RELATIONSHIP BETWEEN STUDENTS' AUTONOMY AND CAREER READINESS

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ABSTRACT

While colleges and universities have historically emphasized holistic education, employers continue to be concerned that students are missing core elements of the non-technical skills which are necessary to be successful in the workplace. Organizations such as the National Association of Colleges and Employers as well as the Association of American Colleges and Universities have provided data that reflect the disconnect between what employers expect and what recent graduates possess in terms of their non-technical skillsets. Despite efforts to prepare students for early career success based upon known employer expectations, the current disconnect demonstrates that an increased understanding about the gap in graduates' skills is needed. To better recognize gaps in skill development, it is important to understand where students are developmentally. This study's purpose is to understand how student development affects the students' perceived prioritization of the importance and their proficiency with technical and non-technical skills in order to provide a means to promote student growth toward employer expectations.

An electronic survey was used to gather information about the students' level of autonomy, how students prioritized the importance of career-readiness competencies, and the students' proficiency level for each competency. The survey had three sections: demographics, career-readiness competencies, and The Iowa Developing Autonomy Inventory. Descriptive statistics were used for the Iowa inventory and career-readiness competencies in order to gather information related to the mean, range, variance, and standard deviation. After the descriptive statistics were calculated, a test of differences between means was created using a *t*-test ($a = .05$) for each subscale and career-readiness competency in order to study possible differences among classification, age, academic discipline, and gender. Finally, a seemingly unrelated regression

(SUR) was used as the main statistical technique to analyze the relationship between the Iowa inventory subscales and the career-readiness competencies.

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CHAPTER 1: INTRODUCTION

According to Friedman (2020) there are more than 45 million student borrowers who collectively owe $1.6 trillion in student-loan debt. This figure is the second-greatest debt amount in the United States of America; home mortgages are number one. The average college graduate will owe nearly $30,000 in student-loan debt after earning his/her degree. Students are investing at great lengths in the hopes that their postsecondary education will provide what they need to be successful upon graduation. According to the National Center for Education Statistics (2020), 19.7 million students were expected to be enrolled in colleges and universities in 2020. Of those 19.7 million people, 12.3 million were younger than 25 years old. In addition, nearly 2 million college students are expected to graduate in 2020 and transition into the next phase of their life. The transition from college to a career marks a new world of opportunity and uncertainty for college graduates. Are college graduates equipped with the essential skills needed to get hired and to advance in their career?

Background

Students are exposed to a wide array of curricular and co-curricular experiences during their time in college. These experiences provide students with many opportunities to develop their technical and non-technical skills. Technical skills are typically linked with a student's degree and technical skills associated with doing a job (Jones, Baldi, Phillips, & Waikar, 2017). Non-technical skills consist of self-awareness, leadership, working positively in teams, and critical thinking. These non-technical skills complement the technical skills that students develop related to their major and specific job functions (Dixon, Belnap, Albrecht, & Lee, 2010). Both technical and non-technical skills are essential; however, students with strong non-technical skills have a competitive advantage among peers when interviewing and securing their first job

(Jones et al., 2017). Employers consistently look beyond technical skills when hiring people. Soft skills, also known as non-technical skills, are essential attributes that managers seek when hiring new college graduates (Dixon et al., 2010). A candidate's soft skills, or lack thereof, will be the greatest predictor of his/her productivity in the workplace (Bishop, 2017).

Employers focus much of their screening process on evaluating the non-technical skills which candidates possess. Jones et al. (2017) articulated how the culture of hiring places a greater emphasis on soft skills over academic achievement. Employers not only expect applicants to have technical skills, but also expect a graduate to have non-technical skills to complement the work. Jones et al. surveyed recruiters from Fortune 500 companies and non-Fortune 500 companies in order to gain a better understanding about what recruiters look for when recruiting a potential new hire. Recruiters were provided with a list of 21 candidate characteristics and were asked to rank the importance of each characteristic when recruiting a new applicant. According to the survey, the top four characteristics were related to non-technical skills.

The Association of American Colleges and Universities (AACU) uncovered similar findings in terms of the learning outcomes. Hart Research Associates (2018) surveyed executives and hiring managers to gather data regarding how important it is for college students to attain technical and non-technical skills prior to gaining employment. Several non-technical AACU learning outcomes emerged to be the most important. The outcomes consisted of the real-world application of skills and knowledge, working effectively in teams, critical thinking, communication, and ethical judgement. It is important to note that the same executives and hiring managers also indicated the importance of broad learning and cross-cutting skills that reach across all majors. More specifically, the executives and hiring managers noted the

importance of essential or universal skills that are not related to a job function. The National Association of Colleges and Employers (NACE, 2020) also identified eight key competencies related to career readiness. Like the AACU, NACE described similar competencies that employers expect recent graduates to demonstrate critical thinking/problem solving, oral/written communication, teamwork/collaboration, digital technology, leadership, professionalism/work ethic, career management, and global/intercultural fluency.

Role of Postsecondary Education

Colleges and universities play an important role when preparing students for the transition into the workplace (Selingo, 2013). Postsecondary educators have a critical responsibility to provide non-technical education opportunities from the moment students enter college until graduation (Eisner, 2010). The preparation goes beyond a single career center and an exit survey for recent graduates. Selingo explains that colleges and universities should start the process of non-technical skill development as soon as a college student arrives at the university in order to better prepare that student for work life after graduation. The idea of institutionalizing efforts for student success is not new to higher education. Throughout history, colleges and universities have evolved but have done so by providing continuous services to students as they prepare for their careers.

The story of America's colleges and universities reflects a journey of progress and evolution. The early colleges were developed to serve a single purpose: to develop clergy or, in other words, to prepare students for a career (Bok, 2009). Cole (2010) described the first recognized colleges as organized establishments where the priority was to train and to equip young men for ministry. In preparation for the clergy, students learned intellect-based and character-based curriculum (Washburn, 2005). The higher-education landscape changed

dramatically in the 1800s. It was becoming more common for minority groups to attend college. During this time period, 40 colleges across the country were created solely for women. The creation of these colleges would mark the first time in history that women were provided with their own colleges (Washburn, 2005). However, the 1900s provided even more opportunities for colleges to evolve and to diversify.

Beginning with the women's movement and progressing toward the Servicemen's Readjustment Act also known as the GI Bill, more minority groups gained access to a once-upon-a-time restricted education (W. Smith & Bender, 2008). The GI Bill provided access to students who would have never considered college as an option. Kuh, Kinzie, Schuh, and Whitt (2011) described the GI Bill as a mechanism that significantly increased diversity on college campuses. Colleges and universities worked tirelessly to keep up with the demand and the increase of such a diverse enrollment. Curriculum was being discussed, once again, as was the purpose of education. College officials considered student choice, learning, and retention while determining how to proceed with thousands of new and diverse students. This growth led to what Kuh et al. (2011) referred to as the golden years of higher education.

During this time, postsecondary education experienced significant changes. The opportunity to attend college was provided to more individuals, and colleges began to offer many additional degrees and opportunities. Loss (2012) shared that, by the 1970s, many more people felt that going to college was possible; before then, attending college was only a dream or something the elite could experience. Bok (2009) described how colleges and universities began further removing themselves from liberal education. The number of students majoring in vocational programs was increasing while traditional liberal arts majors plummeted. The college

experience was beginning to gain the reputation that a better job equaled a completed college degree.

Regardless of the intended outcome, the collegiate arena has always focused on student success through a holistic education. One way holistic education has occurred is with the inclusion of co-curricular learning that enhances curricular outcomes. This co-curricular focus is often shepherded by student affairs divisions. Long (2012) explained that, throughout history, student affairs has always played a role on college campuses. Student affairs functions are described as those experiences that exist outside the classroom. The first formulized definition of student affairs was created in 1937 when the Student Personnel Point of View was published; the document was revised in 1949. The original publication focused on guidelines related to the college experience, especially the importance of developing the whole student. According to Evans and Reason (2001), the 1949 version went beyond holistic development into understanding and appreciating each student's differences. As the student affairs framework began to gain traction, it was soon complemented by the formation of student development theory.

Student Development Theory

Student development theory has guided educators as they continue their work with college students. Long (2012) described how student development theory became a framework for student affairs in the 1960s. Sanford (1967) explained how development could be defined as the "organization of increasing complexity" (p. 47). Rodgers (1990) described student development as "the ways that a student grows, progresses, or increases their development capabilities as a result of enrollment in an institution of higher education" (p. 27). Evans, Forney, Guido, Patton, and Renn (2009) stated that student development theory provided a foundation for

student development. Evans et al. continued, “Student development theory focuses on intellectual growth as well as affective and behavioral changes during the college years, they also encourage partnerships between student affairs professionals and faculty to enhance student learning and maximize positive student outcomes” (2009, p. 7).

Strayhorn (2016) illustrated that educators are concerned about both students’ learning and students’ development. Theories have been utilized to better understand students’ development. Psychosocial theorists examine “the process of an individual’s psychological growth in, and interaction with, a social environment” (p. 141). Erik Erikson and Arthur Chickering are two instrumental theorists for the establishment of psychosocial development theory. Specifically, Chickering’s theory has been influential to describe how students develop in college.

Chickering’s Theory of Identity Development

A popular student development theory related to student identity is Chickering’s Theory of Identity Development; the theory was first introduced in 1969 (Chickering, 1969) and later updated (Chickering & Reisser, 1993). Chickering’s psychosocial development framework provided an avenue to better understand how students develop throughout their college experience. Chickering’s development model described identity development by defining seven unique vectors of development that contribute to the progression of student identity. Evans et al. (2009) portrayed the vectors as pathways that students fluidly move through as they grow and develop in preparation towards independence.

Vector one involves developing competence through problem solving and engaging in active learning. Vector two is related to managing emotions while moving through autonomy toward interdependence is the third vector. In vector three, students begin to feel more confident

with their decisions and are less likely to rely on others for approval. As students become more confident, they also develop mature interpersonal relationships, which is vector four. Establishing an identity is an important fifth vector because it requires consideration of the first four vectors. Establishing an identity relates to being comfortable with your appearance, gender, and sexual orientation. A college student should also have a clear sense of self within a cultural, historical, and social context. As students establish their identity, they begin moving toward developing purpose, which is the sixth vector. Their purpose becomes the driving force for all they do. The final vector is developing integrity (Chickering & Reisser, 1993). As college students move through Chickering and Reisser's vectors, they are inherently preparing for their transition into the workforce.

Schlossberg's Transition Theory

Evans et al. (2009) illustrated that Schlossberg's transition theory provided a framework to better understand how adults transition and how they cope with those transitions. Schlossberg's transition theory can be viewed as a psychosocial approach where adults have the opportunity to grow and to develop. Schlossberg (1981) indicated that transition happens throughout one's life and does not end with adolescence. People continue to experience transitions and changes throughout their lives. As a result of these changes, individuals experience new networks, behaviors, and self-perceptions. A transition, according to Goodman, Schlossberg, and Anderson (2006), is "any event, or non-event, that results in changed relationships, routines, assumptions, and roles" (p. 33). A student entering college, or a person entering the workforce, would be categorized as an event that may change relationships, routines, assumptions, and roles.

Schlossberg (2008) continued by explaining that the significance of the event or non-event lies in how and to what extent it alters the student's life. Gardner and Van der Veer (1998) argued that the transition from college to a career is equally or more important than the transition from high school to college. Gardner and Van der veer (1998) also shared that more attention needs to be spent transitioning students from college to careers. Through intentional educational programming and classroom experiences, students can begin gathering the tools needed to make a smooth transition into the workforce.

Summary

When students arrive on campus, they are exposed to many curricular and co-curricular experiences. Students may start by finding their classes, meeting their roommate, and even attending a student-organization meeting the first week of school. Students are quickly exposed to technical and non-technical skill development through classroom and outside classroom learning. To create meaningful co-curricular and curricular experiences for students, educators must know where students are developmentally. Chickering and Reisser (1993) indicated that a student's identity development can be determined based on what vectors the student has experienced. By better understanding the relationship between the students' level of autonomy as well as how they prioritize the importance of non-technical and technical skills and their level of proficiency, educators can provide more effective programs and services to assist students for their transition from college to career.

Statement of the Problem

While colleges and universities have historically emphasized holistic education, employers continue to be concerned that students are missing core elements of non-technical skills which are necessary to be successful in the workplace. Despite efforts to prepare students

for early career success based upon known employer expectations, the current disconnect demonstrates that an increased understanding of the gap in the graduates' skills is needed.

Purpose of the Study

This study's purpose is to understand how student development affects (direct effects and moderation with key demographic variables) students' prioritization of the importance and proficiency level for specific career-readiness competencies in order to provide a means to promote student growth toward employer expectations.

Research Questions

To address the study's purpose, the following questions were explored:

1) How does the students' level of autonomy (time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents) relate to their perceived importance of career-readiness competencies (teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management)?
2) How does the students' level of autonomy (time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents) relate to their proficiency with teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management?

Importance of the Study

Colleges and universities can prepare students to be successful in college and beyond by gaining a better understanding of how the students' level of autonomy affects how they prioritize

the importance of non-technical and technical skills as well as their level of proficiency. Gaining insight into importance and proficiency will allow educators to gain a more holistic perspective about a student's educational experience. As a result, colleges and universities can design intentional education programs and services to better serve students and to prepare individuals for the future. For example, by understanding where students are developmentally, program priorities and strategies can be linked to evaluation and assessment methods in order to establish benchmarks. Gaps can be identified, and intentional programs can be established to develop the students' level of autonomy. Because employers stress the importance of non-technical skill development, it is essential that educators have a better understanding of student development and how it affects a student's understanding about the importance of non-technical development. Educators can have a positive influence on a student's transition from college to career by supporting a student's development and skill awareness.

Organization of the Study

Chapter 1 provided the Background about why this topic matters and a brief overview of where we are currently. The Statement of the Problem was given to show that it is unclear how the students' level of autonomy may affect how they prioritize the importance of career-readiness competencies and their proficiency level for each competency. The chapter also described the study's purpose: to understand how student development affects (direct effects and moderation with key demographic variables) students' prioritization of the importance and proficiency level for specific career-readiness competencies in order to provide a means to promote student growth toward employers' expectations.

Chapter 2 presents a review of literature from various books and articles that is crucial for this study's development. The chapter provides an overview of the history and the evolving

purpose of higher education. This literature review also provides a theoretical framework that is rooted in Schlossberg's Transition Theory and Chickering's Theory of Identity Development, coupled with career readiness. In addition, the review gives a summary of definitions as well as how to define technical skills and non-technical skills. Finally, this chapter provides literature that describes the non-technical skills which employers seek from college graduates.

Chapter 3 describes the methodology used for this study. The research questions are reflected in this chapter. Information about the Research Design is provided. The instrument and procedure are also shared to give a better understanding about what was measured and how it was measured. Finally, the data processing and analysis are explained. Chapter 4 presents the results for the findings. Essentially, this chapter answers the two research questions listed earlier. Chapter 5 clarifies the results and findings in relation to the literature review. In addition, this chapter provides recommendations for further research and future practices.

CHAPTER 2: LITERATURE REVIEW

The material in this chapter is presented in six sections. The Introduction gives background information. Then, the literature is utilized to define essential skillsets and to differentiate the non-technical and technical skills. The third section focuses on the specific Skills Employers Seek from recent college graduates. Section four explores the evolution of higher education; subsections then describe the development of student affairs and the launch of student development theory. Section five provides suggestions for program development to address employers' concerns.

Introduction

Students are exposed to a tremendous number of educational experiences during their time in college. These experiences provide students with the opportunity to develop technical and non-technical skills. Non-technical skills consist of skills such as self-awareness, leadership, working positively in teams, and critical thinking. These attributes complement the technical skills students develop related to their major of study (Dixon et al., 2010). The following literature review describes the importance of recent graduates developing strong non-technical skills in order to gain a competitive advantage among peers when interviewing and securing the first job.

Throughout the literature, emphasis is placed on the importance of a student's technical skills which, for most accounts, is the student's degree and skills associated with doing the job (Jones et al., 2017). Because technical skills serve as a prerequisite for a job, non-technical skills, frequently referred to as soft skills, are more commonly being expected from employers. Dixon et al. (2010) argued that employers consistently look beyond technical skills when hiring people. Soft skills are essential attributes that managers should seek when hiring new college graduates.

A candidate's soft skills, or lack thereof, are the greatest predictor of his/her productivity in the workplace (Bishop, 2017).

Regardless of the intended outcome, the role of higher education has continually been focused on student success through holistic education within the collegiate arena. From the establishment of Harvard in 1636 to today's colleges and universities, institutions are preparing students for life after college. As students attend college, they are also growing and developing. Chickering and Reisser's Theory of Identity Development provides insight about how students develop during college. As students develop, they are also preparing for the important transistion from college to a career.

College and universities play an important role when preparing college students for their transition into the workplace (Selingo, 2013). Eisner (2010) identified the important responsibility that postsecondary educators have leading up to the college-to-career transition and the appropriate non-technical skills which students need to be taught prior to entering the workforce. The preparation goes beyond a single career center and an exit survey for recent graduates. Selingo explained that colleges and universities should start the process of non-technical skill development as soon as a college student arrives at the university in order to better prepare that student for work life after graduation. The idea of institutionalizing non-technical development programming efforts for student success is not new to higher education. Throughout history, colleges and universities have evolved but have done so by providing continuous services to students as they prepare for their careers.

Essential Skills

The great debate begins: what is more important, hard skills or soft skills? Before the conversation starts, it is important to first define the two terms. Most references provided in this

literature review utilize the term “soft skills.” While the opposite of soft skills is referred to as hard skills, please also consider that, throughout the literature, the term “soft skills” has been used interchangeably with other terms such as “general skills,” “generic skills,” “non-technical skills,” “employability skills,” “career readiness skills,” “human skills,” and “leadership skills.” Similarly to soft skills, the broad range of terminology is reflected for the term “hard skills” as well; for this term, labels such as “technical skills,” “educational skills,” and “cognitive skills” have been used. The following section provides multiple definitions for both hard and soft skills.

The literature is filled with definitions related to hard skills. To start the discussion, Weber, Finley, Crawford, and Rivera, Jr. (2009) explained that hard skills had been most commonly identified as those skills related to doing the job. Essentially, hard skills are derived from the knowledge and intellect related to an individual’s job function. Prabhaker (2004) reinforced hard skills as job-specific and added that these job-specific functions are gained through uniquely acquired educational tracks. Peck (2017) stated, “Hard Skills are most often associated with knowledge-based and occupational skills that are quantifiable and measurable. These skills might include computer programming, accounting, or subject matter expertise” (p. 4). Klaus, Rohman, and Hamaker (2007) indicated that, in today’s business world, hard skills are associated with the proficiencies needed to do the job, such as factual knowledge and technical ability.

Diamond (2008) stated that hard skills include technical skills, which typically represent the minimum qualifications needed to perform a job. Lastly, Hendarman and Cantner (2018) defined hard skills as those abilities that are most likely cognitive and something that can be assessed easily. Weber et al. (2009) gave an example of a hard skill pertaining to a civil engineer’s ability to ensure that a highway project will be level and strong enough to hold the

weight of an 80,000-pound semi-trailer truck. These skills allow employees to perform specific tasks, and performance can be measured using benchmarks. Doyle (2018) stated that hard skills should not be overlooked. These abilities are the essential elements that employers initially seek. Hard skills are typically featured on a resume and serve as the prerequisites for an interview. These skills are most noticeable in a job posting or description. Candidates can easily read the description and indicate if they would be able to perform the task with their hard skills. While hard skills may get an individual a job interview, the developed soft skills may be the difference in securing the position and advancing quickly.

Klaus et al. (2007) explained that soft skills represent many different skillsets, consisting of "self-awareness, trustworthiness, conscientiousness, adaptability, critical thinking, attitude, initiative, empathy, confidence, integrity, self-control, organizational awareness, liability, influence, risk-taking, problem solving, leadership, time management, and then some" (p. 2). Diamond (2008) continued by clarifying that soft skills are an accumulation of personal habits, values, attitudes, language abilities, and personality traits. Claxton, Costa, and Kallick (2016) described the importance of soft skills and how these abilities may be perceived based solely on the terminology "soft skills." If you dissect the term "soft skills," it becomes clearer why the authors dislike that term. The word "skills" suggests a technical skill related to a specific area; for example, shooting a gun is a skill. Claxton et al. continued by describing how the word "soft" is a great disservice. The warm and fuzzy feel of the word "soft" implies that the skills are not as important as technical skills or hard skills. "The terminology implies that these valued outcomes are sentimental or 'warm and fuzzy.' It immediately undermines their claim to serious attention, suggesting that we do not consider them as important as the 'hard' data that are presently driving accountability" (2016, p. 62). The authors argue that a better term for these essential skills would

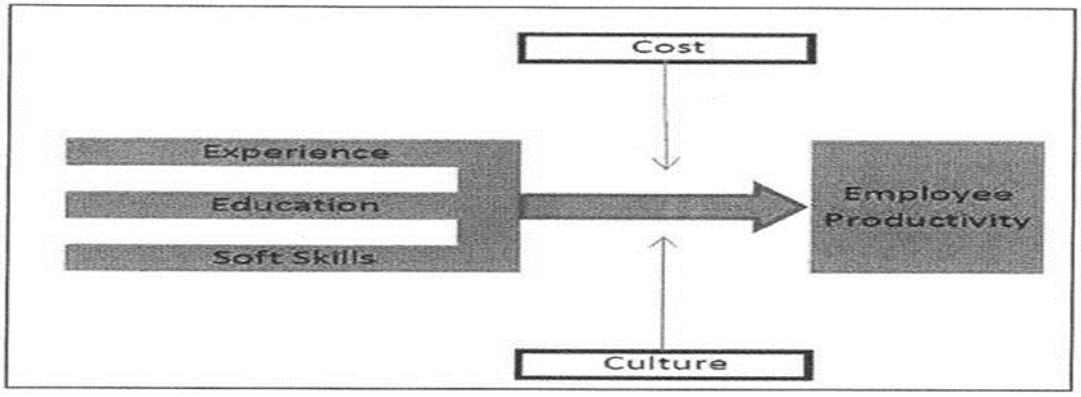
be “thinking dispositions.” Klaus et al. (2007) explained that soft skills complement hard skills by successfully assisting individuals who are utilizing knowledge and technical skills.

Peck (2017) stated, “Soft skills are related to emotional intelligence quotient, the range of character traits and interpersonal skills engaged in people relationships” (p. 4). Weber et al. (2009) continued by painting a picture of soft skills by defining them as “the interpersonal, human, and people or behavioral skills needed to apply technical skills and knowledge in the workplace” (p. 354). Matteson, Anderson, and Boyden (2016) suggested that there is not one universal, agreed-upon definition in the literature regarding soft skills. The literature agrees that soft skills are important; however, when describing soft skills, there is no all-encompassing definition. Matteson et al. (2016) continued by suggesting that, although the term “soft” is catchy, authors have not established a formal definition: “For the development of soft skills to occur, an important first step is to clearly define the desired skills” (p. 83).

Bishop (2017) argued that soft skills are essential attributes which managers should seek when hiring new college graduates. Bishop went on to argue that a candidate’s soft skills, or lack thereof, will be the greatest predictor of his/her productivity in the workplace. Bishop created an employee productivity model where productivity is the output for the education, experience, and soft skills that the new employee possesses. Education, experience, and softs skills are viewed as independent variables that directly affect the dependent variable, which is productivity. Essentially, a new employee’s productivity is the output for the sum of all three independent variables. Bishop continued by saying that soft skills is the most important independent variable and has the greatest influence on productivity. Figure 2.1 provides a visual representation of Bishop’s Employee Productivity Model.

Figure 2.1

Bishop's Employee Productivity Model



According to Klaus et al. (2007), there was a time when soft skills were often overlooked in the business world; however, in today's competitive job market, finding the desired soft skills is becoming a key hiring strategy. Soft skills are receiving more emphasis for employees' performance reviews and salary increases. The value of soft skills has been identified more frequently in recruitment efforts and job-placement processes. This strong focus on soft skills has made the employer somewhat less interested with prospective employees' hard skills and more intrigued by their soft skills.

Skills Employers Seek

According to Dutton (2012), the U.S. Department of Labor devoted $2 billion, through grants, to enhance community-college programs that focused on developing innovative strategies to increase a student's success in his/her career field. Dutton emphasized the importance of these grants being invested to teach students skills beyond the technical skills, such as the soft skills needed in today's business world. Technical skills alone will not be enough for students to be successful in their career. Bancino and Zevalkink (2007) continued by explaining why soft skills are in high demand: "While some people consider soft skills the intangibles, these skills are quickly becoming a requirement that drives tangible and measurable increases in personal

productivity and directly translates to a sustainable competitive advantage in a global marketplace" (p. 22).

Many diverse business sectors have highlighted the importance of soft skills. Dixon et al. (2010) noted that future employers would look beyond technical skills in order to hire employees with valuable soft skills. These traits are so important in the workforce that finance professionals, along with other business professionals, are being criticized for a lack of soft skills. The criticism comes from the amount of pressure concentrated on these skills and how essential they are in the workplace. Other professions, consisting of computer engineers, information system specialists, and accountants, are also experiencing a demand for increased soft-skill development. Bhanot (2009) agreed with Dixon et al. (2010) and stressed the importance of soft skills in today's workforce. An employee with polished soft skills will surpass a counterpart who may rely on the technical skills associated with an academic degree. Dixon et al. (2010) explained that soft skills complement hard skills in the workplace and, when used correctly, can give employees a competitive advantage among peers. Bhanot continued by explaining that, as a result of soft-skill development, organizations are noticing a competitive advantage. This advantage has contributed to employees being more self-aware, better team players, and having a greater emphasis on customer needs.

Hart Research Associates (2013) stated that employers are still looking for job-specific knowledge, such as hard skills, but a much higher emphasis is being placed on the broad range of skills and knowledge that a candidate can contribute to the workplace. Most employers agreed that recent graduates possess enough skills to work entry-level positions, however, these graduates lack the broad range of skills to advance beyond the entry level. Over half of the employers surveyed by Hart Research Associates argued that broader abilities are more

important than job-specific skills for career advancement. The consensus among employers suggested that applicants striving for a long-term, successful career with a company need to show competencies in a broader skillset.

Arum and Roksa (2011) illustrated that external pressures, specifically from the business community, have become more evident within postsecondary education. Business leaders and potential employers are sounding the alarm by questioning the importance of a college degree. For the employer, the question remains, "what is the return on investment?" Business leaders have expressed their concerns regarding the recent graduates' inability to lead in the workplace. Specifically, employers have argued that graduates do not have the soft skills needed to ensure competitiveness in the labor market. DiMartino and Casaneda (2007) also shared the importance of soft-skill development among recent graduates. Skillsets such as written and oral communication, critical thinking, problem solving, accountability, and the ability to work with others effectively are typically nonexistent with recent graduates. Hernon, Dugan, and Schwartz (2013) shared how business communities view college graduates as the output of colleges and universities and as the input for businesses.

Employers are urging higher education to emphasize the significance of meeting workplace needs to compete globally and function as a productive society. Heron et al. (2006) argued that business leaders have high expectations regarding the learning agenda within postsecondary education. Business leaders are expecting colleges and universities to create a curriculum that exposes students to experiences and strategies to assist with the development of skills such as effective communication, critical thinking, and problem solving. Overall, Heron noted that these skills are essential to raise the superiority of the workforce and prepare graduates to serve as engaged citizens.

Businesses expect more than just a completed college degree from students. Employers appreciate a student's degree–usually, the degree is a prerequisite for the job–however, it is beyond the degree that employers are searching. Bancino and Zevalkink (2007) described three reasons why business leaders expect more from college graduates. First, business leaders expect graduates to make improvements to the organization's bottom line. Second, employers understand that competition within businesses has increased, emphasizing the need for skills beyond one's degree. Finally, globalization continues to be a factor in business and for business success. These external pressures have placed more attention on the technical and non-technical skills which students possess upon college graduation. Clarke (2016) argued that soft-skill deficits are a global issue, as indicated by the United Kingdom's (UK) Development Economics Ltd. Development Economics Ltd. predicted that, by 2020, half a million UK employees would have negative consequences in the workforce because of the lack of soft-skill development. This issue continues to grow globally.

Hart Research Associates (2013) reported a thorough examination of what employers are seeking from college students before individuals enter the workforce. The report provided multiple priorities that employers emphasized regarding what students need in order to be successful in today's business world. Employers expressed the need to have recent graduates who could think critically, communicate with colleagues, and understand and solve complex problems. Hart Research Associates continued by sharing that employers are putting more priority on hiring applicants with high levels of intellectual and interpersonal skills. In addition, employers are searching for candidates with innovative and creative mindsets that can be utilized to advance business strategies. Poll (2015) explained that a successful candidate resembles an individual with a broader set of leadership skills who is able to contribute and to provide value to

the company. Employers identified several skills that recent graduates lacked in the work environment. Of those skills indicated, the top four were people skills, problem-solving skills, oral communication, and leadership.

