Writing, Arithmetic/Mathematics, Listening, Speaking</td>
</tr>
<tr>
<td>Thinking Skills</td>
<td>Definition: Thinks Creatively, Makes Decisions, Solves Problems, Visualizes, Knows how to Learn, and Reasons</td>
</tr>
<tr>
<td></td>
<td>Components: Creative Thinking, Decision Making, Problem Solving, Seeing Things in the Mind’s Eye, Knowing How to Learn, Reasoning</td>
</tr>
<tr>
<td>Personal Qualities</td>
<td>Definition: Displays Responsibility, Self-Esteem, Sociability, Self-Management, and Integrity and Honesty</td>
</tr>
<tr>
<td></td>
<td>Components: Responsibility, Self-Esteem, Sociability, Self-Management, Integrity/Honesty</td>
</tr>
</tbody>
</table>

(U.S. Department of Labor, 1991, p. x)

The report urges various stakeholders, including parents, teachers, and employers to work towards helping students achieve these skills. Huitt (1999) revisited the SCANS report and stated that the skills and competencies were still relevant after nearly a decade, although the cognitive, “Thinking Skills” model needed additional components and the author suggested revisions to these areas. Specifically, Huitt (1999) states that abstract thinking, critical thinking, intelligence, wisdom, awareness of competitive pressures and
cultural shifts, and implicit cultural understanding should be included when defining the Thinking Skills domain.

A 2008 document published by the Office of Disability and Employment Policy (ODEP; 2008) addresses employability. This document mentions various attributes that employers desire such as enthusiasm, but it also lists communication and critical thinking skills, echoing the SCANS report. Though this document is geared for individuals with disabilities, the parallel with the SCANS report suggests the identified attributes are universally valuable characteristics of excellent employees. We need ways of accurately measuring these skills.

**Measurement of Employability**

During the last 80 years, alumni surveys have been administered by higher education institutions in an attempt to learn what students do after graduation (Cabrera, Weerts, & Zulick, 2005). There is almost always a section in alumni surveys regarding a student’s current employment (Volkwein, 2010). The omnipresence of questions about a former student’s employment is an indicator of higher education’s interest in alumni employment. Unfortunately, alumni surveys yield poor measurements because they typically have low response rates and are prone to sampling bias since more successful graduates tend to respond. In addition, alumni survey questions about employment are poor indicators of employability skills since factors such as personal circumstances including the desire to seek employment and the job market can influence job obtainment.

There are several published instruments that purport to measure employability. However, these instruments focus on personal characteristics and knowledge of the
employment process rather than employability skills (Fugate & Kinicki, 2008; Rothwell, Herbert, & Rothwell, 2008). The BRIGANCE® Diagnostics Employability Skills Inventory (Brigance, 1995) purports to measure relevant skills necessary for employment, although, the skills measured are at a very basic level intended for use with secondary special education programs. Thus, this scale is not appropriate for use with college students.

There are also many personnel selection tests that employers use in the hiring process. Such instruments may have predictive utility relative to future job performance, but they are not aligned with desired skills needed for a position. Schmidt and Hunter (1998) reviewed 19 commonly used instruments in personnel selection and found that general mental ability and integrity tests have the highest predictive utility of subsequent job performance. However, skill-based assessments were not analyzed in this meta-analysis since they are commonly not used in personnel selection. For the current purpose, skill-based assessment is essential because colleges aim to teach these abilities that should subsequently increase one’s employability skills. Of the employability measures found in the literature, only the Employability Skills Inventory (ESI; Liptak, 2010) seems to be aligned with assessing student’s employability skills that relate to their potential to be employed. Thus, this scale was the focus of the current study.

**Employability Skills Inventory**

The ESI purports to measure the 8 skills identified in the SCANS report (U.S. Department of Labor, 1991). No research studies in the literature have used the ESI. The ESI is commercially available, costing four dollars per use. It is marketed to college career development offices as a tool that can help students identify their strengths and
weaknesses within the eight domains that are measured. The ESI is intended to assist students in improving their employability skills. The ESI was not developed as a program assessment instrument.

The ESI test manual suggests that items were created in relation to the SCANS report, although no detail was provided regarding this process. The measure includes 80 items that contribute to eight subscales reflecting the SCANS skills, with ten items on each subscale. Respondents answer items using a three-point scale: (1) Not True, (2) Somewhat True, or (3) Very True. Although the ESI seems to align well with the current measurement need, there is no validity evidence supporting the interpretation of scores on the eight subscales.

Validity

Validity is the process where scores from a scale take on meaning (Benson, 1998; Messick, 1995). Validity is an iterative process, where evidence is continually collected in an effort to support current interpretations of scores and their use for defined purposes (Messick, 1995). Though there are many frameworks to study validity (Borsboom, Mellenbergh & Heerden, 2004; Kane, 2000), Benson (1998) provides a coherent framework that will be used for this study. Benson’s (1998) framework is grounded in Messick’s (1995) theoretical assumptions about validity.

Messick (1995) views validity as a unified framework, where one collects different evidence to support an integrated interpretation of scores. According to Benson (1998), it is critical to have a strong program of construct validation for interpreting scores. In this framework, a construct is a latent characteristic or trait that is theoretically believed to drive responses to observations or items (Cronbach & Meehl, 1955). Within
Benson’s (1998) framework for a strong program of construct validation there are three stages: 1) the substantive stage, 2) the structural stage, and 3) the external stage.

The substantive stage refers to defining the theoretical and empirical area of the construct of interest, in this case “employability.” The structural stage investigates the interrelationships among items on the measure, specifically how the items on a scale relate to the theoretical construct under study. Finally, the external stage is concerned with determining if the construct is related to other constructs in theoretically expected ways.

**The Substantive Stage.** The substantive stage concerns the theoretical and empirical definition of a construct. This stage tests whether scores are interpreted in theoretically correct ways. This stage includes investigating content validity, to ensure that the content of the measure is theoretically accurate (Sireci, 1998). Content validity is commonly understood to be the process of determining the degree to which test items represent the domain of a target construct (Miller, Setzer, Sundre, & Zeng, 2007). Content validity can be assessed by gathering relevant information from subject matter experts (SMEs) to determine that observations, or items, are in line with the theoretical domain. Alternatively, one could gather content-related evidence through activities such as backwards translations, or investigating potential construct underrepresentation and/or irrelevancy (Benson, 1998). Construct underrepresentation occurs when the empirical evidence of the construct is too narrow. That is, the items do not measure the breadth of the construct. Likewise, construct irrelevancy occurs when variables that are not related to the theoretical construct are measured. Occurrence of either construct
underrepresentation or construct irrelevancy reduces one’s ability to make valid inferences about a particular domain.

**The Structural Stage.** The structural stage of Benson’s (1998) strong program investigates the structural, or internal, characteristics of the items intended to measure a construct. Statistical analyses, such as factor analysis and generalizability theory are used to estimate the consistency of scores. It is critical to ensure that items relate in theoretically expected ways. If they do not, one cannot conclude that the items represent a latent construct of interest (Benson, 1998). For example, the Thinking Skills items are scored and summed to a number that represents “Thinking Skills,” implying a unidimensional construct. If the items are functioning correctly and truly represent Thinking Skills, then a unidimensional model that is placed on the data should fit.

**The External Stage.** Once substantive and structural evidence has been collected, external validity can be investigated. Evidence within this stage determines whether the construct relates to other constructs in expected ways. One may gather such evidence by testing group differentiation, demonstrating that known groups perform in expected ways. Likewise, the construct should be highly correlated with other logically related measures. For example, with respect to Thinking Skills, the score that represents this construct should correlate with the *Need for Cognition Scale* (Cacioppo, & Petty, 1982) score since the two constructs are theoretically related.

**Current Validity Evidence for the ESI**

The test manual for the ESI includes a theoretical rationale for the creation of the items that is rooted in the SCANS report. Unfortunately, the eight SCANS domains consist of sub-domains and it is not clear how these individual subareas were used or
weighted when creating the items on the ESI. For example, it’s not clear if analyzing and
decision making (subcomponents of Thinking Skills) are equally represented on the
Thinking Skills items, because item development information was omitted from the test
manual. Thus, there is limited substantive evidence. Additionally, there is no structural
evidence presented in the manual suggesting that the items are interrelated in
theoretically expected ways. Test-retest reliability was conducted for a subset of the
sample used in test construction and while these values look promising (correlations
ranged from .78 to .93) this analysis was limited to a subset of the items (N=20 of the 278
individuals sampled). Like the substantive stage, the validity evidence for the structural
stage is lacking.

The ESI test manual does include a segment about the external validity of the
scale. Specifically, subscale scores were correlated with a related scale, the
Transferability Skills Scale (Liptak & Shatkin, 2007). However, without evidence of
substantive and structural validity, external validity should not be evaluated. The
findings may reflect systematic measurement error rather than constructs of interest.

**Thinking Skills**

Of the eight subscales on the ESI, the Thinking Skills subscale most closely aligns
with the goals of a liberal arts education (AAC&U, 2005). The SCANS report states it is
a necessary skill, and a re-evaluation of this report calls for an even stronger emphasis on
this cognitive domain (Huitt, 1999). The Thinking Skills subscale is comprised of the
following components as defined by the SCANS report: creative thinking, decision
making, problem solving, seeing through the mind’s eye (e.g., processing information),
knowing how to learn, and reasoning, as described in Table 2 (Liptak, 2010; U.S.
Department of Labor, 1991). These abilities also align well with the critical thinking literature (Fisher, 2001). The item development process described in the ESI test manual is not clear, although, it appears items were written to generally represent this domain. Unfortunately, no evidence is provided to support a conclusion that the 10 Thinking Skills items will generate a valid representation of Thinking Skills. In the test manual, the following narrative is provided to describe individuals who score high on the Thinking Skills subscale:

People who score high on this scale tend to be able to think creatively, make effective decisions, solve problems logically and efficiently, visualize how things work, apply sound reasoning skills, and use effective learning techniques to acquire new knowledge and skill (Liptak, 2010, p. 8)

Note that this description of thinking skills spans several different constructs (e.g., creative thinking, decision making, problem solving, reasoning, etc.). This is quite an array of separate and unique skills to be addressed with just 10 items. Further, the test manual does not specify which items represent each of these unique thinking-skills constructs. Thinking skills is central to both liberal arts education and employability, so it should be explored more fully.
CHAPTER 3

Method and Results

There is a need in higher education to assess students’ potential to be employed (i.e., employability). The *Employability Skills Inventory* (ESI; Liptak, 2010) is a measure that could potentially fulfill this need; however, this new scale lacks validity evidence. The purpose of the current study is to begin gathering validity evidence for this purpose\(^1\). During some phases of my analysis I will seek validity evidence for the entire ESI, however, a comprehensive analysis would be beyond the scope of a Master’s Thesis. Therefore, for some analyses, I will limit my focus to the Thinking Skills subscale. Thinking Skills are relevant to both liberal arts education outcomes, as well as skills that employers seek.

