4-7-2022

# Research and Relationship-based Curriculum – Exploration of How Research and Relationship Experiences in Undergraduate Education Impact Students' Employability, Graduate Education Intention, and Entrepreneurial Acumen

Michelle Pipes
*University of Missouri-St. Louis*, wigintonm@mst.edu

**Research and Relationship-Based Curriculum – Exploration of How Research and Relationship Experiences in Undergraduate Education Impact Students' Employability, Graduate Education Intention, and Entrepreneurial Acumen**

Michelle Pipes

Master of International Human Relations - Organizational, University of Oklahoma, 1999

Bachelor of Journalism/Mass Communications, University of Oklahoma, 1996

A Dissertation Prospectus Submitted to The Graduate School at the University of Missouri – St. Louis in partial fulfillment of the requirements for the degree Doctor of Business Administration

May 2022

<u>Advisory Committee</u>

Dinesh Mirchandani, Ph.D.

Chairperson

Jennifer Reynolds-Moehrle., Ph.D.

Seemantini Pathak, Ph.D.

**Abstract**

After decades of shrinking financial research support (Smith, 2004), continuously rising

tuition and student debt (Beal et al., 2019), and the induction of numerous alternatives

(Garrett, 2021), traditional higher education is struggling to provide the value that

students are demanding (Woodall et al., 2014). Student engagement has been positively

linked to increased retention (staying in school until completion of a degree) and reduced

dropout (leaving school and not returning) rates (Finn & Rock, 1997; Reschly &

Christenson, 2012), both of which contribute to how students perceive the value of higher

education (Alves, 2011). The purpose of this study was to provide an original validation

of a conceptual framework, *Research and Relationship-Based Curriculum* (RRBC), and

explore the relationships between six RRBC independent variables derived from the

National Survey on Student Engagement (NSSE) (The Trustees of Indiana University,

2020), i.e., High-Impact Practices (HIP), Reflective and Integrative Learning (RIL),

Quality of Interactions (QI), Student-Faculty Interactions (SFI), Development of

Transferable Skills (DTS), and Higher-Order Learning (HOL), and undergraduate

students' Graduate Education Intention as well as perceptions of their Employability and

Entrepreneurial Acumen. Our key findings were that greater exposure to HIP and DTS

increases students' perceptions of Employability; that greater exposure to SFI increases

students' Graduate Education Intentions; and that greater DTS increases students'

perceptions of Entrepreneurial Acumen. These findings provide valuable implications for

researchers and higher educational institutions.

    *Keywords*: Connected Curriculum, undergraduate students, research, NSSE,
RRBC, Research and Relationship-Based Curriculum, higher education, employability,
graduate education intention, entrepreneurial acumen

## Acknowledgements

Attaining my doctorate degree was the culmination of a lifelong love of learning, while struggling with ADD that hampered learning and the razor-sharp focus that higher education demands. However, I did not ever give up and I hope to serve as an inspiration and encouragement to others who also wrestle with their brain.

**To my safe harbor and amazingly supportive husband, Andy Pipes**, who provided unswerving support throughout the last three years. Thank you for being my loudest cheerleader, my rock, and the one who believes in me the most. I wouldn't be here if it weren't for you. No matter what I needed, you made it happen. Thank you.

**To Dr. Ekin Pellegrini**, who was the reason I applied to the UMSL DBA program, the reason I stayed in the program when it got hard, and the reason I was able to finish well – despite many obstacles, challenges, and frustrations. You are beyond amazing!

**To my dissertation committee**, I would like to express my gratitude to Dr. Dinesh Mirchandani, my dissertation chair, and Dr. Seemantini Pathak and Dr. Jennifer Reynolds-Moehrle, who provided invaluable guidance, insight, and encouragement throughout this process.

**I give thanks to God** for this amazing opportunity to learn, grow and become the person and professional I was meant to be. I realize that education is denied to many, and I will not take that for granted or forget to use my knowledge and voice to speak for those without the same opportunities or network. Oh, and thank you for coffee, too, because I needed it every day to keep studying and working - #KeurigFueled.

# Contents

**Chapter 1: Introduction**

Undergraduate students are paying more than ever before for an education that is missing the mark with employers, graduate programs, and startup business ventures – there are critical gaps between what universities promise students and what is delivered (Keeling & Hersh; 2011, Song, 2021; Saint Amour, 2020). For the 2018-19 academic year, undergraduate tuition, fees, room, and board were estimated to be $47,419 at private nonprofit institutions, $27,040 at private for-profit institutions, and $18,383 at public institutions (National Center for Education Statistics, 2021), while the 2019 median U.S. household income was only $68,703 (U.S. Census Bureau, 2020). In 2019, 45 million U.S. college borrowers across all demographics and age groups collectively owed more than $1.5 trillion in student loan debt, making it the second highest consumer debt category, right behind mortgage debt, and higher than both auto loans and credit cards (Forbes, 2019). Graduates of higher education are not adequately prepared for the challenges of post-graduation outcomes (Gedye et al., 2004; Suvedi, 2016), more specifically employability, graduate education, or starting their own business, thus, calling into question the perceived value of a college degree.

Bourner and Millican (2011) report that graduates need to be well-rounded, with evidence of work and life experience. Bennett (2012) argues that the prevailing economic social trends demand that graduates manage change, be creative and *entrepreneurial*. Caruth (2018) purports that college persistence and graduation rates have not improved in two decades, while the time it takes to earn degrees has increased, which means that students incur more financial debt and there are fewer undergraduates eligible for

*graduate programs*. There is also ever-increasing attention to graduates' ability to relate

to their chosen career if they are to be considered *employable*, which includes performing

to industry expectations (e.g., see Holmes (2013), and Tomlinson (2012)). Jackson (2017)

sums it up by purporting that students use *experiences* to make sense of their intended

profession through observing, questioning, and interacting with seasoned professionals.

These experiences are frequently referred to as *student engagement* (National Survey of

Student Engagement (NSSE), 2020; Gonyea et al., 2003) and is increasingly seen as a

valid indicator of institutional excellence (Axelson & Flick, 2010). Prior research

proposes that HEIs (Higher Education Institutions) argue *value* instead of *cost alone*

(Keeling & Hersh, 2011), but that value must be self-evident to all stakeholders. In this

study, we focus on three evident outcomes of value to HEIs and their stakeholders, i.e.,

students' *employability*, *graduate education intention*, and *entrepreneurial acumen*.

In response to the widening stakeholder gaps - between theory and practice,

student and scholar, and between trends in colleges that do not offer educations that are

nimble, agile, and relevant and in-demand educations that provide the opportunity for a

more seamless transition from the classroom to the boardroom – I designed the Research

and Relationship-Based Curriculum (RRBC) framework to bring value to higher

education stakeholders and elevate the college experience (as defined by "student

engagement") and improve post-graduation outcomes. The RRBC model contains 14

stakeholder dimensions (e.g., see Chapter 2 for descriptions): *K-12 students,*

*undergraduate students, graduate students, lifelong learners, faculty, academic*

*departments, higher education institution (singular), higher education network (multiple*

*HEIs), dissemination outlets (e.g., journal publications, conferences, future research),*

*broader impacts (greater good), alumni, government, industry, and research*. However,

to begin the validation of the RRBC model, only the stakeholder dimensions of

*undergraduate students*, *research*, and *professional relationships between students* and

*other higher education stakeholders* that contribute to the three post-graduation outcomes

of employability, graduate education intention, and entrepreneurial acumen will be

explored in this study. These three post-graduation career outcomes speak to the

increasing need for HEIs to provide greater value for all stakeholders, or risk decline

when students opt for alternate post-secondary education that may be quicker to obtain

and at a much lower cost.

Influenced by the United Kingdom's Connected Curriculum framework (Fung,

2017), RRBC was designed specifically for the U.S. higher education environment, for

the unique culture and industry nuances that American undergraduates are expected to

meet when entering the workforce. Whether an undergraduate plans to find a job, start

their own business, or continue to graduate school, there are widening gaps that have

been identified in higher education. Some of these gaps include technology gaps (Price,

2017), technical, leadership, employability, and professional skills (Jackson et al., 2016).

Colleges and universities need to remain relevant and provide value to all stakeholders or

risk decreased student enrollment due to undergraduate education alternatives (e.g.,

certificate programs, technical school, online education).

This study utilized a modified National Survey of Student Engagement (NSSE,

2020) measurement tool to frame the six independent variables: High-Impact Practices,

Reflective and Integrative Learning, Quality of Interactions, Development of

Transferable Skills, Higher-Order Learning, and Student-Faculty Interactions. These six

constructs were aligned with the three post-graduation dependent variable outcomes (employability, graduate education intention, and entrepreneurial acumen) and measure undergraduate engagement in four public, Midwestern, degree-granting colleges. The control variables for this initial study include undergraduate class level, transfer student status, and highest level of parental education. *Class level* is of interest to me because I want to see if the impact and interest of research activities and professional relationships increases as students' progress through their undergraduate courses, as well as if higher class level students perceive greater benefits from these experiences as they draw closer to graduation. I'm also interested in finding out if *transfer status* has any impact on student perceptions or if this demographic market reflects the same results of traditional (non-transfer) students. Lastly, I would like to understand if *parental education* has any impact on student perceptions, especially since many parents want or expect their children to obtain the same (if not higher) degree that they obtained.

**Significance of the Study**

The Council on Undergraduate Research (n.d.) defines undergraduate research as "an inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline" (para. 3). Undergraduate research can be broadly defined to include creative activity, scientific inquiry, and scholarship (Kinkead, 2003). According to the National Conferences on Undergraduate Research (n.d.), "Its central premise is the formation of a collaborative enterprise between student and faculty member—most often one mentor and one burgeoning scholar but sometimes (particularly in the social and natural sciences) a team of either or both" (para. 6). Healy and Jenkins (2009) noted, in a comprehensive review of the nature

and forms of undergraduate research in the United States and Great Britain, that elements

of inquiry and research include developing research skills and techniques, learning about

current research in the discipline, engaging in research discussion, and undertaking

research and inquiry. These activities and the resulting professional relationships are

integral in the creation of future professionals and take place both individually and in

team settings.

Kardash (2000) found that students who participated in an undergraduate research

experience reported an increase in such specific research skills as "observing and

collecting data, understanding the importance of controls, interpreting data, orally

communicating the results of research projects, and thinking independently" (p. 196).

Lopatto (2004) discusses how undergraduate students participating in a research program

reported learning gains, such as increased understanding of the research process,

scientific problems, and lab techniques, as well as gains in personal development like

tolerance for obstacles and working independently. Seymour, Hunter, Laursen, and

DeAntoni (2004) reported that participation in a research experience led to the following

gains: development of professional collegiality with faculty mentors and peers; increased

knowledge and understanding of science and research; increased personal and

professional self-confidence; enhanced communication skills; gains in the application of

knowledge and skills; and gains in understanding, clarification, and refinement of future

career and postgraduation plans.

In the RRBC model (see Figure 1), students (e.g., K-12, undergraduate, graduate,

and lifelong learners) interact with one another and faculty, who are engaged in research

and teaching, while also interacting with the eight other stakeholders through their

research activities and professional relationships.
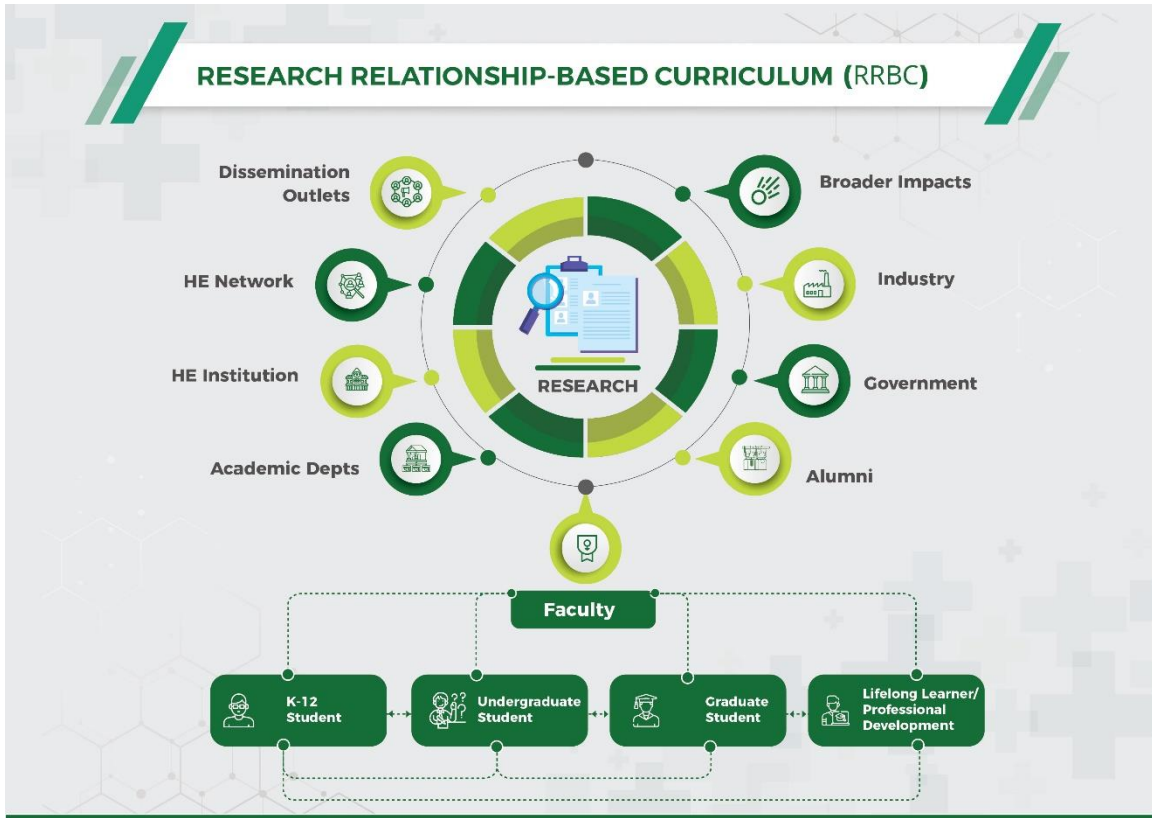


*Figure 1 The Research & Relationship-Based Curriculum conceptual framework*

**Students' Perceptions of Post-Graduation Employability**

In the RRBC model (see Figure 1), *employability* of undergraduate students

directly impacts the *Industry* and *Alumni* dimensions, through the provision of new

employees and new alums. If HEIs are not preparing their students to compete and

succeed in the job market, the value of their education will decrease from the student,

alumni, and industry perspectives.