A similar finding was published in Job Outlook (2016): employers are looking for leaders who can contribute to a group while efficiently communicating. When employers were questioned about the qualities reviewed on an applicant's resume, both leadership and the ability to work in a team ranked the highest. Specifically, if all were equal, besides leadership skills, the employers always hired the applicant with leadership experience.

Hart Research Associates (2015) indicated that employers and students perceive student preparedness differently when people enter the workforce. Hart Research Associates utilized the Association of American Colleges and Universities' learning outcomes for the study. Table 2.1 illustrates how employers and students ranked student preparedness related to each learning outcome. As you can see, employers and students viewed the students' preparedness much differently. Students were much more likely to rank preparedness higher among the learning outcomes while employers were the opposite.

Table 2.1

Student Preparedness Related to AACU Learning Outcomes

Learning Outcome	% of Employers who Indicated that Students are Well Prepared in this Area	% of Students who Indicated that Students are Well Prepared in this Area
Working with others in teams	37%	64%
Staying current on technologies	37%	46%
Ethical judgment and decision making	30%	62%
Locating, organizing, evaluating information	29%	64%
Oral communication	28%	62%
Working with numbers/statistics	28%	55%
Written communication	27%	65%
Critical/analytical thinking	26%	66%
Being innovative/creative	25%	57%
Analyzing/solving complex problems	24%	59%
Applying knowledge/skills to real world	23%	59%
Awareness/experience of diverse cultures in U.S.	21%	48%
Staying current on developments in science	21%	44%
Working with people from different backgrounds	18%	55%
Staying current on global developments	18%	43%
proficient in other language	16%	34%
Awareness/experience of diverse cultures outside U.S.	15%	42%

Peck (2017) argued that the skills employers seek can be categorized as career-readiness competencies. Peck described career readiness as "the attainment and demonstrations of requisite competencies that broadly prepare college graduates for a successful transition into the workforce" (pp. 15-16). The National Association of Colleges and Employers (NACE) led the community when it developed a task force to examine competencies related to the career-readiness skills. The task force was comprised of career service professionals and human

resource professionals. This task force not only defined career readiness, but also developed competencies directly related to career readiness. Table 2.2 provides the definitions for each of the eight NACE career-readiness competencies.

Table 2.2

NACE Career Readiness Definitions

Career-Readiness Competency	Definition
Critical Thinking/ Problem Solving	"Exercise sound reasoning to analyze issues, make decisions, and overcome problems. The individual is able to obtain, interpret, and use knowledge, facts, and data in this process, and may demonstrate originality and inventiveness" (NACE, 2020).
Oral/Written Communication	"Articulate thoughts and ideas clearly and effectively in written and oral forms to persons inside and outside of the organization. The individual has public speaking skills; is able to express ideas to others; and can write/edit memos, letters, and complex technical reports clearly and effectively" (NACE, 2020).
Teamwork/ Collaboration	"Build collaborative relationships with colleagues and customers representing diverse cultures, races, ages, genders, religions, lifestyles, and viewpoints. The individual is able to work within a team structure and can negotiate and manage conflict" (NACE, 2020).
Digital Technology	"Leverage existing digital technologies ethically and efficiently to solve problems, complete tasks, and accomplish goals. The individual demonstrates effective adaptability to new and emerging technologies" (NACE, 2020).
Leadership	"Leverage the strengths of others to achieve common goals and use interpersonal skills to coach and develop others. The individual is able to assess and manage his/her emotions and those of others; use empathetic skills to guide and motivate; and organize, prioritize, and delegate work" (NACE, 2020).
Professionalism/ Work Ethic	"Demonstrate personal accountability and effective work habits, e.g., punctuality, working productively with others, and time workload management, and understand the impact of non-verbal communication on professional work image. The individual demonstrates integrity and ethical behavior, acts responsibly with the interests of the larger community in mind, and is able to learn from his/her mistakes" (NACE, 2020).
Career Management	"Identify and articulate one's skills, strengths, knowledge, and experiences relevant to the position desired and career goals and identify areas necessary for professional growth. The individual is able to navigate and explore job options, understands and can take the steps necessary to pursue opportunities, and understands how to self-advocate for opportunities in the workplace" (NACE, 2020).
Global/Intercultural Fluency	"Value, respect, and learn from diverse cultures, races, ages, genders, sexual orientations, and religions. The individual demonstrates, openness, inclusiveness, sensitivity, and the ability to interact respectfully with all people and understand individuals' differences" (NACE, 2020).

Job Outlook (2018) utilized the National Association for Colleges and Employers' career readiness competencies to gage employers' and students' perspectives. Table 2.3 illustrates the

employers' and students' perceptions regarding proficiency for each competency. Like the Hart Research Associates' data, the results from Job Outlook (2018) show a large disconnect between employers and students. Once again, students give themselves higher percentages for all competencies except digital technology.

Table 2.3

Employers' and Students' Perceptions Regarding the NACE Competencies

Competency	% of Employers who Rated Recent Grads Proficient*	% of Students who Considered Themselves Proficient**
Professionalism/Work Ethic	42.5%	89.4%
Oral/Written Communications	41.6%	79.4%
Critical Thinking/Problem Solving	55.8%	79.9%
Teamwork/Collaboration	77.0%	85.1%
Leadership	33.0%	70.5%
Digital Technology	65.8%	59.9%
Career Management	17.3%	40.9%
Global/Intercultural Fluency	20.7%	34.9%

Peck (2017) explained that having the competencies and their definitions provides avenues for intentional learning and closing the gap between what employers are looking for and what education is producing. Peck illustrated how these competencies create a common vocabulary for educators and employers. In addition, having a common language provides avenues for educators to design a curriculum that explores these competencies by allowing students to gain meaningful skills prior to graduation. This common vocabulary provides a framework for employers to utilize when assessing student readiness. Peck argued that this list of competencies may be used as a tool to help college graduates successfully transition into the workplace.

According to Archer and Davison (2008), The International Employer Barometer (IEB) administered a pilot survey to employers in order to gather data related to the employability of recent college graduates. The survey's focus was to obtain information regarding the soft and hard skills that recent graduates needed. Two hundred and thirty-three employers participated in the survey, and the results indicated that action needed to be taken to better equip graduating college students with specific skills which would better prepare people for work. The report highlighted that 30% of employers confront issues with the college graduate's inability to utilize "generic skills" such as teamwork, problem solving, and communication.

The IEB survey allowed employers to rank the top 10 most-important skills and capabilities that are sought when recruiting graduates. The list, starting with the most important, consisted of the following items: communication skills, team-working skills, integrity, intellectual ability, confidence, character/personality, planning and organizational skills, literacy, numeracy, and analysis and decision-making skills. Archer and Davison (2008) continued by explaining that, of the employers surveyed, there was a greater percentage of individuals who believed a graduate's soft skills were more important than the student's degree.

Jones et al. (2017) researched recruiters from Fortune 500 companies and non-Fortune 500 companies in order to gain a better understanding about what people look for when recruiting a potential new hire. The authors indicated that a paradigm shift has started; recruiters were focused less on academic achievement and more on soft skills. For example, from a list of 21 factors, recruiters indicated what they look for in a new employee; the top four traits were related to soft skills: a positive attitude, respect for others, trustworthiness/honesty/ethics, and taking initiative. The bottom five on the list were work experience, math skills, high grades, having been active in a student professional organization, and knowledge of global or

international business. Table 2.4 displays the 21 characteristics and their average scores. This study suggested that employers look for many factors beyond technical skills.

Table 2.4

Non-Technical and Technical Characteristics with Their Average Scores

Factors	*M*	*SD*
Positive Attitude	4.83	0.48
Respectful of Others	4.80	0.49
Trustworthy, Honest, and Ethical	4.76	0.69
Takes Initiative	4.72	0.61
Takes Responsibility	4.72	0.53
Cooperative/Team Player	4.61	0.64
Good Communicator/Interpersonal Skills	4.60	0.72
Ambitious	4.39	0.85
Self-Confident	4.36	0.73
Critical Thinker	4.27	0.81
Dress/Demeanor/Personal Appearance	4.20	0.77
Leadership Ability	4.19	0.89
Good Sense of Humor	4.02	0.99
Knowledge of Major Field	3.50	1.11
Computer Software Skills	3.39	0.92
Work Experience	3.16	0.91
Quantitative/Statistical/Math Skills	3.10	1.30
High Grades	3.04	0.83
Active in Student Professional Organizations	2.78	1.20
Knowledge of Global or International Business	2.52	1.24

King (2015) highlighted that the business landscape has changed dramatically in the past decade. New jobs, ranging from social-media managers to app developers, are emerging. As the business world continues to evolve rapidly, higher education is falling behind. The results of an IBM Institute for Business Value survey administered to industry and academic leaders found

two areas where both groups agreed. King indicated how business and academic leaders agreed that the skills students lack are the same skills businesses demand. These skills include adaptability, flexibility, business communication, teamwork, agility, and problem solving.

The Association of American Colleges and Universities (AACU) uncovered similar findings in terms of the learning outcomes. Hart Research Associates (2018) surveyed executives and hiring managers to gather data regarding how important it is for college student to attain technical and non-technical skills prior to gaining employment. Several non-technical AACU learning outcomes emerged to be the most important: the real-world application of skills and knowledge, working effectively in teams, critical thinking, communication, and ethical judgment. It is important to note that the same executives and hiring managers also indicated the importance of broad learning and cross-cutting skills that reach across all majors. Specifically, executives and hiring managers noted the importance of essential or universal skills that were not specifically related to a job function.

Throughout the literature, employers have provided perspective regarding the non-technical skills that students should have when entering the workforce. Research has shown that employers seek non-technical skills over technical skills when hiring candidates. The research also illustrates how students believe that they are better equiped for the workforce compared to the employers' perspectives. This disconnect continues to provide avenues for colleges and universities to find ways to close the gap between what employeers expect from recent graduates and what graduates are actually delivering.

Role of Postsecondary Education

Higher education has been part of America's fabric for hundreds of years. Cole (2010) described the first recognized colleges as organized establishments where the priority was to

train and to equip young men for ministry. Washburn (2005) agreed with Cole's description, emphasizing the training for spiritual purposes by describing the early colonial college system as a training ground for clergy. In fact, Harvard was recognized as the first college with the sole purpose of training and developing clergy (Cole, 2010).

Not only was religious affiliation associated with the college curriculum, in the first half of the nineteenth century, so was colleges organizational structure (Lucas, 2006). Colleges classically employed two types of educators: a tutor and a professor. Both the tutor and the professor came from a religious background and had college experience. The tutor's main role consisted of enforcing rules and assisting with academics while the professor served as the primary educator. As noted earlier, the first established colleges had their purpose woven into religious outcomes. However, subsequent colleges offered a variety of content beyond having a religious association (Lucas, 2006).

While the college's main purpose was to educate clergy, the curriculum revealed that more than religion was being taught. There were two basic kinds of curricula: the intellect-based curriculum and the character-based curriculum. Using these two curricula in combination, early colleges provided the clergy member with developmental opportunities to enhance his scholarly and personal self (Washburn, 2005). According to Washburn, multiple factors of a student's experience aided in his/her college experience. These experiences consisted of the foundational belief to teach moral principles; to deliver basic cultural knowledge; to build character; and to emphasize language, literary achievement, and critical thinking. The college curriculum aimed to serve students by fostering mental discipline and improving intellect by exposing students to logic, mathematics, moral philosophy, Latin, and Greek. Bok (2009) shared similar views, describing early colleges as pathways for men to build character and to develop intellect. The

intellect-based curriculum concentrated on reviewing ancient languages, having class discussions, and solving math problems while the character-based curriculum focused on studying classical texts, following rules and regulations inside and outside the classroom, and attending chapel.

Despite the formal curriculum being tied to enhancing intellect and character, Cole (2010) noted that most students were dissatisfied with their formal education and regarded classroom lessons as dry. Students argued that they learned much more outside the classroom through clubs and debates, and by reading modern literature. As students' priorities began to change, so did the demographics, curriculum, and purpose of postsecondary education.

As the United States of America evolved, so did colleges and universities throughout the country. The 1800s marked a time when higher education experienced many changes associated with access. Washburn (2005) identified the early 1800s as a time when the college landscape changed rapidly which, in turn, created more opportunity. Throughout history, the demographics of a college student consisted of identifying as white and being a male. However, the rapid change in the higher-education landscape created a more diverse range of individuals who attended college, ultimately reducing the percentage of students who identified as white males. The changing landscape created more higher-education opportunities for women. During this time, 40 colleges across the country were developed solely for women. The increase of women colleges was significant for the makeup of higher education, from 100% homogenous to more access (Altbach, Gumport, & Berdahl, 2011).

Washburn (2005) indicated that, with the settling of the frontier and a growing democratic nation, colonial colleges began to evolve and to take on different responsibilities. As a result, the federal government began to get involved with postsecondary education by

providing land to establish more universities and to promote public education. Loss (2012) explained that, on July 2, 1862, President Abraham Lincoln signed the Morrill Land-Grant Colleges Act. In 1862, the first Morrill Act was passed by Congress, which blazed the path for the federal government to begin utilizing land to establish colleges and universities to serve the institution's local community by focusing on the essentials of agriculture and mechanical arts. During this time, the Morrill Act served as the leading movement for public universities (Washburn, 2005). With the introduction of public universities, the religious influence at colleges started to fade, and access for students to attend college was becoming more feasible.

After the Civil War, education reform spread across the country. Bok (2009) described how influences, such as federal land grants, donations from industries, and international influences, began to affect undergraduate curriculum. As a result, the classical curriculum was replaced with many diverse topics, such as physics, chemistry, biology, modern language, and literacy (Altbach et al., 2011). The curriculum shift was primarily influenced by Harvard's President Charles W. Eliot and his initiative to accommodate "true learning" by implementing an elective system. Students began to experience a variety of academic options and to explore many diverse disciplines (Bok, 2009). As curriculum changes took center stage on college campuses, religious bonds continued to be questioned, and religious ties were even broken as colleges disconnected faith from character building.

As this crusade continued, the curriculum evolved, creating many electives. Students were exposed to electives and many class options which, ultimately, led to students taking advantage of the educational system. Students soon filled class schedules with electives, creating a challenge for structured curriculum. The free-choice concept for selecting classes led to

considerable disruption within colleges. While students abused the elective system, the colleges' academic direction suffered (Bok, 2009).

Years after the Civil War, great adversity spread across the country, and colleges once again, scrambled to find new direction. During this time, the American college established a more consistent curriculum, and the world was introduced to the first research university (Cole, 2010). The American college was beginning to be defined. Altbach et al. (2011) stated:

> By 1908, it was possible to define the standard American university. It admitted only bona fide high school graduates. It provided them with two years of general education followed by two years of advanced or specialized courses. It offered doctoral training in at least five departments, appropriately led by Ph.D.'s, and had at least one professional school. (p. 55)

As college academic systems were becoming reputable, enrollment began a drastic climb. By the beginning of the First World War, enrollment numbers at traditional universities significantly increased from less than 100 students to approximately 5,000 students by 1915. American colleges and universities began to have uniform organizational structures, consisting of similar credit hours, offerings, admissions, majors, and other functions. As enrollment numbers climbed, so did world tensions. Beginning in 1939, the country experienced the Second World War, and the effect that it had on the country and the world was telling (Altbach et al., 2011).

After the wars, the landscape and purpose of higher education changed once again. Altbach et al. (2011) described how standardization and the introduction of the GI Bill served as a turning point for the American higher-education system. According to Altbach et al., this period in history could be defined as "the most tumultuous in the history of American higher

education" (p. 61). W. Smith and Bender (2008) agreed with Altbach et al. stating, "The transformation of the postwar American University was so extensive that it resulted in a wholly new institution, qualitatively different from that of the first half of the century" (p. 1). Bok (2009) described this time in history as a curriculum crossroads for many colleges and universities. Some schools held on to their classical curriculum while others promoted total freedom of choice, and some institutions focused on practical vocational curriculums. With colleges and universities transforming once again, the standardization of higher education became more apparent and commonly practiced.

Lucas (2006) described the post-world-war era as a time when college enrollment climbed. According to W. Smith and Bender (2008), the GI Bill allowed thousands of returning soldiers to attend and to afford college after the Second World War. During this time, the influx of college students doubled enrollment numbers across the country. As college-enrollment numbers grew, so did the number of recognized colleges. By 1962, colleges were receiving a significant amount of money from the federal government. In fact, $5.5 billion from Veterans Affairs was provided to support the GI Bill. This legislation provided access to students who would have previously never considered college as an option. Kuh et al. (2011) described the GI Bill as a mechanism that significantly increased diversity on college campuses. Colleges and universities worked tirelessly to keep up with the demand and increase from such a diverse enrollment. The curriculum was being discussed, once again, as was the purpose of education. College officials considered student choice, learning, and retention while determining how to proceed with thousands of new and diverse students. This growth led to what Kuh et al. (2011) referred to as the golden years of higher education.

In the 1970s, vocational education began gaining traction because of two major factors: employers demanded a more significant amount of value from their employees, and students viewed college as a way to a better life. Loss (2012) explained that, by the 1970s, many more people felt that going to college was possible; before then, it was only a dream or something the elite were able to experience. Bok (2009) described how colleges and universities began further removing themselves from liberal education. The number of students majoring in vocational programs was increasing while traditional liberal arts majors plummeted. The college experience was beginning to gain the reputation that a better job equaled a completed college degree. Some people would argue that colleges and universities were turning into employment training grounds for students who were pursuing jobs, rather than being a holistic liberal education.

Higher education has evolved throughout history. The American college has progressed and now functions differently than it did in 1636 when Harvard was established. Kuh et al. (2011) went on to describe

> the history of American Colleges and Universities less as a compendium of facts and more as a description of the lively process by which each generation of college students, administrators, donors, and legislators has wrestled with the issue of who shall be educated and how. (p. 21)

As colleges and universities evolved, the pupose of educating students for the next stage of their lives remained consistent.

Student Affairs

Regardless of the intended outcome, there has always been a focus on student success through holistic education within the collegiate arena. One way holistic education has occurred is through the inclusion of co-curriclar learning to enhance curricular outcomes. This co-curriclar

focus is often shepherded by student affairs devisions. According to Long (2012), throughout history, student affairs always played a role on the college campus; it was just not referred to as student affairs in the early days. Historians pinpoint many examples of student affairs work throughout history, but one of the most well-noted moments was when the University of Chicago's President William Rainey Harper appointed Alice Freeman Palmer as the first Dean of Women in 1892. Alice Freeman Palmer advocated for female students and saw that women were cared for outside the classroom. During this same time, Harvard's president appointed LeBaron Russell Briggs as the dean to look after the men at Harvard (Coomes & Gerda, 2016).

As the term "deaning" became more popular, colleges were establishing deans of men and women. The men's deans focused on advising and counseling men; the women's deans were focused on many other components, such as vocational preparation, moral and religious issues, chaperoning, discipline, and acting as a mother away from home (Dungy & Gordon, 2011). Female deans were focused on the entire student, and soon this holistic approach would be the calling for all deans because the foundation of student affairs was being created through the groundwork established by deans throughout history.

During the deaning movement, vocationalism was a hot topic. Frank Parsons, author of the 1909 book *Choosing a Vocation*, was very influential to student affairs in the early 1900s. Job placement and finding career paths for students quickly became a function for deans, especially deans of women who believed in vocational education, across campuses. The notion that deans and their assistants could assist with career preparation and guidance became the bedrock for developing the whole student, which lead to a new approach for student affairs (Coomes & Gerda 2016). The new approach was soon rooted in a publication that would set the stage for the future of student affairs.

The first version of the *Student Personnel Point of View* was published in 1937, and the revised copy was published in 1949. The original publication focused on guidelines related to the college experience, especially the importance of developing the whole student (Dungy & Gordon, 2011). According to Evans and Reason (2001), the 1949 version went beyond holistic development into understanding and appreciating each student's differences. Only a decade later, a focus on student development would serve as the new approach for several decades. Long (2012) described how student development theory became a framework for student affairs in the 1960s.

Student Development Theory

Sanford (1967) stated that development could be defined as the "organization of increasing complexity" (p. 47). Rodgers (1990) described student development as "the ways that a student grows, progresses, or increases their development capabilities as a result of enrollment in an institution of higher education" (p. 27). Coomes and Gerda (2016) referred to student development as "human development concepts" in order to address the students' developmental needs. Evans et al. (2009) described how student development theory provided a foundation for student development. Evans et al. continued, "Student development theory focuses on intellectual growth as well as affective and behavioral changes during the college years, they also encourage partnerships between student affairs professionals and faculty to enhance student learning and maximize positive student outcomes" (p. 7). Student development theory has provided guidance to educators at various colleges and universities.

As college students are transitioning through college, they are also developing. A popular student development theory related to student identity is Chickering's Theory of Identity Development; the theory was first introduced in 1969 (Chickering, 1969) and later updated

(Chickering & Reisser, 1993). Chickering's psychosocial development framework provides an avenue to better understand how students develop throughout their college experience. Chickering's development model described identity development by defining seven unique vectors that contribute to the progression of student identity. Evans et al. (2009) described the vectors as pathways that students fluidly move through while growing and developing in preparation towards independence.

Vector one involves developing competence. Developing competence is done through problem solving and engaging in active learning. Vector two is related to managing emotions while moving through autonomy toward interdependence is the third vector. In vector three, students begin to feel more confident about their decisions and are less likely to rely on others for approval. As students become more confident, they are also developing mature interpersonal relationships, which is vector four. Establishing an identity is an important fifth vector because it requires consideration of the first four vectors. Establishing an identity relates to being comfortable with your appearance, gender, and sexual orientation. A college student will also have a clear sense of self within a cultural, historical, and social context. As students establish their identity, they begin moving toward developing a purpose, which is the sixth vector. Their purpose becomes the driving force for all they do. The final vector is developing integrity (Chickering & Reisser, 1993).

Strayhorn (2016) noted that students move through the vectors at different rates. Vectors can also connect with each other and may even overlap over time. Strayhorn provided a visual of Chickering's Seven Vectors (as shown in Figure 2.2). Students can fall back to earlier vectors during their time in college. Students going back to previous vectors is frequently described as developmental regression.

Figure 2.2

Chickering's Seven Vectors

Note. Strayhorn, 2016, p. 135.

Evans et al. (2009) explained the complexity of measuring psychosocial development; a student is continuously developing, and the environment's effect can affect a student's development. Both continuous development and the environment are unpredictable, making them challenging to measure. The literature highlights several efforts to assess psychosocial development through the lens of Chickering and Reisser's (1993) vectors. The two most-used instruments related to Chickering's vectors are the Student Developmental Task and Lifestyle Assessment (Winston & Miller, 1987) and Jackson and Hood's (1986) Iowa Student Development Inventories. Pahl (2011) stated that The Iowa Student Development Inventories was created to assess six of the seven vectors, but it did not assess developing integrity, which is the last vector.

The Iowa Developing Autonomy Inventory (Jackson & Hood,1986) was created to assess college students' levels of autonomy as defined within the third level of Chickering and Reisser's (1993) Seven Vectors of Development. As students move through this vector, they learn to

function on their own by taking accountability for themselves. Through this vector, college students can manage the pressures between the necessity for independence and the want for acceptance, along with respecting others' individuality and independence (Chickering & Reisser, 1993). The Iowa Developing Autonomy Inventory was designed to encompass 90 Likert-type items (Pahl, 2011). The 5-point scale had the following descriptions: 1 = never characteristic of me, 2 = seldom characteristic of me, 3 = sometimes characteristic of me, 4 = often characteristic of me, and 5 = almost always characteristic of me. Six subscales, with 15 items each, represented the inventory. The subscales consisted of time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents.

The Iowa Developing Autonomy Inventory has been used in several studies. Pahl (2011) utilized the instrument to understand the relationship between Chickering and Reisser's third vector and Stephen Covey's seven habits of highly effective people. Taub (1997) conducted research using the Iowa Developing Autonomy Inventory to better understand the relationship between several factors associated with traditional-age undergraduate women. These factors consisted of residence status, race-ethnicity, age, class year, interpersonal relationships, and parental attachment. Taub (1997) continued to utilize the inventory to explore undergraduate women's autonomy and parental attachment. The study's purpose was to investigate parental attachment and autonomy, and if they vary within in a diverse group of undergraduate women.

The Iowa Developing Autonomy Inventory's reliability has been shared in several studies. An internal consistency reliability coefficient of .94 for the entire instrument was identified with .77 to .88 for the subscales (Jackson & Hood, 1986). Taub (1997) had similar results with an internal consistency coefficient of .92 for the instrument and .72 to .85 coefficients for the subscales. In addition, Pahl (2011) found the subscales' reliability coefficient

to be comparable, with interdependence being 0.75, emotional independence: parents, 0.86; time management, 0.82; money management, 0.79; emotional independence: peers, 0.75; and mobility, 0.83.

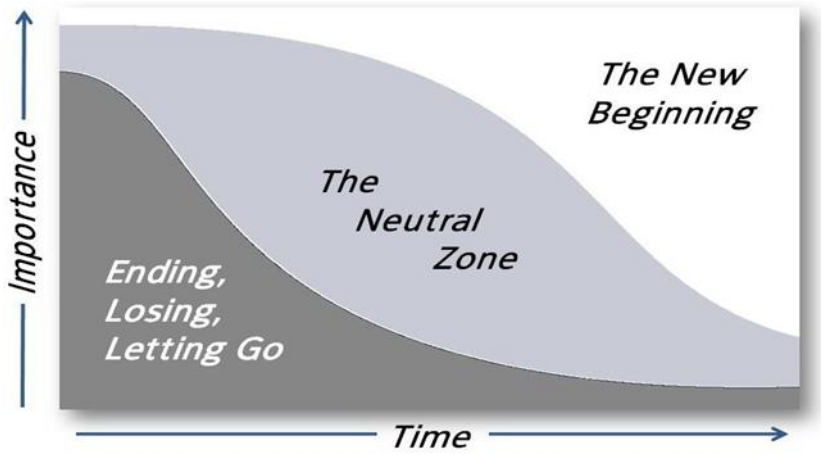
As college students move through Chickering and Reisser's vectors, they are inherently preparing for their transition into the workforce. This change is extremely important for college students. In fact, for most college students, the answer to "why" they attend college is simply to get a better job (Busteed, 2015). According to *The American Freshman National Norms for fall 2016*, 84.8% of students attending college in 2016 associated going to college with getting a better job and an enhanced quality of life (Eagan, Stolzenberg, Zimmerman, Aragon, Sayson, and Rios-Aguilar, 2014). Today's students expect postsecondary education to prepare them for one of the greatest life transistions: moving from college to a career.

Scholossberg (1981) indicated that transistions happen throughout one's life and do not end with adolescence. People continue to expereince transistions and change throughout their lives. As a result of these changes, individuals experence new networks, behaviors, and self perceptions. A transition, according to Goodman et al. (2006), is "any event, or non-event, that results in changed relationships, routines, assumptions, and roles" (p. 33). A college student entering college, or the workforce, would be categorized as an event that may change relationships, routines, assumptions, and roles. Bridges (2009) described the difference between change and transistions. Change is situational while a transistion is psychological. Change is inevitable, and the difference between how a person expereinces one change and another one depends on how he/she faces the transistion. Bridges provided three phases of transistion: letting go of the old ways and the old identity people had, going through an in-between time when the

old is gone but the new isn't fully operational, and emerging from the transistion and making a new beginning. Figure 2.3 illustrates the three phases.

Figure 2.3

The Three Phases of Transition



Note. Bridges, 2009, p. 5.

Olson (2014) illustrated that, during the transition, college graduates often describe how they feel as though something is missing prior to entering the workforce. Transitioning graduates have linked this feeling to a sense of not being prepared. As students manage these emotions and potential pitfalls when transitioning, the research suggests that intentional preparation may aid in a successful transition. Schlossberg (2008) stated:

> We must be satisfied with knowing that we will all experience both events and non-events continually; and that by strengthening the ability to understand them and by exercising coping skills, we will be better prepared to master the transistions and not allow them to control us. (p .7)

Schlossberg (2008) continued by explaining that the significance of the event or non-event lies in how and to what extent it alters people's lives. Gardner and Van der Veer (1998) argued that the transition from college to a career is equally as important as the transition from high school.

They also said that an equal or greater amount of attention needs to be spent transitioning students from college to careers and that the process needs to start when students arrive on campus for their first year (Gardner & Van der Veer, 1998).