Research Questions

**Research Question 1A: Employer Survey.** The literature regarding skills employers seek in potential employees is vast and does not include one common theoretical definition. The SCANS Report is used as a model for the present study since the ESI items were written to reflect it. In an effort to gauge the importance of the eight factors emphasized in the SCANS model to the selection of future employees, a survey was distributed to employers to determine: 1) what skills and characteristics employers seek when hiring, 2) if the 8 domains identified in the SCANS report are important in the hiring process, and 3) if the ten Thinking Skills items on the ESI reflect relevant and important abilities in making hiring decisions. I hypothesize that the employers will find all eight domains important but other factors may also be considered.

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\(^1\) I have obtained permission from JIST Publishing to use this scale for research purposes. See Appendix A.
**Research Question 1B: Backwards Translation.** How well do the 80 items of the ESI reflect the eight intended domains? By implementing a backwards translation, I gathered initial substantive validity evidence. I hypothesize that the items will generally relate to most domains because, at face value, the items seem relevant to the construct they are intended to measure.

**Research Question 2: Confirmatory Factor Analysis.** The ten Thinking Skills subscale items are totaled to create a subscale score. This practice assumes that the items represent a unidimensional construct, “Thinking Skills,” although this assumption has not yet been tested. Confirmatory factor analyses (CFAs) will be implemented to determine: 1) if a unidimensional model fits the data, and 2) if an alternative bifactor model fits the data. If the unidimensional model fits the data, this will provide structural validity evidence suggesting common variance among the items that could be reflective of Thinking Skills. To be sure the construct is truly Thinking Skills and not an extraneous variable, the construct should relate to other constructs in theoretically expected ways (i.e., external validity).

**Research Question 3: Correlations with Similar Constructs.** If a unidimensional model fits the data, then the Thinking Skills items can be correlated with similar constructs. Will the Thinking Skills subscale scores positively relate to the Need for Cognition scores?

**Organization of Methods and Results Sections**

Four studies were conducted to gather construct validity evidence for the *Employability Skills Inventory (ESI)*, with a particular emphasis being placed on the ten items that comprise the Thinking Skills subscale. Because multiple studies were
conducted involving different samples and different methodologies, a brief overview followed by a method, result, and discussion segment for each stage of Benson’s (1998) framework is presented. Stage 1, the Substantive Stage, contains two studies. During Study 1A, subject matter experts stated skills necessary for employment and also evaluate the importance of the eight subscales associated with the ESI and the tasks involved in the ten Thinking Skills items of the ESI. During Study 1B, graduate students performed a backwards translation of the ESI. During Stage 2, the Structural Stage, a unidimensional model and an alternative bifactor model was evaluated to test the structure of the Thinking Skills subscale. Since important problems with respect to the substantive and structural validity evidence were identified, external validity evidence for the Thinking Skills subscale, was not collected, however a general discussion about the types of studies one can employ to gather external validity evidence can be found in the discussion chapter of this thesis.

Substantive Stage—Content Validation (Study 1A)

Tests and measures should represent their intended theoretical domain. Content validation procedures gather evidence of this theoretical relationship. Whereas construct validation is a process that typically focuses on the inferences made from test scores, content validity emphasizes the test and involves evaluating the test’s domain representation, relevance, definition, and test construction procedures (Sireci, 1998). The Standards for Educational and Psychological Testing (Standard 7.11; American Educational Research Association, American Psychology Association, & National Council of Measurement in Education, 1999) emphasize evaluation of content representation of tests for their intended purposes.
Content validity evidence is often gathered by using participant judgments rather than statistical methods. Subject matter experts (SMEs) are often consulted during the theory development process, as well as in later item alignment evaluation efforts in order to gauge how well items reflect a given theory. For the current study, SMEs were individuals who hire college graduates. Ideally, the practices of SMEs should align with the theory behind skills sought in the hiring process.

**Research Questions.** 1) What skills and characteristics do employers seek when hiring? 2) Are the 8 domains identified in the SCANS report important in the hiring process? 3) Are the ten Thinking Skills items important abilities sought during the hiring process?

**Background.** The SCANS report provides a model for employability skills. However, this model is more than 20 years old. While Huitt (1999) suggests that these skills and abilities were generally still appropriate 12 years ago, this theoretical domain should be evaluated. Further, when performing validity studies, it is important to test alternative hypotheses, including construct underrepresentation (American Educational Research Association, American Psychological Association, & National Council of Measurement in Education, 1999).

Construct underrepresentation occurs when the theoretical domain is too narrowly defined (Messick, 1989). Thus, it is of interest whether the subcomponents (e.g., Basic and Interpersonal Skills) adequately represent “employability.” To determine this, SMEs were asked open-ended questions that inquired what skills they seek during the hiring process.
After listing characteristics, abilities, traits, and skills sought when hiring a college graduate, SMEs were asked to rate the importance of the 8 domain areas to ascertain the current value in these areas and abilities. Likewise, SMEs were asked to rate the importance of the 10 abilities described in the Thinking Skills definition. To gather this information from SMEs, I used an online survey. I expected a response rate of approximately 55% based on a study that evaluated response rates in academia (Baruch, 1999).

**Sample and Procedure.** The following protocol was approved by the James Madison University Institutional Review Board. Approximately 106 employers in the Harrisonburg, Virginia community were asked to respond to a survey via Qualtrics. The 106 employers were selected from a list of individuals who have collaborated at least once with James Madison University’s Career and Academic Planning program, from whom we obtained their contact information. The selected employers varied greatly in the nature of their organizations and the types of jobs for which they hire. For example, careers in customer service, construction, lodging, legal services, museums, restaurants, and insurance agencies, among others, were included in this sample.

An initial email was sent to employers to explain the nature of the study and request participation (see Appendix B). Following the initial invitation, three subsequent reminder emails were sent over a three week period (see Appendices C through E). The first page of the survey stated the purpose of the study and instructed employers to proceed if they consented to participate. Next, employers were asked two open ended questions. First, they were asked about the qualities, abilities, and skills they seek when selecting future employees. The second question asked employers specifically about the
skills they seek in potential employees. The second question was meant to capture skill specific responses that may not have been collected in the first question. Upon completing the open-ended portion of the survey, employers were prompted to move forward. They were not permitted to return to these items later during the survey process.

Employers were next asked to rate the importance of 13 skill and ability domains. Eight of the listed domains were from the SCANS Report, and the other five represented other traits and skills identified in the literature (Hansen & Hansen, n.d.; Peter D. Hart Research Associates, Inc., 2008). Employers rated the importance of each skill relevant to the hiring process using a 5-point Likert scale ranging from “Not at all Important” to “Very Important.” At the end of this page, an open ended question asked employers to list any skills missing from the list of 13 skills.

Finally, employers rated the importance of the ten abilities described within the Thinking Skills items. The items had self-referential information removed. For example, the item “I can easily understand pictures, symbols, and graphs” was reduced to “understanding pictures, symbol, and graphs.” Respondents were asked to respond to these items using a 5-point Likert scale mirroring the domain response scale. See Appendix F for a complete copy of the survey.

Results. Forty of the 106 employers sampled responded to the survey providing complete data, yielding a 38% response rate. All respondents answered the first question regarding skills, abilities, and characteristics sought in potential employees. Nineteen of the forty employers responded to the follow up question regarding specific skills sought when hiring college graduates. The reduction in sample size was expected as employers
were instructed to skip the question if they properly addressed it in question one. The three specific research questions will be addressed in the following sections.

**What Skills Do Employers Seek?** The survey began with two open-ended questions: (Q1) what characteristics, traits, abilities, and/or skills are you seeking when you hire a college graduate? and (Q2) what specific skills are you seeking when you hire a college graduate? Employers tended to answer this question in list format, and responses were relatively short ranging from 10-99 words. I analyzed the responses using open-coding. Open coding involves identifying themes and organizing responses relative to those themes (Strauss & Corbin, 1990). Answers to questions 1 and 2 were combined since the second question was intended to capture any skills that may have not initially come to mind. Unique employer responses were assigned to themes, and in the case that an employer listed the same skill in Questions 1 and 2, the skill was only “counted” once. Many employer responses were subdivided into more than one category. For example, if an employer responded “I seek communication and computer skills,” half of the response would be coded as “communication skills” and the latter half as “technology skills.”