**Students' Graduate Education Intention**

U.S. graduate programs are experiencing a skills gap in technically and scientifically adept students who are ready to step into professional research roles (Jackson, 2003). Because the RRBC was designed to impact both higher education programing and its financial health, *Graduate Education Intention* (GEI) is of interest from undergraduate engagement, retention, and completion perspectives. Undergraduate students can be potential graduate school students, if exposed to *Research* (RRBC dimension) and scholarly methodology, the role of *Government* (RRBC dimension) and grant funding in higher education and graduate research activities, the *Dissemination of Research* (RRBC dimension) findings for Broader Impact (RRBC dimension), and *Faculty* (RRBC dimension) whose expertise they can tap into in their *HEI's Academic Departments* (RRBC dimension), at other *HEI*s (RRBC dimension), and within the *HE Network* (RRBC dimension). Multiple studies argue the value of undergraduate research experiences to students' gains in research skills, knowledge about research careers, self-identification as a scientist, and aspirations for graduate education (e.g., Laursen, Hunter, Seymour, Thiry, & Melton, 2010).

**Students' Perceptions of Post-Graduate Entrepreneurial Acumen**

In this study, *Entrepreneurial Acumen* is utilized as the term for the skills and knowledge needed by an undergraduate who desires to start their own business, instead of going to work for an existing business or organization. No matter the *Industry* (RRBC Dimension)*,* entrepreneurs can disrupt the established business models simply by entering a market. However, established businesses in every market are competing for the same clients, customers, and revenue. If new entrepreneurs don't enter the workplace

with a solid set of professional-level, competitive skills that allow them to navigate the changing stream of the current business environment, they are more than likely doomed to fail.

This is important given the increasing numbers of students considering or pursuing entrepreneurial careers (Robertson & Wilkinson, 2006; Harding, 2007; Holden et al., 2007) and the diverse range of contexts and industries in which they can do so.

Undergraduates need the ability to transition seamlessly into the professional workplace, but they also need to understand the opportunities and challenges associated with continuing their own education and expertise in their chosen field, as well as the unique challenges that they might encounter if they were to start their own business.

Understanding, managing, and expanding undergraduate students' perceptions of these three critical post-graduation outcomes is crucial and one way of measuring their current level of exposure is by measuring student engagement in research activities and professional relationship-based areas.

**Purpose of this Study**

The purpose of this study is to use a modified NSSE (2020) survey tool to begin to validate and explore the RRBC conceptual framework model, while validating the modified NSSE across three control variables *class level*, *student status (traditional or transfer)*, and *highest level of parental education*.  Furthermore, this study will model the distinctiveness of a modified NSSE, through Confirmatory Factor Analysis and Structural Equation Modeling, from undergraduate students' graduate education intention and students' perceptions of employability and entrepreneurial acumen.

Figure 2 shows this study's research model, which includes the undergraduate outcomes as the three Dependent Variables (DVs) of *employability*, *graduate education intention*, and *entrepreneurial acumen*, and how they interact with the six Independent Variables (IVs): *high-impact practices, reflective and integrative learning, quality of interactions, student-faculty interactions, development of transferable skills*, and *higher-order learning*.
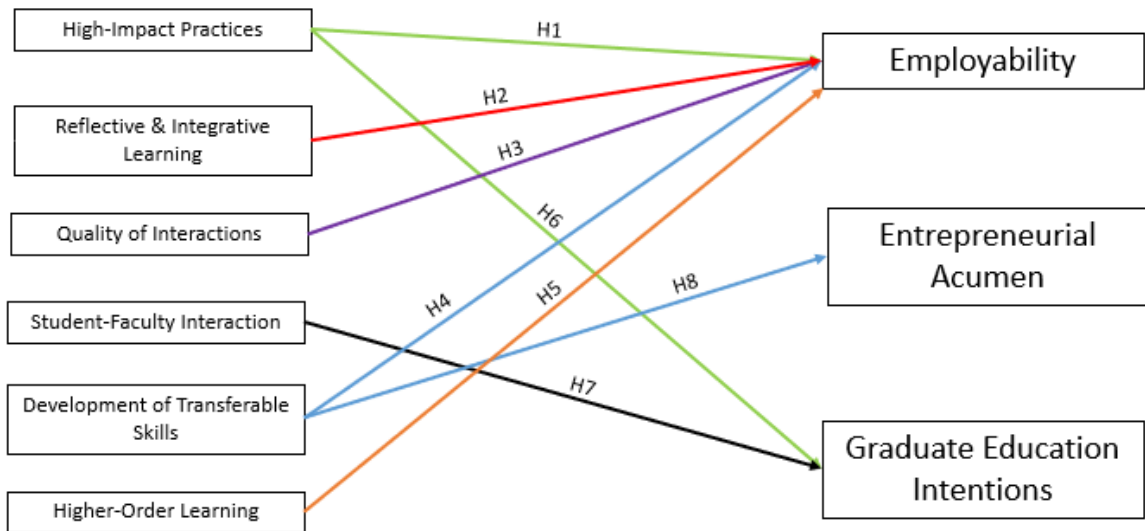


*Figure 2 RRBC's Research Model's Six IVs and Three DVs graphically displayed*

RRBC is a "conceptual framework" developed by me (see Figure 1). To explore its dimensions, this study utilizes an established measurement tool, the *National Survey of Student Engagement* (NSSE) (The Trustees of Indiana University, 2020), from which student engagement that has been implemented, revised, validated, and used by a significant number of higher education researchers and institutions in the United States and beyond since 2000. The NSSE (pronounced *Nessie*) considers *student engagement* as more of an umbrella concept, and less of single construct of ideas, rooted in research on

college students and how their college experiences affect their learning and development. Kuh (2001; 2009) describes the NSSE as measuring the extent to which undergraduate students participate in educationally effective activities as well as their perceptions of facets of the institutional environment that support their learning and development.

Through its online student survey titled *The College Student Report*, NSSE (The Trustees of Indiana University, 2020) annually "collects information at hundreds of four-year colleges and universities about first-year and senior students' participation in programs and activities that institutions provide for their learning and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college." In 2020, 601 colleges and universities participated in NSSE's annual online survey, with 484,242 freshman and senior students responding. Since its inception, approximately six million students have completed the NSSE survey, from more than 1,650 HEIs.

**Research Question**

This study endeavors to better understand undergraduate students' *Graduate Education Intention* and which student perceptions are most strongly associated with post-graduation *Employability* and *Entrepreneurial Acumen* among the six RRBC independent variables, which are aligned with the NSSE concepts of *High-Impact Practices, Reflective and Integrative Learning, Quality of Interactions, Student-Faculty Interactions, Development of Transferable Skills*, and *Higher-Order Learning* (The Trustees of Indiana University, 2020), after controlling for three variables: *class level, transfer status, and highest level of parental education*.

The research question central to the above goals is: ***How do research and relationship experiences in undergraduate education impact students' graduate education intention and students' perceptions of employability and entrepreneurial acumen?***

**Chapter 2: Literature Review**

**Introduction**

In a 2019 SHRM (Society of Human Resource Management) report that 51% of its members who responded to a survey said that "education systems have done little or nothing to help address the skills shortage" (p.1). Almost three in four employers say they "have a hard time finding graduates with the soft skills their companies need" (Burner et al., p. 1). A 2019 Cengage/Morning Consult survey of 650 employers and over 1,500 college students found that 73% of members stated the process of *finding qualified applicants whom your organization values* very or somewhat difficult, while 64% reported it very or somewhat difficult to find qualified applicants with *critical-thinking skills*, and 54% stated the same difficulty with finding qualified applicants with *communications skills*. College graduates are, in increasing numbers, entering the workforce without enough post-graduation career success factors, such as experience with project management, written and oral communication, problem-solving and self-management techniques. The 2016 McGraw-Hill Education Workforce Readiness Survey also substantiated this by reporting that only 21% of undergraduates felt *very prepared* to join the workforce and 67% felt that their workforce readiness *could be improved* (Hanover Research, 2016). Likewise, 16% of all Americans state that, in today's economy, a four-year degree prepares graduates *very well* for a well-paying job (Pew Research Center, 2016).

Higher Education Institutions (HEIs) have been traditionally influenced by funding entities (Van der Zwaan, 2017). By this standard, students are only one of the

revenue streams for HEIs, and their mission extends beyond student-centricity as

reflected in current faculty reward and recognition programs, which are based mostly on

faculty research and the securing of subsequent funding for their university.

In recent years, HEIs have transitioned from a 'research for the sake of

scholarship' to 'research for the sake of resources (e.g., grants, course buyouts, laboratory

equipment, etc.)' mentality (Boyd, 2010) influencing the experiences, opportunities, and

preparation of undergraduate students.

U.S. HEIs that desire to remain relevant in today's continuously evolving

educational environment are becoming more aware that they must find new ways to

create and foster a synergistic research culture that is infused with rich relationships

between stakeholders that impact student employability, graduate education intention,

and entrepreneurial acumen.  Thoughtfully crafted instruction, meaningful interactions

with professionals, theoretical and practical introduction to the career field of the

student's choosing, as well as academic research training are considered essential to

creating well-rounded undergraduate students. Given the scarcity of the conventional

career path and high job mobility rates among new college graduates (Jain & Jain, 2013),

it is crucial that higher education allows undergraduate students to gain a connection with

and clear understanding of the expectations, core values, and behaviors central to most

professions, and encourage them to construct their own pre-professional identity (PPI)

aligned with these common elements (Jackson, 2017).

Creating and fostering purposeful and meaningful relationships with higher

education stakeholders, through a research and relationship-based curriculum framework,

is thus far from an unexplored area of student experience regarding impact on student

employability, graduate education intention, and entrepreneurial acumen. However, one way for educators, administrators, and faculty to lead institutional change initiatives that "bring about shifts in values, boundaries, and paradigms required for broad-based changes in teaching and learning that are taking place at universities" (Schroeder, 2011, pp. 1-2), is by taking a hard look at how their current curriculum is connected to the modern student and how research activities and professional relationship opportunities are presented to them and all other higher education stakeholders.

**Undergraduate Research and Relationships: Historical Perspective**

Higher Education (HE) has existed for hundreds of years, in several different organizational frameworks and academic iterations, which have been guided and dictated by religion and government, and to a lesser extent, by society and politics. However, with the significant and continual reductions in government funding over the past decade, higher education in the United States has come to the nexus of yet another paradigm shift in traditional, bricks-and-mortar public and private institutions. Add to this HEI mix entrepreneurial colleges, the digitization of instruction, and the rise of technology-centric schools that have carved out a new niche in higher education, appealing to many potential students who are looking for an affordable education that does not take years for them to complete and decades more for them to pay off (Craig, 2018).

Altbach et al., (2010) propose that there are four fundamental, interrelated forces that have contributed to the current revolution of higher education: "the *massification* of HE (*which refers to the unprecedented number of enrollments in higher education around the world for the past 50 years*), globalization, the advent of the knowledge society and the importance of research universities within it, and the information

technology" (including distance education) (p. 31). Additional concerns over record high tuition for students, elimination of all but the most basic administrative staff, as well as the increased pressure for faculty to do research, student recruitment, seek continual publication, and external funding has redirected higher education's focus from *students and greater good* to *faculty research and bottom-line financials*. "They're (undergraduates) not getting the skills that employers are seeking in those first jobs. The mismatch of the employer and education market is prompting this revolution" (Craig, 2018).

This study explores three outcomes of student engagement and satisfaction – student employability (Pool & Sewell, 2007; Tomlinson, 2007), graduate education intention (Kuh et al., 2006a), and entrepreneurial acumen (Towers et al., 2020) – and proposes that higher education institutions can achieve sustainable revenue streams through increased student satisfaction because of intentional undergraduate research and professional relationship activities (Lear, Ansorge, & Steckelberg, 2010). A conceptual framework called Research and Relationship-Based Curriculum (RRBC) explains how increasing such initiatives would contribute to more robust, cutting-edge faculty research and the greater good of society.

Research and Relationship-Based Curriculum is adapted foundationally from the European *Connected Curriculum* (Fung, 2017) framework, which is gaining a foothold in higher education abroad, especially the United Kingdom (UK). However, RRBC is a conceptual research-focused, relationship-based framework, developed specifically for U.S. undergraduate education curriculum that increases the financial potential of an

institution through purposeful, meaningful, and planned joint research and relationship opportunities between all 14 of its stakeholders.

Higher education, and how it functions, is contextual – often evolving in unique ways though culture, region, and social constructs. The "universal" higher education experience is a comprehensive and interwoven concept (Van der Zwaan, 2017) that has evolved somewhat differently in every country of the world, which means where you attend higher education influences you as a person and will also influence your future career path.  The United States has made great strides in both public and private colleges and universities, claiming seven of the top ten institutions according to World University Rankings in 2020 – the other three top ten institutions are in the UK. Based on such a strong combined ranking between the U.S. and UK and a similar higher education structure, this study proposes that the foundation of Connected Curriculum (Fung, 2016b) offers a strong scaffolding with which to base the RRBC higher education-focused conceptual framework. This paper, and proposed RRBC conceptual framework, focuses solely on U.S. Higher Education Institutions (HEIs); however, it should be noted that the United States higher education network of colleges and universities is interlaced with and has been subsequently influenced by HEIs around the world (Brubacher & Rudy, 2017). Thus, RRBC also has the potential to impact higher education around the world.