Program Development to Address Priorities

The relationship between work and 21st-century skills was researched through a 2013 Microsoft Partners in Learning and Pearson Foundation study. According to Gallup, Inc. (2013), a senior in his/her last year of school who has participated in activities to develop his/her 21st-century skills is positively correlated with greater perceived work quality. The 21st-century skills include collaboration, knowledge construction, problem solving and innovation, self-regulation, the use of technology for learning, and skilled communication. K. K. Smith (2012) argued, "Colleges and universities must define their role in educating students in a way that will assist them not only during their time as students but for the long-term as well" (p. 5). Henscheid (2008) stated, "The greatest service that higher education can provide to these worried and debt-ridden seniors is solid preparation for life after college" (p. 22).

According to Fox (2018), parents, employers, and students expect more from a college education, which results in the stakes being higher than ever to prepare students for work after graduation. Fox (2018) suggested that career readiness is an essential element for the success of recent college graduates. By institutionalizing career-readiness programs, universities need to rely on many stakeholders who are connected to a student's experience. King (2015) suggested three techniques that postsecondary educators should consider when preparing students for the transition from college to work. First, postsecondary educators should adopt more hands-on and practical tactics. Second, colleges and universities should consider providing experience-based and real-world learning opportunities for students. Finally, collaborative efforts should be

expanded and built between the private sector and academia in order to create significant value for all stakeholders.

Fox (2018) explained that, to create an institutional approach for career readiness, universities must include many stakeholders, not relying solely on career-service professionals to handle this much-needed task. This institutional priority needs to be integrated into all aspects of a university, stretching from students to alumni and all players in between. Established leadership programs may be an opportunity to give stakeholder's direct connections about career-readiness skills from the National Association of Colleges and Employers as well as the student experience.

As suggested by Poll (2015), the highest percentage of surveyed employers indicated their concern regarding what students were learning in college. The graduates were not prepared for employment, and their inability to utilize soft skills in the workplace could be disruptive and unproductive. Leckey and McGuigan (1997) stated that employers prefer the student's ability to demonstrate teamwork, communication, and self-skills to the degree classification: less emphasis on traditional degrees and more on practical skills. As a result of these findings, the authors suggested that colleges and universities should review the current curriculum and locate areas where soft-skill development could be inserted and taught. In addition, spreading the word on a college campus about the importance of soft skills could create greater awareness. Fox (2018) previously provided the same suggestion when indicating the importance of an institutionalized approach to provide avenues for students' skill development on campus. Employers suggested that there was too much importance placed on book learning and not enough emphasis on real-world learning.

Parks and Taylor (2016) echoed the concept of real-world learning by arguing that academic transcripts do not provide employers with the evidence needed to see that a college graduate possesses the necessary skills to be successful in the workplace. Stakeholders outside higher education are becoming skeptical that students are gaining the skills needed for the workplace because traditional transcripts do not document the holistic learning that a student may experience in college. The value of higher education is being questioned, and employers are concerned that students are not acquiring the skills and abilities required to be successful in their careers. Schulz (2008) continued by emphasizing the important role that colleges and universities play in a student's soft-skill development. Schulz stated, "Educators have a special responsibility regarding soft skills, because during students' school and university time, they have a major impact on the development of their students' softs kills" (p. 153). According to Henscheid (2008), a higher-education trend is starting to emerge, demonstrating how college educators are utilizing a college student's senior year to better prepare him/her for a career.

Henscheid (2008) provided multiple examples of how colleges and universities are using the senior-year experience to prepare students for work upon graduation. The examples shared consisted of curricular and co-curricular initiatives. Some examples included classes such as senior seminars and capstone courses, as well as programs focused on finance, ethics in the workplace, leadership, transitions, etiquette, and even how to dress for success in the workplace.

Peck and Preston (2018) created a model to connect postsecondary education with industry. The Co-curricular Career Connections (C3) Leadership Model provides a framework that incorporates three significant experiences on and off campus. Connecting curricular and co-curricular learning is essential. Connecting structured leadership programs with experiential learning and connect learning attained from college to a student's career field. The overall intent

of C3 is to provide a framework that can be utilized by both higher education and industry in order to equip students with essential skills prior to full-time employment.

Chapter Summary

Work continues as students, educators, and employers learn about the correct path for a student's successful transition from college to career. The literature validates how important it is for college graduates to balance both technical and non-technical skills. Past research also provides evidence that employers are unsatisfied with students and higher education as students enter the workforce underprepared. Students and employers disagree regarding preparedness. Overall, the literature has provided enough evidence to see a problem, and now, it is time to fix the problem.

CHAPTER 3: METHODS

While colleges and universities have historically emphasized holistic education, employers continue to be concerned that students are missing the core elements of non-technical skills which are necessary to be successful in the workplace. Despite efforts to prepare students for early career success based upon known employer expectations, the current disconnect demonstrates that an increased understanding about the gap in graduates' skills is needed. This study's purpose is to understand how student development affects (direct effects and moderation with key demographic variables) a student's prioritization about the importance and proficiency level of specific career-readiness competencies in order to provide the means to promote student growth toward employer expectations. To address the study's purpose, the following questions were explored:

1) How does the students' level of autonomy (time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents) relate to their perceived importance of career-readiness competencies (teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management)?
2) How does the students' level of autonomy (time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents) relate to their proficiency with teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management?

Research Design

This study used an ex-post facto (co-relational) design (Cohen, Manion, & Morrison, 2018). The study's variables consisted of the eight career-readiness competencies that were developed by the National Association of Colleges and Employers (NACE, 2020) and the Iowa Developing Autonomy Inventory, containing 90 questions arranged with 6 subscales and aiming to measure a student's level of autonomy (Jackson & Hood, 1986).

Participants and Sampling

The study participants were all enrolled undergraduate students at North Dakota State University (NDSU). The participants ranged from first-year students to graduating seniors, which made up 82% of the student population. The total undergraduate population consisted of 10,831 students; 2,218 of them were first-year students. Of the 10,831 students, 10,598 were degree seeking individuals while 233 were non-degree seeking students. All the students were welcome to participate as long as they were recognized through NDSU's Office of Registration and Records as enrolled undergraduate students.

Instruments

To gather data for this study, an electronic survey (Appendix C) was created using an online platform (Qualtrics). The survey questions were arranged in three different sections. The first section focused on participant demographics. The second section had eight career-readiness competencies where students ranked the items in terms of importance and proficiency. The third section was designed to capture the students' levels of autonomy as represented by Chickering and Reisser's (1993) third vector.

Demographics

The survey's demographic section captured several key characteristics: age, gender, academic classification, and academic discipline. The academic classification was represented by the number of credits completed by a student. Academic discipline was represented by the broad range of disciplines that are found in higher education, as defined by the National Survey of Student Engagement (NSSE). The list of discipline categories included the following: Arts and Humanities, Biological Sciences, Mathematics and Computer Science, Social Sciences, Business, Communications, Media and Public Relations, Education, Engineering, Health Professions, and Social Service Professions. The response options for gender were female, male, transgender/other, and prefer not to disclose. Age was recorded as a whole number. These specific demographics were selected to allow comparison and to gain a fuller perspective about the relationship between the variables of interest.

Career-Readiness Competencies

The National Association of Colleges and Employers (NACE) is a professional organization. It provides several services to colleges and employers, including the forecasting and hiring trends for the job market, tracking salaries, recruiting and hiring best practices, and student attitudes and outcomes. In addition to the many services and programs offered, NACE has also defined the competencies that are paramount for students to gain prior to graduation. NACE (2020) defined these eight skills as career-readiness competencies. The list was developed by a task force which was established by NACE. The task force consisted of human resources (HR)/staffing professionals and college career-service professionals. The eight career-readiness competencies were critical thinking/problem solving, oral/written communication,

teamwork/collaboration, digital technology, leadership, professionalism/work ethic, career management, and global/intercultural fluency.

This section of this survey contained the eight career-readiness competencies. Participants were asked to rate the competencies by what they believed to be most important. Participants also reviewed the eight competencies and rated how proficient they were with each one. A seven-point, Likert-type scale was used for both the importance and the proficiency ratings (scores ranged from 1 to 7: 1 = *not at all important* and 7 = *extremely important*). The same approach was used to measure the students' level of proficiency for each competency.

Iowa Developing Autonomy Inventory

The Iowa Developing Autonomy Inventory (Jackson & Hood, 1986) was used to assess college students' levels of autonomy as defined in the third level of Chickering and Reisser's (1993) Seven Vectors of Development. The Iowa Developing Autonomy Inventory was designed to encompass 90 Likert-type items (Pahl, 2011). The five-point, Likert-type scale consisted of the following response options: 1 = never characteristic of me, 2 = seldom characteristic of me, 3 = sometimes characteristic of me, 4 = often characteristic of me, and 5 = almost always characteristic of me. Six subscales, which each had 15 items, were in the inventory. The subscales were time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents.

Hood (1997) described that the dimensions of autonomy scales were developed utilizing various aspects of autonomous observed related to college students. Originally Hood and Jackson (1985) developed the inventory using nine scales that measured a student's level of autonomy. Two of the scales measured emotional independence, consisting of emotional independence from peers and emotional independence from parents. Chickering and Reisser

(1993) explained, “emotional independence means freedom from continual and pressing needs for reassurance, affection, or approval” (p. 47). Four of the other scales were designed to measure instrumental independence which consisted of time management, money management, the management of school and work experiences, and mobility. Chickering and Reisser (1993) described instrumental independence as “learning how to go from one place to another without depending on others and the ability to identify resources required to fulfill personal needs and desires” (p. 47). The remaining scales were used to measure interdependence consisting of interdependencies between self and others, interdependencies between self and community, and interdependencies between the self and large social structures. Chickering and Reisser (1993) defined interdependence as “respecting the autonomy of others and looking for ways to give and take with an ever-expanding circle of friends” (p. 47). After Hood and Jackson (1985) reviewed the original data from their first study, intercorrelations among the nine subscales provided an opportunity to make some changes to the subscales. Eventually, the management of school and work experiences scale was combined within the time management scale. In addition, the three interdependence scales were combined into a single interdependence scale.

An internal consistency reliability coefficient of .94 for the entire instrument was identified with .77 to .88 for the subscales (Jackson & Hood, 1986). Taub (1997) had similar results, with an internal consistency coefficient of .92 for the instrument and .72 to .85 coefficients for the subscales. In addition, Pahl (2011) found the subscales’ reliability coefficient to be comparable, with interdependence being 0.75, emotional independence: parents, 0.86; time management, 0.82; money management, 0.79; emotional independence: peers, 0.75 and mobility, 0.83.

Procedures

Approval to conduct the study was granted by the Institutional Review Board. After approval was granted, student email addresses were obtained from North Dakota State University's Office of Registration and Records. This sampling frame consisted of 9,812 email addresses for all NDSU undergraduates (freshmen, sophomores, juniors, and seniors) who were enrolled for at least one credit.

Data Collection and Analysis

Participants were recruited via email (Appendix A). The email consisted of the researcher's introduction; the significance of the study; and a link to the survey, which first directed participants to the Informed Consent Form (Appendix D). Following the consent form, participants were able to take the Qualtrics survey (Appendix E). The invitation email was sent to all possible participants on May 19, 2020. Following the first email, a second email was sent on May 26, 2020, with a third reminder email sent on May 31, 2020. A final email reminder was sent on June 9, 2020.

Once data collection concluded, the raw data were transferred from Qualtrics for cleaning and error checking. For this analysis, invalid records were defined as those meeting at least one of the following criteria: (a) any respondent with an invariant response set for one or more subscales, or (b) any respondent who completed the entire instrument in a less than reasonable time (3 minutes).

An ordinal scale was used because it allowed for a comparison parameter to better understand whether the variables were greater or lesser than each other. All items from the job candidates' characteristic section were equally important. However, the Iowa inventory had 6 subscales with 15 questions per scale. All items were equally important, so no weights were

used. For each autonomy subscale, composite scores were computed as the mean of the scores for that subscale's 15 items. Subscale composite scores were only computed for those subjects who responded to at least half of the subscale items (i.e., 8 or more of the 15 items).

The primary inferential analytical technique was seemingly unrelated regression (SUR). This particular variant of multiple linear regression allowed for the simultaneous analysis of both the importance and the proficiency ratings for each of the eight career-readiness competencies. A key feature of SUR was that the technique allows for the correlation of the two residual terms. Data were analyzed using Stata (version 16).

CHAPTER 4: RESULTS

This chapter contains the results from the data analysis. These results are organized according to the eight career-readiness competencies.

The main method of analysis used here is a technique known as *seemingly unrelated regression* (SUR). This approach allows for the joint estimation of several regression models, each with its own dependent (response) variable and potentially different sets of independent (predictor) variables. Each regression model also has its own error term, and these errors are free to correlate with the errors of other models in the system. Despite the name of this technique, the regression models are typically related in some way. In this study, there will be a separate SUR model (one for each of the eight career-readiness competencies), and each model has two dependent variables (importance rating and proficiency rating of a given competency).

SUR Models for the Career-Readiness Competencies

This chapter is organized by the eight types of career-readiness skills, and each skill has its own separate SUR model with two dependent variables (namely, the importance rating and proficiency rating of the given skill). The initial form of these models begins with the six autonomy subscale scores (interdependence, emotional independence from parents, time management, money management, emotional independence from peer, and mobility) and four covariates (age, gender, academic rank, and general academic discipline). Note that the covariate general academic discipline had nine levels based on the NSSE guidelines. One of these levels—Communications, Media, and Public Relations—was removed from these analyses due to small sample size ($n = 4$). The initial model specifies that the covariates (academic rank and general academic discipline) are both allowed to have a joint effect (first-order interactions) with each of the six autonomy variables. Each of these models is then estimated and reduced by eliminating

nonsignificant ($\alpha = .05$) interaction terms in a stepwise manner (i.e., model "trimming"). Note that the hierarchical principle was followed in this process, thus any nonsignificant main effects retained in the model if it is part of a significant interaction.

Each of the following eight sections includes the details on the final model for each competency. However, the tables with the complete SUR results the final versions of the models are omitted here (the full results tables are presented in Appendix G). These sections also contain the post-hoc analyses for significant interaction effects and significant main effects (given that the predictor is not involved in a significant interaction).

Teamwork/Collaboration

The SUR model for teamwork/collaboration reduced to a total of 12 significant interactions. There was also one significant main effect that was not otherwise involved in a significant interaction with a covariate. The list of significant effects in the final model are given in Table 4.1.

Table 4.1

Significant Effects in the Final SUR Model for Teamwork/Collaboration

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	Mobility	Emo. ind. parents Mobility	Interdependence
Proficiency	Interdependence Emo. ind. parents Time mgmt. Emo. ind. peers Mobility	Interdependence Emo. ind. parents Money mgmt. Emo. ind. peers	

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final teamwork/collaboration model are given in Table 4.2. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were not significantly correlated for this model, $r = .133$, $p = .058$.

Table 4.2

Overall Results for the SUR Model for Teamwork/Collaboration

Rating type	*RMSE*	R^2	*F*	*p*
Importance	.7774934	.3719	3.94	< .001
Proficiency	.8574319	.5823	4.10	< .001

Note. The final model estimates were based on a sample of $n = 202$. The regression *df* for the *F*-tests for importance and proficiency were 30 and 68, respectively; the residual *df* was 304.

Interaction Effects on the Importance Rating of Teamwork/Collaboration

There were three different statistically significant interaction effects on the importance rating of teamwork/collaboration: mobility × academic discipline, emotional independence–parents × academic rank, and mobility × academic discipline. The details for each are given in the following subsections.

Importance ← Mobility × Academic Discipline

The overall (joint) test for the interaction of the mobility dimension of autonomy and academic discipline is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the importance rating of teamwork/collaboration predicted by the mobility are given for each category of academic discipline in Table 4.3.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of teamwork/collaboration and the mobility dimension of autonomy. While Biological Sciences produced a negative relationship between importance and

mobility (*b* = -0.77, *p* = .007), both Math and Computer Science (*b* = 1.30, *p* = .007) and Engineering (*b* = 0.36, *p* = .023) produced positive relationships for the same two variables. The remaining five categories had nonsignificant simple slopes.

Table 4.3

Simple Slopes for the Importance Rating of Teamwork/Collaboration on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.115	0.217	0.529	0.597	[-0.312, 0.542]
Biological Science	-0.772	0.284	-2.721	0.007	[-1.330, -0.214]
Math & Computer Science	1.299	0.478	2.717	0.007	[0.358, 2.240]
Social Sciences	0.113	0.240	0.470	0.638	[-0.360, 0.586]
Business	-0.338	0.230	-1.474	0.142	[-0.790, 0.113]
Education	-0.166	0.646	-0.257	0.797	[-1.437, 1.105]
Engineering	0.355	0.155	2.289	0.023	[0.050, 0.661]
Health Professions & Social Service	0.020	0.292	0.070	0.944	[-0.554, 0.595]

Note. The dependent variable (importance rating) was scored on a seven-point scale; the independent variable (mobility) was scored on a five-point scale.

Importance ← Emotional Independence–Parents × Academic Rank

The interaction of the emotional independence–parents dimension of autonomy and academic rank is significant. As a result, there was a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the importance rating of teamwork/collaboration predicted by the emotional independence–parents are given for each category of academic rank in Table 4.4.

Of the five categories of academic rank, two contained a significant relationship between the importance rating of teamwork/collaboration and the emotional independence from parents dimension of autonomy. First year (*b* = -0.63, *p* = .012*)* and second year (*b* = -0.78, *p* = .001)

produced negative relationships for the same two variables. The remaining three categories had nonsignificant simple slopes.

Table 4.4

Simple Slopes for Importance of Teamwork/Collaboration on Emotional Independence–Parents by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.638	0.253	-2.524	0.012	[-1.135, -0.141]
Second	-0.784	0.228	-3.443	0.001	[-1.231, -0.336]
Third	0.144	0.195	0.740	0.460	[-0.240, 0.529]
Fourth	0.108	0.173	0.625	0.532	[-0.232, 0.447]
Fifth or more	-0.529	0.479	-1.104	0.271	[-1.471, 0.414]

Note. The dependent variable (importance rating) was scored on a seven-point scale; the independent variable (emotional independence–parents) was scored on a five-point scale.

Importance ← Mobility × Academic Rank

The overall test for the interaction of the mobility dimension of autonomy and academic rank is significant, which warrants a follow-up analysis of the conditional regression weights. The simple slopes for the importance rating of teamwork/collaboration predicted by the mobility are given for each category of academic rank in Table **4.5**.

Of the five categories of academic rank, one contained a significant relationship between the importance rating of teamwork/collaboration and the mobility dimension of autonomy. Second year ($b = 0.83$, $p < .001$) produced a positive relationship. The remaining four categories had nonsignificant simple slopes.

Table 4.5

Simple Slopes for Importance of Teamwork/Collaboration on Mobility by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.278	0.263	-1.057	0.291	[-0.795, 0.240]
Second	0.821	0.211	3.893	0.000	[0.406, 1.236]
Third	-0.143	0.185	-0.770	0.442	[-0.508, 0.222]
Fourth	0.105	0.178	0.592	0.554	[-0.245, 0.456]
Fifth or more	-0.458	0.339	-1.353	0.177	[-1.125, 0.208]

Note. The dependent variable (importance rating) was scored on a seven-point scale; the independent variable (mobility) was scored on a five-point scale.

Interaction Effects on the Proficiency Rating of Teamwork/Collaboration

There were nine different statistically significant interaction effects the proficiency rating of teamwork/collaboration: emotional independence–peers × academic discipline, time management × academic discipline, emotional independence–parents × academic discipline, interdependence × academic discipline, mobility × academic discipline, emotional independence–peers × academic rank, emotional independence–parents × academic rank, interdependence × academic rank, and money management × academic rank. The details for each are given in the following subsections.

Proficiency ← Emotional Independence–Peers × Academic Discipline

The interaction of the emotional independence–peers dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of teamwork/collaboration predicted by the emotional independence–peers are given for each category of academic discipline in Table 4.6.

Of the eight categories of academic discipline, three contained a significant relationship between the proficiency rating of teamwork/collaboration and the emotional independence–peers of autonomy. While Social Sciences produced a positive relationship between proficiency and emotional independence–peers (b = 0.91, p = .018), both Arts & Humanities (b = -1.71, p = .003) and Education (b = -2.56, p = .001) produced negative relations for the same two variables. The remaining five categories had nonsignificant simple slopes.

Table 4.6

Simple Slopes for Proficiency of Teamwork/Collaboration on Emotional Independence–Peers by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-1.709	0.561	-3.043	0.003	[-2.813, -0.604]
Biological Science	-0.210	0.448	-0.469	0.639	[-1.093, 0.672]
Math & Computer Science	-0.752	0.749	-1.004	0.316	[-2.226, 0.722]
Social Sciences	0.908	0.382	2.380	0.018	[0.157, 1.660]
Business	0.385	0.394	0.977	0.329	[-0.390, 1.160]
Education	-2.563	0.785	-3.266	0.001	[-4.108, -1.019]
Engineering	0.372	0.252	1.480	0.140	[-0.123, 0.867]
Health Professions & Social Service	0.548	0.677	0.809	0.419	[-0.785, 1.880]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Time Management × Academic Discipline

The overall (joint) test for the interaction of the time management dimension of autonomy and academic discipline is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the proficiency rating of teamwork/collaboration predicted by the management of time are given for each category of academic discipline in Table 4.7.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of teamwork/collaboration and the management of time of autonomy. Both Math & Computer Science (b = 0.94, p = .055) and Social Sciences (b = 2.29, p = .001) produced a positive relationship between proficiency and management of time. The remaining six categories had nonsignificant simple slopes.

Table 4.7

Simple Slopes for Proficiency of Teamwork/Collaboration on Time Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.299	0.369	-0.812	0.417	[-1.025, 0.426]
Biological Science	0.162	0.346	0.469	0.639	[-0.518, 0.842]
Math & Computer Science	0.938	0.487	1.928	0.055	[-0.019, 1.896]
Social Sciences	2.290	0.660	3.467	0.001	[0.990, 3.589]
Business	-0.198	0.308	-0.642	0.521	[-0.805, 0.409]
Education	-0.108	0.808	-0.133	0.894	[-1.698, 1.483]
Engineering	0.311	0.244	1.274	0.204	[-0.169, 0.792]
Health Professions & Social Service	0.364	0.258	1.414	0.159	[-0.143, 0.872]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of teamwork/collaboration predicted by the emotional independence–parents are given for each category of academic discipline in Table 4.8.

Of the eight categories of academic discipline, five contained a significant relationship between the proficiency rating of teamwork/collaboration and the emotional independence–

parents of autonomy. While Math & Computer Science produced a positive relationship between proficiency and emotional independence–parents (b = 2.95, p < .001). Biological Sciences (b = -1.20, p = .001), Social Sciences (b = -1.71, p = .003), Business (b = -0.80, p = .012), and Health Professions and Social Services (b = -1.04, p = .030) Arts & Humanities (b = -1.71, p = .003) and Education (b = -2.56, p = .001) produced negative relations for the same two variables. The remaining three categories had nonsignificant simple slopes.

Table 4.8

Simple Slopes for Proficiency of Teamwork/Collaboration on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.696	0.392	1.778	0.076	[-0.074, 1.467]
Biological Science	-1.200	0.355	-3.375	0.001	[-1.899, -0.500]
Math & Computer Science	2.951	0.605	4.881	0.000	[1.761, 4.141]
Social Sciences	-1.712	0.580	-2.952	0.003	[-2.853, -0.571]
Business	-0.804	0.318	-2.527	0.012	[-1.430, -0.178]
Education	0.151	0.470	0.321	0.749	[-0.774, 1.076]
Engineering	-0.350	0.213	-1.642	0.102	[-0.770, 0.069]
Health Professions & Social Service	-1.041	0.477	-2.181	0.030	[-1.980, -0.102]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Interdependence × Academic Discipline

The interaction of the interdependence dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of teamwork/collaboration predicted by the interdependence are given for each category of academic discipline in Table 4.9.

Of the eight categories of academic discipline, four contained a significant relationship between the proficiency rating of teamwork/collaboration and the interdependence of autonomy.

While Social Sciences produced a negative relationship between proficiency and interdependence (b = -3.68, p = .001). Math & Computer Science (b = 1.27, p = .025), Education (b = 3.12, p = .002), and Engineering (b = 0.86, p = .001) produced positive relations for the same two variables. The remaining four categories had nonsignificant simple slopes.

Table 4.9

Simple Slopes for Proficiency of Teamwork/Collaboration on Interdependence by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.083	0.477	-0.173	0.862	[-1.021, 0.855]
Biological Science	0.930	0.562	1.654	0.099	[-0.176, 2.037]
Math & Computer Science	1.272	0.565	2.254	0.025	[0.161, 2.384]
Social Sciences	-3.675	1.094	-3.359	0.001	[-5.829, -1.522]
Business	0.611	0.380	1.610	0.109	[-0.136, 1.358]
Education	3.122	1.022	3.056	0.002	[1.112, 5.133]
Engineering	0.858	0.259	3.311	0.001	[0.348, 1.368]
Health Professions & Social Service	-0.057	0.461	-0.123	0.902	[-0.965, 0.851]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Mobility × Academic Discipline

The interaction of the mobility of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of teamwork/collaboration predicted by the mobility are given for each category of academic discipline in Table 4.10.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of teamwork/collaboration and the mobility of autonomy. Both Arts & Humanities (b = 0.93, p = .005) and Education (b = 1.82, p = .012) produced a positive

relationship between proficiency and mobility. The remaining six categories had nonsignificant simple slopes.

Table 4.10

Simple Slopes for PRO_01 on MOBILITY by Levels of ACDISP

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.933	0.327	2.849	0.005	[0.289, 1.577]
Biological Science	0.594	0.444	1.337	0.182	[-0.280, 1.468]
Math & Computer Science	-0.963	0.587	-1.640	0.102	[-2.118, 0.192]
Social Sciences	0.478	0.349	1.369	0.172	[-0.209, 1.166]
Business	0.242	0.295	0.820	0.413	[-0.338, 0.822]
Education	1.819	0.719	2.530	0.012	[0.404, 3.233]
Engineering	-0.013	0.177	-0.076	0.940	[-0.361, 0.335]
Health Professions & Social Service	-0.215	0.403	-0.535	0.593	[-1.008, 0.577]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Emotional Independence–Peers × Academic Rank

The interaction of the emotional independence–peers dimension of autonomy and academic rank is significant. The simple slopes for the proficiency of teamwork/collaboration predicted by the emotional independence–peers are given for each category of academic rank in Table 4.11.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of teamwork/collaboration and the emotional independence–peers dimension of autonomy. Fourth year (b = -0.86, p = .002) produced a negative relationship between proficiency and emotional independence–peers. While fifth year or more (b = 1.49, p = .054) produced positive relations for the same two variables. The remaining three categories had nonsignificant simple slopes.

Table 4.11

Simple Slopes for PRO_01 on EIPEER by Levels of ACRANK

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.497	0.403	-1.234	0.218	[-1.290, 0.296]
Second	0.455	0.293	1.552	0.122	[-0.122, 1.031]
Third	0.074	0.329	0.226	0.822	[-0.574, 0.722]
Fourth	-0.861	0.280	-3.073	0.002	[-1.412, -0.310]
Fifth or more	1.491	0.770	1.937	0.054	[-0.024, 3.006]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Emotional Independence–Parents × Academic Rank

The interaction of the emotional independence–parents dimension of autonomy and academic rank is significant. The simple slopes for the proficiency of teamwork/collaboration predicted by the emotional independence–parents are given for each category of academic rank in Table 4.12.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of teamwork/collaboration and the emotional independence–parents dimension of autonomy. Both Second year (b = -0.76, p = .005) and Fifth year or more (b = -2.76, p < .001) produced a negative relationship between proficiency and emotional independence–parents. The remaining three categories had nonsignificant simple slopes.

Table 4.12

Simple Slopes for Proficiency of Teamwork/Collaboration on Emotional Independence–Parents by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.377	0.309	1.220	0.223	[-0.231, 0.985]
Second	-0.762	0.268	-2.841	0.005	[-1.290, -0.234]
Third	-0.018	0.237	-0.078	0.938	[-0.486, 0.449]
Fourth	-0.090	0.219	-0.412	0.681	[-0.520, 0.340]
Fifth or more	-2.760	0.754	-3.662	0.000	[-4.244, -1.277]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Interdependence × Academic Rank

The interaction of the interdependence dimension of autonomy and academic rank is significant. The simple slopes for the proficiency of teamwork/collaboration predicted by the interdependence are given for each category of academic rank in Table 4.13.

Of the five categories of academic rank, one contained a significant relationship between the proficiency rating of teamwork/collaboration and the interdependence dimension of autonomy. Fourth year ($b = 1.24$, $p < .001$) produced a positive relationship between proficiency and interdependence. The remaining three categories ad nonsignificant simple slopes.