Using this method, I identified seven prominent “skill” categories and seven “personal characteristic” categories that were referenced by at least five employers. Skill categories included: Communication, Thinking, Teamwork, Technology, Knowledge, Resourcefulness, and Multicultural skills. Personal Characteristic categories included: Reliability, Integrity, Work Ethic, Positive Attitude, Ambition, Self-Motivated, and Work Ethic. “Components” were created to describe responses within a category. Each category, along with its components and the frequency of responses, is listed in Tables 3 and 4. Table 3 includes “skill” data and Table 4 includes “characteristic” data.
In addition to the fourteen themes identified, there were a number of “Miscellaneous” responses. Responses placed in this category varied and included: Customer Service, Curiosity, Professionalism, Independence, and Willingness to Learn. Notably, “Work Experience” was referenced several times. This domain did not directly relate to skills or personal characteristics. Rather, this factor could be considered as a confounding variable. Work experience would likely influence employability, however, it is not associated with the typical demands of college. Therefore, work experience should not be considered as a factor within an assessment of employability skills developed during college. Since relevant work experience contributes to employment potential, it will be important to control for relevant work experience on any college assessment tool that measures employability.
Table 3

Employer Survey Responses to Q1: Skills

<table>
<thead>
<tr>
<th>Category</th>
<th>Components</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Clear Written and Oral Communication Skills; Interpersonal Skills; Good Articulation; Correct Grammatical Use</td>
<td>24</td>
</tr>
<tr>
<td>Technology</td>
<td>Ability to use Microsoft Office; Adapting to New Software; Experience Using Technology; Basic Computer Skills</td>
<td>17</td>
</tr>
<tr>
<td>Thinking</td>
<td>Quick Thinking; Problem Solving; Decision Making; Intellectual; Analytic Skills</td>
<td>12</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Being a Team Player; Working Well with Others</td>
<td>9</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Applying Knowledge</td>
<td>7</td>
</tr>
<tr>
<td>Resourceful</td>
<td>Time Management; Prioritizing; Organization Skills</td>
<td>7</td>
</tr>
<tr>
<td>Multicultural</td>
<td>Working with People with Different Backgrounds; Diversity Appreciation</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. N=40
Table 4

Employer Survey Responses to Q1: Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Components</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Reliable; Dependable</td>
<td>12</td>
</tr>
<tr>
<td>Integrity</td>
<td>Trust; Integrity; Honesty</td>
<td>9</td>
</tr>
<tr>
<td>Work Ethic</td>
<td>Hard Working</td>
<td>8</td>
</tr>
<tr>
<td>Positive Attitude</td>
<td>Positive Outlook; Personable;</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Enthusiastic</td>
<td></td>
</tr>
<tr>
<td>Ambition</td>
<td>Ambition, Drive, Passion, Vision</td>
<td>5</td>
</tr>
<tr>
<td>Self-Motivated</td>
<td>Self-motivated</td>
<td>5</td>
</tr>
<tr>
<td>Willingness to Learn</td>
<td>Willingness to Learn</td>
<td>5</td>
</tr>
</tbody>
</table>

Note. N=40

Are the SCANS Skills Still Important For Hiring? After responding to the two open-ended questions, employers rated the importance of 13 skills and abilities using a 5 point Likert scale ranging from 1- “Not at all Important” to 5-“Very Important.” Eight skills were directly from the SCANS report and five abilities/skills from the literature were included as reasonable alternatives (distracters). Descriptive information for the 13 skills, characteristics and abilities arranged in the order it was found on the survey are listed in Table 5. Likewise, Figure 1 displays the 13 skills, characteristics, and abilities in rank order.
Table 5

*Employer Survey Subscale Importance Results*

<table>
<thead>
<tr>
<th>Subscale/Objective</th>
<th>Average</th>
<th>Median</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESI Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Skills</td>
<td>4.72</td>
<td>5.00</td>
<td>0.57</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Thinking Skills</td>
<td>4.73</td>
<td>5.00</td>
<td>0.51</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Personal Qualities</td>
<td>4.75</td>
<td>5.00</td>
<td>0.44</td>
<td>4.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Resource Management</td>
<td>4.20</td>
<td>4.00</td>
<td>0.65</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Information Skills</td>
<td>4.13</td>
<td>4.00</td>
<td>0.73</td>
<td>2.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>4.68</td>
<td>5.00</td>
<td>0.33</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Systems Management</td>
<td>3.93</td>
<td>4.00</td>
<td>0.73</td>
<td>2.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Technology Use</td>
<td>4.13</td>
<td>4.00</td>
<td>0.76</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Other Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercultural Skills</td>
<td>3.95</td>
<td>4.00</td>
<td>0.85</td>
<td>2.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Integrity</td>
<td>4.88</td>
<td>5.00</td>
<td>0.33</td>
<td>4.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Adaptability</td>
<td>4.40</td>
<td>5.00</td>
<td>0.74</td>
<td>3.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Work Ethic</td>
<td>4.83</td>
<td>5.00</td>
<td>0.38</td>
<td>4.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Professionalism</td>
<td>4.75</td>
<td>5.00</td>
<td>0.49</td>
<td>3.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>
Figure 1. Rank ordering of employer responses to importance of skills. Black bars represent 8 SCANS Skills, and gray bars represent the five other skills, traits, and abilities.
Thinking Skills Importance to Hiring? The last page of the survey asked employers to rate the importance of each of the abilities described in the ten Thinking Skills items using a 5 point Likert scale ranging from 1- “Not at all Important” to 5-“Very Important.” Results are presented in Table 6. Items are arranged in order of average rated importance. (Item descriptions are not presented due to copyright concerns).

Table 6

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Average</th>
<th>Median</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>4.55</td>
<td>5.00</td>
<td>0.60</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>4.45</td>
<td>5.00</td>
<td>0.71</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>46</td>
<td>4.28</td>
<td>4.14</td>
<td>0.82</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>4.23</td>
<td>4.00</td>
<td>0.70</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>48</td>
<td>4.20</td>
<td>4.14</td>
<td>0.82</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>3.93</td>
<td>4.00</td>
<td>0.80</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>3.93</td>
<td>4.00</td>
<td>0.92</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>47</td>
<td>3.90</td>
<td>4.00</td>
<td>0.93</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>3.36</td>
<td>3.00</td>
<td>1.04</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>2.85</td>
<td>3.00</td>
<td>1.01</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Discussion. Through open coding analysis two overarching themes were identified from the first two open-ended questions: skills and personal characteristics. That is, employers seek both when hiring college students. Employers not only cited characteristics they sought when hiring college students but they referenced them almost as frequently as the skill domains.

Specifically, employers frequently cited seven skills and seven characteristics. Employers seek college graduates who have Communication, Technology, Thinking, Teamwork, Applied Knowledge, Resourcefulness, and Multicultural Skills. Likewise, they seek personal characteristics including Reliability, Integrity, Work Ethic, a Positive
Attitude, Ambition, Self-Motivation, and a Willingness to Learn. While there appears to be overlap in what employers say they want and the SCANS model of employability, there are also clear distinctions (e.g., employers never mentioned systems management).

After responding to the initial two open ended questions, employers were asked to rate the importance of 13 skills relative to hiring college students. Integrity, Work Ethic, Personal Qualities, Professionalism, and Thinking Skills received the highest average ratings. It should be noted however, that ceiling effects were encountered. Employers responded favorably to all 13 skills, abilities, and traits, making relative differences of importance difficult to distinguish. Nevertheless, it was quite interesting that integrity and work ethic received the highest importance ratings. Both of these constructs were frequently cited characteristics by employers in the open ended portion of the survey, as well.

The open ended responses and rated skills inform employability theory. Specifically, substantive validity for the ESI is lacking. The ESI, which is based on the SCANS model is not completely congruent with what employers say is important when hiring college graduates. There are some areas of overlap (e.g., Technology Use), though largely the employer survey results are not consistent with the SCANS model. Further, personal characteristics, in addition to skills, were stated as being very important to hiring. In fact, some personal characteristics were among the highest rated skills and abilities on the survey.

Lastly, employers were asked to rate the importance of the ten abilities on the Thinking Skills items. Items cannot be presented due to copyright restrictions. Overall, a less prominent ceiling effect was encountered for these items. In fact, there were some
items that were deemed not important or neutral (i.e., Items 8 and 9). This information coupled with forthcoming structural results should provide insight into necessary revision strategies for these items, as they lack substantive validity.

**Substantive Stage—Content Validation (Study 1B)**

**Research Question.** How well do the 80 ESI items reflect their intended eight domains defined from the SCANS Report?

**Background.** Klein & Kosecoff (1975) describe the process of determining the degree of fit between test items to specified objectives. This process is known as a “content alignment” or “backwards translation,” so named because raters try to map items “back” to specified objectives. Raters in this process are typically SMEs.

Traditionally, when conducting a content alignment procedure, the “item-by-item method” is employed. In this approach, participants review the items one at a time and decide which objective(s), if any, each item best matches. Additionally, there is also the “objective-by-objective method” which involves a yes/no decision for every possible item-objective combination (Miller, Setzer, Sundre, & Zeng, 2007). Unfortunately, the objective-by-objective method is time intensive since the rater must go through all items for each objective. The ESI has eight subscales (i.e., objectives) with a total of 80 items which would have been too taxing for raters to complete; therefore, the item-by-item method was used. Regardless of method type, raters are permitted to map items to more than one objective or to none at all during the content alignment activity. “Objectives” of the ESI refer to descriptions of each domain that were reported in the ESI test manual and each description will be presented in the following results section.
Sample and Procedure. Twelve graduate students enrolled in the course, PSYC 812: Assessment Methods and Instrument Design at James Madison University performed a content alignment activity using the item-by-item method as a required course assignment. Additionally, one faculty member, the professor of the course, participated using the objective-by-objective method. Data from the 13 participants were combined to assess the substantive validity of the ESI instrument. These individuals were not SMEs in personnel selection; however, they do possess knowledge of test development theory and practice. Raters in this course were instructed to complete this alignment task as homework due in one week.

Raters reviewed a Microsoft Excel file with the following components: instructions for performing the backwards translation, the test author’s descriptions of the eight subscales, the items (presented in a randomized order), and a worksheet in which raters could record their judgments. The instructions for the raters were as follows:

This is a Backwards Translation for the Employability Skills Inventory. The purpose of this procedure is to determine how well the content of the items aligns with the intended objectives. To begin, please carefully read over all 8 objectives on the second sheet of this excel file (the tab is labeled "Objective Definitions"). Then print out the items themselves, which are in the third sheet ("Test Items"). In the fourth sheet ("Backwards Translation"), please proceed item by item (the items are in columns), placing an "X" (big or little) next to the objective(s) you feel the item represents/cover. It is acceptable to mark more than one objective, and there is a "None" box to mark if you feel that the item does not map onto any of the specified objectives. An illustrative example is shown below. There are 80
items on this measure; within the "Backwards Translation" tab, the panes are frozen so that you can scroll through the item columns without losing sight of the objectives. Please remember that the test items are copyrighted and should be kept secure.