**Defining the Research and Relationship-Based Curriculum Framework**

The Research and Relationship-Based Curriculum (RRBC) proposes to bridge the gap (Minocha, Hristov, & Reynolds, 2017; Agrawal, 2014; Miller, Biggart & Newton, 2013), between the *idealistic* side of education and the *business* side of education – providing a conceptual curriculum framework that U.S. higher education

administrators and educators can use to more strongly integrate active learning (Arthurs & Kreager, 2017), evidence-based classroom processes (Murtonen & Balloo, 2019), and academic/professional relationships (National Academies of Sciences, Engineering and Medicine, 2017) into higher education to potentially increase student engagement and satisfaction, motivation and interaction in the areas of graduate education intention, and student perceptions of employability and entrepreneurial acumen.

The responsibility of creating and integrating research-based activities within the RRBC curriculum and providing opportunities for establishing relationships with stakeholders lies with the HEI, however, the potential success or failure of those relationships lies with everyone involved in the process. Faculty know the importance and potential impact of academic research and relationships (Fung, 2017; Bautista et al., 2016), so it is integral that they impart this knowledge to undergraduate students who are learning how to become future professionals (i.e., employees, researchers, entrepreneurs). For the purposes of this dissertation, only the seven RRBC dimensions that are pertinent to this paper (*undergraduate students, graduate students, faculty, academic departments, higher education institutions, industry, and research*) are included in this study, but a brief definition and justification of all 14 dimensions is provided here:

**Dimension 1: K-12 Students**

Pre-college students feed the higher education pipeline (Martinez, 2021), but they impact HEIs sooner through programs designed for discovery, exploration and research guided and instructed by faculty via undergraduate students, graduate students, and lifelong learners (Roland, 2013). K-12 students engaged in research activities will interact with one another, their faculty instructor(s), and any undergraduate or graduate

students assisting faculty. They may also influence peers, siblings, parents and pre-collegiate teachers, counselors, and administrators. Such interaction may take the form of academic summer camps, campus lab tours, and virtual class presentations of scientific experiments (Mintz, 2020).

**Dimension 2: Undergraduate Students**

Undergraduate students make up the largest pool of the higher education population. They also have the greatest untapped potential to be recruited into research projects or areas of study (Merkel, 2003), even with the least amount of research experience and the smallest professional networks (Schwartz, 2003). Students engaged in research activities will interact with other undergrads, their faculty instructor(s), any graduate students, alumni or (directly/indirectly) industry involved in joint research activities (Doerschuk, 2004), as well as mentoring any K-12 students through research, discovery, and exploration activities such as summer camps, field trips, student competitions, campus orientation activities, and subject matter immersion experiences.

**Dimension 3: Graduate Students**

Master's and doctoral students, who make up a smaller portion of the higher education student population, still have the potential to significantly impact the health of a HEI (Foley, 2020), since they pay the highest per-credit-hour and have the greatest capability and opportunities to impact higher education research. However, as noted in *The Quiet Crises* (Jackson, 2003), U.S. graduate students are also experiencing a skills gap in the technically and scientifically adept students who are ready to step into professional research roles. Through the thesis and dissertation processes, graduate

students explore, define, and begin to add to the body of knowledge in their chosen areas of research right alongside of their faculty advisors (Leak et al, 2018). Graduate students interact with other graduate students, and they have the potential to teach and interact with undergraduate students, through faculty-led and mentored research activities, as well as interacting with K-12 students who come through the HEI's recruitment pipeline (Lave, 1991). It is at this level that many graduate students also begin to engage with and collaborate directly with alumni, government funding agencies and industry.

**Dimension 4: Lifelong Learners**

Lifelong learners may or may not have gone to work for a company, attended graduate school or started their own business, but they continue to make education and training a personal and professional priority (McIntyre & Solomon, 1999), connecting with faculty, other lifelong learners, and industry through certification programs and non-credit activities like professional conferences, individual courses to strengthen areas of weakness (e.g., Advanced Excel training, leadership and management development, computer programming), as well as collaborating on research projects from the perspective of a Subject Matter Expert (SME). Lifelong learners can also provide internship and co-op opportunities, serve as part of a research project's leadership team, as well as influence decisions regarding new hires and research and design projects. They are also prime candidates for Professional Development Hours (PDHs) or Continuing Education Units (CEUs) programs. These lifelong learning professionals understand the importance and impact that continuous improvement, education, and discovery have on themselves and the world at large and how the skills needed to stay relevant and be progressive are ever-changing and always evolving (Frost & Taylor, 2001).

**Dimension 5: Faculty**

Faculty are the core catalysts in the Research and Relationship-Based Curriculum framework, since they are at the crux of all teaching and research activity, and they typically have the widest and most diverse reach of all the higher education stakeholders (Seipel, 2018). Faculty also have the potential to reap both the tangible and intangible rewards from their investment into student research (Lawrence & Blackburn, 1985), as well as the joint benefits that come from collaborating with other faculty (e.g., within their department, within their institution, and with external faculty), alumni, government funding agencies, and industry (Ashby et al., 2018). Through thoughtful, collaborative, and meaningful albeit more heavily front-loaded curriculum design, faculty have the opportunity to collaborate with fellow colleagues to craft and design research- and relationship-based assignments designed to train future researchers and critical thinkers. Many faculty were trained to convey their subject matter to classrooms, with little thought as to how the instruction would build upon, integrate and connect ideas, concepts and research from multiple disciplines or how they could help develop meaningful research and relationships with their students, other faculty, other institutions, alumni, government funding agencies, and collaborating corporations.

**Dimension 6: Academic Departments**

Individual academic departments are led by researchers tasked with increasing student enrollment, retention, and satisfaction, recruiting (if appropriate) graduate students, raising money for the department/college through grant-funded faculty research, corporate research collaborations, alumni giving and the reduction of any staff, resources or equipment that can be maintained, reduced, or phased out (Lucas, 2000). Students

(undergraduate and graduate) are one piece of the financial acquisition puzzle, but the entire picture is never clear given the daily scrambling for more funds from shrinking sources. As government funding is reduced, faculty are being driven to increase student recruitment, grant applications, corporate collaborations, and alumni development, which all take time and resources away from research.

The large pool of undergraduate students already committed, focused and passionate about their chosen area of study might be an underutilized solution. By strategically planning a more research-focused curriculum that utilizes two-way relationships with students (Swanson & Coddington, 2016), not just a one-way, subject matter delivery mechanism, faculty are able to provide more robust research – both opportunities and outcomes – through multiple-perspective insights and ideas (Keeling & Hersh, 2011). Academic departments are uniquely positioned to train future student researchers through modified assignments that introduce and hone a student's skill set in areas like project management, critical thinking, funding acquisition, professional presentations, research process and theories, professional networking, and research idea generation.

Another rich source of research support is from academic departmental staff (Whitchurch, & Gordon, 2017), who are integral sources of research opportunities, information, and accountability – support staff are faculty's gatekeepers to research payment, supplies management, and resource allocation.

**Dimension 7: Higher Education Institutions**

HEIs are more plentiful than ever before, with an eclectic mixture of traditional public and private colleges and universities, technical colleges, online universities, and

community colleges. There are also more students than ever before, all of whom can shop around, select, and obtain a post-secondary education based on their area of interest, financial situation, and academic acumen (Ducoff, 2021). There are also new entrepreneurial education opportunities (Garrett, 2021) that are attractive to students because they are cheaper to attend, developed with a streamlined subject curriculum, they provide a path to quicker completion and, many times, these education options are more convenient with local, online, and blended class options. Traditional public and private, research-intensive institutions should be feeding their own future researcher pipeline through a connected curriculum that builds research-precept-upon-research-precept. Integrating faculty from multiple disciplines offers students even more opportunities to explore research from their own perspective and area of interest, as well as from multiple other perspectives (Orr et al., 2020) – providing a more robust research environment, exponentially more engaged and experienced future researchers, along with an attractive landscape for government and corporate collaborations who desire the most robust research for their investment.

**Dimension 8: Higher Education Network**

There is a rich and robust research community that crosses all cultures, borders, and institution walls. Researchers connect and establish relationships based on areas of study, mutual projects, and through professional networking at conferences, symposiums, and seminars (Merkel, 2003). Project teams are built through skill, interest and availability but establishing relationships is key to the success of any research endeavor. Faculty utilize their personal and professional networks throughout their career, which is built one relationship at a time. When students are engaged in academic research, they

build their research and critical thinking skills and professional network (Merkel, 2003)

sooner than others who are not actively involved in the research process, which gives the

more experienced student a competitive advantage in the workforce. Faculty who

collaborate with students (Lopatto, 2007) can gain insight and ideas into areas of their

research they may have never considered, as well as being able to provide more robust

data with additional input and collaboration with their students.

**Dimension 9: Dissemination Outlets**

Journal publications, conference presentations, government funding reports and

academic research marketing are all important ways of disseminating research findings

and impacting the professional research reputation of the collaborating faculty and their

perspective institutions, any grant funding agencies, any industry support, and to society

at large (Jones & Canuel, 2013). As HEIs have grown, so have research activities, which

have led to a sharp increase in the volume of research publications (Van der Zwaan,

2017). Faculty and their professional collaborators could easily incorporate their research

projects into their teaching assignments (e.g., having students develop and host a poster

session on research outcomes, having students help administer an online survey through

the IRB process, or brainstorming with a class as to why certain aspects of a particular

research project did not come to the conclusions hypothesized by the researcher).

Disseminating results professionally is a requirement of the research process, but

disseminating research outcomes in the classroom is important, too, because it gives

students a broader perspective of that body of knowledge, current areas of study,

potential challenges, and unexpected successes or discoveries (Spronken-Smith, 2013).

Students need to understand that acquiring knowledge is one area of research but disseminating that knowledge to others is another integral part of the research process.

**Dimension 10: Broader Impacts**

Adapting the National Science Foundation's (NSF) definition of *Broader Impacts*, the Research and Relationship-Based Curriculum framework was designed to help all research stakeholders (e.g., students, faculty, administration, collaborators, funding agencies, and alumni) think about research advancing discovery and understanding while promoting teaching, training, and learning (NSF PAPPG, 2020), as well as ethics (NIH, 2011; Keiler et al., 2017).

**Dimension 11: Alumni**

Alumni are in a unique position to benefit their alma mater(s) because they are intimately familiar with the institution's faculty, other students who have attended, as well as areas of interest and study (Egan et al., 2021; Ebert & Harbor, 2015). Many students graduate and enter careers that can provide value back to the colleges and universities that they attended through a vast network of personal and professional relationships, industry collaboration opportunities, possible host sites of future interns, and potential hires of other alums. Alumni have the potential to influence corporate giving, sponsorship of professional activities, and paying for research collaborations that might not happen without external funding. Alums are also excellent speakers for undergraduate student groups, partners on student research projects, as well as fertile ground for faculty to develop research collaborations with and through their industry (Zydney et al, 2002).

**Dimension 12: Government**

In 2009, the U.S. government funded 50% of higher education research conducted, which equated to about $33 billion (AAU, 2011). In 2019, that amount was $27.7 billion, which was 62% of the total amount of higher education research funded (AAU, 2019), leaving HEIs scrambling to make up for the loss of financial support, with many faculty pushed to apply for every competitive research grant in their area. Tight restrictions on what universities can and cannot use awarded funds for have changed how academic departments and HEIs manage, support, and distribute research funds. Research projects, even those with top secret clearance, utilize research skills sets that students can learn, practice, hone and perfect (e.g., learn about a new research theory and how to apply it, how to propose and pitch a new research idea, or how to take a great deal of data and condense it into meaningful concepts) (Petrella & Jung, 2008).

**Dimension 13: Industry**

HEIs, especially those public institutions that rely heavily on government funding, have had to become more entrepreneurial in nature and partnering with industry, through faculty research, was a way to benefit both parties – academic departments benefitted from research funding and corporations benefitted from cutting-edge research that had the potential to give them a unique, competitive advantage in their industry (LeGrand et al., 2017; Zainol et al., 2014). Industry professionals also have the potential to benefit students through the provision of SMEs to the classroom or for student organization speakers, sponsorships of academic events, as well as serving as a site for hosting future students (e.g., student internships, externships, and co-ops) or hiring graduating students.

**Dimension 14: Research**

Research activities are the cornerstone of the Research and Relationship-Based Curriculum framework, touching all the 14 dimensions either directly or through faculty interaction. Knowledge (known) and research (unknown) are two of the marketable outcomes of academic environments – both of which are integral to creative, innovative, and progressive thinkers – that take bodies of knowledge and find new uses for them or that explore and discover new bodies of knowledge that can solve old problems. Faculty are the stewards of academic teaching and learning, but they may also be required to raise their own funds to pay for their research (e.g., salaries, assistants, facilities, HEI overhead, equipment, travel to conferences, supplies, etc.), as well as add to the resources of their department and institution. Faculty must continuously compete for research funding, through corporate collaborations, non-profit support, and/or governmental funding agencies, while trying to fund and build their research repertoire. Research, and the resulting personal and professional relationships, prepare students for the workplace through diverse skills sets that they can apply to situations they will face during their career (e.g., being appointed to a project team, leading a project team, making public presentations, evaluating data to find meaningful insights, making a business case for funding a project, or how to handle unexpected outcomes) (Katkin, 2003; NSF, 2003; Doyle, 2000).

## Chapter Three: RRBC - Theoretical Research Model

**Student Engagement**

Alexander Astin (1984) described the concept of student involvement as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 297). The gain of students from their experiences at college is proportional to their involvement. C. Robert Pace (1998) similarly concluded that student outcomes in college do not result exclusively from courses but rather from the full array of college life. Learning and student involvement might take place in the dorm room, the classroom, or even on the ball field – social, academic, and extracurricular. Astin's (1999) Theory of Involvement also supports student involvement through students who are highly involved in campus activities, organizations, their coursework, and with their instructors and other students. Astin's key ideas of quality of effort, involvement and time on task have all contributed to the conceptualization of what NSSE calls and is referred to in this study as *student engagement*.