Table 4.13

Simple Slopes for Proficiency of Teamwork/Collaboration on Interdependence by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.258	0.362	0.715	0.475	[-0.453, 0.970]
Second	0.332	0.365	0.907	0.365	[-0.388, 1.051]
Third	-0.060	0.302	-0.198	0.843	[-0.653, 0.534]
Fourth	1.240	0.246	5.040	0.000	[0.756, 1.724]
Fifth or more	-0.448	0.542	-0.827	0.409	[-1.516, 0.619]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Money Management × Academic Rank

The overall (joint) test for the interaction of the money management dimension of autonomy and academic rank is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the proficiency of teamwork/collaboration predicted by the management of time are given for each category of academic rank in Table 4.14.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of teamwork/collaboration and the management of money dimension of autonomy. Both Second year (*b* = -0.58, p = .010) and Third year (b = -0.51, p = .056) produced a negative relationship between proficiency and management of money. The remaining three categories had nonsignificant simple slopes.

Table 4.14

Simple Slopes for Proficiency of Teamwork/Collaboration on Money Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.236	0.301	0.782	0.435	[-0.357, 0.829]
Second	-0.576	0.223	-2.589	0.010	[-1.014, -0.138]
Third	-0.506	0.264	-1.915	0.056	[-1.025, 0.014]
Fourth	0.272	0.219	1.240	0.216	[-0.160, 0.704]
Fifth or more	0.145	0.464	0.314	0.754	[-0.767, 1.058]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Main Effects on the Ratings of Teamwork/Collaboration

The interdependence aspect of autonomy had a significant main effect on the importance rating of teamwork/collaboration (Table 4.15). Note that there were significant main effects for other dimensions of autonomy, but these were not examined further here since they were also involved in one or more significant interactions.

Table 4.15

Significant Main Effect on Importance Rating of Teamwork/Collaboration

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance rating	Autonomy: interdependence	0.613	0.132	4.638	0.000	[0.353, 0.874]

Note. The importance rating of teamwork/collaboration is scored on a seven-point scale; the interdependence dimension of autonomy is scored on a five-point scale.

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The SUR model for teamwork/collaboration reduced to a total of 11 significant interactions. All significant main effects were also involved in a significant interaction with a

covariate and hence not examined further. The list of significant effects in the final model are given in Table 4.16.

Table 4.16

Significant Effects in the Final SUR Model for Digital Technology

Rating type (dependent variables)	Interaction with covariates	
	Academic discipline ×	Academic rank ×
Importance	Interdependence Emo. ind. peers Time mgmt. Money mgmt. Mobility	Interdependence Time mgmt. Money mgmt.
Proficiency	Emo. ind. parents Money mgmt.	Money mgmt.

Note. There were no significant main effects which were not involved in one or more significant interaction effects.

The overall results for the final digital technology model are given in Table 4.17. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .208$, $p = .003$.

Table 4.17

Overall Results for the SUR Model for Digital Technology

Rating type	*RMSE*	R^2	*F*	*p*
Importance	.8913005	.4901	3.09	< .001
Proficiency	1.0569300	.3236	3.03	< .001

Note. The final model estimates were based on a sample of $n = 199$. The regression *df* for the *F*-tests for importance and proficiency were 63 and 31, respectively; the residual *df* was 302.

Interaction Effects on the Importance Rating of Digital Technology

There were eight different statistically significant interaction effects the importance rating of digital technology: interdependence x academic discipline, time management x academic discipline, money management x academic discipline, emotional independence–peer x academic discipline, mobility x academic discipline, time management x academic rank, interdependence x academic rank, and money management x academic rank. The following details for each are given in the following subsections.

Importance ← Interdependence × Academic Discipline

The interaction of the interdependence dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of digital technology is predicted by interdependence are given for each category of academic discipline in Table 4.18.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of digital technology and the interdependence dimension of autonomy. While Arts & Humanities produced a positive relationship between importance and interdependence ($b = 2.02$, $p < .001$), both Biological Sciences ($b = -1.46$, $p = 0.012$) and Health Professionals & Social Services ($b = -1.05$, $p = 0.021$) produced negative relationships for the same two variables. The remaining five categories had nonsignificant simple slopes.

Table 4.18

Simple Slopes for Importance of Digital Technology on Interdependence by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	2.015	0.501	4.021	0.000	[1.029, 3.002]
Biological Science	-1.457	0.574	-2.537	0.012	[-2.587, -0.327]
Math & Computer Science	0.541	0.635	0.852	0.395	[-0.709, 1.790]
Social Sciences	0.781	0.745	1.049	0.295	[-0.684, 2.247]
Business	0.446	0.396	1.127	0.261	[-0.333, 1.225]
Education	1.903	1.199	1.587	0.114	[-0.457, 4.263]
Engineering	-0.157	0.267	-0.589	0.556	[-0.683, 0.368]
Health Professions & Social Service	-1.047	0.452	-2.316	0.021	[-1.936, -0.157]

Importance ← Time Management × Academic Discipline

The interaction of the time management dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of digital technology is predicted by time management are given for each category of academic discipline in Table 4.19.

Of the eight categories of academic discipline, two contained a significant relationship between the importance rating of digital technology and the time management dimension of autonomy. Both Arts & Humanities (b = -1.37, p = 0.002) and Education (b = -3.29, p = 0.008) produced a negative relationship between importance and time management. The remaining six categories had nonsignificant simple slopes.

Table 4.19

Simple Slopes for Importance of Digital Technology on Time Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-1.372	0.444	-3.093	0.002	[-2.245, -0.499]
Biological Science	-0.107	0.359	-0.298	0.766	[-0.814, 0.600]
Math & Computer Science	0.415	0.978	0.425	0.671	[-1.509, 2.340]
Social Sciences	-0.335	0.842	-0.398	0.691	[-1.992, 1.321]
Business	-0.411	0.323	-1.275	0.203	[-1.046, 0.224]
Education	-3.290	1.241	-2.652	0.008	[-5.731, -0.849]
Engineering	0.170	0.258	0.658	0.511	[-0.338, 0.677]
Health Professions & Social Service	0.516	0.339	1.522	0.129	[-0.151, 1.184]

Importance ← Money Management × Academic Discipline

The interaction of the money management dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of digital technology is predicted by money management are given for each category of academic discipline in Table 4.20.

Of the eight categories of academic discipline, one contained a significant relationship between the importance rating of digital technology and the money management dimension of autonomy. Biological Sciences produced a negative relationship between importance and money management (b = -1.69, p < .001). The remaining seven categories had nonsignificant simple slopes.

Table 4.20

Simple Slopes for Importance of Digital Technology on Money Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-1.372	0.444	-3.093	0.002	[-2.245, -0.499]
Biological Science	-0.107	0.359	-0.298	0.766	[-0.814, 0.600]
Math & Computer Science	0.415	0.978	0.425	0.671	[-1.509, 2.340]
Social Sciences	-0.335	0.842	-0.398	0.691	[-1.992, 1.321]
Business	-0.411	0.323	-1.275	0.203	[-1.046, 0.224]
Education	-3.290	1.241	-2.652	0.008	[-5.731, -0.849]
Engineering	0.170	0.258	0.658	0.511	[-0.338, 0.677]
Health Professions & Social Service	0.516	0.339	1.522	0.129	[-0.151, 1.184]

Importance ← Emotional Independence–Peers × Academic Discipline

The interaction of the emotional independence–peers dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of digital technology is predicted by emotional independence–peers are given for each category of academic discipline in Table 4.21.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating and the emotional independence–peers of autonomy. While Health Professionals & Social Services produced a negative relationship between importance and emotional independence (b = -1.77, p = 0.003), both Arts & Humanities (b = 1.27, p = 0.005) and Biological Sciences (b = 1.31, p = 0.004) produced positive relationships for the same two variables. The remaining five categories had nonsignificant simple slopes.

Table 4.21

Simple Slopes for Importance of Digital Technology on Emotional Independence – Peers by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	1.270	0.450	2.824	0.005	[0.385, 2.155]
Biological Science	1.308	0.457	2.864	0.004	[0.409, 2.206]
Math & Computer Science	-0.406	0.710	-0.572	0.568	[-1.804, 0.992]
Social Sciences	0.210	0.440	0.478	0.633	[-0.655, 1.075]
Business	-0.491	0.398	-1.235	0.218	[-1.273, 0.291]
Education	-0.860	0.764	-1.126	0.261	[-2.363, 0.643]
Engineering	0.042	0.247	0.169	0.866	[-0.444, 0.528]
Health Professions & Social Service	-1.775	0.585	-3.034	0.003	[-2.926, -0.623]

Importance ← Mobility × Academic Discipline

The interaction of the mobility dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of digital technology is predicted by mobility are given for each category of academic discipline in Table 4.22.

Of the eight categories of academic discipline, two contained a significant relationship between the importance rating and the mobility of autonomy. Those two consisted of Arts & Humanities (b = -1.18, p = 0.001) and Engineering (b = -0.38, p = 0.027) produced a negative relationship between importance and mobility. The remaining six categories had nonsignificant simple slopes.

Table 4.22

Simple Slopes for Importance of Digital Technology on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-1.181	0.340	-3.474	0.001	[-1.850, -0.512]
Biological Science	0.169	0.441	0.383	0.702	[-0.699, 1.037]
Math & Computer Science	-0.256	0.552	-0.464	0.643	[-1.342, 0.830]
Social Sciences	-0.562	0.295	-1.908	0.057	[-1.142, 0.018]
Business	-0.032	0.252	-0.126	0.900	[-0.527, 0.464]
Education	0.458	0.753	0.608	0.543	[-1.024, 1.941]
Engineering	-0.380	0.171	-2.219	0.027	[-0.718, -0.043]
Health Professions & Social Service	0.522	0.410	1.272	0.204	[-0.286, 1.330]

Importance ← Time Management × Academic Rank

The interaction of the time management dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of digital technology is predicted by time management are given for each category of academic rank in Table 4.23.

Of the five categories of academic rank, one contained a significant relationship between the importance rating and the time management dimension of autonomy. First year (b = -1.378, $p < .001$) produced a negative relationship between importance and time management. The remaining four categories had nonsignificant simple slopes.

Table 4.23

Simple Slopes for Importance of Digital Technology on Time Management by levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-1.378	0.322	-4.282	0.000	[-2.011, -0.745]
Second	0.329	0.403	0.817	0.415	[-0.464, 1.122]
Third	-0.516	0.278	-1.859	0.064	[-1.063, 0.030]
Fourth	-0.141	0.281	-0.502	0.616	[-0.694, 0.412]
Fifth or more	0.881	0.529	1.665	0.097	[-0.160, 1.922]

Importance ← Interdependence × Academic Rank

The interaction of the interdependence dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of digital technology is predicted by interdependence are given for each category of academic rank in Table 4.24.

Of the five categories of academic rank, two contained a significant relationship between the importance rating and the interdependence dimension of autonomy. While First year (b = 1.539, p < .001) produced a positive relationship between importance and interdependence. Fifth or more year (b = -1.583, p = 0.009) produced a negative relationship for the same two variables. The remaining three categories had nonsignificant simple slopes.

Table 4.24

Simple Slopes for Importance of Digital Technology on Interdependence by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	1.539	0.380	4.054	0.000	[0.792, 2.286]
Second	-0.563	0.436	-1.292	0.197	[-1.420, 0.295]
Third	0.492	0.329	1.496	0.136	[-0.155, 1.140]
Fourth	-0.139	0.289	-0.480	0.631	[-0.708, 0.430]
Fifth or more	-1.583	0.606	-2.613	0.009	[-2.775, -0.391]

Importance ← Money Management × Academic Rank

The interaction of the money management dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of digital technology is predicted by money management are given for each category of academic rank in Table 4.25.

Of the five categories of academic rank, three contained a significant relationship between the importance rating and the money management dimension of autonomy. While First year ($b = 0.697$, $p = 0.035$) and second year ($b = 0.697$, $p = 0.027$) produced a positive relationship between importance and money management. Fifth or more year ($b = -1.289$, $p = 0.026$) produced a negative relationship for the same two variables. The remaining two categories had nonsignificant simple slopes.

Table 4.25

Simple Slopes for Importance of Digital Technology on Money Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.697	0.329	2.121	0.035	[0.050, 1.344]
Second	0.671	0.302	2.221	0.027	[0.076, 1.265]
Third	-0.206	0.252	-0.819	0.414	[-0.701, 0.289]
Fourth	-0.188	0.221	-0.851	0.395	[-0.623, 0.247]
Fifth or more	-1.289	0.577	-2.236	0.026	[-2.424, -0.155]

Interaction Effects on the Proficiency Rating of Digital Technology

There were three different statistically significant interaction effects the proficiency rating of digital technology—namely, emotional independence–parents x academic discipline, money management x academic discipline, money management x academic rank. The following details for each are given in the following subsections.

Proficiency ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of digital technology is predicted by emotional independence–parents are given for each category of academic discipline in Table 4.26.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of digital technology and the emotional independence–parents dimension of autonomy. Both Math & Computer Science ($b = 2.42$, $p < .001$) and Engineering ($b = 0.55$, $p = 0.022$) produced a positive relationship between proficiency and emotional independence–parents. The remaining six categories had nonsignificant simple slopes.

Table 4.26

Simple Slopes for Proficiency of Digital Technology on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.650	0.381	-1.709	0.089	[-1.399, 0.099]
Biological Science	-0.388	0.392	-0.991	0.323	[-1.159, 0.383]
Math & Computer Science	2.415	0.683	3.538	0.000	[1.072, 3.758]
Social Sciences	-0.514	0.459	-1.119	0.264	[-1.418, 0.390]
Business	-0.117	0.314	-0.372	0.710	[-0.736, 0.502]
Education	-0.529	0.529	-1.000	0.318	[-1.570, 0.512]
Engineering	0.548	0.239	2.296	0.022	[0.078, 1.018]
Health Professions & Social Service	-0.218	0.435	-0.500	0.618	[-1.074, 0.639]

Proficiency ← Money Management × Academic Discipline

The interaction of the money management dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of digital technology is predicted by money management are given for each category of academic discipline in Table 4.27.

Of the eight categories of academic discipline, one contained a significant relationship between the proficiency rating of digital technology and the money management dimension of autonomy. Biological Sciences (b = -1.17, p = 0.001) produced a negative relationship between proficiency and money management. The remaining seven categories had nonsignificant simple slopes.

Table 4.27

Simple Slopes for Proficiency of Digital Technology on Money Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.253	0.326	0.775	0.439	[-0.388, 0.894]
Biological Science	-1.170	0.359	-3.261	0.001	[-1.875, -0.464]
Math & Computer Science	0.119	0.426	0.279	0.781	[-0.719, 0.956]
Social Sciences	0.786	0.558	1.408	0.160	[-0.313, 1.884]
Business	-0.310	0.369	-0.840	0.402	[-1.036, 0.416]
Education	0.765	0.784	0.976	0.330	[-0.777, 2.307]
Engineering	0.020	0.270	0.074	0.941	[-0.511, 0.551]
Health Professions & Social Service	0.209	0.414	0.506	0.613	[-0.605, 1.023]

Proficiency ← Money Management × Academic Rank

The interaction of the money management dimension of autonomy and academic rank is significant. The simple slopes for the proficiency rating of digital technology is predicted by money management are given for each category of academic rank in Table 4.28.

Of the five categories of academic rank, four contained a significant relationship between the importance rating and the money management dimension of autonomy. While first year (b = .78, p = 0.018) and second year (b = .75, p = 0.008) produced a positive relationship between proficiency and money management. Both third year (b = -0.74, p = 0.005) and fifth year or more (b = -1.39, p = 0.012) produced negative relationships for the same two variables. The remaining one category had a nonsignificant simple slope.

Table 4.28

Simple Slopes for Proficiency of Digital Technology on Money Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.784	0.329	2.385	0.018	[0.137, 1.431]
Second	0.754	0.281	2.682	0.008	[0.201, 1.307]
Third	-0.737	0.258	-2.853	0.005	[-1.245, -0.229]
Fourth	-0.037	0.238	-0.153	0.878	[-0.505, 0.432]
Fifth or more	-1.387	0.551	-2.517	0.012	[-2.472, -0.303]

Main Effects on the Ratings of Digital Technology

All significant main effects on both the importance and proficiency ratings were involved in one or more significant interactions; hence, no post-hoc analyses are necessary.

Critical Thinking/Problem Solving

The SUR model for critical thinking/problem solving reduced to a total of nine significant interactions. There were also thee significant main effects that were not otherwise involved in significant interactions with covariates. The list of significant effects in the final model are given in Table 4.29.

Table 4.29

Significant Effects in the Final SUR Model for Critical Thinking/Problem Solving

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	Emo. ind. parents Time mgmt. Mobility	Emo. ind. parents Time mgmt. Mobility	Interdependence Emo. ind. Peers
Proficiency	Interdependence Emo. ind. parents Mobility		Time mgmt.

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final critical thinking/problem solving model are given in Table 4.30. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .249$, $p < .001$.

Table 4.30

Overall Results for the SUR Model for Critical Thinking/Problem Solving

Rating type	*RMSE*	R^2	*F*	*p*
Importance	.6856148	0.4160	3.00	< .001
Proficiency	.9144337	0.3621	3.65	< .001

Note. The final model estimates were based on a sample of $n = 201$. The regression *df* for the *F*-tests for importance and proficiency were 50 and 32, respectively; the residual *df* was 318.

Interaction Effects on the Importance Rating of Critical Thinking/Problem Solving

There were six different statistically significant interaction effects the importance rating of critical thinking/problem solving: emotional independence–parents × academic discipline, time management × academic discipline, mobility × academic discipline, emotional

independence–parents × academic rank, time management × academic rank, and mobility × academic rank. The details for each are given in the following subsections.

Importance ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of critical thinking/problem solving predicted by emotional independence–parents are given for each category of academic discipline in Table 4.31.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of critical thinking/problem solving and the emotional independence–parents dimension of autonomy. While Biological Sciences produced a positive relationship between importance and emotional independence–parents (b = 0.62, p = .017), both Social Sciences (b = -0.67, p = .026) and Business (b = -0.68, p = .004) produced negative relationships for the same two variables. The remaining five categories had nonsignificant simple slopes.

Table 4.31

Simple Slopes for Importance of Critical Thinking/Problem Solving on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.223	0.241	-0.926	0.355	[-0.696, 0.251]
Biological Science	0.622	0.260	2.397	0.017	[0.112, 1.133]
Math & Computer Science	-0.073	0.530	-0.137	0.891	[-1.115, 0.970]
Social Sciences	-0.671	0.300	-2.240	0.026	[-1.261, -0.082]
Business	-0.684	0.234	-2.919	0.004	[-1.145, -0.223]
Education	-0.318	0.345	-0.923	0.357	[-0.997, 0.361]
Engineering	0.024	0.165	0.146	0.884	[-0.300, 0.348]
Health Professions & Social Service	0.230	0.326	0.704	0.482	[-0.412, 0.871]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Importance ← Time Management × Academic Discipline

The interaction of the time management dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of critical thinking/problem solving predicted by time management are given for each category of academic discipline in Table 4.32.

Of the eight categories of academic discipline, two contained a significant relationship between the importance rating of critical thinking/problem solving and the time management dimension of autonomy. Both Math & Computer Science (b = -0.68, p = .035) and Business (b = -0.91, p < .001) produced negative relationships between importance and time management. The remaining six categories had nonsignificant simple slopes.

Table 4.32

Simple Slopes for Importance of Critical Thinking/Problem Solving on Time Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.139	0.254	-0.548	0.584	[-0.639, 0.361]
Biological Science	0.408	0.250	1.634	0.103	[-0.083, 0.899]
Math & Computer Science	-0.683	0.323	-2.116	0.035	[-1.319, -0.048]
Social Sciences	-0.062	0.268	-0.230	0.818	[-0.588, 0.465]
Business	-0.906	0.221	-4.104	0.000	[-1.340, -0.472]
Education	-0.607	0.568	-1.068	0.286	[-1.725, 0.511]
Engineering	-0.119	0.179	-0.667	0.505	[-0.470, 0.232]
Health Professions & Social Service	0.399	0.220	1.814	0.071	[-0.034, 0.831]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Importance ← Mobility × Academic Discipline

The interaction of the mobility dimension of autonomy and academic discipline is significant, which call for a follow-up analysis of the conditional regression weights. The simple slopes for the importance rating of critical thinking/problem solving predicted by mobility are given for each category of academic discipline in Table 4.33.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of critical thinking/problem solving and the emotional independence–parents dimension of autonomy. Social Sciences ($b = 0.66$, $p = .007$) produced a positive relationship between importance and mobility. The remaining seven categories had nonsignificant simple slopes.

Table 4.33

Simple Slopes for Importance of Critical Thinking/Problem Solving on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.322	0.200	-1.607	0.109	[-0.716, 0.072]
Biological Science	-0.590	0.332	-1.778	0.076	[-1.243, 0.063]
Math & Computer Science	0.701	0.533	1.315	0.190	[-0.348, 1.749]
Social Sciences	0.655	0.241	2.724	0.007	[0.182, 1.129]
Business	0.188	0.239	0.789	0.431	[-0.281, 0.658]
Education	-0.364	0.584	-0.624	0.533	[-1.513, 0.784]
Engineering	0.085	0.144	0.591	0.555	[-0.198, 0.369]
Health Professions & Social Service	0.027	0.305	0.087	0.931	[-0.574, 0.627]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Importance ← Emotional Independence–Parents × Academic Rank

The interaction of the emotional independence–parents dimension of autonomy and academic rank is significant. As a result, an analysis of the simple slopes was completed. The simple slopes for the importance rating of critical thinking/problem solving predicted by emotional independence–parents are given for each category of academic rank in Table 4.34.

Of the five categories of academic rank, one contained a significant relationship between the importance rating of critical thinking/problem solving and the emotional independence–parents dimension of autonomy. Second year produced a negative relationship between importance and emotional independence–parents (b = -0.56, p = .007). The remaining four categories had nonsignificant simple slopes.

Table 4.34

Simple Slopes for Importance of Critical Thinking/Problem Solving on Emotional Independence – Parents by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.107	0.222	-0.484	0.629	[-0.543, 0.329]
Second	-0.555	0.206	-2.700	0.007	[-0.960, -0.151]
Third	-0.156	0.172	-0.910	0.364	[-0.494, 0.182]
Fourth	0.206	0.154	1.338	0.182	[-0.097, 0.508]
Fifth or more	0.317	0.412	0.770	0.442	[-0.493, 1.128]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Importance ← Time Management × Academic Rank

The simple slopes for the importance rating of critical thinking/problem solving predicted by time management are given for each category of academic rank in Table 4.35. The overall test for the interaction of the time management dimension of autonomy and academic rank is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes).

Of the five categories of academic rank, one contained a significant relationship between the importance rating of critical thinking/problem solving and the time management dimension of autonomy. Second year produced a negative relationship between importance and time management (b = -0.64, p = .004). The remaining four categories had nonsignificant simple slopes.

Table 4.35

Simple Slopes for Importance of Critical Thinking/Problem Solving on Time Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.117	0.199	-0.586	0.558	[-0.508, 0.275]
Second	-0.639	0.219	-2.918	0.004	[-1.070, -0.208]
Third	0.280	0.169	1.663	0.097	[-0.051, 0.612]
Fourth	-0.114	0.168	-0.678	0.498	[-0.444, 0.216]
Fifth or more	-0.493	0.293	-1.682	0.094	[-1.070, 0.084]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Importance ← Mobility × Academic Rank

The interaction of the mobility dimension of autonomy and academic rank is significant, which warrants a follow-up analysis of the conditional regression weights. The simple slopes for the importance rating of critical thinking/problem solving predicted by mobility are given for each category of academic rank in Table 4.36.

Of the five categories of academic rank, one contained a significant relationship between the importance rating of critical thinking/problem solving and the mobility dimension of autonomy. Second year produced a positive relationship between importance and mobility $b = 0.65$, $p = .001$). The remaining four categories had nonsignificant simple slopes.

Table 4.36

Simple Slopes for Importance of Critical Thinking/Problem Solving on Mobility by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.293	0.228	-1.284	0.200	[-0.743, 0.156]
Second	0.650	0.193	3.366	0.001	[0.270, 1.031]
Third	0.077	0.163	0.469	0.639	[-0.245, 0.398]
Fourth	-0.233	0.158	-1.472	0.142	[-0.545, 0.078]
Fifth or more	-0.076	0.283	-0.268	0.789	[-0.632, 0.480]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Interaction Effects on the Proficiency Rating of Critical Thinking/Problem Solving

There were three different statistically significant interaction effects on proficiency of critical thinking/problem solving: interdependence x academic discipline, emotional independence – parents x academic discipline, and mobility x academic discipline. The details for each are given in the following subsections.

Proficiency ← Interdependence × Academic Discipline

The interaction of the interdependence dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of critical thinking/problem solving predicted by interdependence are given for each category of academic discipline in Table 4.37.

Of the eight categories of academic discipline, once contained a significant relationship between the proficiency rating of critical thinking/problem solving and the interdependence dimension of autonomy. Math & Computer Science produced a positive relationship between proficiency and interdependence ($b = 2.42$, $p < .001$). The remaining seven categories had nonsignificant simple slopes.

Table 4.37

Simple Slopes for Proficiency of Critical Thinking/Problem Solving on Interdependence of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.445	0.403	-1.104	0.270	[-1.237, 0.348]
Biological Science	-0.250	0.586	-0.427	0.670	[-1.404, 0.903]
Math & Computer Science	2.416	0.669	3.613	0.000	[1.101, 3.732]
Social Sciences	-0.317	0.568	-0.559	0.577	[-1.435, 0.800]
Business	-0.400	0.360	-1.111	0.267	[-1.109, 0.308]
Education	1.029	0.806	1.276	0.203	[-0.558, 2.615]
Engineering	0.009	0.265	0.033	0.974	[-0.512, 0.529]
Health Professions & Social Service	0.404	0.441	0.917	0.360	[-0.463, 1.272]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Proficiency ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of critical thinking/problem solving predicted by emotional independence–parents are given for each category of academic discipline in Table 4.38.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of critical thinking/problem solving and the emotional independence–parents dimension of autonomy. Math & Computer Science produced a positive relationship between proficiency and emotional independence–parents (b = 1.72, p = .020). Social Sciences (b = -1.14, p = .007) produced a negative relationship between proficiency and emotional independence–parents. The remaining six categories had nonsignificant simple slopes.

Table 4.38

Simple Slopes for Proficiency of Critical Thinking/Problem Solving on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.019	0.311	-0.062	0.951	[-0.631, 0.592]
Biological Science	-0.259	0.364	-0.712	0.477	[-0.976, 0.457]
Math & Computer Science	1.717	0.733	2.344	0.020	[0.276, 3.159]
Social Sciences	-1.143	0.421	-2.715	0.007	[-1.972, -0.315]
Business	0.511	0.311	1.641	0.102	[-0.102, 1.123]
Education	0.397	0.473	0.839	0.402	[-0.534, 1.329]
Engineering	0.380	0.210	1.809	0.071	[-0.033, 0.792]
Health Professions & Social Service	0.796	0.457	1.742	0.082	[-0.103, 1.695]

Note. The importance rating is on a seven-point scale; autonomy is on a five-point scale.

Proficiency ← Mobility × Academic Discipline

The interaction of the mobility dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of critical thinking/problem solving predicted by mobility are given for each category of academic discipline in Table 4.39.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of critical thinking/problem solving and the mobility dimension of autonomy. Both Arts & Humanities ($b = 0.58$, $p = .047$) and Social Sciences ($b = 1.04$, $p = .001$) produced a positive relationship between proficiency and mobility. The remaining six categories had nonsignificant simple slopes.

Table 4.39

Simple Slopes for Proficiency of Critical Thinking/Problem Solving on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.576	0.289	1.991	0.047	[0.007, 1.146]
Biological Science	0.385	0.402	0.958	0.339	[-0.406, 1.176]
Math & Computer Science	-1.252	0.723	-1.730	0.085	[-2.675, 0.172]
Social Sciences	1.043	0.309	3.378	0.001	[0.435, 1.650]
Business	-0.024	0.322	-0.075	0.940	[-0.658, 0.610]
Education	-0.395	0.803	-0.492	0.623	[-1.976, 1.185]
Engineering	0.044	0.191	0.229	0.819	[-0.332, 0.420]
Health Professions & Social Service	0.115	0.406	0.284	0.777	[-0.684, 0.914]

Note. The proficiency rating is on a seven-point scale; autonomy is on a five-point scale.

Main Effects on the Ratings of Critical Thinking/Problem Solving

Interdependence and emotional independence–peers dimensions of autonomy had significant main effects on the importance rating of critical thinking/problem solving.