After all thirteen completed files were received from participants the results were aggregated by item to determine how well each item matched its target objective. Lawshe (1975) suggested that alignment be determined using a “cut-off” value greater than 50% to determine if an item represents an objective. Rather than making a strict cut-off, I compared percent-agreement rates relative to one another, rather than using an absolute criterion. Values greater than 50% are considered good agreement.

Results. Objective-level results are presented in the Table 7 below. The “Average” column indicates the degree to which the items were judged to map onto their target objective (i.e., congruence) across raters. For example, the ten Basic Skills items were judged to “match” their intended objective (“Basic Skills”) 88% of the time, suggesting excellent agreement across raters most of the time. For individual items on the subscale, the degree of matching ranged from 54% (“Minimum”) to 100% (“Maximum”), so matching was only marginally better than Lawshe’s standards for some items. The “SD” column provides the standard deviation, a measure of variability in average ratings across the subscale items. Across the entire ESI, item-objective congruence was 74%, which is high. Table 7 provides insight into the global alignment of the ESI items to their intended subscales.
All average alignment values for the ESI subscale were greater than 50%.

Particularly high degrees of alignment were found for the Technology Use subscale (92%), Basic Skills (88%), and Interpersonal Skills (85%) dimensions; although some of the individual items for each of these scales did not align very well. The Systems Management subscale had the weakest item-to-objective alignment (52%) with only 4 aligned items.

Items must be well aligned to their intended objectives to reflect substantive validity. Likewise, it is equally important that items do not map to other objectives. If this is the case, then the scale is threatened by construct irrelevancy. Construct irrelevancy occurs when factors other than the intended factor are measured. In order to make inferences from scores, one must first be confident that the items only measure the intended construct. Unfortunately, “dual-loading” of items is evidence of construct irrelevancy.

Table 7 presents a global view of the backward translation results, however item level information provides a complete alignment summary. Item level alignment

### Table 7

*Summary Information for the Content Alignment Activity*

<table>
<thead>
<tr>
<th>Subscale/Objective</th>
<th>Average</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Skills</td>
<td>88</td>
<td>17</td>
<td>54</td>
<td>100</td>
</tr>
<tr>
<td>Thinking Skills</td>
<td>67</td>
<td>19</td>
<td>31</td>
<td>92</td>
</tr>
<tr>
<td>Personal Qualities</td>
<td>78</td>
<td>16</td>
<td>46</td>
<td>100</td>
</tr>
<tr>
<td>Resource Management</td>
<td>69</td>
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<td>100</td>
</tr>
<tr>
<td>Information Skills</td>
<td>60</td>
<td>27</td>
<td>15</td>
<td>92</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>85</td>
<td>15</td>
<td>54</td>
<td>100</td>
</tr>
<tr>
<td>Systems Management</td>
<td>52</td>
<td>34</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Technology Use</td>
<td>92</td>
<td>12</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Overall Matching Accuracy</td>
<td>74</td>
<td>20</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>
information can be found in Tables 8 through 15. For each of these tables, the definition of the subdomain is provided in the table title and the header row indicates the target objective and the numbers of items associated with it. Within this table, highlighted rows indicate the objective onto which the items are supposed to map. Items that raters mapped to a different/additional objective more than 46% of the time are bolded. Forty-six percent was chosen as a criterion because it approximates the relative criterion of 50%.

The “None” row presents information regarding items that do not map onto any of the objectives supplied in the content alignment activity.

Table 8

*Content Alignment Item Results: Basic Skills*

**Basic Skills.** Basic skills form the foundation for success on a job. People who score high on this scale tend to be skilled in reading, writing, listening, speaking, and mathematics (Liptak, 2010, p.8)

<table>
<thead>
<tr>
<th>Target Objective</th>
<th>1</th>
<th>2</th>
<th>3*</th>
<th>4</th>
<th>5</th>
<th>41</th>
<th>42*</th>
<th>43</th>
<th>44</th>
<th>45*</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking Skills</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
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<td>8</td>
<td>15</td>
<td>8</td>
<td>5</td>
</tr>
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<td>Personal Qualities</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>31</td>
<td>0</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Resource Management</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Information Skills</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>8</td>
<td>54</td>
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<td>8</td>
<td>23</td>
<td>31</td>
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<td>20</td>
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<td>Interpersonal Skills</td>
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<td>0</td>
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<td>12</td>
</tr>
<tr>
<td>Systems Management</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Technology Use</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>23</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Eight Basic Skills items mapped uniquely to the target domain. Two items dually loaded onto two different objectives. Item 2 was mapped moderately to both Basic Skills and Interpersonal Skills and Item 5 was mapped moderately to both Basic Skills and Information Skills. However, an overall alignment of 88% is quite acceptable. There are only a few items in need of attention within this subscale, Items 2 and 5.
**Table 9**

*Content Alignment Item Results: Thinking Skills*

**Thinking Skills.** People who score high on this scale tend to be able to think creatively, make effective decisions, solve problems logically and efficiently, visualize how things work, apply sound reasoning skills, and use effective learning techniques to acquire new knowledge and skills (Liptak, 2010, p.8).

<table>
<thead>
<tr>
<th>2. Thinking Skills</th>
<th>6</th>
<th>7*</th>
<th>8*</th>
<th>9</th>
<th>10</th>
<th>46</th>
<th>47*</th>
<th>48*</th>
<th>49</th>
<th>50</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Skills</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>62</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
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<td>Target Objective</td>
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<td>62</td>
<td>31</td>
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</tr>
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<td>Personal Qualities</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>38</td>
<td>15</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
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<td>Resource Management</td>
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<td>8</td>
<td>8</td>
<td>8</td>
<td>23</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Information Skills</td>
<td>69</td>
<td>31</td>
<td>15</td>
<td>31</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Systems Management</td>
<td>0</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>38</td>
<td>69</td>
<td>31</td>
<td>0</td>
<td>54</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td>Technology Use</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
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<td>0</td>
<td>31</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Five items mapped uniquely to the target domain (Items 7, 8, 10, 47, & 48). Item 9 was related to Basic Skills more frequently than the target objective. The four remaining items dually loaded onto multiple objectives. Item 6 was mapped strongly to both Thinking Skills and Information Skills. Items 46, 49, and 50 mapped to both Thinking Skills and Systems Management. The overlap among these items indicated a threat of construct irrelevancy and should be investigated further.
### Table 10

**Content Alignment Item Results: Personal Qualities**

**Personal Qualities.** People who score high on this scale have the personal qualities needed to be successful in the workplace. They take responsibility for their actions and persevere to reach their goals. They are friendly, open, and adaptable in working with others. They know what they are capable of and set and monitor progress toward goals. They are also honest and act with integrity (Liptak, 2010, p.8).

<table>
<thead>
<tr>
<th>3. Personal Qualities</th>
<th>11*</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15*</th>
<th>51</th>
<th>52</th>
<th>53*</th>
<th>54</th>
<th>55</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Skills</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thinking Skills</td>
<td>15</td>
<td>8</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>0</td>
<td>0</td>
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</table>

<table>
<thead>
<tr>
<th>Target Objective</th>
<th>46</th>
<th>85</th>
<th>69</th>
<th>100</th>
<th>69</th>
<th>85</th>
<th>69</th>
<th>77</th>
<th>100</th>
<th>85</th>
<th>78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Management</td>
<td>15</td>
<td>15</td>
<td>46</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Information Skills</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>0</td>
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<td>3</td>
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<tr>
<td>Interpersonal Skills</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Systems Management</td>
<td>8</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>8</td>
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<td>Technology Use</td>
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<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Eight Personal Qualities items mapped strongly to the target domain. Item 13 was dually mapped to Personal Qualities and Resource Management, though the relationship with the target objective was rather high. Item 46 was mapped to the target objective, although the percent of agreement was below 50%. Overall, Personal Qualities item alignment results are fairly consistent, yielding evidence of substantive validity.
47

Table 11

Content Alignment Item Results: Resource Management

**Resource Management.** People who score high on this scale are skilled at identifying, organizing, planning, and allocating resources, whether it’s time, money, manpower, or materials. They know how to prioritize, keep to a schedule, and meet deadlines. They can set budgets, make financial forecasts, and keep accurate financial records. They are able to adequately allocate and use materials and space, and they understand how to use and distribute work based on the skills of others (Liptak, 2010, p.8).

<table>
<thead>
<tr>
<th>4. Resource Management</th>
<th>16*</th>
<th>17</th>
<th>18</th>
<th>19*</th>
<th>20</th>
<th>56</th>
<th>57</th>
<th>58*</th>
<th>59</th>
<th>60*</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Skills</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Thinking Skills</td>
<td>0</td>
<td>31</td>
<td>8</td>
<td>8</td>
<td>46</td>
<td>8</td>
<td>23</td>
<td>0</td>
<td>8</td>
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<td>14</td>
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<td>Personal Qualities</td>
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<td>0</td>
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<td>46</td>
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<td><strong>Target Objectives</strong></td>
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<td>100</td>
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<td>54</td>
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<td>69</td>
<td>69</td>
<td>69</td>
<td>69</td>
</tr>
<tr>
<td>Information Skills</td>
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<td>0</td>
<td>15</td>
<td>8</td>
<td>8</td>
<td>38</td>
<td>46</td>
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</tr>
<tr>
<td>Interpersonal Skills</td>
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<td>0</td>
<td>92</td>
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<td>0</td>
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<tr>
<td>Systems Management</td>
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<td>8</td>
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<td>23</td>
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<td>15</td>
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<td>12</td>
</tr>
<tr>
<td>Technology Use</td>
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<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Six Resource Management items uniquely mapped to the target domain. Three items dually loaded onto the target objective and alternative domains. Item 57 dually mapped to the target objective and Information Skills, whereas Item 59 dually mapped to the target objective and Personal Qualities. Item 20 was slightly related to both the target objective and Thinking Skills. Finally, Item 18 was mapped 92% of the time to Interpersonal Skills, and only to the target objective 31%. Thus, not only is “dual loading” a common occurrence, but there is no pattern to the irrelevancy. This inconsistency and lower congruence rate suggests particularly low substantive validity evidence for the Resource Management subscale. Substantial item revisions are needed.
Content Alignment Item Results: Information Skills

Information Skills. People who score high on this scale are skilled at acquiring and evaluating various types of information. They are able to process, organize, and maintain information using computers and other technology. They are skilled at gathering information from a variety of sources and then interpreting it and communicating it to others (Liptak, 2010, p.9).