Astin (1970; 1984) and Pace (1969; 1980) stressed the importance of the college environment role – including what an institution does or does not do – in regard to student involvement and effort. Pace (1964; 1982) presented students as active participants in their own academic learning, which contrasted with the models that view students only as passive subjects. Pace (1998) described his work as an analysis of relationships in their "natural setting," between effort and outcomes, environments and attainment, and patterns of college students' activities and institutional influences. Astin (1984) further expressed the vital role of the HEI, in stating that the "effectiveness of any educational practice is directly related to the capacity of that policy or practice to increase

involvement" (p. 298). This study embraces Astin's belief that students share responsibility, with their institution, for the overall impact of their own college experience, and those same institutions must collaborate with stakeholders to create, foster, guide, and reward undergraduate students in research activities and through professional relationships.

**Good Practice and Active Learning in Undergraduate Education**

Chickering and Gamson (1987) distilled 50 years of educational research on the teaching and learning activities that were most likely to benefit learning outcomes into Seven Principles of Good Practice in Undergraduate Education: (1) student-faculty contact; (2) cooperation among students; (3) active learning; (4) providing prompt feedback; (5) emphasizing time on task; (6) communicating high expectations; and (7) respecting diverse talents and ways of learning. These commonsense principles of Chickering and Gamson's were intended to guide students, administrators, and faculty members, with support from state agencies and trustees, in their efforts to improve teaching and learning. Their argument was that, while each practice can stand alone, when all are present their effects are multiplied and exert a powerful force on undergraduate education. The RRBC embraces and enfolds these seven principles of good practice in undergraduate education into its model, with several additional key stakeholders or *dimensions* (not examined in this current study) that make up the 14 dimensions of RRBC.

Pascarella and Terenzini (1991; 2005) identified a range of pedagogical and programmatic interventions—such as peer teaching, note taking, active discussion, integration across courses, and effective teaching practices—that increase students'

engagement in learning and academic work and thereby enhances their learning and development. Ewell and Jones (1993), commenting on Astin's (1991) work, asserted that "information on outcomes alone is virtually uninterpretable in the absence of information about key experiences" (p. 126). RRBC utilizes these academic activities, via professional relationships, as the foundation for building more undergraduate research-focused activities and outcomes.

**Adapting NSSE as a Measurement Tool: Engagement Indicators, High-Impact Practices and Topical Modules**

NSSE's (2020) guiding principle has been to maintain its signature focus on diagnostic and actionable information related to effective educational practice, which shifted the survey to a set of ten "Engagement Indicators," ensconced in four broad themes:

*Theme 1. Academic Challenge*, which includes: (1) Higher-Order Learning, (2) Reflective and Integrative Learning, (3) Learning Strategies, and (4) Quantitative Reasoning.

*Theme 2. Learning with Peers*, which includes: (1) Collaborative Learning, and (2) Discussions with Diverse Others.

*Theme 3. Experiences with Faculty*, which includes: (1) Student-Faculty Interactions, and (2) Effective Teaching Practices.

*Theme 4. Campus Environment*, which includes: (1) Quality of Interactions and (2) Supportive Environment.

In addition to the ten Engagement Indicators, the NSSE survey examines six High-Impact Practices (e.g., service-learning, learning community, research with faculty,

internship or field experience, study abroad, and culminating senior experience). There are also optional Topical Modules, survey questions on specific topics like development of transferable skills, writing experiences, and experiences with diverse perspective, that can be added by institutions to the core NSSE survey. Through these overarching themes, I found six constructs that resounded with the three post-graduation outcomes of RRBC (and became this study's six independent variables) including: *High-Impact Practices (NSSE's six HIPs), Reflective and Integrative Learning (NSSE Theme 1), Quality of Interactions (NSSE Theme 4), Development of Transferable Skills (NSSE Topical Module, complementing the core survey about HOL and RIL), Higher-Order Learning (NSSE Theme 1)*, and *Student-Faculty Interactions (NSSE Theme 3)*.

The original National Survey on Student Engagement (NSSE, 2020) was launched with a behavioral dimension that includes how students use their time in and outside of class (e.g., asking questions, collaborating with peers in learning activities, integrating ideas across courses, reading and writing, and interacting with faculty) as well as how faculty members structure learning opportunities and provide feedback to students.

Because beliefs and attitudes are antecedents to behavior (Bean & Eaton, 2000), students' perceptions of the campus environment are a critical piece in assessing their receptivity to learning and overall perceptions to higher education value. A key standard in NSSE's design was that survey content would be based on prior empirical evidence of a relationship to student learning and development (Ewell, 2010). This strong focus on student behavior is important because it makes NSSE markedly different from other surveys of college students that examine their values and attitudes or their satisfaction

with the college experience. The focus on behavior is both concrete and actionable so that when results fall short of what is desired, the behavioral measures suggest avenues of intervention (The Trustees of Indiana University, 2020).

**Benchmarking With NSSE**

Because institutions have a substantial degree of influence over students' learning behaviors, perceptions, and environments (Pascarella & Terenzini, 2005), student engagement data provide valuable diagnostic information for institutional leaders and faculty on the activities, opportunities, and insights that positively impact undergraduate research activities and relationships. NSSE was developed as a benchmarking tool to gauge the effectiveness of undergraduate programs by freshmen and seniors – students both at the beginning and at the end of their degree programs. Prior research studies have shown that NSSE's measures are dependable measurement of group means (Fosnacht & Gonyea, 2012; Pike, 2006a, 2006b). Kuh (2001) wrote that these benchmarks "represent educational practices that resonate well with faculty members and administrators" while they are also "understandable to people outside the academy, like parents of prospective students, accreditors, and so on" (p. 14). Major revisions to NSSE took place in 2013, with four primary goals: (1) Develop new measures related to effective teaching and learning, (2) Refine the existing measures, (3) Improve the clarity and applicability of the survey language, and (4) Update the terminology to reflect current educational contexts. It is the 2020 revised NSSE version, which contains seven years of adjustments and validation, which was the foundation for the modified NSSE that was used this study.

**RRBC's Adaptation of Connected Curriculum**

The Research and Relationship-Based Curriculum (RRBC) conceptual model was heavily influenced by and adapted from the groundbreaking United Kingdom's *Connected Curriculum* framework (Fung, 2017), which incorporates an innovative design with a student-centric focus.

Fung (2016b) states that *connectedness* lies at the heart of this vision, which she sees as there are no less than twelve dimensions of higher education connectedness that can be glimpsed below, namely connections:

1) Between disciplines
2) Between the academy and the wider world
3) Between research and teaching
4) Between theory and practice
5) Between the student and teacher/lecturer/professor
6) Between the student in her/ his interior being – and in his/ her being in the wider world
7) Between the student and other students
8) Between the student and her/his disciplines – that is, being authentically and intimately connected epistemologically and ontologically
9) Between the various components of the curriculum
10) Between the student's own multiple understandings of and perspectives on the world
11) Between different areas – or components – of the complex organization that constitutes the university
12) Between different aspects of the wider society, especially those associated with society's learning processes (p. vi).
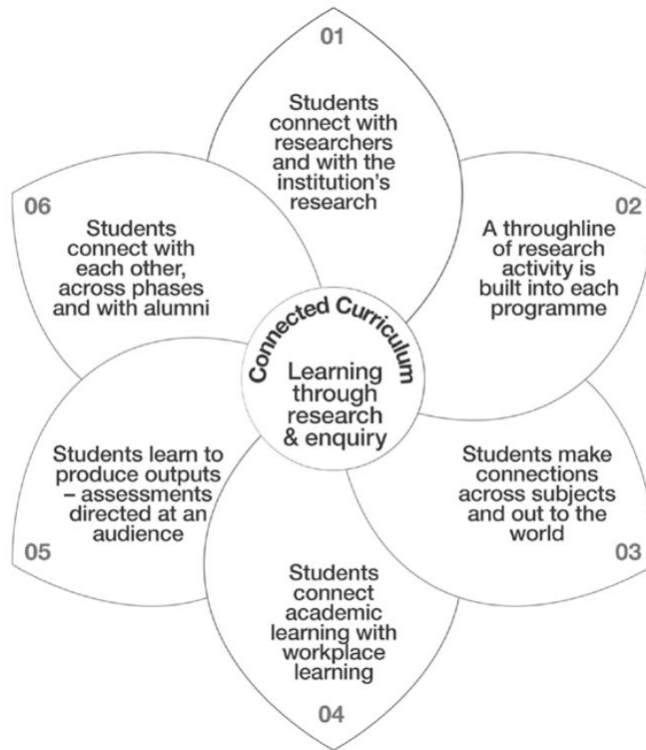
*Figure 3 Connected Curriculum (Fung, 2017) Framework*

Prior research also indicates that connected curriculum and role modeling can influence a student's choice of career (Lewis, 2012). Most U.S. graduate student instruction is focused on research and, while some graduate students do teach undergraduate courses, most are not trained in teaching theory, instructional design, or incorporating student interaction into exploration activities. Thus, it would appear that U.S. universities and colleges differ in the extent to which an undergraduate has opportunity and encouragement to participate in research. This lack of formal undergraduate research training and lack of professional relationship building opportunities, we hypothesize, would adversely impact graduate education intention, and student perceptions on employability and entrepreneurial acumen.

Delving deeper into the Connected Curriculum framework, its originator, Fung (2017), states that "it was designed to be a catalyst for (1) sharing excellent practices already taking place in higher education institutions, and (2) stimulating new creative ideas for enriching the curriculum and the wider student experience" (p. 4). The crux of the 20-year vision of the Connected Curriculum approach is learning through inquiry and research, which is an *active style* of learning that pushes across subject borders and into new arenas of analyses and connections for the educator and the student. Connected Curriculum purports to open a dialogue between diverse peoples and explores new possibilities and relationships among students, faculty, staff, and others who bring a wealth of experiences and knowledge horizons to explore the spaces between academia and the rest of the world. RRBC was designed to embrace this same spirit and these same goals.

**Theoretical Framework**

**Theoretical Foundations of Employability**

*Employability* is defined as a set of achievements – skills, understandings, and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefit themselves, the workforce, the community, and the economy (García-Aracil & Van der Velden, 2008). Jackson and Hancock (2010) noted that "the ability to transfer one's skills—a key element of graduate employability and PPI (pre-professional identity)—is influenced by the learner, learning program, and organizational characteristics" (p. 3). This means that both the student and

higher education have joint responsibility with other stakeholders in the development, monitoring and evaluation of undergraduate students – one must create these meaningful learning experiences and the other must take advantage of and engage in them.

As a multi-dimensional concept (Little, 2001), *employability* as a theory (Knight & Yorke, 2002, 2003; Yorke, 2005) is not easy to define because the idea of being employable can include many factors. Employability is not simply about students making skills deposits into a bank of competence (Morley, 2001), but it is more of a synergistic melding of personal attributes, various kinds of skills, and subject matter understanding (Knight & Yorke, 2002). Employers want to hire employees who are critical thinkers, problem solvers, team players, and effective communicators (Billing, 2003). Knight and Yorke (2003) define the concept of *Employability* as a set of achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen careers.

In 2019, the labor force participation rate for recent college graduates was 79% (Barroso & Schopoulos, 2021). Because most undergraduates will start on their chosen career path by obtaining employment, this study has a strong emphasis on measuring the constructs that lead to post-graduation employment (referred to as *employability*). Of course, there is cross-over of many professional skills, especially soft skills that benefit all post-graduation intentions. However, it must be reiterated that employability is a multi-faceted concept (Anderson, 2021) which spans a myriad of factors that allow an individual to function successfully in the workplace and transfer their skillset across a range of personal and professional contexts. The complexity of post-graduation employability is highlighted in the Higher Education Academy's (2015) framework,

which consists of attributes and capabilities (such as communication, self-awareness, self-management, and collaboration), technical and transferable skills, knowledge and application, behaviors, qualities and values, enterprise and entrepreneurship, career management, awareness, reflection and articulation, and confidence and resilience and networks.

**How High-Impact Practices Impact Employability**

The High-Impact Practice (HIP) skills that undergraduate students learn in career preparation experiences appear to increase their time-management skills and self-discipline (Kane, Healy & Henson, 1992; Taylor, 1988) as well as increase critical thinking and communication skills (Maskooki, Rama & Raghunandan, 1998; Raymond, McNabb & Matthaei, 1993).

Harvey and colleagues (1993) found that employers want graduates with knowledge, intellect, willingness to learn, self-management skills, communication skills, team-working and interpersonal skills, but Hawkins & Winter (1995) suggest it comprises career management skills and effective learning skills: self-awareness, self-promotion, exploring and creating opportunities, action planning, networking, matching and decision-making, negotiation, political awareness, coping with uncertainty, development focus, transfer skills and self-confidence. Grounded in Constructivist Theory (Wadsworth, 1996), interactions with faculty, other students, and potential employers support construction of new knowledge and understanding by questioning previous knowledge and experience, in an active, contextual, motivational, personal, and social context.

*Hypothesis 1: Greater exposure to High-Impact Practices increases students'*

*perceptions of Employability.*

**How Reflective and Integrative Learning Impact Employability**

Problem-solving in the real world requires integrated solutions, in which science, language, mathematics, engineering, visualization, scientific reasoning, and technology are regularly intermingled in various combinations, sequences, proportions, and duration" (Wesson, 2012). Reflective and Integrative Learning (RIL) requires students to connect with course content in order to relate their experiences and understandings to the subject at hand. Motivating students in this way helps them to make connections between what they learn in the classroom and the world around them, while inspiring them to reexamine personal beliefs and considering ideas and issues from the perspectives of others. This deep approach to learning includes educational processes that go beyond by rote information and focuses more on connecting with the information's underlying meaning (Nelson Laird, Shoup & Kuh, 2005b).

Being able to integrate and reflect upon knowledge when encountering new information are vital for student success – both while in school and postgraduation. Students must not simply learn new knowledge, but they must learn to process that knowledge and be able to apply it to other situations, as well as understand and comprehend various perspectives that each situation applies. Empirical studies have shown that students who benefit from deep approaches to learning obtain higher academic achievement (Zeegers, 2004), as well as increase student retention, while helping students integrate and transfer information faster (Nelson Laird, Shoup & Kuh, 2005a). Too, in addition to college success, fostering a habit of reflecting and integrative

learning can assist students in becoming lifelong learners as professionals and as mature

citizens. It is not learning in singular subjects that creates critical, innovative, and

inspirational thinkers, but by blurring the lines between academic subjects that allows for

expansion, integration, and collaboration in the minds of students and faculty. "We can

'hook' students on the value of learning best by 'hooking' the curriculum back together

through content integration in meaningful learning contexts" (Wesson, 2012, p. 26).