Gender shows a significant relationship with importance of critical thinking/problem solving. Females tended to rate importance slightly higher than males, roughly by a margin of one-quarter of a point on a seven-point scale, $b = 0.27$, $p = .012$. Importance of critical thinking/problem solving has a positive relationship with the interdependence dimension of autonomy, $b = 0.61$, $p < .001$ and the emotional independence–peers dimension of autonomy, $b = 0.23$, $p < .047$.

The time management dimensions of autonomy had significant main effects on the proficiency rating of critical thinking/problem solving.

Proficiency of critical thinking/problem solving has a positive relationship with the time management dimension of autonomy, $b = 0.57$, $p < .000$. Table 4.40.

Table 4.40

Significant Main Effects on Critical Thinking/Problem Solving

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Emo. ind. peers	0.234	0.117	1.996	0.047	[0.003, 0.466]
Importance	Interdependence	0.440	0.127	3.450	0.001	[0.189, 0.691]
Proficiency	Time management	0.574	0.129	4.446	0.000	[0.320, 0.828]

Oral/Written Communication

The SUR model for oral/written communication is rather sparse as it reduced to only one significant interaction. There were four significant main effects that were not otherwise involved in a significant interaction with a covariate. The list of significant effects in the final model are given in Table 4.41.

Table 4.41

Significant Effects in the Final SUR Model for Oral/Written Communication

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	(none)	(none)	Interdependence Money mgmt.
Proficiency	Emo. ind. parents	(none)	Interdependence Time mgmt.

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final model for oral/written communication are given in Table 4.42. Both regression equations produced large (and statistically significant) R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .197$, $p = .005$.

Table 4.42

Overall Results for the SUR Model for Oral/Written Communication

Rating type	*RMSE*	R^2	*F*	*p*
Importance	.9280549	.1439	11.45	< .001
Proficiency	1.0066670	.2184	3.21	< .001

Note. The final model estimates were based on a sample of $n = 201$. The regression *df* for the *F*-tests for importance and proficiency were 3 and 18, respectively; the residual *df* was 379.

Interaction Effects on the Proficiency Rating of Oral/Written Communication

There was one statistically significant interaction effects the proficiency rating of oral/written communication—namely, emotional independence–parents × academic discipline. The details for are given in the following subsections.

Proficiency ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of oral/written communication predicted by the emotional independence–parents are given for each category of academic discipline in Table 4.43.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of oral/written communication and the emotional independence–parents of autonomy. While Arts & Humanities produced a negative relationship between proficiency and emotional independence–parents ($b = -0.690$, $p = .049$), Engineering ($b = 0.494$,

p = .021) produced a positive relation for the same two variables. The remaining six categories had nonsignificant simple slopes.

Table 4.43

Simple Slopes for Proficiency of Oral/Written Communication on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.690	0.350	-1.972	0.049	[-1.378, -0.002]
Biological Science	0.168	0.351	0.479	0.632	[-0.523, 0.859]
Math & Computer Science	0.352	0.632	0.557	0.578	[-0.890, 1.594]
Social Sciences	-0.417	0.371	-1.123	0.262	[-1.146, 0.313]
Business	-0.293	0.271	-1.081	0.280	[-0.825, 0.240]
Education	0.517	0.486	1.063	0.288	[-0.439, 1.472]
Engineering	0.494	0.213	2.320	0.021	[0.075, 0.912]
Health Professions & Social Service	-0.294	0.384	-0.766	0.444	[-1.048, 0.461]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Main Effects on the Ratings of Oral/Written Communication

The money management and interdependence aspects of autonomy had significant main effects on the importance of oral/written communication. While time management and interdependence aspects of autonomy had significant main effects on the proficiency rating of oral/written communication (Table 4.44).

Table 4.44

Summary of Significant Main Effects on the Ratings of Oral/Written Communication

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Money mgmt.	0.264	0.110	2.399	.017	[0.048, 0.480]
Importance	Interdependence	0.613	0.153	4.008	< .001	[0.312, 0.914]
Proficiency	Time mgmt.	0.328	0.139	2.350	.019	[0.054, 0.602]
Proficiency	Interdependence	0.540	0.183	2.956	.003	[0.181, 0.900]

Note. The importance and proficiency ratings of oral/written communication are scored on a seven-point scale; the dimensions of autonomy are scored on a five-point scale.

Professionalism/Work Ethic

The SUR model for professionalism/work ethic reduced to a total of four significant interactions. There were also three significant main effects that were not otherwise involved in significant interactions with covariates. The list of significant effects in the final model are given in Table 4.45.

Table 4.45

Significant Effects in the Final SUR Model for Professionalism/Work Ethic

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	Mobility	Interdependence	Time mgmt.
Proficiency	(none)	Emo. ind. peers Time mgmt.	Interdependence Money mgmt.

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final professionalism/work ethic model are given in Table 4.46. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .252\_$, $p < .001$.

Table 4.46

Overall Results for the SUR Model for Professionalism/Work Ethic

Rating type	*RMSE*	R^2	*F*	*p*
Importance	0.7236705	.2490	2.75	< .001
Proficiency	0.9228863	.3026	5.61	< .001

Note. The final model estimates were based on a sample of $n = 201$. The regression *df* for the *F*-tests for importance and proficiency were 25 and 16, respectively; the residual *df* was 359.

Interaction Effects on the Importance Rating of Professionalism/Work Ethic

There were two different statistically significant interaction effects the importance rating of professional work ethic, mobility × academic discipline, and interdependence × academic rank. The details for each are given in the following subsections.

Importance ← Mobility × Academic Discipline

The interaction of the mobility dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of professional work ethic predicted by mobility are given for each category of academic discipline in Table 4.47.

Of the eight categories of academic discipline, one contained a significant relationship between the importance rating of professional work ethic and the mobility dimension of autonomy. Arts & Humanities ($b = -0.649$, $p = .001$) produced a negative relationship between importance and mobility. The remaining seven categories had nonsignificant simple slopes.

Table 4.47

Simple Slopes for Importance of Professionalism/Work Ethic on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.649	0.186	-3.480	0.001	[-1.015, -0.282]
Biological Science	-0.377	0.259	-1.454	0.147	[-0.886, 0.133]
Math & Computer Science	-0.599	0.456	-1.313	0.190	[-1.495, 0.298]
Social Sciences	-0.165	0.213	-0.776	0.438	[-0.584, 0.253]
Business	0.371	0.196	1.887	0.060	[-0.016, 0.757]
Education	1.142	0.583	1.959	0.051	[-0.004, 2.288]
Engineering	0.111	0.132	0.841	0.401	[-0.149, 0.372]
Health Professions & Social Service	0.165	0.256	0.646	0.518	[-0.338, 0.669]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Importance ← Interdependence × Academic Rank

The interaction of the interdependence dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of professional work ethic predicted by the mobility are given for each category of academic rank in Table 4.48.

Of the five categories of academic rank, one contained a significant relationship between the importance rating of professional work ethic and the mobility dimension of autonomy. Fifth or more year ($b = 1.433$, $p < .001$) produced a positive relationship between importance and interdependence. The remaining seven categories had nonsignificant simple slopes.

Table 4.48

Simple Slopes for Importance of Professionalism/Work Ethic on Interdependence by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.089	0.300	0.295	0.768	[-0.502, 0.679]
Second	0.357	0.290	1.228	0.220	[-0.214, 0.927]
Third	0.363	0.235	1.545	0.123	[-0.099, 0.825]
Fourth	0.059	0.201	0.294	0.769	[-0.335, 0.453]
Fifth or more	1.433	0.408	3.515	0.000	[0.631, 2.235]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Interaction Effects on the Proficiency Rating of Professionalism/Work Ethic

There were two different statistically significant interaction effects the proficiency rating of professional work ethic—namely, time management × academic rank, and emotional independence–peers × academic rank. The details for each are given in the following subsections.

Proficiency ← Time Management × Academic Rank

The interaction of the time management dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of professional work ethic predicted by the time management dimension are given for each category of academic rank in Table 4.49.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of professional work ethic and the time management dimension of autonomy. Third year produced a positive relationship between proficiency and time management ($b = 1.045$, $p < .001$) and fourth year ($b = 0.531$, $p = .023$) also produced a positive

relationship for the same two variables. The remaining three categories had nonsignificant simple slopes.

Table 4.49

Simple Slopes for Proficiency of Professionalism/Work Ethic on Time Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.466	0.261	1.788	0.075	[-0.046, 0.979]
Second	-0.120	0.300	-0.400	0.689	[-0.710, 0.470]
Third	1.045	0.244	4.275	0.000	[0.564, 1.526]
Fourth	0.531	0.233	2.277	0.023	[0.072, 0.989]
Fifth or more	0.122	0.431	0.282	0.778	[-0.727, 0.970]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Proficiency ← Emotional Independence–Peers× Academic Rank

The interaction of the emotional independence–peers dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of professional work ethic predicted by the emotional independence–peers dimension are given for each category of academic rank in Table 4.50.

Of the five categories of academic rank, one contained a significant relationship between the proficiency rating of professional work ethic and the emotional independence–peers dimension of autonomy. Third year produced a negative relationship between proficiency and emotional independence–peers (b = -0.949, p = .001). The remaining four categories had nonsignificant simple slopes.

Table 4.50

Simple Slopes for Proficiency of Professionalism/Work Ethic on Emotional Independence – Peers by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.248	0.363	-0.683	0.495	[-0.961, 0.466]
Second	-0.278	0.265	-1.051	0.294	[-0.799, 0.242]
Third	-0.949	0.294	-3.232	0.001	[-1.527, -0.372]
Fourth	0.306	0.265	1.152	0.250	[-0.216, 0.827]
Fifth or more	-0.399	0.446	-0.895	0.372	[-1.276, 0.478]

Main Effects on the Ratings of Professionalism/Work Ethic

There time management aspect of autonomy had a significant main effect on the importance rating of professionalism/work ethic. While money management and interdependence aspects of autonomy had significant main effects on the proficiency rating of professionalism/work ethic (Table 4.51).

Table 4.51

Summary of Significant Main Effect on the Rating of Professionalism/Work Ethic

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Time mgmt.	0.206	0.102	2.015	.045	[0.005, 0.406]
Proficiency	Money mgmt.	0.392	0.129	3.049	.002	[0.139, 0.645]
Proficiency	Interdependence	0.341	0.169	2.020	.044	[0.009, 0.673]

Note. The importance and proficiency ratings of professionalism/work ethic are scored on a seven-point scale; the dimensions of autonomy are scored on a five-point scale.

Leadership

The final SUR model for leadership contained four significant interactions. There were also two significant main effects that were not otherwise involved in significant interactions with covariates. The list of significant effects in the final model are given in Table 4.52.

Table 4.52

Significant Effects in the Final SUR Model for Leadership

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	Interdependence Emo. ind. parents Money mgmt. Mobility	(none)	Time mgmt.
Proficiency	(none)	(none)	Mobility

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final leadership SUR model are given in Table 4.53. Both regression equations were significant. While the R^2 for the importance rating of leadership was quite substantial, the R^2 for the proficiency rating was only moderate in size. The residual terms from the two equations were significantly correlated for this model, $r = .296$, $p < .001$.

Table 4.53

Overall Results for the SUR Model for Leadership

Rating type	*RMSE*	R^2	*F*	*p*
Importance	0.9864274	0.3711	3.10	< .001
Proficiency	1.1494350	0.1268	14.52	< .001

Note. The final model estimates were based on a sample of $n = 200$. The regression *df* for the *F*-tests for importance and proficiency were 40 and 2, respectively; the residual *df* was 356.

Interaction Effects on the Importance Rating of Leadership

There were three different statistically significant interaction effects the importance rating of leadership—namely, mobility × academic discipline, money management × academic discipline, money management × academic discipline, interdependence x academic discipline, and emotional independence–parents × academic discipline. The details for each are given in the following subsections.

Importance ← Mobility × Academic Discipline

The interaction of the mobility dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of leadership predicted by the mobility are given for each category of academic discipline in Table 4.54.

Of the eight categories of academic discipline, two contained a significant relationship between the importance rating of leadership and the mobility dimension of autonomy. Both Arts & Humanities (b = -0.891, p = .004) and Business (b = -0.928, p = .009) produced a negative relationship between importance and mobility. The remaining six categories had nonsignificant simple slopes.

Table 4.54

Simple Slopes for Importance of Leadership on Mobility by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.891	0.311	-2.865	0.004	[-1.503, -0.279]
Biological Science	-0.402	0.428	-0.938	0.349	[-1.245, 0.440]
Math & Computer Science	1.121	0.725	1.546	0.123	[-0.305, 2.546]
Social Sciences	0.221	0.329	0.672	0.502	[-0.425, 0.867]
Business	-0.928	0.355	-2.611	0.009	[-1.627, -0.229]
Education	0.663	0.814	0.815	0.416	[-0.938, 2.265]
Engineering	0.297	0.193	1.533	0.126	[-0.084, 0.677]
Health Professions & Social Service	-0.289	0.449	-0.643	0.520	[-1.172, 0.594]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Importance ← Money Management × Academic Discipline

The interaction of the money management dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of leadership predicted by the money management are given for each category of academic discipline in Table 4.55.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of leadership and the money management dimension of autonomy. Arts & Humanities (b = 0.664, p = .025) produced a positive relationship between importance and leadership. Both Business (b = -1.245, p = .001) and Engineering (b = -0.539, p = .022) produced a negative relationship between importance and leadership. The remaining five categories had nonsignificant simple slopes.

Table 4.55

Simple Slopes for Importance of Leadership on Money Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	0.664	0.296	2.247	0.025	[0.083, 1.246]
Biological Science	-0.355	0.309	-1.151	0.251	[-0.963, 0.252]
Math & Computer Science	-0.361	0.381	-0.948	0.344	[-1.110, 0.388]
Social Sciences	-0.393	0.795	-0.494	0.621	[-1.956, 1.170]
Business	-1.245	0.389	-3.200	0.001	[-2.011, -0.480]
Education	-1.336	0.685	-1.950	0.052	[-2.684, 0.012]
Engineering	-0.539	0.234	-2.304	0.022	[-0.999, -0.079]
Health Professions & Social Service	-0.083	0.399	-0.208	0.836	[-0.868, 0.702]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Importance ← Interdependence × Academic Discipline

The overall (joint) test for the interaction of the interdependence dimension of autonomy and academic discipline is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the importance rating of leadership predicted by the interdependence dimension are given for each category of academic discipline in Table 4.56.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of leadership and the interdependence dimension of autonomy. Arts & Humanities ($b = 2.128$, $p < .001$), Biological Sciences ($b = 1.614$, $p = .007$), and Business ($b = 1.231$, $p = .004$), produced a positive relationship between importance and leadership. The remaining five categories had nonsignificant simple slopes.

Table 4.56

Simple Slopes for Importance of Leadership on Interdependence by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	2.128	0.417	5.106	0.000	[1.308, 2.948]
Biological Science	1.679	0.614	2.734	0.007	[0.471, 2.887]
Math & Computer Science	1.041	0.697	1.493	0.136	[-0.330, 2.412]
Social Sciences	0.091	0.921	0.099	0.921	[-1.721, 1.903]
Business	1.231	0.422	2.917	0.004	[0.401, 2.061]
Education	-1.220	0.827	-1.475	0.141	[-2.847, 0.407]
Engineering	0.015	0.274	0.055	0.956	[-0.525, 0.555]
Health Professions & Social Service	0.883	0.481	1.838	0.067	[-0.062, 1.828]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Importance ← Emotional Independence–Parents × Academic Discipline

The interaction of the emotional independence–parents dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of leadership predicted by the emotional independence–parents dimension are given for each category of academic discipline in Table 4.57.

Of the eight categories of academic discipline, three contained a significant relationship between the importance rating of leadership and the interdependence dimension of autonomy. Math & Computer Science (b = -1.742, p = .019) produced a negative relationship between importance and leadership. While Business (b = 0.813, p = .035) and Education (b = 1.269, p = .013) produced positive relationships between the two same variables. The remaining five categories had nonsignificant simple slopes.

Table 4.57

Simple Slopes for Importance of Leadership on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.294	0.311	-0.946	0.345	[-0.905, 0.317]
Biological Science	0.561	0.373	1.505	0.133	[-0.172, 1.294]
Math & Computer Science	-1.742	0.739	-2.357	0.019	[-3.195, -0.289]
Social Sciences	-0.426	0.738	-0.577	0.564	[-1.879, 1.026]
Business	0.813	0.385	2.114	0.035	[0.057, 1.570]
Education	1.269	0.507	2.503	0.013	[0.272, 2.266]
Engineering	0.012	0.230	0.052	0.959	[-0.441, 0.465]
Health Professions & Social Service	0.416	0.458	0.909	0.364	[-0.484, 1.316]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Main Effects on the Ratings of Leadership

The time management aspect of autonomy had a significant main effect on the importance rating of leadership. While mobility and interdependence aspects of autonomy had significant main effects on the proficiency rating of leadership (Table 4.58).

Table 4.58

Summary of Significant Main Effect on the Ratings of Leadership

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Time mgmt.	0.336	0.150	2.239	.026	[0.041, 0.631]
Proficiency	Mobility	0.389	0.129	3.015	.003	[0.135, 0.643]
Proficiency	Interdependence	0.715	0.187	3.827	< .001	[0.348, 1.082]

Note. The importance and proficiency ratings of leadership are scored on a seven-point scale; the dimensions of autonomy are scored on a five-point scale.

Global/Multi-Cultural Fluency

The final SUR model for global/multi-cultural fluency contained only a single significant interaction. However, there were five significant main effects that were not otherwise involved in significant interactions with covariates. The list of significant effects in the final model are given in Table 4.59.

Table 4.59

Significant Effects in the Final SUR Model for Global/Multi-Cultural Fluency

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	(none)	(none)	Interdependence Money mgmt.
Proficiency	Emo. ind. parents	(none)	Interdependence Money mgmt. Mobility

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final global/multi-cultural fluency model are given in Table 4.61. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .387$, $p < .001$.

Table 4.60

Overall Results for the SUR Model for Global/Multi-Cultural Fluency

Rating type	*RMSE*	R^2	*F*	*p*
Importance	1.404592	0.3126	10.00	< .001
Proficiency	1.396614	0.2786	3.62	< .001

Note. The final model estimates were based on a sample of $n = 198$. The regression *df* for the *F*-tests for importance and proficiency were 9 and 22, respectively; the residual *df* was 363.

Interaction Effects on the Proficiency Rating of Global/Multi-Cultural Fluency

There was only one statistically significant interaction effects the proficiency rating of global/multi-cultural fluency—namely, emotional independence–parents × academic discipline. The details are given in the following subsections.

Proficiency ← Emotional Independence–Parents × Academic Discipline

The interaction of the global/multi-cultural fluency dimension of autonomy and academic discipline is significant. The simple slopes for the proficiency rating of global/multi-cultural fluency predicted by the emotional independence–parents dimension are given for each category of academic rank in Table 4.61.

Of the eight categories of academic discipline, two contained a significant relationship between the proficiency rating of global/multi-cultural fluency and the emotional independence–parents dimension of autonomy. Both Arts & Humanities (b = -1.189, p = .010) and Biological Science (b = -1.089, p = .022) produced a negative relationship between proficiency and emotional independence–parents. The remaining six categories had nonsignificant simple slopes.

Table 4.61

Simple Slopes for Proficiency of Global/Multi-Cultural Fluency on Emotional Independence – Parents by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-1.189	0.459	-2.588	0.010	[-2.092, -0.285]
Biological Science	-1.089	0.475	-2.294	0.022	[-2.023, -0.155]
Math & Computer Science	1.461	0.819	1.785	0.075	[-0.149, 3.071]
Social Sciences	-0.559	0.496	-1.128	0.260	[-1.535, 0.416]
Business	-0.422	0.364	-1.160	0.247	[-1.137, 0.294]
Education	0.721	0.630	1.145	0.253	[-0.518, 1.960]
Engineering	0.363	0.289	1.254	0.211	[-0.206, 0.931]
Health Professions & Social Service	0.419	0.507	0.826	0.409	[-0.578, 1.416]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Main Effects on the Ratings of Global/Multi-Cultural Fluency

The interdependence and money management dimensions of autonomy had significant main effects on both the importance and proficiency ratings of global/multi-cultural fluency (Table 4.62). In addition, mobility had a significant main effect on the proficiency rating.

Table 4.62

Summary of Significant Main Effect on the Ratings of Global/Multi-Cultural Fluency

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Interdependence	1.006	0.231	4.358	< .001	[0.552, 1.459]
Importance	Money mgmt.	-0.644	0.171	-3.760	< .001	[-0.980, -0.307]
Proficiency	Interdependence	0.608	0.233	2.603	.010	[0.149, 1.067]
Proficiency	Money mgmt.	-0.570	0.179	-3.191	.002	[-0.921, -0.219]
Proficiency	Mobility	0.344	0.162	2.117	.035	[0.024, 0.663]

Note. The importance and proficiency ratings of global/multi-cultural fluency are scored on a seven-point scale; the dimensions of autonomy are scored on a five-point scale.

Career Management

The SUR model for career management reduced to a total of five significant interactions. There were also three significant main effects that were not otherwise involved in significant interactions with covariates. The list of significant effects in the final model are given in Table 4.63.

Table 4.63

Significant Effects in the Final SUR Model for Career Management

Rating type (dependent variables)	Interaction with covariates		Main effects[a]
	Academic discipline ×	Academic rank ×	
Importance	Money mgmt.	Interdependence	Time mgmt.
Proficiency	(none)	Time mgmt. Money mgmt. Mobility	Emo. ind. parents Emo. ind. peers

[a]Only those significant main effects which were not involved in one or more significant interaction effects are shown here.

The overall results for the final career management model are given in Table 4.64. Both regression equations were significant with sizable R^2 values. The residual terms from the two equations were significantly correlated for this model, $r = .262$, $p < .001$.

Table 4.64

Overall Results for the SUR Model for Career Management

Rating type	*RMSE*	R^2	*F*	*p*
Importance	1.036257	0.2147	2.26	< .001
Proficiency	1.175675	0.3239	4.69	< .001

Note. The final model estimates were based on a sample of $n = 200$. The regression *df* for the *F*-tests for importance and proficiency were 25 and 21, respectively; the residual *df* was 352.

Interaction Effects on the Importance Rating of Career Management

There were two different statistically significant interaction effects the importance rating of career management—namely, money management × academic discipline and interdependence × academic rank. The details for each are given in the following subsections.

Importance ← Money Management × Academic Discipline

The interaction of the money management dimension of autonomy and academic discipline is significant. The simple slopes for the importance rating of career management predicted by the money management dimension are given for each category of academic discipline in Table 4.65.

Of the eight categories of academic discipline, one contained a significant relationship between the importance rating of career management and the money management dimension of autonomy. Business ($b = -0.969$, $p = .004$) produced a negative relationship between importance and career management. The remaining seven categories had nonsignificant simple slopes.

Table 4.65

Simple Slopes for Importance of Career Management on Money Management by Levels of Academic Discipline

Academic discipline	*b*	*SE*	*t*	*p*	95% CI
Arts & Humanities	-0.463	0.318	-1.457	0.146	[-1.088, 0.162]
Biological Science	-0.380	0.314	-1.208	0.228	[-0.998, 0.238]
Math & Computer Science	0.660	0.403	1.636	0.103	[-0.133, 1.454]
Social Sciences	0.423	0.479	0.883	0.378	[-0.519, 1.365]
Business	-0.969	0.332	-2.919	0.004	[-1.623, -0.316]
Education	0.169	0.721	0.234	0.815	[-1.249, 1.587]
Engineering	-0.164	0.232	-0.706	0.480	[-0.621, 0.293]
Health Professions & Social Service	0.469	0.369	1.270	0.205	[-0.257, 1.195]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Importance ← Interdependence × Academic Rank

The interaction of the interdependence dimension of autonomy and academic rank is significant. The simple slopes for the importance rating of career management predicted by the interdependence dimension are given for each category of academic rank in Table 4.66.

Of the five categories of academic rank, one contained a significant relationship between the importance rating of career management and the interdependence dimension of autonomy. Fifth or more year ($b = 1.726$, $p = .004$) produced a positive relationship between importance and career management. The remaining seven categories had nonsignificant simple slopes.

Table 4.66

Simple Slopes for Importance of Career Management on Interdependence by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.667	0.435	1.535	0.126	[-0.188, 1.522]
Second	-0.010	0.408	-0.024	0.981	[-0.813, 0.793]
Third	0.021	0.318	0.067	0.946	[-0.603, 0.646]
Fourth	-0.318	0.286	-1.114	0.266	[-0.880, 0.243]
Fifth or more	1.726	0.593	2.908	0.004	[0.558, 2.893]

Note. The dependent variable was scored on a seven-point scale; the independent variable was scored on a five-point scale.

Interaction Effects on the Proficiency Rating of Career Management

There was one statistically significant interaction effects the proficiency rating of career management—namely, mobility × academic rank, time management x academic rank, and money management x academic rank. The details are given in the following subsections.

Proficiency ← Mobility × Academic Rank

The overall (joint) test for the interaction of the mobility dimension of autonomy and academic rank is significant, which warrants a follow-up analysis of the conditional regression weights (otherwise known as the simple slopes). The simple slopes for the proficiency rating of career management predicted by the mobility dimension are given for each category of academic rank in Table 4.67.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of career management and the mobility dimension of autonomy. Third year ($b = 0.517$, $p = .040$) produced a positive relationship between proficiency and mobility. While

Fifth or more year (b = -1.494, p < .001) produced a negative relationship between proficiency and mobility. The remaining three categories had nonsignificant simple slopes.

Table 4.67

Simple Slopes for Proficiency of Career Management on Mobility by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.208	0.360	0.578	0.564	[-0.500, 0.916]
Second	-0.043	0.313	-0.137	0.891	[-0.659, 0.573]
Third	0.517	0.251	2.058	0.040	[0.023, 1.011]
Fourth	0.154	0.236	0.651	0.516	[-0.311, 0.619]
Fifth or more	-1.494	0.414	-3.608	0.000	[-2.308, -0.680]

Proficiency ← Time Management × Academic Rank

The interaction of the time management dimension of autonomy and academic rank is significant. The simple slopes for the proficiency rating of career management predicted by the time management dimension are given for each category of academic rank in Table 4.68.

Of the five categories of academic rank, two contained a significant relationship between the proficiency rating of career management and the time management dimension of autonomy. Both Third year (b = 1.685, p < .001) and Fifth or more year (b = 2.160, p < .001) produced a positive relationship between proficiency and time management. The remaining three categories had nonsignificant simple slopes.

Table 4.68

Simple Slopes for Proficiency on Time Management by Levels of Academic Rank

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	-0.067	0.355	-0.189	0.850	[-0.765, 0.631]
Second	0.038	0.467	0.081	0.936	[-0.881, 0.957]
Third	1.685	0.308	5.480	0.000	[1.081, 2.290]
Fourth	0.409	0.282	1.452	0.147	[-0.145, 0.964]
Fifth or more	2.160	0.586	3.687	0.000	[1.008, 3.312]

Proficiency ← Money Management × Academic Rank

The interaction of the money management dimension of autonomy and academic rank is significant. The simple slopes for the proficiency rating of career management predicted by the money management dimension are given for each category of academic rank in Table 4.69.

Of the five categories of academic rank, three contained a significant relationship between the proficiency rating of career management and the money management dimension of autonomy. While First year (b = 0.954, p = .014) produced a positive relationship between proficiency and money management. Both Third year (b = -0.695, p = .031) and Fifth or more years (b = -2.084, p = .003) produced a negative relationship between the same two variables. The remaining two categories had nonsignificant simple slopes.

Table 4.69

Simple Slopes for PRO_08 on MNGMONEY by Levels of ACRANK

Academic rank	*b*	*SE*	*t*	*p*	95% CI
First	0.954	0.387	2.462	0.014	[0.192, 1.716]
Second	0.163	0.377	0.434	0.664	[-0.577, 0.904]
Third	-0.695	0.320	-2.171	0.031	[-1.325, -0.065]
Fourth	0.093	0.276	0.338	0.736	[-0.450, 0.637]
Fifth or more	-2.084	0.701	-2.971	0.003	[-3.464, -0.705]

Main Effects on the Ratings of Career Management

Of the autonomy variables that were not involved in a significant interaction with either academic discipline or academic rank, only time management had a significant main effect on the importance rating of career management.

Table 4.70

Summary of Significant Main Effect on the Ratings of Career Management

Response	Predictor	*b*	*SE*	*t*	*p*	95% CI
Importance	Time mgmt.	0.331	0.165	2.002	.046	[0.006, 0.656]
Proficiency	Emo. ind. peer	0.538	0.204	2.632	.009	[0.136, 0.940]
Proficiency	Emo. ind. parent	-0.342	0.164	-2.089	.037	[-0.664, -0.020]

Note. The importance and proficiency ratings of career management were scored on a seven-point scale; the dimensions of autonomy were scored on a five-point scale.