<table>
<thead>
<tr>
<th>5. Information Skills</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24*</th>
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</tr>
</tbody>
</table>

Three Information Skills items were uniquely mapped to the target domain. Three items were dually loaded to multiple objectives, and four items were strongly mapped to distinct objectives. Items 25, 61, and 65 mapped moderately to both the target objective and the Basic Skills objective (items 25 and 61) and the Thinking Skills objective (item 65). Further, Items 21, 22, 23, and 24 were mapped strongly to either the Basic Skills (items 21 and 22) objective or the Technology Use (items 23 and 24) objective rather than being strongly related to the target objective. The Information Skills subscale items need extensive revisions.
Table 13

*Content Alignment Item Results: Interpersonal Skills*

**Interpersonal Skills.** People who score high on this scale work well with others. They enjoy participating as members of a team and working with people from diverse backgrounds. They treat customers and clients with respect and provide excellent customer service. They are skilled at helping others resolve conflicts through compromise and are effective communicators. They have leadership skills and enjoy persuading others and taking responsibility (Liptak, 2010, p.9).

<table>
<thead>
<tr>
<th>6. Interpersonal Skills</th>
<th>26*</th>
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<th>28</th>
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</tr>
</tbody>
</table>

Five Interpersonal Skills items were uniquely mapped to the target domain. Five items (29, 66, 67, 68 & 69) were moderately related to both the target objective and Personal Qualities. This consistent pattern of dual loading should be investigated because it is a threat to substantive validity (i.e., construct irrelevancy).
Table 14

*Content Alignment Item Results: Systems Management*

**Systems Management.** People who score high on this scale understand how social, organizational, and technological systems work and they can operate effectively within those systems. They can identify trends and predict their impact. They can also anticipate problems and make allowances, suggest modifications to existing systems, and develop new ways of doing things. They know the roles they play in an organization and how their work affects the work of others (Liptak, 2010, p.9).

<table>
<thead>
<tr>
<th>7. Systems Management</th>
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<th>33</th>
<th>34</th>
<th>35</th>
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</table>

Three Systems Management items were uniquely mapped to the target domain.

Two items (72 & 74) were dually mapped to the target objective and also the Thinking Skills domain. Half of the items (34, 35, 71, 73, 75) were strongly mapped to alternative objectives rather than the target objective. Items 34, 35, and 71 were mapped to Personal Qualities, and Items 73 & 75 were mapped to Resource Management. The Systems Management subscale is in need of attention.
Table 15

Content Alignment Item Results: Technology Use

Technology Use. People who score high on this scale are skilled in working with computers and other technology. They can choose the right tools, equipment, hardware, and software for the job, and they understand how to apply technology to tasks to get the best results. They can set up and operate machines and equipment and can effectively maintain and troubleshoot problems with technology (Liptak, 2010, p.9).

<table>
<thead>
<tr>
<th>8. Technology Use</th>
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<tr>
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**Target Objective**

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</table>

Eight Technology Use items were uniquely mapped to the target domain. Items 38 and 39 were dually mapped to the target objective and either Systems Management (item 38) or Information Skills (item 39). This subscale has the strongest content validity evidence due to its high congruence average, and limited frequency of dual loading items.

Discussion. Overall, all subscales achieved average congruence above 50%, surpassing Lawshe’s (1975) suggested criteria. Nevertheless, the Thinking Skills, Resource Management, Information Skills, and Systems Management subscales have rather high occurrences of dual loading and low item congruence. Dual loading may be due to an overlap of definitions. For example, the Thinking Skills and Systems Management subscales both have “problem solving” in the definition. Thus, these types of items logically dual loaded. All subscale definitions should be distinct to assist in the prevention of this issue. Items with low congruence to their intended objective should be
critically evaluated, revised, and possibly omitted if they are not aligned with the intended domain.

There were two main limitations in this study regarding the raters used. The participants who rated items were not subject matter experts. We would expect that SMEs would be more accurate raters, as they would likely be more familiar with the target domains. Ideally, raters for this study would be individuals who are responsible for hiring college graduates. I’m not certain that my raters produced results that would drastically deviate from the current findings since the objective definitions and items were easily interpreted. Second, raters experienced fatigue during the rating process because they were assigned to complete three additional content alignment activities during the same short time frame. Performing these activities requires great concentration and takes 60-120 minutes per test. Fatigue could have lowered the accuracy of alignment ratings.

Overall, there is initial content validity evidence for four of the eight subscales of the ESI. All scales had item level issues that should be addressed, and the four weaker subscales have more critical theoretical issues that should be resolved before addressing item level concerns. Each subscale definition should clearly reflect the theoretical domain with minor overlap to other domains.

Structural Stage

How well do the ten items that purport to represent the construct “Thinking Skills,” represent a unitary construct? During the next phase of my analysis, I sought to answer this question. The Thinking Skills items on the 80 item ESI scale are items 6-10 and 46-50. Items 7, 8, 47 and 48 are negatively worded items. It is possible that the negative wording of these items contributes unique systematic variance causing a
“method effect” which detracts from these items reflecting their intent, to measure thinking skills. Method effects result from common variance attributed to a method (such as negatively worded items) rather than the factor of interest (Tomas & Oliver, 1999). To test if these items are contributing to a method effect, I determined whether responses to the ESI thinking skills items are better represented by a bifactor model (Thinking Skills and method effect) than a single factor (thinking skills). See Figure 2.

**Research Question.** 1) Do the ten Thinking Skills items represent a unidimensional factor, and 2) if not, is a negative wording effect conflicting the fit of a unidimensional factor?

**Background.** Confirmatory Factor Analysis (CFA) was used to evaluate the fit of a unidimensional and a bifactor model for the Thinking Skills subscale (see Figure 2). Model A in Figure 2 depicts a unidimensional model of employability which addresses the first research question, and Model B depicts a bifactor model addressing the second research question. When using a CFA, the goal is to test if a theoretical model “fits” the data. If the model “fits,” then one can look at factor pattern coefficients that explain how much variance is due to a common factor (in this case, Thinking Skills) in each item.

Maximum Likelihood (ML) is a statistical mechanism that derives parameter estimates (e.g., factor pattern coefficients) and estimates model fit (Kline, 2011). Thus, it is referred to as an “estimator” and functions well when data are normally distributed. ML is typically used as an estimator when using CFA because the resulting estimated parameters are less biased and the fit indices are more accurate than other estimators (e.g., generalized least squares). These properties of ML remain intact when models are
misspecified (i.e., wrong), which they always are to some degree (Olsson, Foss, Troye, & Howell, 2000).

The ESI presents a unique problem for CFAs because this scale only provides three response options to respondents (1-Not True; 2-Somewhat True; 3-Very True) and thus the data are not considered continuous, but rather categorical in nature (Finney & DiStefano, in press). Categorical data should not be evaluated with a normal theory estimator. If a normal theory estimator is used, like ML, then the model fit indices, parameter estimates, and standard errors will likely be biased. Thus, Categorical Variable Methodology (CVM) should be employed to account for the true nature of the data using the correct weight matrix for an estimator.

Although the data from the ESI are categorical, the underlying construct, Thinking Skills, is believed to be continuous and normally distributed in nature ($y^*$ represents an attenuated categorical variable that is estimated instead of the crude categorical estimate). The discrete categories that arise by the limited response options (i.e., 1-3) filter the continuous nature of the variable into a much coarser estimate of Thinking Skills. Further, $y^*$, the continuous underlying latent variable, does not equal the observed item scores; in CFA, the goal is to estimate relationships among the underlying latent responses ($y^*$), rather than coarse observed estimates. In categorical analyses, therefore, the relationship between $y^*$ for each item is an estimate rather than the observed item scores. Estimates are created by modeling polychoric correlations instead of Pearson product moment correlations; modeling Pearson correlations would result in attenuated parameter estimates due to the crude nature of the categorical data (Brown, 2006; Finney & DiStefano, in press).
Model A: Unidimensional Model

Model B: Bifactor Model

*Figure 2.* Two Thinking Skills models evaluated with a CFA. Model A suggests that a latent construct “Thinking Skills” drives an individual’s response to the ten Thinking Skills items. If Model A fits the data then structural evidence will have been established for this subscale and the items can be summed. Model B also suggests a Thinking Skills construct, but that the negative worded items (7, 8, 47, & 48) also share common variance.
To appropriately model the polychoric correlations, Robust Diagonally Weighted Least Squares (DWLS) estimation was employed. Weighted Least Squares (WLS) estimation requires difficult computations and rarely converges to an admissible solution without an incredibly large sample size. Alternatively, DWLS only uses the diagonal elements of the weight matrix used in WLS making it easier to converge and reducing sample size requirements. Further, Robust DWLS can adjust for diversion from normality just like the Satorra-Bentler adjustment applied to ML estimation; robust DLWS generally performs better than WLS (Finney & DiStefano, in press; Satorra & Bentler, 1994).

Several types of fit indices can be used to determine how well a proposed model fits the data. The first type of model fit is “absolute.” Absolute fit indices assess how well a model reproduces the data. The most widely used absolute fit index is the $\chi^2$. If a $\chi^2$ test is not significant, this indicates that the model reproduces the data well and thus remains plausible. Robust $\chi^2$ values from robust DWLS using categorical data seem to be fairly accurate, although more research is needed regarding specificity to misspecification of models (Finney & DiStefano, in press).