It has been suggested that employability is less likely to be about cultivating

attributes, skills, or student experiences just to enable them to get a job; it is more about

undergraduate learning with less emphasis on 'employ' and more focus on 'ability'. The

main focus is on developing critical and reflective skills, with the goals of enhancing and

empowering the learner. Employment is a by-product of this enabling process (Harvey,

2003; Lees, 2002b; Knight & Yorke, 2002). Based on Reflective Learning Theory (Boyd

& Fales, 1983), where the student reflects upon their learning experience as a complex

and intentional process that recognizes the role of social context and experience

(Brockbank, 2006), RIL is an important component of undergraduate learning,

understanding, and preparation for post-graduation outcomes.

*Hypothesis 2: Greater exposure to Reflective and Integrative Learning increases*

*students' perceptions of Employability.*

**How Quality of Interactions Impacts Employability**

Yorke (2006) defines employability as "a set of achievements — skills,

understandings and personal attributes — that make graduates more likely to gain

employment and be successful in their chosen occupations, which benefits themselves,

the workforce, the community and the economy" (p. 7). Performance Indicators Research

Group (1991) notes that "employability is not to be confused with employment rates" (p.

88ff), but "workers need not only to have learned a lot but also, above all, have learned

how to learn. This is the notion of "educability". They must have the capacity not only to

adapt but also to be creative in rapidly changing work environments. This is the notion of

"employability", or, even better, "sustainable employability" (Bourgeois, 2002) (p. 24).

When students are surrounded with supportive faculty, staff, advisors, and other

students, they are better able to find help when they need it, while learning with and from

those around them. These types of Quality Interactions (QIs) are positive interpersonal

relationships – both formal and informal – that are necessary to enhance the student

experience with student characteristics, interests, and attributes influencing the quality

and frequency of interactions with others (Cole, 2007; Kim & Sax, 2009).

Prior research has shown high quality interactions to be related to academic

achievement, critical thinking, and social development (Umbauch & Wawrzynski, 2005;

Whitt et al., 1999). In general, the content and extent of one's interactions with major

agents of socialization, such as faculty members and other students, are largely

responsible for college impact (Pascarella & Terenzini, 1991). According to Kuh, Kinzie,

Buckley, Bridges & Hayek (2006a), this view is consistent with a social network

perspective that college students' relationships with faculty, staff, peers, family, friends,

and mentors contribute to student satisfaction, retention, and gains from college (Astin,

1977; Kuh et al., 1991; Pascarella & Terenzini, 1991, 2005; Tinto, 1975, 1993). Thus, if

student satisfaction, retention, and gains from college, in this case employability, impact

student perceptions, it stands to reason that managing and crafting meaningful

interactions would be important to HEIs. And, while quality interactions can have a

positive effect on student perceptions, the opposite is also true – that the lack of quality

interactions can have a negative effect on student perceptions.

The QI content area captures participant's perceptions of the quality of students'

interactions with alumni, staff, corporate partners, and other students. Richardson and

Radloff (2014) argue that students who feel that higher education staff do not understand

their interests and needs are unlikely to be engaged in their studies. Mancuso et al. (2010)

suggests that a mismatch between the perceptions of students and teaching staff 'can

signal a disconnect in the pedagogical process that hampers its effectiveness'. HEIs that

do not create meaningful interactions with all key stakeholders may be missing out on

integral opportunities to increase students' perceptions of employability.

*Hypothesis 3: Greater Quality of Interactions increases students' perceptions of*

*Employability.*

**How Development of Transferrable Skills Impact Employability**

Jones and Mina (2018) offer that understanding and applying formulaic course

work is an invaluable tool for students to master, however, an imbalance occurs when the

conceptual definitions and relationships are not emphasized, which causes students to be

weak when it comes to explaining why and how things happen – this is why the

Development of Transferable Skills (DTS) is crucial to undergraduate education.

Adapted from a pilot survey that was developed by the American Association of

State Colleges and Universities, this concept examines activities that develop useful and

transferable skills for the workplace and beyond (such as verbal and written fluency,

critical thinking, creative thinking, problem solving, project management, and time management). Kemp and Seagraves (1995) explain the need for a "flexible, adaptable workforce to suit the constantly developing and changing requirements of the workplace has focused attention on the development of transferable skills, that is skills and abilities which are considered applicable in more than one context." There are many terms for this concept, including: personal, generic and core skills, core competences, and personal competence just to name a few. When considering the new employee requirements of the workplace, various studies have indicated employer dissatisfaction with the development of such skills in undergraduates (Roizen & Jepson, 1985; Tolley, 1991; Otter, 1992; Harvey et al., 1993) and a recognition of their weakness in these skills by undergraduates (Brennan, 1987). Gibb (2014) argues that the Goal Setting Theory is relevant to understanding the assessment of soft skills and describes and explains the cognitive, emotional, and social dimensions of behavior, including soft skill performances, with reference to goals and their characteristics (p. 10) (Locke & Latham, 1990; Locke & Latham, 2006). For a goal to be considered "good," it should be specific, difficult, but attainable, and feedback can be given between stakeholders relative to their attainment (McCarthy & Garavan, 2006).

 *Hypothesis 4: Greater Development of Transferable Skills increases students' perceptions of Employability.*

**How Higher-Order Learning Impacts Employability**

 Higher-Order Learning (HOL) encapsulates how much students' coursework impacts challenging cognitive tasks such as analysis, application, judgment, and

synthesis. Requiring students to engage in tasks like these requires more than mere memorization of facts. According to Lewis and Smith (1993), higher-order learning reflects a pattern that students proactively integrate new knowledge and existing information and connect and extend this information to seek answers to perplexing issues during the learning process.

The HOL concept area captures how much student coursework emphasizes challenging cognitive tasks such as application, analysis, judgment, and synthesis. McNeill et al. (2012) reports that assessment of higher-order learning outcomes such as creativity, problem-solving, and critical thinking have remained a challenge for higher education. Colleges and universities may purport the value of higher order skills; however, "questions remain about how well academics are equipped to design their curriculum and particularly their assessment strategies accordingly" (p. 1). It should be noted that Higher-Order Learning varies greatly by disciplinary area. There is more HOL in communications, media, and public relations and less in STEM areas of study (e.g., engineering, mathematics) (The Trustees of Indiana University, 2020).

When students engage in higher-order learning, they make decisions on what to do and what to believe, come up with new ideas or devise new objects, solve current problems, as well as make predictions. Challenging undergraduate students to participate in HOL activities helps students to move toward learning in a deep way and to gain knowledge beyond a mere surface-level understanding (Marton & Säljö, 1976b, 1997; Nelson Laird, Shoup & Kuh, 2005b). NSSE's 2013 survey found that students who engage in HOL-designed courses do a better job of critically analyzing ideas, applying

acquired knowledge to practice, reflecting on experiences, in addition to evaluating and

viewing information and new ideas from various sources (NSSE, 2020).

Challenging intellectual and creative work is central to student learning and

collegiate quality. Colleges and universities promote high levels of student achievement

by calling on students to engage in complex cognitive tasks requiring more than mere

memorization of facts (BrckaLorenz, 2017). Bloom's Taxonomy (1956) outlines the six

categories of cognitive domain - from simple to complex and from concrete to abstract:

knowledge, comprehension, application, analysis, synthesis, and evaluation (Krathwohl,

2002). NSSE's HOL Engagement Indicator agrees with Bloom's Taxonomy's (1956)

abstract and categories, which focuses on how students utilize the knowledge they have

learned in real world practice.

*Hypothesis 5: Greater exposure to Higher-Order Learning increases students'*

*perceptions of Employability.*

**Independent Variables Related to Graduate Education Intention**

Prior research (White, 2018) found statistically significant positive relationships

($P < .01$) between both faculty caring and faculty-supportive behaviors and their impact

graduate education intention. Similarly, there has been significant previous research that

supports the impact that high-impact practices (which specifically involve undergraduates

and faculty or other professionals) have on graduate education intention (Deemer et al.,

2020; Laursen et al., 2010).

*Graduate Education Intention* (GEI) is developed while an individual is an

undergraduate student and is defined as a masters or doctoral degree (Deemer et al.,

2020). Due to their positive associations with student learning and retention, certain undergraduate opportunities are designated "high-impact" (e.g., service-learning, research with faculty, field experiences, internships, study abroad, etc.). High-Impact Practices (HIPs) demand considerable time and effort, facilitate learning outside of the classroom, require meaningful interactions with faculty and students, encourage collaboration with diverse others, and provide frequent and substantive feedback. Participation can be life changing (Kuh, 2008), as evidenced by the increasing number of experiential learning opportunities being offered to, and in some cases required of, undergraduates.

As the second area of post-graduation outcome, this study does not hypothesize whether or not reflective and integrative learning, quality of interactions, development of transferable skills and higher-order learning are related to graduate education intention but it focuses more specifically on student-faculty interactions and high-impact practices (service learning, learning community, research with faculty, internship, field experience, study abroad, etc.) that are more closely aligned with an undergraduate student's consideration of graduate school options (Massi et al., 2014) and the people and activities they are likely to encounter during their college experience.

**How High-Impact Practices Impact Graduate Education Intention**

Special undergraduate opportunities such as joint research with faculty, service-learning, learning communities, study abroad experiences, internships, and culminating senior experiences are called High-Impact Practices (HIPs) because of their positive effects on student learning and retention (Kuh, 2008).

Kuh (2008) reported that participation in HIPs has positive relationships with deep approaches to learning and student-reported gains on a variety of outcomes for all

types of students, historically underserved students seem to benefit even more than their

majority peers. However, such students are less likely to participate in HIPs in the first

place - particularly first-generation and African American students – so it is crucial that

institutions provide multiple and varied opportunities to participate, and that faculty

create an atmosphere that fosters and values HIP participation. Utilizing Deci and Ryan's

(1985) Self-Determination Theory, which is based on two key assumptions: the need for

growth drives behavior and that autonomous motivation is important – both of which

resonate strongly with the HIP activities. These High-Impact Practices (HIPs) demand

considerable time and effort, facilitate learning outside of the classroom, require

meaningful interactions with faculty and students, encourage collaboration with diverse

others, and provide frequent and substantive feedback.

   *Hypothesis 6: Greater the exposure to High-Impact Practices increases students'*
*perceptions of Graduate Education Intentions.*

**How Student-Faculty Interactions Impact Graduate Education Intention**

   According to Endo and Harpel (1982), the significance of close student-faculty

interactions has a broader impact on students than beyond that of providing an academic

experience and information. Prior research has suggested that SFIs are important in

increasing students' educational aspirations (Thistlethwaite, 1960, 1962; Grigg, 1965;

Gurin & Katz, 1966), with Kuh and Hu (2001) arguing that "contact between students

and faculty members increases during the four years of college. Advanced courses in the

major field are usually smaller than the introductory survey or general education classes

students take in the first two years of baccalaureate study, thus allowing students to get to

know their professors better… Faculty themselves likely make themselves more

accessible to juniors and seniors, as they are more comfortable with and find it more rewarding to work on an individual basis with more intellectually mature students in the context of their discipline." (p. 326)

Meaningful student-faculty interactions are not a given in an undergraduate experience, which is why HEIs remain mindful of time, effort, and resource requirements on faculty. If graduate schools are to remain competitive, faculty must have the time and opportunity to establish, train, and foster relationships with undergraduates – who feed the graduate school pipeline – as well as have adequate research time with their graduate research team(s). Faculty have demonstrated a significant investment in their interest, education, and career – it is this passion of purpose that resonates with others who share an affinity for the same subject or research area.

*Hypothesis 7: Greater Student-Faculty Interactions increases students' Graduate Education Intentions.*

**Independent Variable Related to Entrepreneurial Acumen**

Entrepreneurship is the least pursued of this study's three, post-graduation outcomes, due to students being risk-averse after investing a great deal of money and time in their higher education, the attraction of a higher corporate salary and benefits, as well as the potential for long hours and initial low pay for a startup (Phillips, 2018). This study does not hypothesize the impact of reflective and integrative learning, quality of interactions, student-faculty interaction, or higher-order learning on entrepreneurial acumen, but takes a more streamlined approach for the specific needs of today's business startups. In the UK and EU, the Higher Education Statistics Agency (2017) reported that 4.7% graduates were self-employed or freelancing and .06% had started their own

business within six months of graduating. In the U.S., the 2019 rate of new entrepreneurs was 31% (Statista, 2022), with 20% going under by their first year and 30% in their second year (Isador, 2021), although 44% of entrepreneurs do have a college degree. However, according to the Harvard Business Review (Azoulay, 2018), the average age at which a successful founder starts a company is 45 years old. This study was distributed only to undergraduates, with a median age of 21 years old and an average age of 23.6 years old. Future entrepreneurs need undergraduate experiences and activities that develop useful and transferable skills for use in the workplace (e.g., creative and critical thinking, problem solving, project and time management, verbal and written fluency) and beyond.

   *Entrepreneurial Acumen* is the ability to make good judgments and quick decisions, typically in an entrepreneurial endeavor (Lucas et al., 2009). Today's business marketplace requires a wider range of knowledge than ever before in history, which means that undergraduate students who desire to embark on their own business startup journey will need a broad range of knowledge, skills, and expertise to navigate the waters that are filled with the defunct business owners that were unprepared, equipped or unable to learn, apply and manage the wealth of knowledge that is demanded of modern business owners (e.g., IT, supply chain, financing, marketing, HR).