CHAPTER 5: DISCUSSION

This study's purpose is to understand how student development affects a student's prioritization regarding the importance and proficiency level of specific career-readiness competencies to provide the means to promote student growth toward employer expectations. While colleges and universities have emphasized holistic education, employers continue to be concerned that students are missing the core elements of non-technical skills which are necessary to be successful in the workplace. Despite efforts to prepare students for early career success based upon known employer expectations, the current disconnect demonstrates that an increased understanding about the gap in graduates' skills is needed.

To better prepare students for the transition from college to career, educators should understand the impact a student's development has in relation to career readiness competencies. As educators begin to better understand this impact, intentional student experiences can be established in and out of the classroom to address potential gaps. In order to achieve the purpose of this study, two research questions were developed.

Summary of Results

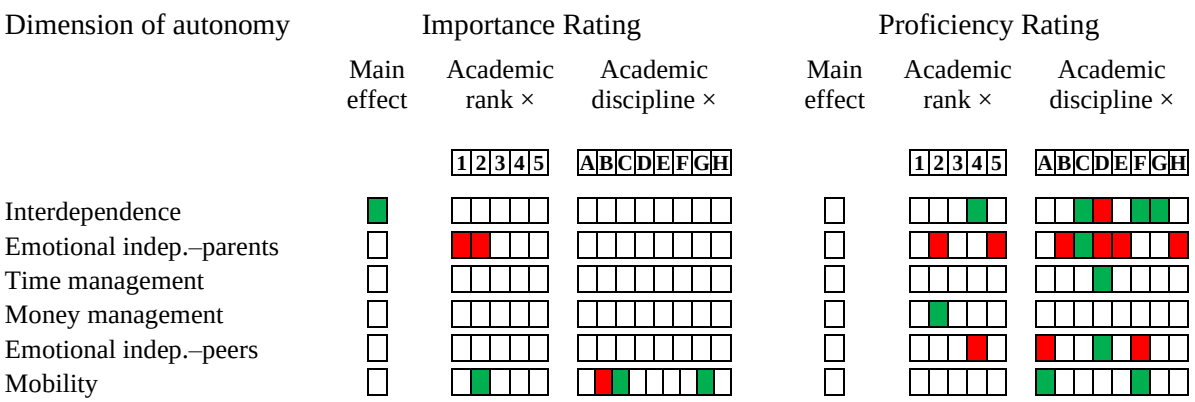
This section provides a summary of the results for both research questions identified. The first research question explored students' level of autonomy (time management, money management, mobility, interdependence, emotional independence: peers, and emotional independence: parents) related to their perceived importance of career-readiness competencies (teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management) toward their career success. While the second research question explored how a students' level of autonomy (time management, money management, mobility, Interdependence,

emotional independence: peers, and emotional independence: parents) related to their proficiency in career readiness competencies (teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written communication, professional work ethic, leadership, global/multi-cultural fluency, and career management.

The following figures (Figures 5.1 through 5.8) show the statistically significant relationships between a students' level autonomy and career readiness competencies with academic rank and academic discipline as moderators. These figures serve as concise visual summary for the numerous interactions found within the data. These figures were organized in such a way to allow for side-by-side comparisons of the importance rating and proficiency rating. The array of boxes under the academic rank heading represent (from left to right) the following classifications: first year, second year, third year, fourth year, and fifth year (or more). The array of boxes under the academic discipline heading represent (from left to right) Arts and Humanities, Biological Science, Math and Computer Science, Social Sciences, Business, Education, Engineering, and Health Professions and Social Services. A green marker represents a positive relationship between the particular rating and dimension of autonomy at the given level of the indicated moderator variable (or main effect); a red marker represents a negative relationship in the same manner.

Figure 5.1

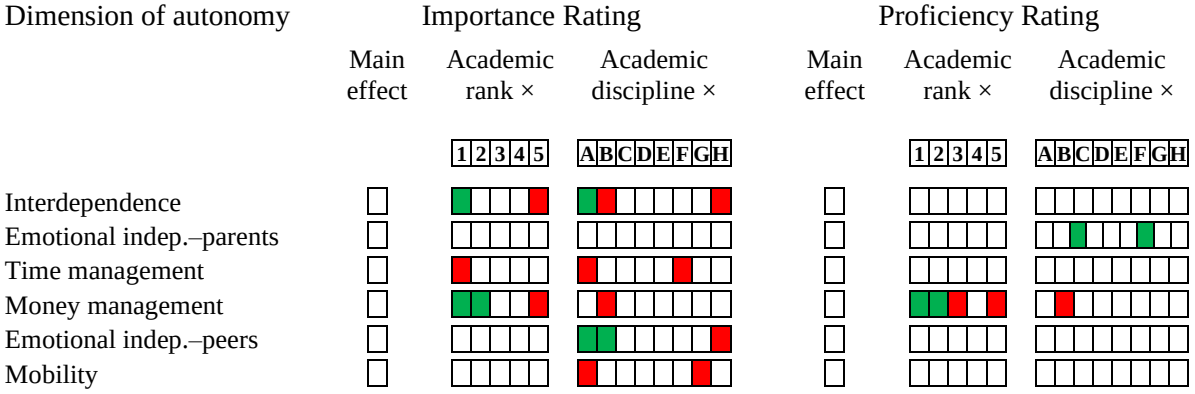
Summary of the Results for Teamwork/Collaboration



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.2

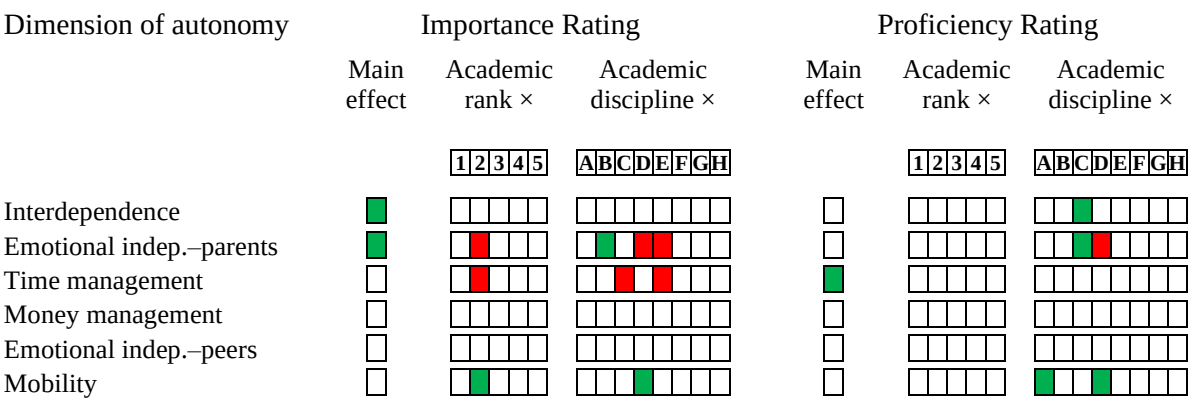
Summary of the Results for Digital Technology



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.3

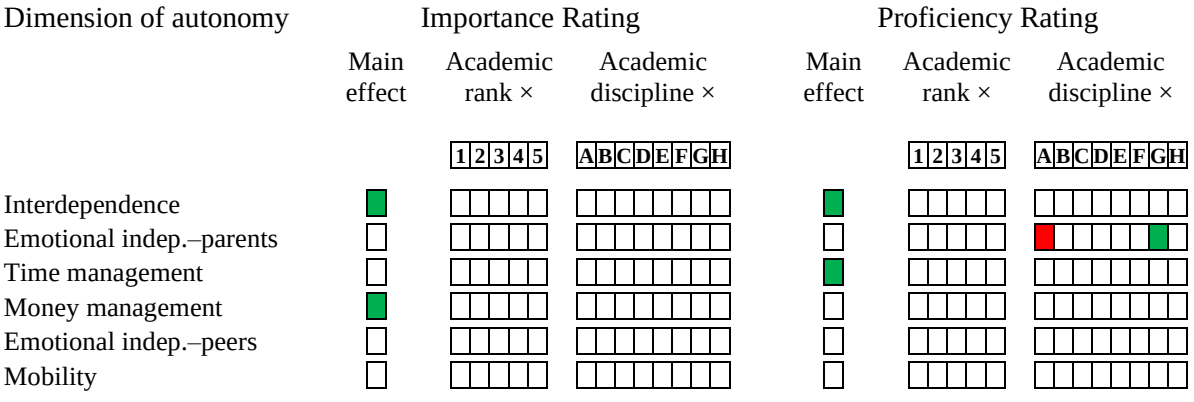
Summary of the Results for Critical Thinking/Problem Solving



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.4

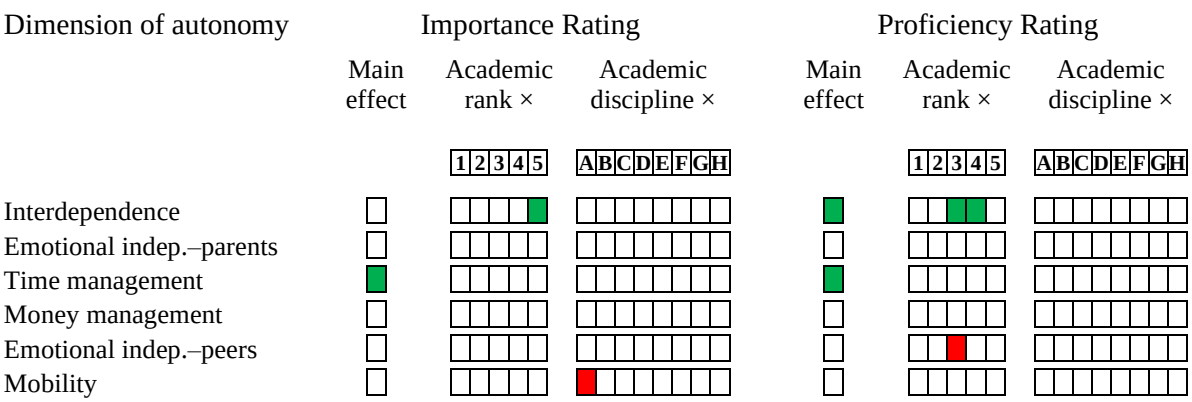
Summary of the Results for Oral/Written Communication



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.5

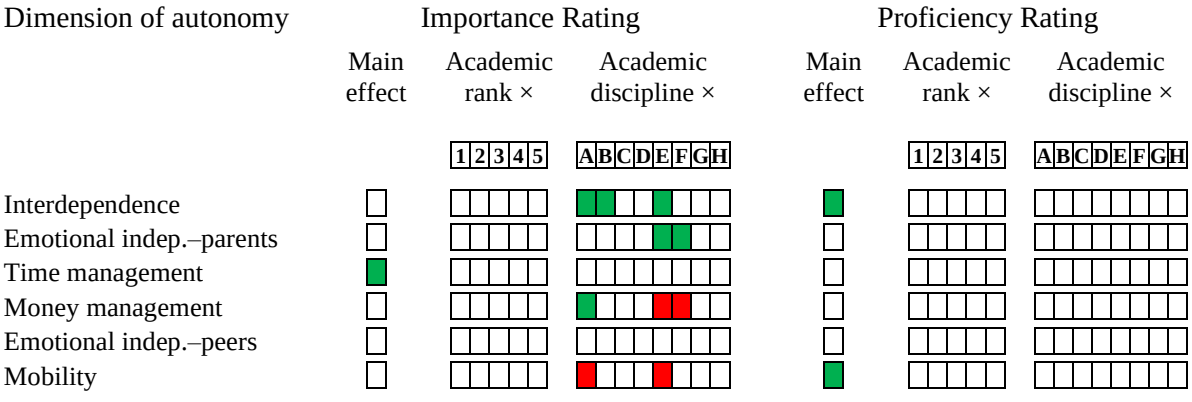
Summary of the Results for Professionalism/Work Ethic



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.6

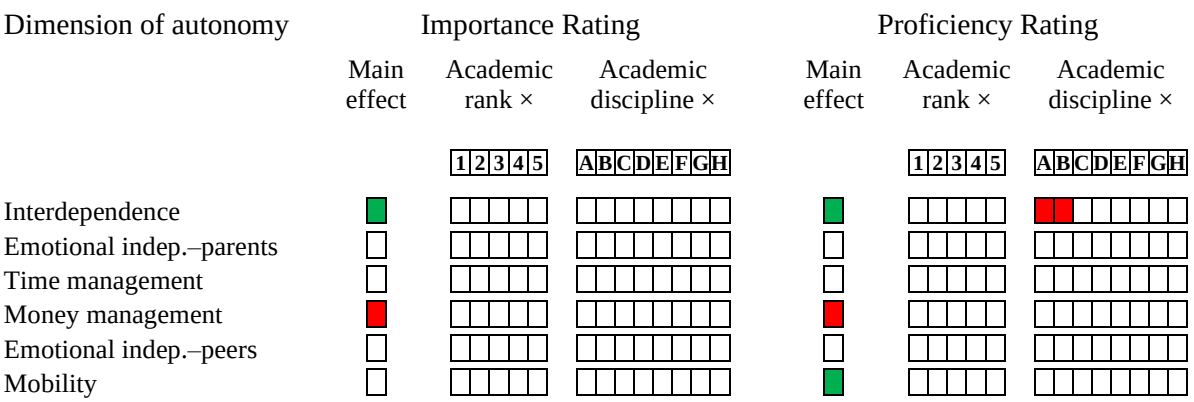
Summary of the Results for Leadership



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.7

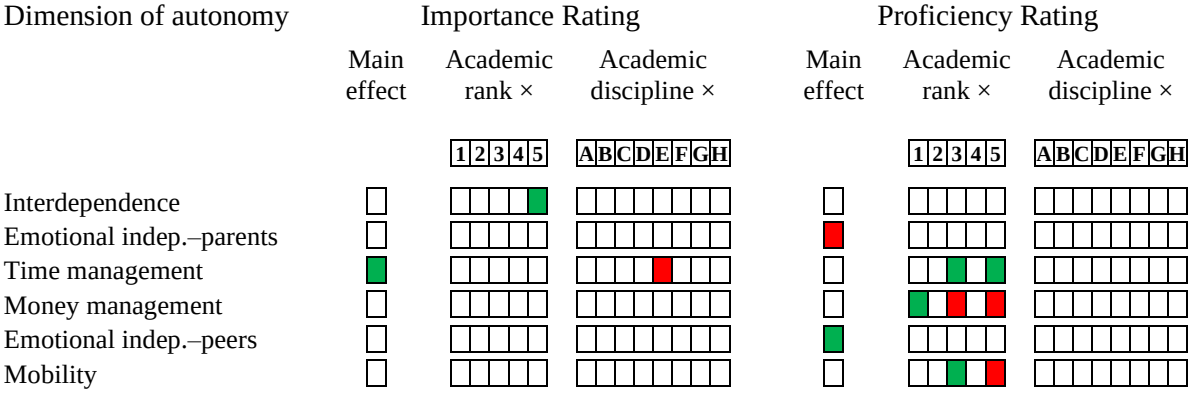
Summary of the Results for Global/Multi-Cultural Fluency



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

Figure 5.8

Summary of the Results for Career Management



Note. Academic Rank: 1-first year, 2-second year, 3-third year, 4-fourth year, 5-Fifth or more year. Academic Discipline: A-arts & humanities, B-biological science, C-math & computer science, D-social sciences, E-business, F-education, G-engineering, H-health professions & social services. Slopes: Red-negative interaction, Green-positive interaction.

The level of autonomy for undergraduate students does indeed impact their perceived importance and proficiency level regarding career-readiness competencies, but these relationships are often dependent upon other key factors. The summary figures clearly show several patterns emerge within the data. Specifically, the relationship between the covariates of academic rank and academic discipline and a students' level of autonomy. The next section will provide a discussion of the results and key takeaways related to several important interactions found within the data.

Discussion

After analyzing the results, several key observations were made. When reviewing academic rank, it was relatively apparent why some academic ranks produced interactions between autonomy and career readiness while others did not. For example, first year students are transitioning form high school to college. For most students this is probably the first time they are leaving home. This critical point in a first-year students' life may have a significant impact on their level of autonomy. The same could be argued for fifth or more year students who are planning to graduate. These students are preparing for their transition from college to career. This important transition may also contribute to a significant relationship with a students' level of autonomy. However, it was less clear why certain disciplines were significant while others were not. Research predominately connects academic rank and autonomy; not often do we see academic discipline provided. As a result, this provides many possibilities for future research, but certainly is less clear why certain disciplines were significant while others were not.

A review of the findings led to the emergence of several broad themes. These themes – teamwork/collaboration, digital technology, critical thinking/problem solving, oral/written

communication, and professionalism/work ethic – are described below along with some of their practical implications.

Teamwork/Collaboration

Of the five categories of academic rank, there was a significant relationship for both first year and second year students between the importance rating of teamwork/collaboration and emotional independence from parents. The relationships were negative, indicating that as emotional independence from parents increases, a student's viewpoint of the importance of teamwork/collaboration decreases. This parallels what is happening as students are transitioning from home to college. First and second year students are developing their emotional independence from parents, and at the same time they are not seeing the value in teamwork/collaboration. This makes sense because these students are striving to become more independent from mom and dad. As a result, teamwork and collaborative initiatives may also be impacted, due to the student working toward independence.

Gardner and Van der Veer (1998) stressed the importance of preparing college students for their transition to career as early as their first year. Many efforts have been made over the years to ensure first year students and more recently second year students are engaged and make a solid transition into college. Some of these efforts consist of learning communities, first-year student success courses, leadership development programs, and others. As a former student-affairs professional it is clear that these types of programs assist in the development and engagement of students. However, only a select few students may participate in these co-curricular experiences. Student affairs professionals must continue to partner with faculty to develop learning opportunities for students inside and outside the classroom to ensure students

understand the importance of teamwork/collaboration. These programs should be heavily geared toward first- and second-year students.

An additional finding was related to the relationship between importance of teamwork/collaboration and mobility. As a second-year student's mobility increases, so does their perspective on the importance of teamwork/collaboration. Second year students are starting to feel more comfortable being away from home and as a result start seeing the importance of teamwork/collaboration. This is wonderful opportunity to provide these students with internship opportunities. As second-year students have the opportunity to be more mobile and experience different learning environments their view on the importance of teamwork/collaboration increases. Educators should not wait until students are in their last couple years of college to expose them to internship opportunities, but instead introduce those opportunities earlier.

Several key findings also emerged specific to proficiency and teamwork/collaboration. Related to academic rank, interdependence, emotional independence–parents, and emotional-independence–peers were all statistically significant for fourth year and fifth year students. There was a positive interaction between fourth year students and Interdependence. As fourth year students prepare to graduate, they have spent the last several years developing in college. They are becoming more comfortable with themselves and their values are becoming concrete. These students are more confident in working with teams and collaborating.

Emotional independence from parents also had an impact on how second and fifth or more year students look at their proficiency in teamwork. As their emotional independence from parents increases their proficiency in teamwork decreases. For second-year students this to be expected as they are becoming more independent. This indicates a call to action for educators to provide additional teamwork skill development opportunities. The same is true for fifth or more

year students. These students have spent a significant amount of time in college and may be struggling with their proficiency in teamwork and collaboration, because of their longevity in higher education. Over the years, they have mastered the art of getting the job done, instead of working collectively with a team. Special attention should be placed on fifth or more year students to ensure they feel confident in their ability to work in teams prior to graduating. More teamwork opportunities for these students would be very beneficial.

Similar to second- and fifth or more-year students, fourth year student's proficiency in teamwork/collaboration also decreased. However, not because of emotional independence from parents, but instead emotional independence from peers. Emotional independence from peers produced a negative relationship on fourth year students. While fourth year students became more independent from peers their proficiency in teamwork/collaboration decreased. This is important to note, because fourth year students are finding their own voice and may struggle with learning from others in a team environment. Providing educational opportunities that stress appreciating different perspectives and embracing others would be a strong program that could be designed for these students.

The data shows a significant difference between academic disciplines related to importance verses proficiency. There were 15 significant interactions when students ranked their proficiency in teamwork/collaboration compared only three under importance. Emotional independence from parents appeared to be most relevant across several disciplines consisting of five out of the eight disciplines measured. Of those five disciplines, all had a negative relationship except Math & Computer Science which had a positive relationship.

Overall, the data tells a story that educators should consider, when preparing to assist students with their transition from college to career. According to NACE (2020), teamwork is a

critical competency to develop prior to joining the workforce. As stated in the literature review, teamwork/collaboration pertains to developing relationships from all backgrounds, while working together to gather individual perspectives to solve team objectives.

It is important for educators to understand that first and second-year students may struggle with teamwork, because they are developing emotional independence from parents. Therefore, it is so important to start developing teamwork/collaboration skills as soon as students enter college. It could be too late if teamwork programs are introduced to address this competency when students are in their final year of college. This point was made within the data, specific to the negative relationship observed in fifth or more year students who identify they are not proficient in teamwork/collaboration skills. There is a window of opportunity to serve students during their college duration by providing collaboration skill development opportunities on day one.

Digital Technology

According to NACE (2020) digital technology is the ability to leverage several technologies that can assist with tasks and ways to utilize new technologies to address complex problems. After analyzing the data, several findings emerged within this area. For example, as first-year student's interdependence increases, digital technology also increases. First-year students often enter college with strong technological experience because they grew up in a world where technology was ingrained into most everything. In other words, they feel confident in their ability to leverage technology in college. Interestingly, as fifth or more year student's interdependence increases their perspective of the importance of digital technology decreases. As educators we need to ensure that our soon to be graduating students understand the importance digital technology when venturing into the world of work.

Another interesting finding was related to time management and first-year students. As time management decreased, the importance of digital technology increased. As first-year students struggled with time management their perspective regarding the importance of digital technology increased. This finding can assist educators as they provide robust technology platforms for students to achieve academic success. The need to show how technology can be applied to assist with the success of a student as they manage their time is essential. In addition to time management, money management was significantly important for first- and second-year students. As their ability to manage financially increased so did their view on the importance of digital technology. The opposite was true for fifth or more year students in which, as their ability to manage money increased, they indicated the lack of importance in digital technology.

When reviewing the importance of digital technology related to academic discipline it was striking to there was no significant interactions with Math & Computer Science, Social Science, and Business. This is significant because it could demonstrate that these three disciplines are appropriately utilizing digital technology. It would be interesting to see how the use of digital technology is promoted across disciplines on campus. This would allow students to see how technology may assist the work they will do in their future career.

An interesting key finding also emerged specific to proficiency and digital technology. money management was the only dimension of autonomy that was significant with academic rank and proficiency. It is interesting to note that all academic ranks were significant except fourth year students. First and second year students produced a positive relationship between proficiency and digital technology while third- and fifth or more-year students produced a negative relationship with the same two variables.

After further examination, as first and second year student's ability to management money increases, so does their proficiency with digital technology. This is important to note for educators as they build curriculum for first- and second-year students. For example, if a college or university provides the opportunity for a life skills course for all first-year students, money management should be considered as a topic. The data shows that as first year students develop money management skills, their proficiency of digital technology increases. As educators, if we are striving to create avenues for proficiency this would be an excellent strategy around digital technology and money management. The data also shows that as money management increases for third- and fifth or more-year students proficiency of digital technology decreases. More research needs to be done in this area to better understand why upper levels students are experiencing a different outcome related to proficiency and digital technology.

Overall, the data is apparent that first- and second-year students feel digital technology is important and they are proficient while fifth and more year students think the opposite. This is an important point to consider when developing successful curricular and co-curricular experiences for students to assist in their digital technology development. In addition, gaining a better understanding of how academic disciplines utilize technology in and out of classroom would be a great step towards developing digital technology learning opportunities.

Critical Thinking/Problem Solving

NACE (2020) described critical thinking/problem solving as the ability to analyze complex issues while overcoming problems and demonstrating sound decision making. When exploring the importance of critical thinking related to academic rank, second-year students had several significant interactions. As second-year student's emotional independence from parents increased the importance of critical thinking/problem solving decreased. As second-year students

continue to rely heavily on their parents their ability use critical thinking skills deteriorates. As a result, second-year students may struggle to think through issues on their own and feel compelled to check with mom and dad for every decision. As educators we are noticing this in education from the increase parent calls and the lack of decision-making authority a student feels they have in their college journey.

In addition, as second-year students struggle managing their time, critical thinking/problem solving increases. This can be evident as a second-year student is faced with the many demands of college they are forced to think critically to solve problems. This is great in theory that second-year students are utilizing critical thinking skills when the pressure of balancing a schedule arises. However, how do educators provide avenues for second-year students to utilize critical thinking skills even when time management is not an issue. As educators, we can create problem-based learning approaches to allow students to see the importance of critical thinking and problem solving in a safe environment.

It is also interesting to note, critical thinking/problem solving is the first competency that the Business discipline had a significant interaction under importance. Similar to second year student's business students indicate that as their emotional independence from parents increases, they too indicate the importance of critical thinking decreases. These same students when managing time demands goes down their critical thinking/problem solving increases. Once again, this provides an opportunity for business students to utilize their critical thinking skills holistically.

There were no significant interactions for critical thinking/problem solving and proficiency under academic rank. It was surprising to see the lack of significant interactions. This may indicate the significant amount of work that must be done within higher education to ensure

students are proficient in critical thinking/problem solving before graduating from college. This provides a tremendous opportunity to ensure critical thinking/problem solving curriculum provides several avenues for critical thinking skill development. A different way of looking at the data would show that there were no significant interactions, because students felt equipped to be able to think critically and problem solve. Certainly, more research needs to be done in this area.

Overall, there is a great opportunity to assist our second-year students with their critical thinking and problem-solving skills. As educators, we should work with our second-year students to empower them to make their decisions through complex issues. We need to encourage our parents to assist with this process by encouraging their involvement in developing critical thinking skills in their students. We can wait until students are stressed to demonstrate critical thinking, but instead provide learning avenues to teach students how to utilize critical thinking and problem-solving skills in everyday practices.

Oral/Written Communication

NACE (2020) described oral/written communication as the ability to effectively and clearly articulate thoughts and ideas through speaking and writing. There were no interactions with academic rank or academic discipline for the importance of oral/written communication, which was surprising. Specifically, there is no evidence from this study to suggest autonomy impacts how a student ranks the importance of oral/written communication. However, there was an interaction with autonomy and proficiency ranking of oral/written communication for two academic disciplines. For Arts & Humanity students there was a negative interaction related to emotional independence from parents and how students ranked their proficiency level. As students within the Arts & Humanities discipline emotional independence from parents increases

their proficiency in oral/written communication decreases. The opposite is true for students within the Engineering discipline. As their emotional independence from parents increases so does their proficiency in oral/written communication. Engineering and Arts & Humanities are completely different disciplines. It may be possible that Engineering student's perception of their proficiency increases because they are utilizing technical writing skills to communicate while students within Arts & Humanities may be utilizing less technical writing and more verbal communication, which may cause a decreased perception of proficiency.

Only one subscale for autonomy was significant. That subscale was emotional independence from parents. The important thing note for oral/written communication is the impact that parents have on their child's ability to communicate effectively. As the data continues to be reviewed, highlights from the results is becoming more apparent that parental influences impact students. Overall, it was surprising that oral/written communication had only two interactions. However, the lack of significant results may simply be due to relatively small sample sizes for the analyses, which necessitates further research to gain a deeper understanding.

Professionalism/Work Ethic

Professionalism/work ethic is such an important skill develop as students are preparing to transition to their careers. NACE (2020) described professionalism/work ethic as the ability to demonstrate personal accountability related to punctuality, non-vermal communication, professional image, and exemplifying integrity. It was interesting reviewing the data around professionalism/work ethic. Over the course of my career in higher education, many hours were spent developing co-curricular experiences to assist students with the development of their professional presence. It was always enjoyable working with first-year students to help them develop their professionalism skills, but their skills were always quite different compared to

graduating seniors. The graduating seniors are way further along in their development of professional presence compared to first-year students. While this is not surprising due to the developmental nature of the college experience, as educators we could do more to increase professionalism early on, which would have long-term benefits as well.

Related to interdependence and academic rank, as interdependence increased the importance of professional/work ethic increased for fifth or more year students. This makes sense because as fifth or more year students are nearing graduation, they are becoming more interdependent and confident in themselves and their values. As they become interdependent, they are also more aware of the importance of professionalism. These students have probably already had several interviews and have experienced the real-world experiences.