$\chi^2$ tests are measures of exact fit. There are also supplemental fit indices, which assess approximate model-data fit. Unfortunately, measures of approximate fit can vary greatly under many different conditions when using Robust DWLS with categorical data. Yu (2002) found that the Comparative Fit Index, (CFI) and the Root Mean Square Error of Approximation (RMSEA) performed rather well with categorical data. However, establishing cutoffs for “good” fit has been difficult; more stringent guidelines than those used for ML estimation have been recently suggested (Nye & Drasgow, 2011).
When modeling data using CFA, one wants to avoid incorrect estimates (i.e., misspecification). When using ML, the CFI is very sensitive to misspecified factor pattern coefficients (i.e., the variance explained in items due to the factor) (Hu & Bentler, 1998). The CFI evaluates model fit relative to an “independence model,” which assumes no relationships among observed variables. The CFI ranges between 0 and 1, with higher values indicating better fit. A recommended cutoff for the CFI is .95 or above (Hu & Bentler, 1999; Yu & Muthen, 2002). The RMSEA is an absolute fit index that estimates the lack of fit in the population removing sampling error. According to Yu & Muthen (2002) the RMSEA typically does not function as well at small sample sizes (n < 250). Lower values on the RMSEA suggest better fit within the population, and they recommend using a cutoff around .06 for this fit index. Further research is needed to better understand fit indices for categorical data. For the current study, these suggested guidelines will be used to inform the assessment of model-data fit. However, because further research is needed in the area of approximate fit indices, an emphasis will be placed on the polychoric correlation residuals when assessing model-data fit.

Polychoric residuals reveal the difference between each element in the observed and the model-implied polychoric correlation matrices. Positive correlation residuals indicate that the model-implied correlation underestimated the observed correlation, and negative values indicate overestimation. Generally, an absolute correlation residual value of .10 or greater is considered to represent local misfit (Kline, 2011); however, this appraisal is relative to the size of the original polychoric correlations. In summary, \( \chi^2 \) significance tests will be evaluated, along with the CFI and RMSEA for approximate and global fit and polychoric correlation residuals to assess local model-data misfit.
Sample and Procedure. Upon receiving publisher permission and IRB approval, the complete 80-item ESI was administered to 283 undergraduates at a midsized southern university, James Madison University. The test format was adapted for online administration using the software package, Qualtrics. This procedure helped to protect the intellectual property of the scale, since participants only had access to the items while in a controlled, proctored setting. Online administration facilitated test administration, scoring and data management.

Participants were recruited using the undergraduate psychology participant pool, a program in which undergraduates enrolled in introductory-level psychology courses must participate in three studies during the semester. Students who participated were from a variety of majors, varied in academic level, and were mostly female and Caucasian. The ESI was administered in a computer lab. Approximately, 22-25 students were tested during each session. I placed two consent forms at each computer. As students entered the testing area they were instructed to read the consent form and ask me any questions they might have.

After the participants provided consent, I explained the nature of the study. Students were instructed to answer questions as honestly as possible, while taking their time to respond. It was noted on the assessment that students would not be dismissed from the study until all participants had completed the scale, thus alleviating the urge to rush. Students were then given a web link to access the online version of the ESI.

Structured data collection procedures evoke greater attention by the student and appear to reduce negative wording method effects (Finney, 2001). In an effort to structure data collection and to deter students from rushing through the 80-item measure,
I administered Sudoku puzzles after the first set of 40 items, before participants were permitted to move to the next set of 40. Once all students had completed the assessment, they were debriefed and thanked for their time. Using this strategy, all testing sessions ended in approximately 22 minutes, and participants were not dismissed from the session until everyone had completed their assessment.

Results. Two-hundred and eighty three students provided responses on the ESI. Using listwise deletion, only nine cases were omitted due to missing data. Four of these nine omitted cases were due to technical difficulties, where students began the assessment and technical problems prevented them from continuing. Polychoric correlations were estimated using LISREL 8.80; these are presented along with the percent of students using each response option in Table 16. The magnitude of most polychoric correlations was quite low. This low magnitude indicates that there is limited common variance among items; even if a model fits, factor pattern coefficients may be low indicating weak relationships among items that are supposed to be driven by the Thinking Skills factor. A few correlations are moderate (such as the relationship between Items 46 and 50), and the negatively worded items are negatively correlated as expected.
Table 16

Polychoric Correlations and Frequencies for Thinking Skills Items

<table>
<thead>
<tr>
<th>Item</th>
<th>6</th>
<th>7*</th>
<th>8*</th>
<th>9</th>
<th>10</th>
<th>46</th>
<th>47*</th>
<th>48*</th>
<th>49</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7*</td>
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</tr>
<tr>
<td>8*</td>
<td>-.210</td>
<td>.208</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>.564</td>
<td>-.203</td>
<td>-.255</td>
<td>1.000</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>.214</td>
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<td>-.146</td>
<td>.374</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>.158</td>
<td>-.162</td>
<td>-.109</td>
<td>.192</td>
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<td>-.298</td>
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<td></td>
<td></td>
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<tr>
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<td>-.064</td>
<td>.016</td>
<td>-.041</td>
<td>-.176</td>
<td>-.060</td>
<td>-.046</td>
<td>.250</td>
<td>1.000</td>
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<td></td>
</tr>
<tr>
<td>49</td>
<td>.092</td>
<td>-.090</td>
<td>.026</td>
<td>.295</td>
<td>.269</td>
<td>.237</td>
<td>-.058</td>
<td>-.060</td>
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<tr>
<td>50</td>
<td>.161</td>
<td>-.327</td>
<td>-.119</td>
<td>.271</td>
<td>.424</td>
<td>.516</td>
<td>-.274</td>
<td>-.080</td>
<td>.456</td>
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</tr>
</tbody>
</table>

Not True 02.9 42.3 37.2 00.4 03.6 12.4 75.9 63.5 01.5 07.3
Somewhat 32.1 52.2 41.2 24.1 37.6 53.3 16.8 30.3 29.6 53.6
Very True 65.0 05.5 21.5 75.5 58.8 34.3 07.3 06.2 69.0 39.1

Note: Response percentages are presented at the bottom of the table.
*Items 7, 8, 47, and 48 are negatively worded items and were not reverse scored for analysis.

Confirmatory Factor Analysis (CFA) was conducted using LISREL 8.80 and DWLS estimation. The unidimensional model did not fit the data well, rDWLS $\chi^2 (35) = 81.95, p < .001$, RMSEA = 0.07, CFI = 0.86. The $\chi^2$ and CFI suggest model misspecification; however, the RMSEA is very close to the proposed cutoff of .06 indicating fairly adequate fit. The somewhat conflicting information regarding fit is a direct result of the different information provided by each fit index. The RMSEA is an absolute fit index, reflecting the difference between the observed and model-implied polychoric correlation matrix. Because the correlations among the items were so low, the correlation residuals cannot be overly large, thus resulting in a decent RMSEA; it is easy to reproduce weak item relationships. On the other hand, CFI assesses fit relative to an independence model which assumes no relationships among items. Because the item relationships are generally weak, the fit between the independence model is not much worse than the hypothesized model, resulting in a low CFI. The low CFI value is
reflecting the low correlations among items. The weak relationships among the ten items are particularly problematic. Given these weak relationships, model-data fit is especially poor.

Table 17 presents the polychoric correlation residuals. Because the unidimensional model did not fit, it is appropriate to diagnose local misfit. There are 16 residuals with an absolute value greater than or equal to .10. Unfortunately, there are no distinct patterns of misfit among the residuals and misfit permeated the model.

Table 17

*Items 7, 8, 47, and 48 are negatively worded items and were not reverse scored for analysis.

A bifactor model was tested to determine if a negative wording method effect could explain the misfit in the unidimensional model (see Figure 2). Fit of this model didn’t seem likely since the correlation residuals of the unidimensional model did not seem to be consistently high. Items 7, 8, 47, and 48 were allowed to serve as indicators to both the “Thinking Skills” factor and a “Method Effect” factor. The correlation between the two factors was set to zero. This model did not converge to an admissible solution.

In order to diagnose why the bifactor model did not converge, an ancillary analysis was conducted. Because the bifactor model assumed systematic unique variance
above and beyond any common variance shared across the items due to the Thinking Skills latent variable, it was hypothesized that the model did not converge due to a lack of shared variability among the negatively worded items. To test this hypothesis, instead of estimating factor pattern coefficients for the negatively worded method factor, the errors among the four negatively worded items were allowed to correlate.

This model converged, however, it did not fit the data, rDWLS $\chi^2 (29) = 67.12$, $p < .001$, RMSEA = 0.07, CFI = 0.89. The overall fit of this model was better than the unidimensional model, as expected, with 12 residuals greater than an absolute value of .10 (see Table 18). The fit of the negatively worded items was improved, and the largest residual between item 6 and 9 remained (.26).

Table 18

Polychoric Correlation Residuals- Negatively Worded Items Model

<table>
<thead>
<tr>
<th>Item</th>
<th>6</th>
<th>7*</th>
<th>8*</th>
<th>9</th>
<th>10</th>
<th>46</th>
<th>47*</th>
<th>48*</th>
<th>49</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7*</td>
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<td>0.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8*</td>
<td>-0.10</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>0.26</td>
<td>0.03</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-0.10</td>
<td>-0.02</td>
<td>0.01</td>
<td>-</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>-0.14</td>
<td>0.07</td>
<td>0.03</td>
<td>-</td>
<td>0.12</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47*</td>
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<td>0.00</td>
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<td>-0.08</td>
<td>0.00</td>
<td>0.00</td>
<td>-</td>
<td>0.04</td>
<td>0.07</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>-0.11</td>
<td>0.07</td>
<td>0.13</td>
<td>0.03</td>
<td>-</td>
<td>0.00</td>
<td>0.09</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>-0.17</td>
<td>-0.07</td>
<td>0.04</td>
<td>-</td>
<td>-</td>
<td>0.09</td>
<td>0.01</td>
<td>-</td>
<td>0.17</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Items 7, 8, 47, and 48 are negatively worded items and were not reverse scored for analysis.