**How Development of Transferrable Skills Impact Entrepreneurial Acumen**

   Whilst university students derive much education and learning from within their principal discipline (McGrath & Kelly, 1986; Oakey et al., 1990; Roberts & King, 1991), significant learning occurs outside the classroom (Rasmussen & Sørheim, (2006), at home, in social settings, and in the workplace. Entrepreneurs must be able to constantly

learn, evaluate, process, evaluate and implement new knowledge, technology, human resources, as well as the unique nuances that exist in every industry in the world.

Ensconced in Situated Learning Theory (Lave & Wenger, 1991), whereby it is suggested that learning occurs in a community of practice, and they contend that learning (particularly for adult education) is a social process where knowledge is co-created by being positioned in a specific context and embedded within both a certain social and physical environment. Situated Learning explains a person's attainment of professional skills and includes research on apprenticeship (how to train a new generation of practitioners) into how new members of a community become "old timers" in that community of practice. William Rankin (2016a, 2016b, 2017) explains the major elements of situated learning as *content* (facts and processes of a task), *context* (situations, values, environmental cues), and *community* the group where the learn will create and negotiate). Situated learning also involves *participation* (where a learner works together with others in order to solve a problem). Situated learning deals with how a person's knowledge (facts, skills, familiarity, understanding, etc.) occurs over the course of an activity and how they create and interpret (Clancey, 1995) this learning.

*Hypothesis 8: Greater Development of Transferable Skills increases students' perception of Entrepreneurial Acumen.*

**Summary**

This study will focus on the three post-graduation outcomes of graduate education intention and students' perceptions of employability and entrepreneurial acumen. As an original validation study of the Research and Relationship-Based Curriculum conceptual

framework, this study measures the six independent variables, which are aligned with the NSSE constructs of High-Impact Practices, Reflective and Integrative Learning, Quality of Interactions, Student-Faculty Interactions, Development of Transferable Skills, and Higher-Order Learning (The Trustees of Indiana University, 2020). The control variables for this initial study include *class level* (Ahlfeldt et al., 2005) (e.g., is there a significant change in student engagement outcomes as students progress through an undergraduate degree?), *transfer status* (Zilvinskis & Dumford, 2018) (e.g., does transfer status impact undergraduate engagement, post-graduation intentions or perceptions?), and *highest level of parental education* (Dong, 2019) (e.g., does the level of parental education or first-generation college student status impact undergraduate student engagement outcomes or perceptions?). These control variables are also included in the full NSSE (2020) survey, which are explored through variations in scores as explained by class level, transfer status, and highest level of parental education. This study will explore the research question: ***How do research and relationship experiences in undergraduate education impact graduate education intention and students' perceptions of employability and entrepreneurial acumen?***

## Chapter 4: Methodology

**Introduction**

This study was designed to explore three undergraduate outcomes inspired from questions from Deemer et al. (2020) for graduate education intention, from Lucas et al. (2009) for entrepreneurial acumen, and from García-Aracil and Van der Velden (2008) for student employability questions. This study utilizes the NSSE (2020), a single tool that is a well-known, academically accepted, and previously validated academic survey.

NSSE (2020) developers designed their online survey tool to ensure that all NSSE items are: 1) appropriate for all types of students; 2) reflect the current higher education landscape; 3) have strong validity and reliability properties; 4) are valued by colleges and universities; 5) are actionable by institutions; 6) have good response variation; 7) have effective response options; and 8) have potential use for future scales.

The full gamut of NSSE questions was categorized by the engagement indicators, high-impact practices, and demographic questions. Only the questions that pertained to employability, graduate education intention, entrepreneurial acumen, as determined by the literature, and demographics were used in this research study and the sum of these questions are referred to throughout this paper as the "modified NSSE".

Institutional Research Board approval for the full and modified NSSE online surveys was given, as was approval from all four of the Midwestern universities that distributed our survey information to their undergraduate students, and approval from Indiana University, to use the modified NSSE, which was kindly given in the spirit of scholarly collaboration.

The online, Qualtrics survey for this study consisted of 28 questions, which are collectively referred to as the "modified NSSE" survey. When an undergraduate student participant successfully completed the modified NSSE survey, they were directed to a second anonymous Qualtrics survey, which consisted of a single, fill-in-the-blank question, asking for the student's university email address that entered the student into a drawing for one of ten $50 Amazon gift cards for their participation, which was paid for personally by the researcher. This allowed students to remain anonymous (no information was passed between the two surveys) and enter an optional drawing for a random gift card drawing. The non-identifying survey output for the modified NSSE and part of the subsequent post-survey data analysis for this study was generated using Qualtrics software, Version XM (September 2021).

The goal of the modified NSSE was to understand how research and relationship-based activities have the potential to impact American HEIs, through increased student engagement and satisfaction as it relates to student impact on graduate education intention and student perceptions of post-graduation employability and entrepreneurial acumen. All class levels of undergraduate students at all four Midwestern universities were sent an email from their specific university's mass email system, which explained the reason for the survey, and each was provided an anonymous link to a quantitative, 28-question Qualtrics survey (e.g., see Appendix C).

The modified NSSE Qualtrics survey was open from July 14, 2021, to August 5, 2021. Surveys were mobile-friendly, so that students could access the online survey via computer, tablet, or smartphone with ease. Once the survey closed, Qualtrics Stats iQ (2021) was used to run basic (visual and summary) descriptive statistics on the data.

Once the raw data were downloaded onto the researcher's personal computer, it was then

uploaded to IBM® SPSS® Amos 27 (Arbuckle, 2020) for further in-depth data

screening, descriptive statistics, Confirmatory Factor Analysis, and Structural Equation

Modeling data analysis.

**Research Sample Defined**

The broad research sample included all genders, ethnicities, economic classes,

and students classified as an undergraduate, degree-seeking student, at four Midwestern,

degree-granting, public universities in the United States, during the Summer 2021

semester. Employment status and income, for the individual student and their family's

socio-economic status, were not tracked but there was an assumption that the data

reflected a typical mixture of undergraduates in the American Midwest.

The total 2021 survey population for this research study was a reported at 52,212

total undergraduate students, with the distribution breakdown as follows: University One

targeted 30,488 undergraduate students; University Two targeted 7,609 undergraduate

students; University Three targeted 7,073 undergraduate students; and University Four

targeted 6,042 undergraduate students. Total respondents for the research survey were

1,398, with 1,004 full completions and 394 with optional questions left unanswered, for a

2.7*%* overall response rate. Although no identifying information was obtained, it was

assumed that an appropriate number of respondents was achieved at all four universities.

University One offers more than 300 degree programs, including 97

undergraduate majors, 96 master's degrees, 69 doctoral degrees and over 70 certificates.

This institution currently utilizes only the full institutional NSSE (freshman and senior

students only) survey tool every other year.

University Two offers over 110 undergraduate degree programs, more than 80 master's degree programs, and 29 doctoral degrees, and more than 65 certificates. This institution currently utilizes both the full institutional NSSE (freshman and senior students only) and its companion survey, the FSSE (Faculty Survey of Student Engagement), every other year and is also conducted by The Trustees of Indiana University (2020).

University Three offers more than 125 areas of study. This institution utilizes both full institutional NSSE (freshman and senior students) and FSSE (all faculty) surveys every other year.

University Four offers 99 undergraduate degree programs, 43 master's degrees, 33 doctoral degrees and more than 80 certificates. Currently, this institution does not participate in either the full institutional NSSE or FSSE surveys.

**Measuring Undergraduate Research and Relationships – Modified NSSE**

Indiana University utilizes the full NSSE to annually collect information at hundreds of four-year colleges and universities about first year and senior students' participation in programs and activities that institutions provide for their learning, student engagement, and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college. NSSE provides institutions comparisons of their students' responses with those of students at comparable institutions.

Full NSSE comparisons cover ten Engagement Indicators, six High-Impact Practices, and all individual full NSSE survey demographic questions. Due to three of the

four universities conducting their own NSSE studies, which does require an institutional financial investment, and the concern that all student data remain unidentifiable, access to past or present full NSSE or FSSE data at the four study universities were not available for analysis.

## Measures

The measurement of the independent and dependent variables as well as the screening of the data are described in detail in Appendix C.

## Procedures

Approvals from UMSL's Institutional Review Board and NSSE (The Trustees of Indiana University, 2020) were obtained, as was approval to distribute the modified NSSE survey at four Midwestern universities. The modified NSSE survey questions were entered into an online Qualtrics survey platform (e.g., see Appendix C), with a link to the study Ethics Memo (e.g., see Appendix A) using an appropriate combination of select choices, fill-in-the-blank, and questions with answers provided with Likert (1932) and Likert-like scales. In using and Likert and Likert-like scales, it was assumed that the strength/intensity of an attitude or perception is linear (i.e., on a continuum from strongly agree to strongly disagree) and the assumption was made that attitudes or perception can be measured.

Undergraduate students eligible to participate were emailed the following message regarding the study, from their respective university's mass email system:

*SUBJECT: Undergraduate Students Wanted, Survey on Research Activities and*

*Relationships*

*"You have the opportunity to contribute to academic research that is exploring how undergraduate research activities and professional relationships impact student employability, graduate education intentions, and entrepreneurial acumen. This anonymous survey is entirely optional. There is no benefit or anticipated harm from participation in this survey, however, your completed survey will provide you with the opportunity to win one of ten $50 Amazon gift cards. This survey will take approximately five to ten minutes to complete. The survey link below will be active until Thursday, August 5, 2021. You may only take the survey once. http:/URL.LINK"*

All responses were captured without any direct interaction between researcher and survey respondents. Once the modified NSSE survey closed, the raw data was downloaded from Qualtrics (2021), in .csv (Comma Separated) format, and uploaded the data into IBM® SPSS® Amos 27 for analysis and graphic visualization.

Descriptive statistics were run on all raw data. To psychometrically evaluate the multiple-item research survey, I used Confirmatory Factor Analysis (CFA), which is widely used in measurement applications for scale refinement and construct validation (Kyriazos, 2018) and offers a context for the validation at hand. CFA is a special case of a Structural Equation Model (SEM) (MacCallum & Austin, 2000, p. 203), which is essentially a CFA model with one or more latent variables and observed variables representing the relationship pattern for those latent constructs (Schreiber, 2008, p. 91).

Using IBM® SPSS® Amos 27, a standardized version of the research model in both CFA and SEM diagrams, were created and analyzed, including formal analysis of

the three DVs (employability, graduate education intention, and entrepreneurial acumen), six IVs (HIP, RIL, QI, DTS, HOL, and SFI), and the three control variables (class level, transfer status, and highest level of parental education).

After analyzing the model fit for both hypothesized CFA and SEM models, a limited number of questions were covaried and/or removed for better model fit. These are discussed in-depth in Chapter 5 results.

**Summary**

This study utilizes the 2020 National Survey of Student Engagement (NSSE) questionnaire distributed annually by The Trustees of Indiana University, in a paired down version referred to in this paper as the "modified NSSE". The modified NSSE survey was distributed via mass email to undergraduate students at four Midwestern universities and participants were given three weeks to take the online, Qualtrics survey. Raw data was analyzed in both Qualtrics iStats (2021) and IBM® SPSS® Amos 27 for descriptive statistics and visualization of the data. SPSS and Amos were used to visualize the CFA and SEM analytics.

## Chapter 5: Results

**Introduction**

Papert (2000) suggested that powerful ideas are (1) highly connected to other ideas, (2) are personal and syntonic to the learner, and (3) are ideas that are immediately useful for solving problems of personal importance. The "universal" higher education experience is a comprehensive and interwoven concept that has evolved somewhat differently in every country of the world, which means where you to obtain higher education influences you as a person and will also influence your career path (Van der Zwaan, 2017).

One participant of this study shared their most significant learning experience, which included,

"*I love that all my courses are connected and relevant to my degree. Professor K[name removed], Professor L[name removed], Professor A[name removed], Professor H[name removed], and SO MANY OTHERS! All have wonderful teaching styles and I LOVE learning in their courses. I would take their classes again if I could. That way I can apply my learning to other courses as well as the real world is so valuable, and I am very much enjoying the university.*"

Due to the time of year that the modified NSSE was distributed (e.g., summer semester) and the fact that three out of four of the universities in the study had conducted the full NSSE survey the semester before (e.g., spring 2021), I was not expecting a significant response rate, but was very pleased with the number of respondents from all four institutions $N = 1,398$.

SEM software IBM® SPSS® Amos 27 was used to perform a CFA, based on data

from a population of 52,212 undergraduate students enrolled at four public, degree-

granting Midwestern universities. Maximum likelihood estimation was utilized because

the data were found to be normally distributed. The data came from a "modified NSSE"

online survey and included twenty-eight, multi-part questions (fourteen of which were

demographic questions) measuring undergraduate student graduate education intention

and student perceptions of employability and entrepreneurial acumen. I evaluated the

assumptions of multivariate normality and linearity through IBM® SPSS® 27. Using box

plots and Mahalanobis distance, no univariate or multivariate outliers were observed.

From 1,398 original responses, a partial data set was entered by 394 participants, who did

not complete one or more of the optional questions, which led to 1,004 cases with no

missing data. However, 140 additional cases were removed for failing the "attention

check" survey question (see Appendix C, Q9.h.), which left a final sample size of $N =$

864; with no missing data.

**Confirmatory Factor Analysis Data Summary of Modified NSSE**

A Confirmatory Factor Analysis (CFA) was the first of two models utilized to

explore the theoretical relationships among the unobserved and observed variables, as

well as test the reliability of the observed variables.

Because testing for specific relational hypotheses were of interest, CFA procedures were

appropriate. Gorsuch (1983) explained the purpose of CFA:

> *"Confirmatory factor analysis is powerful because it provides explicit hypothesis*
>
> *testing for factor analytic problems. . .Confirmatory factor analysis is the more*

*theoretically important—and should be the much more widely used—of the two*

*major factor analytic approaches"* [EFA and CFA] (p. 134).

The modified NSSE version (e.g., see Appendix C) that was used for this study

consisted of 14 questions pertaining to undergraduate learning and student engagement

and 14 demographic questions and was distributed via mass email to undergraduate

students via an anonymous Qualtrics survey link. The modified NSSE purports to

measure levels of learning and student engagement for a student's perceptions and

experiences for the six subscales: Student-Faculty Interactions, Higher-Order Learning,

Development of Transferable Skills, High-Impact Practices, Quality of Interactions, and

Reflective and Integrative Learning.