When the jump is made from importance to proficiency fifth year or more is not significant. Instead as interdependence increases, the proficiency ranking of professionalism/work ethic increases for third and fourth-year students. It is possible that fifth or more year students feel that professionalism/work ethic is very important but struggle with proficiency of professionalism/work ethic while third- and fourth-year students show proficiency in professionalism/work ethic as their interdependence increases.

Related to emotional independence from peers, as emotional independence from peers increases, proficiency in professionalism/work ethic decreases for third-year students. The third-year student is at an interesting time in their college career. As they work on trying to become more independent from peers and those around them, they may feel compelled to resist the pressure to develop a professional presence. These third-year students may feel as if they don't have time to become proficient in professionalism, but instead are content waiting until the day

comes when they need to interview. At that time, they may go to the career center to get assistance.

Overall, developing interdependence in students may assist in their mindset around professionalism/work ethic. As educators, we can intentionally plan to develop curriculum which provides opportunities for students to build confidence and see how the world is interconnected in order to develop a student's level of interdependence. As a result of developing interdependence, students may see the value in professionalism/work ethic.

Leadership

Leadership is the ability to leverage strengths of others and assist in developing others to achieve a common goal by managing personal emotions and guiding and motivating (NACE, 2020). There were no significant interactions for academic rank under importance or proficiency. However, there were interactions within academic disciplines for importance. Specifically, Business had four different interactions consisting of a positive interaction with interdependence and emotional independence from parents, and negative interactions with money management and mobility. This may be due to a specific focus on leadership development opportunities in Business programs.

When interdependence increases the importance of leadership also increases for business students. As business students are exposed with rich leadership development opportunities to assist with their interdependence it is having an impact on that student's mindset around leadership. In addition, as emotional independence from parents increases the importance of leadership also increases. This is important to note if you are a faculty member in the College of Business. The data suggests it would be great approach to develop avenues for students to become more emotional independent from parents. These two positive interactions can be

extremely valuable for Business faculty to recognize as they are preparing curriculum for their students.

Money management and mobility also had an impact on business students. As student's ability to manage money decreased the importance of leadership increased. It is possible that as students are struggling with finances, they are seeing the importance of leadership and how it could positively impact their situation. In addition, as student's mobility decreased the importance of leadership increased. This may reflect that students feel developing their leadership skills could assist with their willingness to travel further from family and experience new ventures.

The lack of significant interactions for other disciplines, which may or may not have the same emphasis on leadership development, may present an immediate opportunity for practitioners. As educators we need to continue to develop programs that promote interdependence. Curricular and co-curricular leadership experiences could be a great approach to proving leadership skill development and may assist with the building of a student's level of interdependence.

Global/Multi-Cultural Fluency

NACE (2020) described global/multi-cultural fluency as respecting and valuing diverse backgrounds and perspectives while demonstrating openness, inclusiveness, and sensitivity towards all people. After exploring the data there were no interactions with academic rank for importance or proficiency and no interactions for academic discipline for importance. The only two interactions happened within proficiency related to interdependence and academic discipline. The two academic disciplines consisted of Arts & Humanities and Biological

Sciences. It was not the two interactions that were most interesting, it was the lack of significant interactions in the data.

This could simply be a result of the demographics and geographical locations of the study's participants. As students were enrolled at a predominately white institution located in the upper Midwest, they may not be exposed to sufficient experiences related to global/multi-cultural fluency. Therefore, students may not believe this area is important and these same students may not believe that they must be proficient in global/multi-cultural fluency. As educators, this could open the door to intentional recruiting students form diverse backgrounds, investing in more study abroad programs, and incorporating diversity training into curricular and co-curricular experiences.

Career Management

Career management is defined by NACE (2020) as the ability to identify one's strengths, knowledge, and skills relevant to a desired job. Career management also contributes to professional growth and understanding of how to navigate job options and advancements. A relationship emerged between interdependence and fifth or more year students: as interdependence increased so did the importance of career management for fifth or more year students. However, we did not see an interaction for proficiency for fifth or more year students. While they understand that it is important, they do not believe they are proficient. This could provide opportunity for educators to engage with fifth or more year students and better understand their views on career management and collectively discuss ways to increase that student's confidence when entering their career.

Of all the academic disciplines, only business had an interaction. As time management decreases the importance of career management increases for business students. As business

students become overwhelmed with in and out of the classroom experiences time management may become a struggle. As a result, for them to increase their level of certainty they put a higher level of importance on career management. In turn, this could create a stressful experience for students. As educators, we could consider assisting these students with hybrid solutions consisting of a blend of time management and career management skillsets.

Another finding consisted of the relationship between time management and academic rank. As time management increases the proficiency level of career management increases for both third year and fifth or more year students. As these students are better able to manage their time, they find time to engage in career management as well. This is an important element to consider when working with students, especially our upper level students. It is important to help them develop their time management skills, because it could provide a tremendous advantage in their career management.

Limitations

This study had several limitations. The first limitation revolved around recruiting participants as this study was launched during the Covid-19 pandemic. As a result, students were finishing up their spring semester at home when they received the invitation to participate in this study. How virtual learning and social distancing may have impacted survey respondents is unclear though it is important to mention that significant impact the pandemic may have had on this research.

Another limitation was the length of the survey. The survey consisted of over 90 questions. It was important that we used all 90 questions for the autonomy inventory, however it served as a barrier to individuals completing the survey. Over 400 students started the survey,

while just little over 200 completed the full survey. The length of the survey was certainly a limitation in this study.

The third limitation to this study involved defining the career readiness competencies. Students were asked to rank the importance and their proficiency levels for each of the NACE career readiness competencies. However, the researchers did not define the competencies for the participants, but instead left it open to their interpretation. This could have served as a limitation, because there was not a common definition for all participants to review.

Implications for Theory

The conceptual framework for this study focused on how a students' level autonomy impacts how they rank the importance and their proficiency level of career readiness skills. The career readiness skills were developed from the National Association for Colleges and Employers (NACE). A student's level autonomy was introduced by Chickering and Reisser (1993) as they discussed seven development vectors students travel through as they grow and develop in college. For the focus of this study, moving through autonomy toward interdependence was chosen as the vector to explore. This was an important vector, because at its pentacle is this idea of interdependence. As students move through college the expectation is that they become more interdependent.

This study has certainly expanded our understanding of how student development plays a role in career readiness. Specifically, Chickering and Reisser's third vector impacts a student's perspective on the importance of career readiness competencies and their level of proficiency. Before this study we did not know how a students' level of autonomy would impact their views related to the NACE career readiness competencies. Checkering and Reisser (1993) introduced seven vectors in their work, so it would be interesting to learn how the other six vectors interact

with the eight career readiness competencies. However, something to consider is the lack of validated instruments linked to each of the vectors.

Gardner and Van der Veer (1998) described how – if educators want students to have a success transition from college to career – we need to start assisting with the development of students as soon as they enter campus. In other words, as we think about interdependence, that process could take several years to achieve for a student. Schlossberg (2008) described that the significance of the event or non-event lies in how and to what extent it alters people's lives. For college students entering a first-time career has the potential to alter that students life. The data reconfirmed the impact that transistion has on college students. For example, when reviewign academic rank, the majoreity of the signifnianct interacts were associated with first year, second year, and fifrth or more year students. This makes sense because first and second year students are transisting from high school, while fifth or more year students are nearing the end of their college journey.

Hood and Jackson (1985) developed an instrument to measure Chickering and Reisser's third vector. This instrument was known as the Iowa Developing Autonomy Inventory. Evans et al. (2009), suggested this inventory is the one of the most reliable and valid instruments compared to others when measuring the third vector. As a result of utilizing the Iowa Developing Autonomy Inventory and the NACE career readiness competencies, a survey was created in order to better understand how autonomy impacts how a student views career readiness competencies.

Overall, implications for theory would be rooted in its relevancy in the future. As educators we need to be aware of how student development theory impacts today's student. It is important note that Chickering and Reisser's identify development vectors are decades old. As a

result, they may not be relevant for today's college student. With the explosion of technology and social media, both of which were not very relevant during the development of these vectors. In addition, demographics of college students are rapidly changing. A question to consider is how today's college demographics compare to the demographics during the time the vectors were established. Finally, the Iowa Developing Autonomy Inventory would also need to be evaluated based on the six subscales. Are the subscales relevant to today's college student, or do they need to be readjusted to reflect the development of autonomy that today's student travels through. These are few implications for theory.

Implications for Research

The student's level of autonomy was measured by Hood and Jackson's (1985) Iowa Developing Autonomy Inventory. The inventory consisted of 90 questions with six subscales. When the analyzing the results, it was overwhelming at times reviewing the six subscales of autonomy and the eight career readiness skills for academic rank and academic discipline. If there was a future study utilizing this strategy, it may be appropriate to encourage the researchers to consider evaluating the option of picking three out of the six subscales to measure. For example, using interdependence, emotional independence–parents, and emotional independence–peers would be three great subscales to utilize. As for the career readiness competencies, an option would be to select four out of the eight career readiness competencies to review. For example, selecting leadership, critical thinking/problem solving, teamwork/collaboration, and oral/written communication may be appropriate to better understand how they relate to a students' level of autonomy. Not only would this reduce the amount of data to navigate, but it would also reduce the survey time needed by participants to complete this survey.

The data did show autonomy to have an impact on how students ranked the importance and their level of proficiency for each of the career readiness competencies. This would indicate that there is a lot more work to do around better understanding how autonomy influences students. For example, emotional independence from parents was an autonomy subscale that continued to emerge in the data as significant. As a result, more research should be considered to better understand the impact parents are having on their child as they are enrolled in college.

The final implication for research is related to the NACE career readiness competencies. These competencies were not defined for participants prior to taking the survey. Future research should consider defining the competencies to ensure all participants are answering based on uniformed definition. For example, there were (relatively) low R^2 for importance ratings in the oral/written model (R^2=.144) and the proficiency ratings in the leadership model (R^2=.127) as compared to all the others. Leadership and oral/written communication may inherently have a greater amount of unexplainable variation.

Essentially, these two variables may be more challenging to define. This could be since the term leadership can be viewed as particularly ambiguous, creating a challenge for participants during the research study to define their level of proficiency. A similar rational could be used for the importance of oral/written communication. One could argue that a person's formal educational journey consists of years of oral/written communication development. As a result, this could cause a tremendous amount of variation on how participants may have answered the importance portion. Overall, researchers should consider providing uniformed definitions for the competencies to participants prior to taking the survey to ensure common language.

Implications for Practice

Overall, the data suggests that a student's level autonomy significantly impacts how students view the importance of career readiness skills and their proficiency level of those same skills. As educators it is critical that we acknowledge how autonomy impacts students and prepare curricular and co-curricular experiences for those students. Intentional co-curricular and curricular student experiences are critical to engage the learner and provide educational opportunities. The following describes how the relationship between autonomy and career readiness allows educators to better target programming for students related to career readiness. The several examples described below are directly related to the results from this research.

Apparent from the data, as first year students enter college, they are starting the journey toward interdependence. Educators should provide learning experiences that encourage interdependence as early as a student's first year in college. One way to begin to build interdependence is assisting students with their confidence. Several confidence exercise could be incorporated into the classroom and outside of the classroom. An example, of out of the classroom could consist of an orientation experience in which all first-year student participate. These self-confidence exercises could be incorporated into curricular or co-curricular experiences. A possible response to developing a campus-wide initiative around developing interdependence could start with academic advisers. Academic advisers could provide students the framework for what it looks like to become more dependent as a college student.

Educators should also pay close attention to the impact parents are having on their children's ability to think for themselves. It was obvious in the data that emotional independence from parents tremendously impacts a student's journey in college. Parental involvement in students' collegiate experiences are becoming more and more frequent. From the admission

process to faculty interactions, parents are deeply involved. As we know from this study, parental dependence can have a negative impact on students. Educators should consider encouraging emotional independence from parents through intentional programming. As students become more emotionally independent from parents, they are more likely to acknowledge the importance of career readiness skills. These students should be challenged to develop more emotional independence from parents, because as a result they will begin to understand the importance of career readiness skills.

Another implication for practice is related to annual career readiness training. Colleges and universities should consider creating annual career readiness experiences designed to showcase the importance of career readiness. The data reflects several significant interactions related to autonomy and career readiness competencies for first, second, and fifth or more year students. While third- and fourth-year students had only a few significant interactions, one would speculate, that could be due to being further removed from the transition of entering college or the transition of entering the workforce. To stay consistent career readiness experiences should be mandatory for first, second, third, fourth, and fifth or more year students. If mandatory, the university can ensure that students are gaining a consistent message around key career readiness topics. The career readiness curriculum should be designed around the NACE career readiness competencies. This would allow the opportunity to compare national data and have a uniformed vocabulary.

Conclusion

Colleges and universities have the great opportunity to develop students as they prepare to embark on one of the greatest transitions of their life. The transition from college to career is a vital time for college students. As educators, we must provide educational opportunities to build

skillsets related to career readiness competencies. It is important to understand that a student's level of autonomy can impact how students rank the importance and their level of proficiency regarding the career readiness competencies, which allows us to utilize ongoing efforts to increase autonomy to also increase career readiness. Educators must take into account the significance of autonomy on the student's skill development journey. Overall, the results of this study provide many opportunities to provide students with intentional learning experiences to address autonomy and career readiness competencies.

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APPENDIX A: PARTICIPANT RECRUITMENT INITIAL EMAIL

Fellow NDSU Student,

Do you feel prepared to secure your first job and advance in your career? [Like most students, I am concerned post-graduation career success.] As a doctoral candidate at NDSU, I am attempting to understand the relationship between your experiences at NDSU and the skills employers are looking for.

By participating in this survey, you will contribute to the ongoing research around student development and career readiness. The results of this research will provide a mechanism for educators to create more engaging programs and services that will aid in your success as a student and beyond.

To access the survey, please click here. If the survey does not open automatically, please copy and paste the following link to your internet browser's address bar: https://ndstate.co1.qualtrics.com/SE/?SID=SV_6zmBy5MsChmV9tj

If you have any questions or concerns about this study or your participation, please call me at 701-388-5245 or email me at Matthew.Skoy@ndsu.edu

Go Bison!

Matthew Skoy

IRB Approval #

APPENDIX B: PARTICIPANT RECRUITMENT REMINDER EMAIL

Fellow NDSU Student,

Do you feel prepared to secure your first job and advance in your career? [Like most students, I am concerned post-graduation career success.] As a doctoral candidate at NDSU, I am attempting to understand the relationship between your experiences at NDSU and the skills employers are looking for.

By participating in this survey, you will contribute to the ongoing research around student development and career readiness. The results of this research will provide a mechanism for educators to create more engaging programs and services that will aid in your success as a student and beyond.

To access the survey, please click here. If the survey does not open automatically, please copy and paste the following link to your internet browser's address bar: https://ndstate.co1.qualtrics.com/SE/?SID=SV_6zmBy5MsChmV9tj

If you have any questions or concerns about this study or your participation, please call me at 701-388-5245 or email me at Matthew.Skoy@ndsu.edu

Go Bison!

Matthew Skoy

IRB Approval #

APPENDIX C: PARTICIPANT RECRUITMENT FINAL EMAIL

Fellow NDSU Student,

Do you feel prepared to secure your first job and advance in your career? [Like most students, I am concerned post-graduation career success.] As a doctoral candidate at NDSU, I am attempting to understand the relationship between your experiences at NDSU and the skills employers are looking for.

By participating in this survey, you will contribute to the ongoing research around student development and career readiness. The results of this research will provide a mechanism for educators to create more engaging programs and services that will aid in your success as a student and beyond.

To access the survey, please click here. If the survey does not open automatically, please copy and paste the following link to your internet browser's address bar: https://ndstate.co1.qualtrics.com/SE/?SID=SV_6zmBy5MsChmV9tj

If you have any questions or concerns about this study or your participation, please call me at 701-388-5245 or email me at Matthew.Skoy@ndsu.edu

Go Bison!

Matthew Skoy

IRB Approval #

APPENDIX D: INFORMED CONSENT FORM

I agree to participate in the research study "The Relationship Between Students' autonomy and career readiness." I have been selected to participate in this study based upon my enrollment as a student at North Dakota State University.

By participating in this research, I may interact with Dr. Chris Ray, the principle investigator, or Mr. Matt Skoy, the lead researcher. Mr. Skoy has a M.Ed. in Education and is currently pursuing a Ph.D. in Education at North Dakota State University. Dr. Chris Ray, Associate Professor in the School of Education will be supervising this research.

I understand that this research is intended to assist the researcher in understanding the relationship between a students' level of autonomy and their career readiness. There are no known risks associated with this project that are greater than those encountered in daily life.

As a participant in this study, I will respond to a variety of statements concerning factors influencing my level of autonomy, be asked to prioritize technical and non-technical skills, as well as provide demographic details about myself. This entire procedure is expected to last approximately 5-10 minutes.

I understand that the university community and society as a whole may benefit from my participation through a greater understanding of how levels of autonomy may influence how a college student prioritizes skills prior to graduation.

I understand that every effort will be made to protect my identity. As my responses will be collected separately from my consent form, it will not be possible for my identifying information to be used in any report to North Dakota State University or any other public reports. The data from this project will be stored electronically on a secure server, and any additional documents from this research will be held in a locked file in the lead researcher's office for a period of five years from the conclusion of this study. Only he and Dr. Ray will have access to the original materials.

All information I provide will be confidential and generally will not be shared with others unless I provide written consent. However, the North Dakota State University Institutional Review Board has the authority to inspect consent records and data files to assure compliance with approved procedures.

I understand that all participation is voluntary and that refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I may discontinue participation at any time without penalty or loss of such benefits mentioned above.

For any questions regarding this research, I may contact:

Matt Skoy, M.S.
Doctoral Candidate
North Dakota State University
(701) 388-5245
Matthew.Skoy@ndsu.edu

Chris Ray, Ph.D.
Associate Professor, School of Education
North Dakota State University
(701) 231-7104
Chris.Ray@ndsu.edu

For information on subjects' rights, I may contact:

Ben Balas, Ph.D.	Kristy Shirley
IRB Chair	IRB Administrator
North Dakota State University	North Dakota State University
(701) 231-6105	(701) 231-8995
Benjamin.Balas@ndsu.edu	Kristy.Shirley@ndsu.edu

I understand that all necessary individuals at North Dakota State University have provided the required approvals for this project. Any questions regarding said approvals should be directed to any of the individuals listed above.

I have read and fully understand the consent form. It is recommended that I print a copy of this page for my records and future reference. By clicking below, I am indicating that I freely and voluntarily agree to participate in this study and I also acknowledge that am at least 18 years of age.

APPENDIX E: SURVEY INSTRUMENT

Part I: Please respond to the following demographic questions.

Classification: Freshman, Sophomore, Junior, Senior

Gender: Female, Male, Transgender/other, prefer not to share

Age *(in years)*: _____

Please mark your Academic Discipline:

Arts & Humanities, Biological Sciences, Mathematics & Computer Science, Social Sciences, Business, Communications, Media, & Public Relations, Education, Engineering, Health Professions and Social Service Professions.

Part II: For the following segments, please rate on a scale 1 to 7 (one being the least important and seven being extremely) the characteristics most important to recruiters when hiring recent graduates.

1. Please rate 1-7 for each career readiness competency listed below.

Competency	1 Not At All Important	2	3	4 Someone what Important	5	6	7 Extremely Important
a. Teamwork/Collaboration							
b. Digital Technology							
c. Critical Thinking/Problem Solving							
d. Oral/Written Communication							
e. Professional Work Ethic							
f. Leadership							
g. Career Management							
h. Computer Software Skills							
i. Good Grades							
j. Knowledge of Major Field							
k. Active in Extra-Curricular Activities							
l. Active in Student Professional Organizations							

Part II cont.: For the following segments, please rate on a scale 1 to 7 (one being not at all proficient and seven being extremely proficient) your level of profiency for each career readiness competency. the characteristics most important to recruiters when hiring recent graduates.

2. Please rate 1-7 for each career readiness competency listed below.

Competency	1 Not At All proficient	2	3	4 Someone what proficient	5	6	7 Extremely proficient
m. Teamwork/Collaboration							
n. Digital Technology							
o. Critical Thinking/Problem Solving							
p. Oral/Written Communication							
q. Professional Work Ethic							
r. Leadership							
s. Career Management							
t. Computer Software Skills							
u. Good Grades							
v. Knowledge of Major Field							
w. Active in Extra-Curricular Activities							
x. Active in Student Professional Organizations							

Part III: For each item below, indicate the number to the right that best fits your honest feelings about the statement.

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
I realize that my behavior toward others will dictate how they will treat me.	1	2	3	4	5
I would go against my parents wishes if the issue was very important to me.					
I put things off until the last minute and regret it.					
When I am in debt, I turn to my parents for help.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
It doesn't bother me if my friends don't accept my ideas.					
I would like living in a variety of places.					
I don't expect anyone to help me, and I prefer not to help anyone buy myself.					
I get upset if I don't get a letter or phone call from my family.					
I can deal with many different responsibilities and still remain my grades.					
I am paying for college at least partly with my own money.					
I don't like to go to a new place without a friend.					
I'd like to keep my life easy by avoiding to much travel or other kinds of change.					
I feel I have a lot to contribute to my school or community.					
My opinions are quite independent from those of my parents.					
My mismanagement of my time is causing me to get bad grades.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
Right now, I could not continue my education if my parents cut off their support.					
I plan my own social life without getting approval from friends.					
I have taken trips alone.					
I don' like people to depend on me for anything.					
I need to contact my parents when I feel discouraged.					
When academic pressures are great, I'm still able to get my outside work done.					
I don't need help to balance my checkbook.					
I really feel uncomfortable when I go to a party without my friends.					
I tend to stay home rather than travel.					
I think that we should share our wealth and expertise with poor countries.					
I solve most of my problems on my own without family help.					
I can't cope with my present school and outside work load.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
My parents give me spending money.					
I can disagree with my boy/girl friends without feeling guilty.					
The thought of re-establishing myself in a new community does not bother me.					
I usually get into a relationship just for what I can get out of it.					
I get upset if my parents don't approve of my leisure activities.					
I do not need to be reminded of deadlines in order to get things finished.					
I can fill out my own tax forms.					
I would feel worthless if I was not accepted by my peers.					
I would not accept a favorable job if long distance travel was required.					
Since I gain from group activities, I feel an obligation to contribute in return.					
I don't feel the need to call my parents before making a financial investment.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
I can't get anything done when I have two or more projects going on at the once.					
I don't understand all of my school bills.					
I can evaluate my friends' values and accept or reject them.					
After I graduate from college, I would like to be highly mobile for a while.					
Campus groups to which I belong should not expect much help from me.					
I look to my parents for solutions to personal problems.					
There aren't many obstacles in or outside my education that I couldn't handle by myself.					
I can work through financial problems without leaning on others for support.					
I feel badly about myself when I'm not dating someone.					
If I had to move, I'd prefer to be near my parent's home.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
I endorse paying taxes since they support necessary services.					
I can reject my parents' advice.					
I never really learned how to manage effectively both school and other outside activities.					
When I'm overdrawn at the bank, I ask my parents for the money I need.					
I can accept the fact that some of peers don't like me.					
If a good job required me to move to another country, I would accept it.					
I believe a university town shouldn't expect community involvement from students.					
I would prefer to compromise myself than go against my parents wishes.					
Because of my background training was sufficient, I'm easily able to handle my school and other work assignments.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
I have enough money to meet my needs.					
I become unhappy when my friends don't like my ideas.					
I do not adjust to new surroundings quickly so I do not seek a job requiring mobility.					
I recognize the need for voting in national elections.					
I do not feel the need for family reassurance when I embark on a new adventure.					
I could never handle taking the night classes while working a full-time job.					
I haven't thought about how I'll finish paying for the rest of my schooling.					
I would go out on a date with someone I like even if my best friends didn't like him/her.					
I could change my residence by myself with little trouble.					
To feel accepted by my friends. I'll do things that are against my principles.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
My own fearfulness of change limits my mobility.					
I feel confident that I can be a contributing member of my country.					
I would not feel upset when entering a place that lacked my parents' approval.					
I think that working at a job while going to school seems more than I can handle.					
My parents manage my budget.					
I contribute to group activities.					
I don't need my parents' approval of the people I date.					
I need emotional support from friends when I try new things.					
I lack skills in making travel arrangements.					
I have often held an outside job in addition to being a student.					
I have a good credit rating.					
I feel I conform to my friends' standards.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
My preference would be to live with my parents rather than to live somewhere else.					
As a citizen, I feel I have an obligation to report any serious crimes I witness.					
I feel emotionally independent of my parents.					
I feel I need to go to someone to help me to coordinate my outside work activities and school problems.					
I don't understand my bank statement.					
I think the best family relationships are based on a mutual give and take.					
Obstacles do not prevent me from moving from one place to another.					
I worry if my friends talk about me when I'm not with them.					
It's very important to me that my parents accept what I'm doing.					
I know how to schedule my priorities as far as time management goes.					

Identity Development	Never characteristic of me	Seldom characteristic of me	Sometimes characteristic of me	Often characteristic of me	Almost always characteristic of me
I have a part-time job so I don't have to rely on my parents for spending money.					

APPENDIX F: IRB APPROVAL

NDSU NORTH DAKOTA STATE UNIVERSITY

May 19, 2020

Dr. Chris Ray
School of Education

Re: IRB Determination of Exempt Human Subjects Research:
Protocol #HE20259, "Relationship Between Students' Autonomy and Career Readiness"

NDSU Co-investigator(s) and research team: Matt Skoy
Date of Exempt Determination: 5/19/2020 Expiration Date: 5/18/2023
Study site(s): online Funding Agency: n/a
The above referenced human subjects research project has been determined exempt (category 2(ii)) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol received 5/8/2020 with updated consent received 5/15/2020.