The correlations among the errors are presented in Table 19. The highest correlation among the negatively worded item error terms was between item 47 and 48 (.20). Although there appears to be a weak relationship between items 47 and 48 after controlling for the unidimensional model, it is clear that there is not a systematic method effect due to the negatively worded items. Likewise, this analysis reveals that the
bifactor model did not converge due to overfactoring (Rindskopf, 1984). In order for the negative method factor to exist, at least three items contributing systematic variance are needed, and with only one moderate relationship among the errors, the bifactor was empirically underidentified with no information to contribute to a second factor.

Table 19

*Ancillary Analysis - Error Correlations*

<table>
<thead>
<tr>
<th>Item</th>
<th>7</th>
<th>8</th>
<th>47</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.12</td>
<td>1.00</td>
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<td></td>
</tr>
<tr>
<td>47</td>
<td>0.06</td>
<td>-0.07</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>0.03</td>
<td>0.16</td>
<td>0.20</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Discussion.** Unfortunately, the unidimensional Thinking Skills model did not fit the 10 Thinking Skills items on the ESI. This misfit reflects a lack of common variance among the items. The low correlations are especially concerning as they suggest that the ten items are not measuring one construct. The structural validity piece of Benson’s (1998) strong program of construct validity requires covariation among items in expected ways and this is clearly missing for these 10 ESI items. Therefore, it is inappropriate to sum the 10 items on this subscale to represent “Thinking Skills.” Since they are not intercorrelated, these ten items are probably tapping into different constructs. Perhaps the subcomponents of the Thinking Skills definition (e.g., analyzing, decision making, etc) are distinct.

The bifactor model did not converge due to empirical underidentification. In order for a factor to exist, there must be three contributing items. Thus, because at least three of the four negatively worded items did not share systematic variance above what was contributed to “Thinking Skills,” the negative wording effect factor was empirically
underidentified. Correlating the errors of the negative items confirmed a lack of common variance after controlling for the Thinking Skills factor. The methodology employed in this study evoked greater attention to the items which may explain the lack of a method effect. If the Thinking Skills items were administered under typical circumstances the effect may be apparent.

This study provides evidence that at least one of the eight subscales on the ESI does not accurately measure the construct attributed to it. This subscale (and perhaps others) requires substantial revision. It is recommended that the other seven subscales be evaluated to determine if they too lack validity evidence.

The employer survey results suggest that the Thinking Skills domain is important. The backward translation results indicated several areas of overlap with other constructs on the ESI which may be related to the lack of common variance among the items. If the items are measuring aspects of other domains, and not Thinking Skills, this could be causing the weak relationships among items identified in the structural analysis.
CHAPTER 4

Discussion

These results suggest that the *Employability Skills Inventory* is not an appropriate assessment instrument for measuring employability among college students. Specifically, the ESI does not have sufficient substantive validity evidence; therefore, inferences from scores cannot be related to the most important subdomains of employability. The employer survey results indicated that some, but not all, of the skills identified in the SCANS report and purportedly measured with the ESI are important to employers when hiring college students. Likewise, there were several skills and personal characteristics that employers regard as important that are not sufficiently included in the ESI, suggesting construct underrepresentation (i.e., the model of employability is too narrowly defined). Further, backwards translation results revealed some items on the ESI aligned well with intended objectives and other items need revision. I also evaluated the structural validity of the Thinking Skills subscale and found poor internal consistency. Other subscales were not evaluated using this technique. The external validity of this test was not evaluated because of problems identified regarding the test’s substantive and structural properties.

Overall, the ESI subdomains do not align with the skills and characteristics that employers, who are SMEs, say they seek when hiring college graduates. The model of employability proposed in the 20 year-old SCANS report may not accurately reflect factors currently being sought during employee selection. The ESI was evaluated to determine if it could be used to measure employability skills among college students.
The results suggest that the ESI cannot fulfill this purpose and therefore I recommend that a measure be created based on a new employability model.

**New Model of Employability**

I propose a new model of employability based on the most frequent responses in the employer survey. This model will include four skills: Communication, Technology, Thinking, and Teamwork skills. Likewise, the model will also include three personal characteristics: Reliability, Integrity, and Work Ethic. Together, these seven constructs represent the necessary skills and characteristics of employability. Presently, this model will be referred to as the “New Model of Employability,” or NME.

The NME partially aligns with current models of higher education outcomes. Specifically, most of the four skill domains are found in the Degree Qualifications Profile’s Intellectual and Analytic Skill domain (DQP; Lumina, 2011), AAC&U’s (2005) description of liberal arts outcomes, and Chickering’s (1999) objectives of higher education. However, these models of higher education do not typically include outcomes related to personal development, such as the three outcomes in the NME (Integrity, Reliability, and Work Ethic). Integrity is mentioned in the AAC&U and Chickering’s framework, but is absent from the DQP. It is interesting that personal characteristics are missing from the DQP, as this model is intended to bring external stakeholders (e.g., employers) to the higher education discussion.

The literature varies regarding employability; however, all seven domains in the NME were represented at least once in the literature (Hansen & Hansen, n.d.; Peter D. Hart Research Associates, Inc., 2008; The Pedagogy for Employability Group, 2004). Finally, the SCANS report includes many of the domains included in the NME, although
it also includes many extraneous areas (e.g., systems management). Table 20 provides a comparison of the NME to outcome models, relevant literature, and the SCANS report.

Table 20

*Top Referenced Skills and Characteristics by Employers*

<table>
<thead>
<tr>
<th>Domain</th>
<th>DQP</th>
<th>AAC&amp;U</th>
<th>Chickering (1999)</th>
<th>Literature</th>
<th>SCANS</th>
</tr>
</thead>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Technology</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Thinking</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Teamwork</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Integrity</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Work Ethic</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Table 20 demonstrates that the skill domains of the NME are aligned with current higher educational outcome models, although the personal characteristics domains are not. These personal development areas surely are in the nature of college, as students often are expected to turn in assignments on time and work hard. Development in these domains is likely inherent in the college experience, but not regarded as an outcome of college.

**Development of a New Employability Measure**

Developing a new measure is both an art and a science (Schmeiser & Welch, 2006). It requires creativity, yet is firmly a science as the process is systematically described in professional standards (AERA, APA, & NCME, 2000). Using these
standards, I will describe the general scale development process necessary for creating a new employability measure based on the NME. Before beginning the scale development process the seven identified employability domains must be clearly stated and substantively shown to relate to theoretical models reflecting each domain. After this process is complete one may begin the item development process (Schmeiser & Welch, 2006).

The new employability measure is to be used solely for assessment and research purposes. It is intended to assess employability among college students, primarily at the senior level. The new theoretical employability model should also align with the empirical items associated with it. The ESI used self-report items to assess the eight domains identified by the SCANS report. It should be noted that self-report is but a small subset of the types of items that could be used to measure these skills. Self-report items are not direct measures of student ability and are prone to aberrant responding. For example, a student could easily not pay attention to the items and respond randomly. Further, a student may experience social desirability when responding and not truly reflect the skill being measured.

Whenever possible, direct measures should be administered. These item types can include multiple choice items, open response (e.g., essays), etc. When determining the item type for a measure, one should consider the intended examinee ability. Ceiling effects commonly resulted from the ESI measure because the items were too simple for college students. A more complex item type that uses the breadth of a response scale is optimal. Perhaps if items included scenarios typically encountered in the work-force one may obtain sufficient variability in responses. Further, more than 3 response options
should be used in a self-report measure. Specifically, at least five Likert options should be available and utilized for response data to be treated as continuous (Muthen & Kaplan, 1985).

If possible, at least 20 items should be developed for each subdomain, yielding a large item pool. Realistically, all items will not psychometrically perform well and many items from the initial item pool will need to be revised or omitted. The items should be piloted on several occurrences with item characteristics being investigated after each occurrence (i.e., tests of reliability, checking for variability). The item pool will be reduced until a smaller, yet reliable subset of items has been determined for each subscale. At this point one may proceed to collect construct validity evidence.

Validity evidence must be obtained for every subscale. Benson’s (1998) strong program of construct validity provides a great framework for proceeding. Analyses similar to the ones performed in this thesis (i.e., backwards translations, CFAs) should be performed, collectively gathering evidence to make an effective validity argument. If substantive and structural evidence exists for a subscale, then external evidence can and should be sought.

In the external stage of the validity process, each scale is tested to see if it performs in expected ways. There are many ways to collect external validity evidence. One could covary subscales with similar scales if the constructs are known to theoretically relate. Similarly, one could collect known-groups validity tests. For example, one would expect for seniors in college to perform better on all scales than freshman and one could collect evidence to demonstrate this assumption. Ultimately, after external evidence is established for all subdomains, external validity can be tested.
for the entire measure (i.e., the overall scale should relate to employability). A prime piece of external validity for the overall measure would demonstrate that employability scores strongly relate with actual employer ratings of students.

Information regarding the item development process should be included in a test manual. This information was missing from the ESI test manual and diagnosis of poor item functionality was practically impossible. Providing this information will allow future tests of validity to be evaluated sufficiently.

**Employability Assessment**

Assessment of student learning is a systematic process that allows academic programs or institutions to identify strengths and weaknesses in student ability. A scale accurately measuring the NME could be used for assessment purposes if the seven domains were adopted as educational outcomes. Specifically, the scale would allow identification of strengths and weaknesses related to the seven areas of employability. New interventions and programmatic changes could then be implemented based on these results. Ultimately, assessment of employability outcomes would allow for improved student development related to life beyond graduation.