Due to the removal of 140 cases for failing the attention check question and

missing data in 394 cases (from optional questions) and the CFA requirement of no

missing data in its data fields, the CFA was run only with complete survey results, thus

all CFA data analysis was conducted with a $N = 864$. Details relevant to how the

modified NSSE's six subscales (observed variables) load onto the three latent variables of

employability (EMP), graduate education intention (GEI), and entrepreneurial acumen

(ENT) are displayed in Figure 4. Because two of the independent variable items (HIP and

DTS) overlapped (termed cross-over items) onto two subscales each, all analyses were

run as if these dual-focused items were all unique variables.

*Table 1 Modified NSSE Descriptive Statistics for Independent Variables*

|  |  | High Impact Practices | Reflective Integrative Learning | Quality of Interactions | Development of Transferable Skills | Students Faculty Interaction | Higher Order Learning |
|---|---|---|---|---|---|---|---|
| N | Valid | 864 | 864 | 864 | 864 | 864 | 864 |
|  | Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean |  | 2.51 | 2.19 | 2.48 | 2.26 | 2.82 | 2.15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Median | 2.33 | 2.18 | 2.50 | 2.30 | 3.00 | 2.00 |
| Std. Deviation | .58 | .54 | .74 | .56 | .68 | .73 |
| Skewness | .10 | .25 | .23 | .16 | -.50 | .28 |
| Std. Error of Skewness | .08 | .08 | .08 | .08 | .08 | .08 |
| Kurtosis | -.03 | -.05 | .26 | -21 | -01 | -.34 |
| Std. Error of Kurtosis | .17 | .17 | .17 | .17 | .17 | .17 |
| Minimum | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Maximum | 4.00 | 4.00 | 5.00 | 4.00 | 4.33 | 4.33 |

The thirty-four observed variables (each represent a survey question that measured one of six independent variables) of the modified NSSE are represented by rectangles in Figure 4, and represent the collective answers obtained through participant responses from a Qualtrics (2021) survey, based on 14 multi-part questions derived from the original NSSE annual survey (The Trustees of Indiana University, 2020), that utilized Likert and Likert-like scales and fill-in-the-blank items. The latent variables (or unobserved variables) are represented by ovals and represent the six independent variables: Quality of Interactions (QI), Reflective and Integrative Learning (RIL), Higher-Order Learning (HOL), Development of Transferable Skills (DTS), Student-Faculty Interactions (SFI), and High-Impact Practices (HIP). The small circles represent the measurement errors (or unique factors) in the variables and are only associated with a single observed variable. One-ended arrows denote the direction of influence or relationship from one variable to another and two-ended arrows express the association not explained within the model.

For the sake of terminology clarification, *direct* effect of an exogenous (independent) variable on an endogenous (dependent) variable is used, since this study does not explore any *indirect* (effect of an independent variable on a dependent variable

through a mediating variable) (Baron & Kenny, 1986). T*otal effects* refer to the total

extent to which the dependent (or outcome) variable is changed by the independent (or

predictor) variable (APA Dictionary of Psychology, 2020), among latent constructs as

dictated by theory or empirically based suppositions (Schreiber et al., 2006).

The factor structure of Indiana University's full NSSE (2020) was investigated

and a smaller, a priori model was defined. This modified NSSE framework utilized the

same question structure and measurements of the original NSSE for the questions that

were included in this study. For this study, only certain factors were used to calculate this

CFA, including: the inventory composed of 34 items that loaded onto six correlated

factors: high-performance practices (3 items), Reflective and integrative learning (10

items), quality of interactions (4 items), development of transferable skills (10 items),

higher-order learning (4 items), and student-faculty interactions (3 items).

**CFA Model Fit**

To evaluate model-data fit, the following fit indices were examined: CMIN (chi-

square value), DF (Degrees of Freedom), CFI (Comparative Fit Index), RMSEA (Root

Mean Square Error of Approximation), and GFI (Goodness of Fit Index) (Jöreskog and

Sörbom (1984), TLI (Tucker-Lewis Coefficient) also known as the Bentler-Bonett (1980)

Non-Normed Fit Index (NNFI), and Bentler-Bonett (1980) Normed Fit Index (NFI).

Specifically, CFI values of .95 or greater indicate close fit, and values between .90

and .95 indicate acceptable fit. RMSEA values of .06 or less indicated close fit, and

values between .06 and .08 indicate acceptable fit. GFI values less or equal to 1, where 1

indicates a perfect fit (Jöreskog & Sörbom, 1984). The typical TLI and NFI range lies

between 0 and 1, with values close to 1 indicating a very good fit (Bentler & Bonett, 1980).

Based on model fit suggested by Tabachnick and Fidell (2007) and Wheaton et al. (1977), the modified NSSE has a *good fit CMIN (415.18) / df (144) = 2.88*. It should be noted that this study had a large sample size (> 200), which could account for some of the large chi-square, since CFA analytic tests of MI (measurement invariance) based on the chi-square statistic are known to be highly sensitive to sample size (Meade et al., 2008), however there were no indications that the data were anything but normally distributed.

**Final CFA Model**

Based on modification indices, Gaskin and Lim's (2016) AMOS Plugin, Model Fit Measures" recommended removing HIP_2b (*Which of the following have you done or do you plan to do before you graduate? - b. Participate in a study abroad program*); RIL_1 (*During the current school year, about how often have you done the following? - a. Explained course material to one or more students*), RIL_2 (*During the current school year, about how often have you done the following? - b. Prepared for exams by discussing or working through course material with other students*), RIL_3 (*During the current school year, about how often have you done the following? - c. Worked with other students on course projects or assignments*), RIL_4 (*During the current school year, about how often have you done the following? - a. Combined ideas from different courses when completing assignments*), RIL_9 (*During the current school year, about how often have you done the following? - f. Learned something that changed the way you understand an issue or concept*), RIL_11 (*was a duplicate of RIL_4*); DTS_1 (*During the current school year, about how often have you done the following? - d. Given a course*

*presentation)*, DTS_2 *(During the current school year, about how often have you done*

*the following? - a. Reached conclusions based on your own analysis of numerical*

*information (numbers, graphs, statistics, etc.))*, DTS_3 *(During the current school year,*

*about how often have you done the following? - b. Used numerical information to*

*examine a real-world problem or issue (unemployment, climate change, public health,*

*etc.))*, DTS_4 *(During the current school year, about how often have you done the*

*following? - c. Evaluated what others have concluded from numerical information)*,

DTS_8 *(How much has your experience at this institution contributed to your knowledge,*

*skills, and personal development in the following areas? - d. Analyzing numerical and*

*statistical information)*, and DTS_9 *(How much has your experience at this institution*

*contributed to your knowledge, skills, and personal development in the following areas? -*

*f. Understanding people of other backgrounds (economic, racial/ethnic, political,*

*religious, nationality, etc.))* were removed.

To improve the CFA model fit, I examined the covariances between errors, only

on errors of the same factor (Hu & Bentler, 1999) and the following errors were covaried:

$e16 <> e38$, $e14 <> e38$, $e13 <> e14$, $e11 <> e13$, $e11 <> e38$, $e28 <> e28$, $e29 <>$

$e31$, $e29 <> e40$, $e39 <> e40$, $e39 <> e31$, and $e31 <> e40$.

Table 2 *Modified NSSE CFA Fit Indices*

| Measure | Estimate | Threshold | Interpretation* |
|---------|----------|-----------|-----------------|
| CMIN | 415.18 | - - | - - |
| DF | 144 | - - | - - |
| CMIN/DF | 2.88 | Between 2** and 5*** | Good |
| CFI | .95 | > .90 | Good |
| RMSEA | .05 | .05 to .08 | Good |
| GFI | .95 | .90 to .95 | Good |
| TLI | .94 | .90 to .95 | Good |
| NFI | .93 | .90 to .95 | Good |

Cutoffs were summarized by Meyers et al. (2016) and used to evaluate the fit of the model where not otherwise specified.

* Schumacker & Lomax (2016).
** Tabachnick & Fidell (2007).
*** Wheaton et al., (1977).
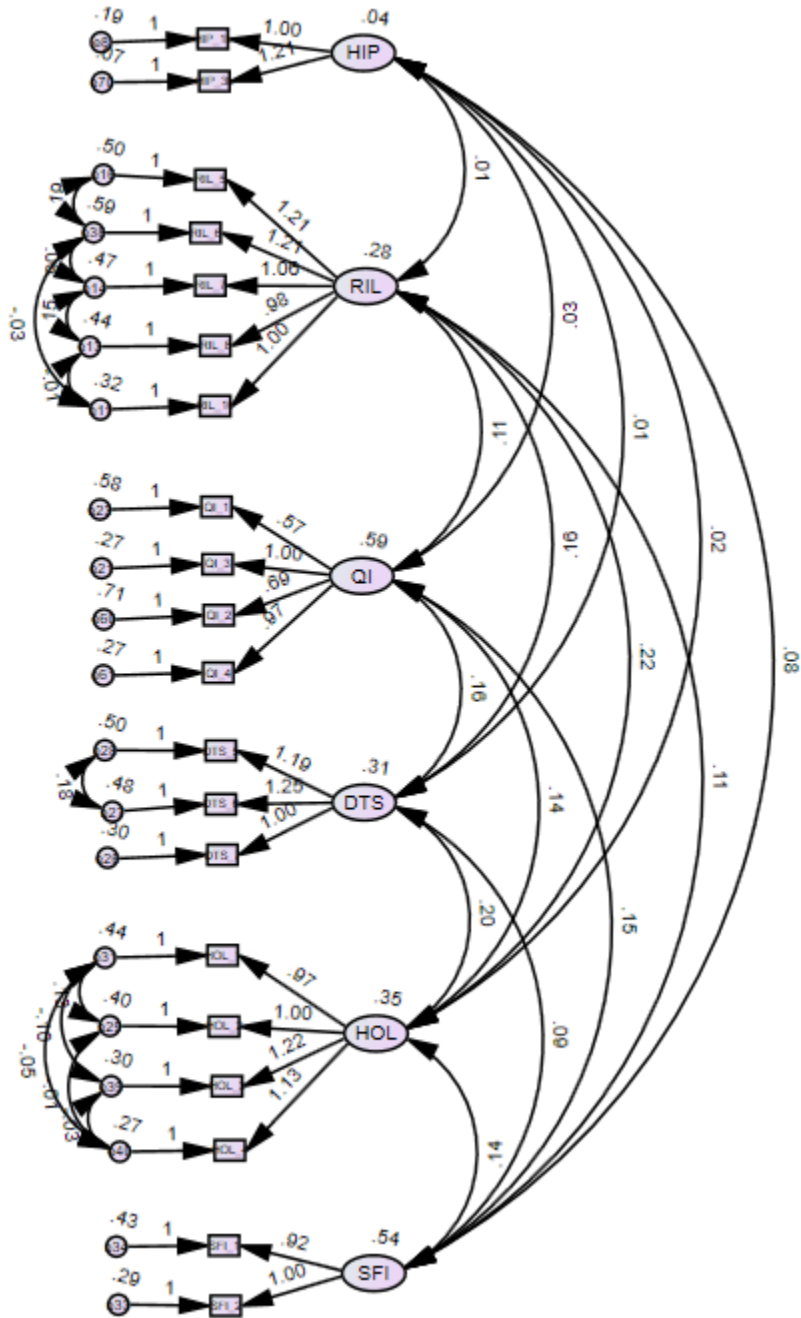


*Figure 4 Modified NSSE CFA Model displayed graphically*

**Structural Equation Modeling Data Summary of Modified NSSE**

The Structural Equation Model (SEM) consisted of the six independent variables: high-performance practices, reflective and integrative learning, quality of interactions, development of transferable skills, higher-order learning, and student-faculty interactions; the three control variables: class level, transfer status, and highest level of parental education, and the three dependent variables (employability, graduate education intention, and entrepreneurial acumen) as graphically displayed in Figure 5.

Based on model fit suggested by Tabachnick and Fidell (2007) and Wheaton et al. (1977), the modified NSSE has a *good fit CMIN (751.24) / df (241)* = 3.12. It should be noted that this study had a large sample size (> 200), which could account for some of the large chi-square, since CFA analytic tests of MI (measurement invariance) based on the chi-square statistic are known to be highly sensitive to sample size (Meade et al., 2008), however there were no indications that the data were anything but normally distributed. Four of the eight factor loadings were statistically significant at $P = .05$.

*Table 3 Modified NSSE SEM Fit Indices*

| Measure | Estimate | Threshold | Interpretation* |
|---|---|---|---|
| CMIN | 751.24 | - - | - - |
| DF | 241 | - - | - - |
| CMIN/DF | 3.12 | Between 2** and 5*** | Good |
| CFI | .93 | > .90 | Good |
| RMSEA | .05 | .05 to .08 | Good |
| GFI | .94 | .90 to .95 | Good |
| TLI | .90 | .90 to .95 | Good |
| NFI | .90 | .90 to .95 | Good |

Cutoffs were summarized by Meyers et al. (2016) and used to evaluate the fit of the model where not otherwise specified.
* Schumacker & Lomax, (2016).
** Tabachnick & Fidell, (2007).
*** Wheaton et al., (1977).