Please also note the following:
• If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
• The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
• Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
• Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

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Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,

Kristy Shirley

Kristy Shirley, CIP, Research Compliance Administrator

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APPENDIX G: COMPLETE RESULTS TABLES FOR SUR MODELS

Table E.1

SUR Parameter Estimates for Competency 01

Effect	*b*	*SE*	*t*	*p*
Importance rating of teamwork/collaboration				
Gender				
Female	0.26	0.12	2.160	0.032
Academic rank				
Second	0.36	0.18	2.024	0.044
Third	0.29	0.18	1.656	0.099
Fourth	0.34	0.17	1.956	0.051
Fifth or more	0.65	0.24	2.671	0.008
Academic discipline				
Biological Science	0.13	0.22	0.575	0.566
Math & Computer Science	0.16	0.27	0.581	0.562
Social Sciences	0.16	0.25	0.656	0.512
Business	-0.02	0.21	-0.074	0.941
Education	0.45	0.27	1.622	0.106
Engineering	0.34	0.19	1.813	0.071
Health Professions & Social Service	0.15	0.22	0.687	0.493
Autonomy: interdependence	0.61	0.13	4.638	0.000
Autonomy: emotional independence (parents)	-0.64	0.25	-2.524	0.012
Autonomy: mobility	-0.23	0.35	-0.647	0.518
Academic rank × Autonomy: emotional independence (parents)				
Second	-0.15	0.34	-0.428	0.669
Third	0.78	0.32	2.482	0.014
Fourth	0.75	0.30	2.448	0.015
Fifth or more	0.11	0.54	0.202	0.840
Academic rank × Autonomy: mobility				
Second	1.10	0.33	3.296	0.001
Third	0.14	0.32	0.417	0.677
Fourth	0.38	0.32	1.197	0.232
Fifth or more	-0.18	0.42	-0.431	0.667

Table E.1. *SUR Parameter Estimates for Competency 01* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: mobility				
Biological Science	-0.89	0.35	-2.534	0.012
Math & Computer Science	1.18	0.51	2.320	0.021
Social Sciences	-0.00	0.32	-0.006	0.996
Business	-0.45	0.31	-1.462	0.145
Education	-0.28	0.68	-0.415	0.679
Engineering	0.24	0.27	0.902	0.368
Health Professions & Social Service	-0.09	0.37	-0.258	0.796
Intercept	5.71	0.23	25.219	0.000
Proficiency rating of teamwork/collaboration				
Academic rank				
Second	-0.15	0.20	-0.754	0.451
Third	-0.09	0.19	-0.466	0.642
Fourth	-0.31	0.19	-1.636	0.103
Fifth or more	1.20	0.30	4.038	0.000
Academic discipline				
Biological Science	0.35	0.24	1.467	0.143
Math & Computer Science	0.57	0.33	1.709	0.088
Social Sciences	0.86	0.27	3.174	0.002
Business	0.66	0.24	2.795	0.006
Education	0.20	0.33	0.599	0.549
Engineering	0.60	0.19	3.135	0.002
Health Professions & Social Service	0.13	0.27	0.475	0.635
Autonomy: interdependence	-0.23	0.62	-0.375	0.708
Autonomy: emotional independence (parents)	1.43	0.51	2.830	0.005
Autonomy: management of time	-0.30	0.37	-0.812	0.417
Autonomy: management of money	0.24	0.30	0.782	0.435
Autonomy: emotional independence (peers)	-2.11	0.70	-3.022	0.003
Autonomy: mobility	0.93	0.33	2.849	0.005
Academic rank × Autonomy: interdependence				
Second	0.07	0.50	0.147	0.883
Third	-0.32	0.47	-0.684	0.494
Fourth	0.98	0.43	2.264	0.024
Fifth or more	-0.71	0.66	-1.069	0.286
Academic rank × Autonomy: emotional independence (parents)				
Second	-1.14	0.40	-2.835	0.005
Third	-0.40	0.40	-1.000	0.318
Fourth	-0.47	0.39	-1.192	0.234
Fifth or more	-3.14	0.82	-3.843	0.000

Table E.1. *SUR Parameter Estimates for Competency 01* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic rank × Autonomy: management of money				
Second	-0.81	0.35	-2.297	0.022
Third	-0.74	0.40	-1.868	0.063
Fourth	0.04	0.36	0.101	0.920
Fifth or more	-0.09	0.54	-0.167	0.867
Academic rank × Autonomy: emotional independence (peers)				
Second	0.95	0.49	1.946	0.053
Third	0.57	0.54	1.052	0.294
Fourth	-0.36	0.50	-0.728	0.467
Fifth or more	1.99	0.85	2.326	0.021
Academic discipline × Autonomy: interdependence				
Biological Science	1.01	0.71	1.430	0.154
Math & Computer Science	1.36	0.73	1.850	0.065
Social Sciences	-3.59	1.22	-2.955	0.003
Business	0.69	0.61	1.128	0.260
Education	3.20	1.11	2.887	0.004
Engineering	0.94	0.54	1.729	0.085
Health Professions & Social Service	0.03	0.70	0.037	0.970
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	-1.90	0.54	-3.524	0.000
Math & Computer Science	2.25	0.71	3.163	0.002
Social Sciences	-2.41	0.71	-3.407	0.001
Business	-1.50	0.47	-3.169	0.002
Education	-0.55	0.60	-0.902	0.368
Engineering	-1.05	0.43	-2.424	0.016
Health Professions & Social Service	-1.74	0.61	-2.826	0.005
Academic discipline × Autonomy: management of time				
Biological Science	0.46	0.50	0.930	0.353
Math & Computer Science	1.24	0.59	2.108	0.036
Social Sciences	2.59	0.77	3.383	0.001
Business	0.10	0.47	0.216	0.829
Education	0.19	0.88	0.218	0.828
Engineering	0.61	0.44	1.374	0.170
Health Professions & Social Service	0.66	0.45	1.469	0.143

Table E.1. *SUR Parameter Estimates for Competency 01* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: emotional independence (peers)				
Biological Science	1.50	0.73	2.065	0.040
Math & Computer Science	0.96	0.94	1.021	0.308
Social Sciences	2.62	0.69	3.810	0.000
Business	2.09	0.71	2.954	0.003
Education	-0.85	0.94	-0.909	0.364
Engineering	2.08	0.60	3.459	0.001
Health Professions & Social Service	2.26	0.91	2.475	0.014
Academic discipline × Autonomy: mobility				
Biological Science	-0.34	0.53	-0.637	0.525
Math & Computer Science	-1.90	0.66	-2.856	0.005
Social Sciences	-0.45	0.48	-0.953	0.341
Business	-0.69	0.46	-1.510	0.132
Education	0.89	0.79	1.124	0.262
Engineering	-0.95	0.37	-2.556	0.011
Health Professions & Social Service	-1.15	0.52	-2.208	0.028
Intercept	5.18	0.23	22.510	0.000

Note. Correlation of residuals $r = .133$, $p = .058$.

Table E.2

SUR Parameter Estimates for Competency 02

Effect	*b*	*SE*	*t*	*p*
Importance rating of digital technology				
Academic rank				
Second	0.04	0.20	0.221	0.825
Third	0.44	0.18	2.413	0.016
Fourth	0.45	0.19	2.429	0.016
Fifth or more	0.55	0.27	2.040	0.042
Academic discipline				
Biological Science	-0.32	0.26	-1.228	0.220
Math & Computer Science	0.89	0.51	1.753	0.081
Social Sciences	-0.34	0.35	-0.976	0.330
Business	0.72	0.26	2.836	0.005
Education	0.19	0.35	0.539	0.590
Engineering	0.65	0.21	3.054	0.002
Health Professions & Social Service	-0.12	0.26	-0.459	0.646
Autonomy: interdependence	3.43	0.64	5.348	0.000
Autonomy: management of time	-2.47	0.56	-4.392	0.000
Autonomy: management of money	1.24	0.47	2.659	0.008
Autonomy: emotional independence (peers)	1.27	0.45	2.824	0.005
Autonomy: mobility	-1.18	0.34	-3.474	0.001
Academic rank × Autonomy: interdependence				
Second	-2.10	0.57	-3.706	0.000
Third	-1.05	0.50	-2.078	0.039
Fourth	-1.68	0.47	-3.538	0.000
Fifth or more	-3.12	0.73	-4.251	0.000
Academic rank × Autonomy: management of time				
Second	1.71	0.50	3.400	0.001
Third	0.86	0.42	2.047	0.041
Fourth	1.24	0.41	3.041	0.003
Fifth or more	2.26	0.62	3.662	0.000
Academic rank × Autonomy: management of money				
Second	-0.03	0.43	-0.062	0.950
Third	-0.90	0.40	-2.238	0.026
Fourth	-0.89	0.39	-2.294	0.022
Fifth or more	-1.99	0.68	-2.929	0.004

Table E.2. *SUR Parameter Estimates for Competency 02* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: interdependence				
Biological Science	-3.47	0.73	-4.753	0.000
Math & Computer Science	-1.47	0.80	-1.850	0.065
Social Sciences	-1.23	0.90	-1.375	0.170
Business	-1.57	0.65	-2.411	0.016
Education	-0.11	1.31	-0.086	0.932
Engineering	-2.17	0.57	-3.784	0.000
Health Professions & Social Service	-3.06	0.70	-4.385	0.000
Academic discipline × Autonomy: management of time				
Biological Science	1.27	0.57	2.228	0.027
Math & Computer Science	1.79	1.08	1.662	0.098
Social Sciences	1.04	0.97	1.072	0.285
Business	0.96	0.54	1.777	0.077
Education	-1.92	1.31	-1.463	0.145
Engineering	1.54	0.52	2.943	0.004
Health Professions & Social Service	1.89	0.58	3.238	0.001
Academic discipline × Autonomy: management of money				
Biological Science	-2.29	0.46	-4.953	0.000
Math & Computer Science	-0.02	0.84	-0.021	0.983
Social Sciences	-0.21	0.94	-0.223	0.824
Business	-0.04	0.45	-0.093	0.926
Education	0.93	0.95	0.983	0.327
Engineering	-0.89	0.39	-2.300	0.022
Health Professions & Social Service	-0.13	0.54	-0.235	0.814
Academic discipline × Autonomy: emotional independence (peers)				
Biological Science	0.04	0.64	0.058	0.954
Math & Computer Science	-1.68	0.86	-1.952	0.052
Social Sciences	-1.06	0.64	-1.662	0.097
Business	-1.76	0.63	-2.816	0.005
Education	-2.13	0.87	-2.449	0.015
Engineering	-1.23	0.51	-2.408	0.017
Health Professions & Social Service	-3.04	0.76	-4.026	0.000
Academic discipline × Autonomy: mobility				
Biological Science	1.35	0.56	2.404	0.017
Math & Computer Science	0.92	0.63	1.470	0.143
Social Sciences	0.62	0.45	1.368	0.172
Business	1.15	0.43	2.672	0.008
Education	1.64	0.82	1.989	0.048
Engineering	0.80	0.38	2.108	0.036
Health Professions & Social Service	1.70	0.54	3.155	0.002
Intercept	5.50	0.24	23.415	0.000

Table E.2. *SUR Parameter Estimates for Competency 02* (continued)

Effect	*b*	*SE*	*t*	*p*
Proficiency rating of digital technology				
Academic rank				
Second	-0.04	0.23	-0.151	0.880
Third	-0.09	0.22	-0.399	0.690
Fourth	0.21	0.22	0.974	0.331
Fifth or more	1.16	0.32	3.592	0.000
Academic discipline				
Biological Science	0.34	0.32	1.085	0.279
Math & Computer Science	0.22	0.37	0.583	0.560
Social Sciences	0.53	0.36	1.455	0.147
Business	0.63	0.31	2.048	0.041
Education	0.34	0.43	0.796	0.427
Engineering	0.82	0.27	3.073	0.002
Health Professions & Social Service	0.84	0.34	2.513	0.013
Autonomy: emotional independence (parents)	-0.65	0.38	-1.709	0.089
Autonomy: management of money	1.05	0.47	2.225	0.027
Academic rank × Autonomy: management of money				
Second	-0.03	0.43	-0.071	0.943
Third	-1.52	0.41	-3.697	0.000
Fourth	-0.82	0.41	-2.026	0.044
Fifth or more	-2.17	0.65	-3.345	0.001
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	0.26	0.54	0.485	0.628
Math & Computer Science	3.07	0.78	3.911	0.000
Social Sciences	0.14	0.60	0.226	0.821
Business	0.53	0.48	1.103	0.271
Education	0.12	0.65	0.187	0.852
Engineering	1.20	0.44	2.698	0.007
Health Professions & Social Service	0.43	0.57	0.760	0.448
Academic discipline × Autonomy: management of money				
Biological Science	-1.42	0.48	-2.941	0.004
Math & Computer Science	-0.13	0.53	-0.250	0.802
Social Sciences	0.53	0.65	0.823	0.411
Business	-0.56	0.49	-1.152	0.250
Education	0.51	0.85	0.602	0.548
Engineering	-0.23	0.42	-0.557	0.578
Health Professions & Social Service	-0.04	0.54	-0.080	0.936
Intercept	4.59	0.29	15.920	0.000

Note. Correlation of residuals $r = .208$, $p = .003$.

Table E.3

SUR Parameter Estimates for Competency 03

Effect	*b*	*SE*	*t*	*p*
Importance rating of critical thinking/problem solving				
Gender				
Female	0.27	0.11	2.529	0.012
Academic rank				
Second	-0.08	0.15	-0.514	0.607
Third	-0.10	0.15	-0.689	0.491
Fourth	0.14	0.15	0.966	0.335
Fifth or more	-0.11	0.20	-0.548	0.584
Academic discipline				
Biological Science	-0.14	0.20	-0.732	0.465
Math & Computer Science	0.24	0.26	0.930	0.353
Social Sciences	-0.34	0.22	-1.539	0.125
Business	0.07	0.18	0.364	0.716
Education	-0.02	0.27	-0.056	0.956
Engineering	0.29	0.16	1.842	0.066
Health Professions & Social Service	0.01	0.21	0.052	0.959
Autonomy: interdependence	0.44	0.13	3.450	0.001
Autonomy: emotional independence (parents)	-0.25	0.30	-0.829	0.408
Autonomy: management of time	-0.10	0.32	-0.305	0.761
Autonomy: emotional independence (peers)	0.23	0.12	1.996	0.047
Autonomy: mobility	-0.64	0.31	-2.047	0.042
Academic rank × Autonomy: emotional independence (parents)				
Second	-0.45	0.30	-1.514	0.131
Third	-0.05	0.28	-0.176	0.861
Fourth	0.31	0.27	1.155	0.249
Fifth or more	0.42	0.46	0.931	0.352
Academic rank × Autonomy: management of time				
Second	-0.52	0.28	-1.859	0.064
Third	0.40	0.26	1.527	0.128
Fourth	0.00	0.26	0.011	0.992
Fifth or more	-0.38	0.34	-1.097	0.273
Academic rank × Autonomy: mobility				
Second	0.94	0.29	3.279	0.001
Third	0.37	0.27	1.346	0.179
Fourth	0.06	0.27	0.224	0.823
Fifth or more	0.22	0.35	0.613	0.540

Table E.3. *SUR Parameter Estimates for Competency 03* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	0.84	0.34	2.485	0.013
Math & Computer Science	0.15	0.58	0.261	0.794
Social Sciences	-0.45	0.39	-1.163	0.246
Business	-0.46	0.33	-1.387	0.166
Education	-0.10	0.41	-0.231	0.818
Engineering	0.25	0.29	0.861	0.390
Health Professions & Social Service	0.45	0.39	1.145	0.253
Academic discipline × Autonomy: management of time				
Biological Science	0.55	0.35	1.553	0.121
Math & Computer Science	-0.54	0.40	-1.360	0.175
Social Sciences	0.08	0.37	0.211	0.833
Business	-0.77	0.32	-2.395	0.017
Education	-0.47	0.62	-0.759	0.448
Engineering	0.02	0.31	0.066	0.947
Health Professions & Social Service	0.54	0.33	1.608	0.109
Academic discipline × Autonomy: mobility				
Biological Science	-0.27	0.37	-0.714	0.476
Math & Computer Science	1.02	0.56	1.811	0.071
Social Sciences	0.98	0.31	3.144	0.002
Business	0.51	0.31	1.648	0.100
Education	-0.04	0.61	-0.069	0.945
Engineering	0.41	0.24	1.678	0.094
Health Professions & Social Service	0.35	0.37	0.954	0.341
Intercept	6.42	0.20	32.798	0.000
Proficiency rating of critical thinking/problem solving				
Academic discipline				
Biological Science	-0.09	0.25	-0.336	0.737
Math & Computer Science	0.79	0.35	2.271	0.024
Social Sciences	0.02	0.29	0.070	0.944
Business	-0.17	0.26	-0.681	0.497
Education	-0.32	0.37	-0.859	0.391
Engineering	0.20	0.21	0.925	0.356
Health Professions & Social Service	-0.17	0.29	-0.601	0.549
Autonomy: interdependence	-0.44	0.40	-1.104	0.270
Autonomy: emotional independence (parents)	-0.02	0.31	-0.062	0.951
Autonomy: management of time	0.57	0.13	4.446	0.000
Autonomy: mobility	0.58	0.29	1.991	0.047

Table E.3. *SUR Parameter Estimates for Competency 03* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: interdependence				
Biological Science	0.19	0.70	0.276	0.782
Math & Computer Science	2.86	0.77	3.692	0.000
Social Sciences	0.13	0.68	0.188	0.851
Business	0.04	0.53	0.084	0.933
Education	1.47	0.90	1.645	0.101
Engineering	0.45	0.47	0.964	0.336
Health Professions & Social Service	0.85	0.59	1.442	0.150
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	-0.24	0.48	-0.500	0.617
Math & Computer Science	1.74	0.79	2.184	0.030
Social Sciences	-1.12	0.52	-2.160	0.032
Business	0.53	0.44	1.202	0.230
Education	0.42	0.57	0.735	0.463
Engineering	0.40	0.37	1.068	0.286
Health Professions & Social Service	0.82	0.55	1.477	0.141
Academic discipline × Autonomy: mobility				
Biological Science	-0.19	0.49	-0.387	0.699
Math & Computer Science	-1.83	0.78	-2.346	0.020
Social Sciences	0.47	0.42	1.101	0.272
Business	-0.60	0.43	-1.387	0.166
Education	-0.97	0.85	-1.138	0.256
Engineering	-0.53	0.35	-1.535	0.126
Health Professions & Social Service	-0.46	0.50	-0.925	0.356
Intercept	5.50	0.18	29.993	0.000

Note. Correlation of residuals $r = .249$, $p < .001$.

Table E.4

SUR Parameter Estimates for Competency 04

Effect	*b*	*SE*	*t*	*p*
Importance rating of oral/written communication				
Gender				
Female	0.31	0.13	2.282	0.023
Autonomy: interdependence	0.61	0.15	4.008	0.000
Autonomy: management of money	0.26	0.11	2.399	0.017
Intercept	6.01	0.10	61.861	0.000
Proficiency rating of oral/written communication				
Gender				
Female	0.34	0.16	2.128	0.034
Academic discipline				
Biological Science	0.37	0.28	1.339	0.181
Math & Computer Science	0.46	0.34	1.354	0.176
Social Sciences	0.63	0.32	1.974	0.049
Business	0.61	0.28	2.189	0.029
Education	0.33	0.37	0.894	0.372
Engineering	0.57	0.24	2.384	0.018
Health Professions & Social Service	0.06	0.30	0.198	0.843
Autonomy: interdependence	0.54	0.18	2.956	0.003
Autonomy: emotional independence (parents)	-0.69	0.35	-1.972	0.049
Autonomy: management of time	0.33	0.14	2.350	0.019
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	0.86	0.49	1.737	0.083
Math & Computer Science	1.04	0.72	1.447	0.149
Social Sciences	0.27	0.51	0.537	0.591
Business	0.40	0.44	0.899	0.369
Education	1.21	0.60	2.017	0.044
Engineering	1.18	0.40	2.928	0.004
Health Professions & Social Service	0.40	0.52	0.766	0.444
Intercept	4.93	0.22	21.980	0.000

Note. Correlation of residuals $r = .197$, $p = .005$.

Table E.5

SUR Parameter Estimates for Competency 05

Effect	*b*	*SE*	*t*	*p*
Importance rating of professional work ethic				
Academic rank				
Second	-0.16	0.16	-1.010	0.313
Third	-0.21	0.16	-1.378	0.169
Fourth	-0.21	0.15	-1.393	0.165
Fifth or more	-0.78	0.21	-3.775	0.000
Academic discipline				
Biological Science	0.14	0.20	0.673	0.501
Math & Computer Science	-0.23	0.25	-0.944	0.346
Social Sciences	0.02	0.22	0.107	0.914
Business	0.03	0.20	0.159	0.874
Education	-0.28	0.25	-1.120	0.264
Engineering	0.08	0.17	0.472	0.637
Health Professions & Social Service	0.35	0.20	1.768	0.078
Autonomy: interdependence	0.09	0.30	0.295	0.768
Autonomy: management of time	0.21	0.10	2.015	0.045
Autonomy: mobility	-0.65	0.19	-3.480	0.001
Academic rank × Autonomy: interdependence				
Second	0.27	0.41	0.650	0.516
Third	0.27	0.38	0.722	0.471
Fourth	-0.03	0.36	-0.082	0.935
Fifth or more	1.34	0.50	2.682	0.008
Academic discipline × Autonomy: mobility				
Biological Science	0.27	0.31	0.872	0.384
Math & Computer Science	0.05	0.49	0.102	0.919
Social Sciences	0.48	0.28	1.721	0.086
Business	1.02	0.27	3.780	0.000
Education	1.79	0.61	2.930	0.004
Engineering	0.76	0.23	3.284	0.001
Health Professions & Social Service	0.81	0.32	2.550	0.011
Intercept	6.61	0.19	35.247	0.000

Table E.5. *SUR Parameter Estimates for Competency 05* (continued)

Effect	*b*	*SE*	*t*	*p*
Proficiency rating of professional work ethic				
Academic rank				
Second	0.41	0.21	1.982	0.048
Third	0.06	0.20	0.292	0.770
Fourth	0.17	0.19	0.869	0.385
Fifth or more	0.20	0.26	0.761	0.447
Autonomy: interdependence	0.34	0.17	2.020	0.044
Autonomy: management of time	0.47	0.26	1.788	0.075
Autonomy: management of money	0.39	0.13	3.049	0.002
Autonomy: emotional independence (peers)	-0.25	0.36	-0.683	0.495
Academic rank × Autonomy: management of time				
Second	-0.59	0.38	-1.546	0.123
Third	0.58	0.34	1.681	0.094
Fourth	0.06	0.34	0.191	0.848
Fifth or more	-0.34	0.49	-0.696	0.487
Academic rank × Autonomy: emotional independence (peers)				
Second	-0.03	0.45	-0.069	0.945
Third	-0.70	0.46	-1.523	0.129
Fourth	0.55	0.44	1.245	0.214
Fifth or more	-0.15	0.57	-0.263	0.792
Intercept	5.75	0.15	38.106	0.000

Note. Correlation of residuals $r = .252$, $p < .001$.

Table E.6

SUR Parameter Estimates for Competency 06

Effect	*b*	*SE*	*t*	*p*
Importance rating of leadership				
Academic discipline				
Biological Science	0.18	0.28	0.644	0.520
Math & Computer Science	0.32	0.37	0.876	0.382
Social Sciences	0.59	0.36	1.628	0.105
Business	0.69	0.27	2.557	0.011
Education	1.31	0.41	3.182	0.002
Engineering	0.34	0.22	1.512	0.131
Health Professions & Social Service	0.72	0.30	2.448	0.015
Autonomy: interdependence	2.13	0.42	5.106	0.000
Autonomy: emotional independence (parents)	-0.29	0.31	-0.946	0.345
Autonomy: management of time	0.34	0.15	2.239	0.026
Autonomy: management of money	0.66	0.30	2.247	0.025
Autonomy: mobility	-0.89	0.31	-2.865	0.004
Academic discipline × Autonomy: interdependence				
Biological Science	-0.45	0.73	-0.615	0.539
Math & Computer Science	-1.09	0.81	-1.345	0.180
Social Sciences	-2.04	1.00	-2.040	0.042
Business	-0.90	0.58	-1.536	0.125
Education	-3.35	0.92	-3.651	0.000
Engineering	-2.11	0.48	-4.385	0.000
Health Professions & Social Service	-1.24	0.63	-1.977	0.049
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	0.85	0.49	1.758	0.080
Math & Computer Science	-1.45	0.80	-1.807	0.072
Social Sciences	-0.13	0.80	-0.165	0.869
Business	1.11	0.50	2.226	0.027
Education	1.56	0.60	2.626	0.009
Engineering	0.31	0.39	0.792	0.429
Health Professions & Social Service	0.71	0.55	1.285	0.200
Academic discipline × Autonomy: management of money				
Biological Science	-1.02	0.42	-2.435	0.015
Math & Computer Science	-1.03	0.47	-2.193	0.029
Social Sciences	-1.06	0.84	-1.257	0.209
Business	-1.91	0.48	-4.007	0.000
Education	-2.00	0.74	-2.707	0.007
Engineering	-1.20	0.37	-3.266	0.001
Health Professions & Social Service	-0.75	0.49	-1.532	0.126

Table E.6. *SUR Parameter Estimates for Competency 06* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: mobility				
Biological Science	0.49	0.53	0.923	0.357
Math & Computer Science	2.01	0.79	2.554	0.011
Social Sciences	1.11	0.45	2.476	0.014
Business	-0.04	0.47	-0.078	0.938
Education	1.55	0.87	1.784	0.075
Engineering	1.19	0.36	3.268	0.001
Health Professions & Social Service	0.60	0.55	1.105	0.270
Intercept	5.37	0.20	27.463	0.000
Proficiency rating of leadership				
Autonomy: interdependence	0.71	0.19	3.827	0.000
Autonomy: mobility	0.39	0.13	3.015	0.003
Intercept	5.13	0.08	63.560	0.000

Note. Correlation of residuals $r = .296$, $p < .001$.

Table E.7

SUR Parameter Estimates for Competency 07

Effect	*b*	*SE*	*t*	*p*
Importance rating of global/multi-cultural fluency				
Academic discipline				
Biological Science	-1.47	0.41	-3.600	0.000
Math & Computer Science	-2.12	0.50	-4.217	0.000
Social Sciences	-0.14	0.46	-0.310	0.757
Business	-0.98	0.41	-2.406	0.017
Education	0.34	0.52	0.652	0.515
Engineering	-1.08	0.35	-3.071	0.002
Health Professions & Social Service	-0.06	0.41	-0.159	0.874
Autonomy: interdependence	1.01	0.23	4.358	0.000
Autonomy: management of money	-0.64	0.17	-3.760	0.000
Intercept	5.41	0.30	17.849	0.000
Proficiency rating of global/multi-cultural fluency				
Academic rank				
Second	0.11	0.29	0.379	0.705
Third	-0.05	0.28	-0.163	0.871
Fourth	0.68	0.27	2.531	0.012
Fifth or more	0.94	0.37	2.553	0.011
Academic discipline				
Biological Science	-0.60	0.40	-1.496	0.136
Math & Computer Science	-0.54	0.48	-1.119	0.264
Social Sciences	0.33	0.45	0.738	0.461
Business	-0.29	0.40	-0.720	0.472
Education	0.74	0.52	1.429	0.154
Engineering	0.09	0.34	0.277	0.782
Health Professions & Social Service	0.14	0.43	0.317	0.751
Autonomy: interdependence	0.61	0.23	2.603	0.010
Autonomy: emotional independence (parents)	-1.19	0.46	-2.588	0.010
Autonomy: management of money	-0.57	0.18	-3.191	0.002
Autonomy: mobility	0.34	0.16	2.117	0.035

Table E.7. *SUR Parameter Estimates for Competency 07* (continued)

Effect	*b*	*SE*	*t*	*p*
Academic discipline × Autonomy: emotional independence (parents)				
Biological Science	0.10	0.65	0.152	0.879
Math & Computer Science	2.65	0.94	2.822	0.005
Social Sciences	0.63	0.67	0.935	0.350
Business	0.77	0.58	1.318	0.188
Education	1.91	0.77	2.473	0.014
Engineering	1.55	0.54	2.881	0.004
Health Professions & Social Service	1.61	0.68	2.374	0.018
Intercept	3.86	0.37	10.551	0.000

Note. Correlation of residuals $r = .387$, $p < .001$.

Table E.8

SUR Parameter Estimates for Competency 08

Effect	*b*	*SE*	*t*	*p*
Importance rating of career management				
Academic rank				
Second	-0.39	0.23	-1.707	0.089
Third	-0.57	0.22	-2.597	0.010
Fourth	-0.31	0.22	-1.435	0.152
Fifth or more	-0.47	0.29	-1.595	0.112
Academic discipline				
Biological Science	-0.40	0.30	-1.370	0.172
Math & Computer Science	-0.54	0.35	-1.524	0.128
Social Sciences	-0.46	0.33	-1.387	0.166
Business	0.11	0.29	0.387	0.699
Education	0.11	0.38	0.293	0.770
Engineering	-0.17	0.25	-0.691	0.490
Health Professions & Social Service	-0.21	0.29	-0.707	0.480
Autonomy: interdependence	0.67	0.43	1.535	0.126
Autonomy: management of time	0.33	0.17	2.002	0.046
Autonomy: management of money	-0.46	0.32	-1.457	0.146
Academic rank × Autonomy: interdependence				
Second	-0.68	0.59	-1.156	0.248
Third	-0.65	0.54	-1.190	0.235
Fourth	-0.99	0.52	-1.905	0.058
Fifth or more	1.06	0.73	1.451	0.148
Academic discipline × Autonomy: management of money				
Biological Science	0.08	0.43	0.194	0.846
Math & Computer Science	1.12	0.50	2.260	0.024
Social Sciences	0.89	0.57	1.564	0.119
Business	-0.51	0.44	-1.145	0.253
Education	0.63	0.78	0.809	0.419
Engineering	0.30	0.38	0.785	0.433
Health Professions & Social Service	0.93	0.47	1.972	0.049
Intercept	6.00	0.27	21.952	0.000

Table E.8. *SUR Parameter Estimates for Competency 08* (continued)

Effect	*b*	*SE*	*t*	*p*
Proficiency rating of career management				
Academic rank				
Second	0.16	0.27	0.585	0.559
Third	-0.60	0.25	-2.368	0.018
Fourth	-0.26	0.25	-1.031	0.303
Fifth or more	0.66	0.37	1.798	0.073
Autonomy: emotional independence (parents)	-0.34	0.16	-2.089	0.037
Autonomy: management of time	-0.07	0.35	-0.189	0.850
Autonomy: management of money	0.95	0.39	2.462	0.014
Autonomy: emotional independence (peers)	0.54	0.20	2.632	0.009
Autonomy: mobility	0.21	0.36	0.578	0.564
Academic rank × Autonomy: management of time				
Second	0.10	0.58	0.179	0.858
Third	1.75	0.46	3.776	0.000
Fourth	0.48	0.45	1.067	0.287
Fifth or more	2.23	0.68	3.271	0.001
Academic rank × Autonomy: management of money				
Second	-0.79	0.53	-1.480	0.140
Third	-1.65	0.49	-3.353	0.001
Fourth	-0.86	0.46	-1.856	0.064
Fifth or more	-3.04	0.80	-3.814	0.000
Academic rank × Autonomy: mobility				
Second	-0.25	0.47	-0.533	0.594
Third	0.31	0.43	0.719	0.473
Fourth	-0.05	0.42	-0.129	0.898
Fifth or more	-1.70	0.54	-3.178	0.002
Intercept	4.69	0.20	23.443	0.000

Note. Correlation of residuals $r = .262$, $p < .001$.