**Impact of College on Employability**

A scale developed to assess the NME could also be used in research studies designed to ascertain the impact of college. For example, institutions could administer the scale at the beginning and end of the college experience to determine the impact of college on employability. Likewise, the scale could be given to a similar demographic group *who did not go to college* and employability could be compared between this group and students who did go to college. Such a study would yield colleges’ effect on
employability that is independent of maturation. Further, if this scale was used at many institutions, aggregate employability profiles could be compared.

Employability as an Outcome of College

Employability is a construct of interest to external stakeholders who question the value of higher education. But should employability be considered an outcome of higher education that is systematically measured? Many faculty would vehemently say no if it were to change the ideal of higher education. These faculty likely fear that the focus of higher education would shift from learning for the sake of learning to vocational training.

It is important to balance employability with other college goals. A liberal arts education is quite different than vocational training. Directly addressing employability would only slightly modify the higher education model. Employability would not replace liberal arts, but rather reinforce and supplement it. Many of the domains of employability in my model are consistent with goals of a liberal arts education. Communication, Thinking, Technology, and Teamwork Skills are largely inherent in the Degree Qualifications Profile and also AAC&U’s (2005) definition of liberal arts education. These particular outcomes are likely emphasized at institutions through general education or within academic programs. Thus, including and creating/refining interventions related to these outcomes would not vastly change the curriculum.

In contrast, the three personal characteristics in the NME are not common outcomes of higher education. With the exception of integrity, these personal characteristics are rarely even mentioned when discussing the outcomes of college. This is quite interesting, given that many college mission statements include encouraging personal development among their students. For example, the mission of James Madison
University is to help students become “educated and enlightened citizens who lead productive and meaningful lives.” This mission goes beyond the knowledge and skills that one learns while obtaining their degree and includes personal development.

Higher education is generally interested in the personal development of a student. Often the student affairs division is charged with achieving this task. The division of student affairs is typically separate from academic affairs, although this was not always true. Prior to the 19th century, faculty were responsible for academic and personal growth of students. Colleges were much smaller and faculty were able to serve these outcomes by working closely with all students. Following rapid college expansion, the duties of developing personal growth and knowledge were split into two separate divisions: academic and student affairs (Reif, 2007).

Student knowledge can be systematically measured because there are structured requirements that students must meet prior to graduation. Assessing personal development, however, is not as easy. Student affairs provides many opportunities for students to experience leadership roles, volunteer in the community, and learn about health and wellness, among other things, although students are typically not required to participate. How can one assess personal development if it is impossible to relate interventions that students experience with outcomes?

Nevertheless, personal development represents key components of the NME. To assess these objectives, higher education must first adopt objectives related to integrity, reliability, and student work ethic. Next, interventions must systematically be mapped to the objectives. These interventions could occur within student affairs or academic affairs. If the two divisions were to collaborate, the possibilities for student development are
endless. Unlike the skill components of the NME, the personal characteristic components would require changes in higher education.

Adoption of employability as an outcome of higher education would have two powerful effects on higher education. First, it would better ensure that graduates are indeed prepared for the workforce, addressing employer concerns about the abilities of graduates. Second, it would define “student success” in a manner that is clear to the general public. These effects would gradually reduce criticisms regarding the value of college and alternatively would bring stakeholders into the higher education conversation, as the Bologna Process and DQP intended.
Appendix A

Letter of Permission

August 24, 2011

Megan Rodgers
James Madison University
Center for Assessment and Research Studies
821 S Main St
MSC 6806
Harrisonburg, VA 22807

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Sincerely,

Athena Wampier
Inside Sales Manager

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Appendix B

Employer Message: Invitation

Dear Employer Name,

JMU's Office of Career and Academic Planning (CAP) identified you as someone who has been very helpful in the process of preparing JMU students for employment. For my thesis as a JMU graduate student, I am conducting a validation study of *The Employability Skills Inventory*. Because you are an expert in personnel selection, I was hoping you could help me determine if this scale reflects the key skills that you seek when hiring college students.

It would be very helpful if you could spend about 10 minutes helping me with my project by completing the survey below.

Take the Survey

Megan Rodgers
Graduate Student
Psychological Sciences M.A. 2012
James Madison University
Appendix C

Employer Message: First Reminder

Dear Employer Name,

I am sending this reminder to again request that you respond to a brief survey that is a critical component of my thesis project. JMU’s Office of Career and Academic Planning (CAP) identified you as someone who has been very helpful in the process of preparing JMU students for employment. For my thesis as a JMU graduate student, I am conducting a validation study of *The Employability Skills Inventory*. Because you are an expert in personnel selection, I was hoping you could help me determine if this scale reflects the key skills that you seek when hiring college students.

It would be very helpful if you could spend about 10 minutes helping me with my project by completing the survey below.

Take the Survey

Thank you,

Megan Rodgers
Graduate Student
Psychological Sciences M.A. 2012
James Madison University
Appendix D

Employer Message: Second Reminder

Dear Employer Name,

I am pleased that 25% of the employers identified by JMU's Office of Career and Academic Planning (CAP) have responded to my survey. In an effort to obtain a representative sample from our community, I am sending a reminder to request that you respond to my survey. The information I collect from personnel experts will be used to better prepare JMU students for employment in the future.

It would be very helpful if you could spend about 10 minutes helping me with my project by completing the survey below.

Take the Survey

Thank you,

Megan Rodgers
Graduate Student
Psychological Sciences M.A. 2012
James Madison University
Appendix E

Employer Message: Final Reminder

Dear Employer Name,

I am sending this final reminder to request that you respond to a brief survey that is a critical component of my thesis project. JMU's Office of Career and Academic Planning (CAP) identified you as someone who has been very helpful in the process of preparing JMU students for employment. For my thesis as a JMU graduate student, I am conducting a validation study of The Employability Skills Inventory. Because you are an expert in personnel selection, I was hoping you could help me determine if this scale reflects the key skills that you seek when hiring college students.

It would be very helpful if you could spend about 10 minutes helping me with my project by completing the survey below.

Take the Survey

Thank you,

Megan Rodgers
Graduate Student
Psychological Sciences M.A. 2012
James Madison University
Appendix F

Employer Survey

The purpose of this study is to gather validity evidence for the Employability Skills Inventory. You were selected to participate in this research due to your expertise in personnel selection. I'd like to ask that you complete the following brief survey regarding the skills you seek when hiring college graduates.

Participation in this study will require 10 minutes of your time. The investigator does not perceive more than minimal risks from your involvement in this study. While there may be no direct benefits to you as a participant, your response will contribute to a greater understanding of a measure being explored for program assessment purposes.

No identifiable information will be collected from you. Reported results from this survey will only be made in aggregate, describing generalizations about the data as a whole. All data will be safely secured and accessible only to the investigators. The investigators retain the right to use and publish non-identifiable data. At the end of the study, all records will be maintained and kept securely by the investigators.

Participation in this research is voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind. However, once your responses have been submitted and anonymously recorded you will not be able to withdraw from the study.

The Institutional Review Board (IRB) at James Madison University has approved this study. If you have questions or concerns during your participation in this study or after its completion, or you would like to receive a copy of the final aggregate results of this study, please contact Megan Rodgers, rodgermm@dukes.jmu.edu. If you have questions regarding your rights as a research participant, please contact Dr. David Cockley, Chair of the IRB of James Madison University: cocklede@jmu.edu, (540) 568-2834.

Sincerely,

Megan Rodgers
Graduate Student
James Madison University
rodgermm@dukes.jmu.edu

By proceeding to the next page you give your consent to participate and agree that you are over 18 years old. You are also confirming you have been given the opportunity to ask questions about this study and you understand what is being requested of you as a participant in this study.
What characteristics, traits, abilities, and/or skills are you seeking when you hire a college graduate?

What specific skills are you seeking when you hire a college graduate?
(Please move ahead if you listed skills in the prior question).

Many factors may be important when hiring a college graduate. Please help us identify those factors that are most important for personnel selection by rating the importance of each factor below.

<table>
<thead>
<tr>
<th></th>
<th>Not at all Important</th>
<th>Unimportant</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Skills</strong></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(reading, writing, listening, speaking, math, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Thinking Skills</strong></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(creative thinking, effective decision making, problem solving, visualization of how things work, reasoning skills, ability to learn, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intercultural Skills</strong></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(working with people from diverse backgrounds, understanding different cultures, multicultural competence)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal Qualities</strong></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(taking responsibility for actions, goal oriented, friendly, open, honest, etc).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Integrity</strong></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(honest, sound moral character and values)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Resource Management**  
(Identifying, organizing, planning, and allocating resources; prioritizing; time and project management, etc.) | □ □ □ □ □ □ |
|---|---|
| **Interpersonal Skills**  
(Working well with others, working as a team, openness to diversity, excellent customer service skills, etc.) | □ □ □ □ □ □ |
| **Systems Management**  
(Understand and effectively work with social, organizational, and technological systems, etc) | □ □ □ □ □ □ |
| **Technology Use**  
(Working with computers and other technology, selecting right tools, equipment, hardware, and software for a job, and application of knowledge to tasks, etc.) | □ □ □ □ □ □ |
| **Adaptability**  
(Ability to adapt to changing work environments) | □ □ □ □ □ □ |
| **Work Ethic**  
(Ability to work hard and stay at a job until complete) | □ □ □ □ □ □ |
| **Information Skills**  
(Acquiring and evaluating various types of information; processing, organizing, and maintaining information using computers and other technology, etc.) | □ □ □ □ □ □ |
| **Professionalism**  
(Acting in a responsible manner, maturity, self-confidence) | □ □ □ □ □ □ |
Are there any additional important skills not included above?
If so, please list below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all Important</th>
<th>Unimportant</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
</table>

*Note. The ten thinking skills item abilities were listed on the survey but will not be presented here due to copyright restrictions.

Did you have difficulty responding to any part of this survey? If so, please describe your concern below.

Thank you for completing this survey. If you have any questions, please contact Megan Rodgers at rodgermm@dukes.jmu.edu.
References


Fugate, M., & Kinicki, A. J. (2008). A dispositional approach to employability:


Liptak, J. (Personal Communication, June 20, 2011).