*Table 4 SEM Standardized Regression Weights for Eight RRBC Hypotheses*

| Hypothesis | Dependent Variables | Independent Variables | Regression Weight Estimate | Standard Error | Critical Ratio | *P* = .05 |
|---|---|---|---|---|---|---|
| H1 | Employability | High Impact Practices | .23 | .19 | 4.56 | *P* <.001 (supported) |
| H2 | Employability | Reflective & Integrative Learning | -.10 | .12 | -1.64 | *P* = .10 (not supported) |
| H3 | Employability | Quality of Interactions | .01 | .05 | .26 | *P* = .80 (not supported) |
| H4 | Employability | Development of Transferable Skills | .63 | .13 | 9.34 | *P* < .001 (supported) |
| H5 | Employability | Higher Order Learning | -.08 | .10 | -1.28 | *P* = .20 (not supported) |
| H6 | Graduate Education Intention | High Impact Practices | -.10 | .57 | -.85 | *P* = .39 (not supported) |
| H7 | Graduate Education Intention | Student-Faculty Interaction | .26 | .16 | 2.96 | *P* < .001 (supported) |
| H8 | Entrepreneurial Acumen | Development of Transferable Skills | .71 | .07 | 16.46 | *P* < .001 (supported) |

**Tests of Convergent and Discriminant Validity**

Campbell and Fiske (1959) established convergent validity and discriminant

validity as common ways to assess the construct validity. Convergent validity establishes

whether the measurement items of constructs indeed load on their respective constructs.

Discriminant (or divergent) validity tests that constructs are distinct from one another

(Shuttleworth, 2019). Table 5 displays test of convergent and discriminant validity.

*Table 5 Convergent and Discriminant Validity*

| Factor | Composite Reliability* | Average Variance Extracted* | DTS | HOL | SFI | QI | RIL | HIP |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Development of Transferable Skills (DTS)** | 0.75 | 0.49 | **0.70** | | | | | |
| **Higher Order Learning (HOL)** | 0.82 | 0.54 | | **0.74** | | | | |
| **Student Faculty Interaction (SFI)** | 0.74 | 0.59 | 0.22 | | **0.77** | | | |
| **Quality of Interactions (QI)** | 0.77 | 0.47 | 0.37 | 0.30 | 0.27 | **0.69** | | |
| **Reflective & Integrative Learning (RIL)** | 0.73 | 0.41 | 0.55 | 0.70 | 0.28 | 0.28 | **0.64** | |
| **High Impact Practices (HIP)** | 0.44 | 0.44 | 0.10 | 0.17 | 0.58 | 0.22 | 0.08 | **0.66** |

*AVEs should be greater than 0.4 and Composite Reliability should be greater than 0.7 (Fornell & Larcker, 1981). The square root of AVE is shown in bold.

According to Fornell and Larcker (1981), the Average Variance Extracted (AVE) should be greater than 0.4 and the Composite Reliability should be greater than 0.7. The square root of AVE is shown in bold, diagonal values (see Table 5). Items in the column are less than this value and thus show discriminant validity. The lower reliability of High Impact Practices (Composite Reliability = 0.437) is likely because it can be modeled as a formative construct (i.e., indicators of internship and research experience can *form* the construct rather than *reflect* it because these indicators may be uncorrelated. However, AMOS cannot model formative constructs. Thus, in the Implications section, I propose using analysis techniques for formative constructs, like partial least squares (PLS) regression, as a topic for future research.
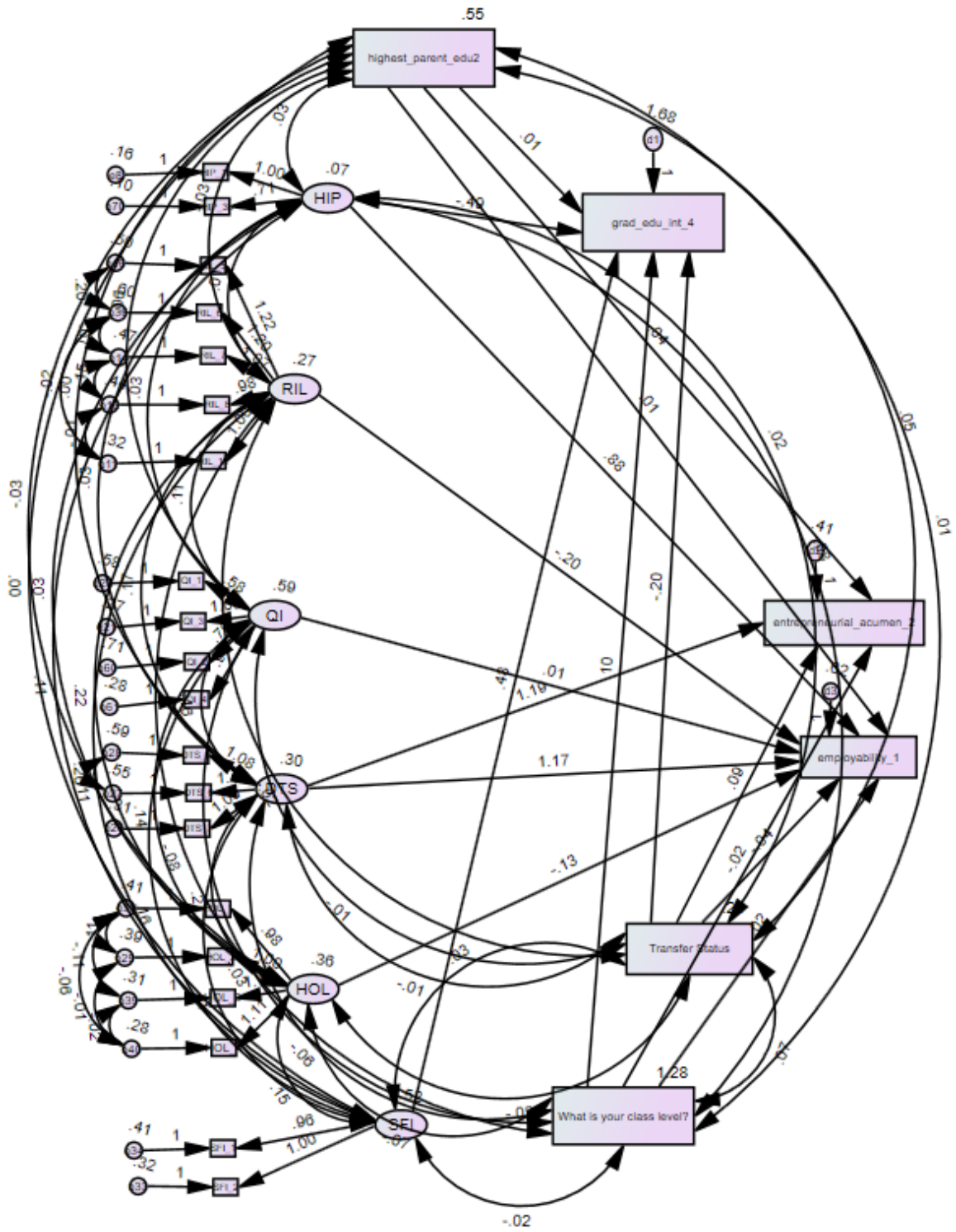
*Figure 5 SEM Model for Modified NSSE graphically displayed*

## Chapter 6: Discussion & Recommendations

### Introduction

Based on the data analysis of both the final CFA and SEM models, as well data screening for the modified NSSE, support was found for four of the eight of hypotheses, as well as some additional findings that were insightful to this study. The final CFA model (see Figure 6) supported half (H1, H4, H7, H8) of this study's a priori, hypothesized factor structure, while failing to reject the final SEM model. The modified NSSE provided an overall acceptable model fit foundation for future RRBC validation and exploration.



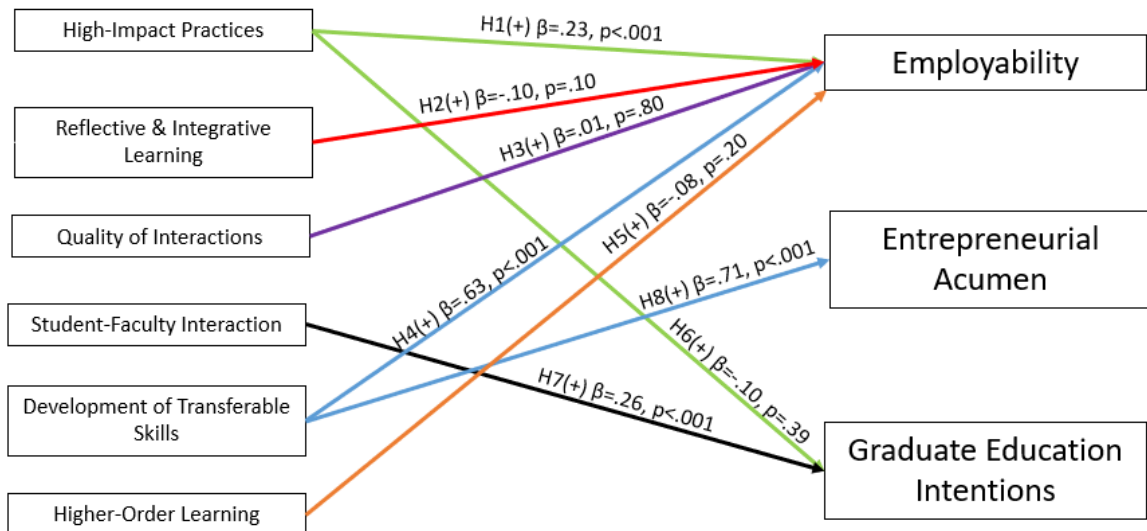*Figure 6 RRBC's Research Model's Hypotheses graphically displayed*

One of the survey participants shared about their most significant learning experience that highlighted reflective and integrative learning and higher-order learning skills,

> *"I'm not sure how to describe what she did, but my history teacher provided the most significant learning experiences. She was excellent at describing topics and*

*events in history simply and relating them to each other. Instead of seeing history*

*as this bland subject that only focused on dates and names, history became a subject*

*that had a lot of grip on life and society today. That class was broken into a lecture*

*segment (with hundred-ish people) and then had smaller classes once a week with*

*no more than 20 people. Having those big classes and small classes really helped*

*cement the concepts and allowed for an environment where I felt more comfortable*

*asking questions and possibly being wrong. History went from my least favorite*

*subject to my favorite that year."*

By strategically planning a more meaningful research-focused curriculum that

utilizes two-way relationships with students, not just a one-way, subject matter delivery

mechanism, faculty have the opportunity to provide more robust research – both

opportunities and outcomes – through multiple-perspective insights and ideas (Keeling &

Hersh, 2011). This study posits that high-impact practices will increase students'

perceptions of employability by introducing undergraduate students to research activities

earlier and more comprehensively, giving more students experience in active research,

while providing real world, practical workplace skills that make them more marketable

after graduation. Furthermore, we argue that development of transferable skills like

thinking critically and analytically, understanding people of other backgrounds, and

solving complex real-world problems increases students' perceptions of employability

through honing of soft skills that are learned through application to a variety of new

situations and diverse audiences. We purport that the same development of transferable

skills also applies to students' perceptions of entrepreneurial acumen, where being able to

solve problems, work with a diverse team, and successful lead through strategic analysis

of trends, facts, and figures, while also thinking creatively and critically are key to success. We also argue that student-faculty interactions are an integral part of graduate education intention, where undergraduate students have opportunities to work with faculty on research projects of interest, learning about research methodology, and whether or not being a specialized researcher is of interest to them.

A research participant revealed a recent experience where they developed a transferable skill, through higher-order and reflective and integrative learning,

> *"In one of my honors critical thinking classes, we had to do a project in which we discussed an issue relevant to the city. It was difficult for me to narrow down a topic at first, but after doing research and talking with my peers in the class, I discovered a historically black neighborhood outside of Westport that has been overtaken by urban development. This project allowed me to discuss how certain minority groups are targeted by urban development. I used this neighborhood as an example, then posed solutions on how to provide compromises for both residents of the neighborhood, urban development goals, and a way to honor the neighborhood's history. As a white person, I learned a lot as I researched statistics on how minorities are negatively impacted by development and read testimonies from Black residents. I was challenged by this project both academically and personally. But my professor and peers were always open to helping me and continually have good constructive feedback."*

For the demographic of *age*, the sample size was 112, due to optional nature of this question. The *minimum age* was 18 and the *maximum ag*e was 65, with a *median age* of 21, an *average age* of 23.8 years old and a standard deviation of 7.3. These findings

are in line with the U.S. average age for students enrolled full-time in undergraduate

programs of 21.8 years old (EducationData.org, 2021). Respondents who self-reported

their class level as Seniors had the highest number of responses at (34.9%), followed by

Juniors 34.4%, Sophomores (17.8%), Freshman (7.9%), and Unclassified (5%). *NOTE:*

*Unclassified students include those students who are not degree-seeking.*

**Findings of the Present Study Impacting Employability**

**Data Screening Summary for Thirty-One Employability Variable Questions**

The initial sample size was $N = 864$. Using IBM® SPSS® Amos 27, I conducted

data screening for the five dimensions of Employability (HIP, RIL, QI, DTS and HOL),

two of which were also shared with the two other outcomes (HIP with graduate education

intention and DTS with entrepreneurial acumen). None of the variables exhibited a high

level of skewness (Bulmer, 1979) or kurtosis (Westfall, 2014) at +/- 1.00. Specifically,

the skewness values ranged from .101 to .278, and kurtosis values ranged from -.366

to .258 across the five dimensions of Employability. Univariate outliers were examined

using z-scores, based on Field (2005) cutoff of 3.29 for extreme cases. No outliers were

detected for HIP, three outliers were detected for RIL (with values of 3.346), one outlier

was detected for QI (3.390), no outliers were detected for DTS, and no outliers were

detected for HOL. Multivariate outliers were examined using Mahalanobis distances,

with a cutoff of 20.515 based on 5 *df* at $P < .001$. Five cases exceeded this value, but I did

not remove from the data because HIP data are also shared with GEI. The resulting

sample size was $N = 864$.

As the main post-graduation outcome for undergraduates, employability was

initially hypothesized to be positively influenced by five of the six independent variables.

However, there was not seemingly a strong tie between student-faculty interaction and employability, with modified NSSE respondents reporting that they *never* (40.6%) or *sometimes* (33.8%) *worked with a faculty member on activities other than coursework*, while 34.8% reported they *never* and 37.3% reported they *sometimes discussed course topics, ideas, or concepts with a faculty member outside of class*. The modified NSSE asked participants, "*How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? e. Acquiring job- or work-related knowledge and skills*" and 28.1% reported *very much* and 35.2% reported *quite a bit*, these responses speak to an overall positive employability experience, but not due to any individual interactions.

*Three High-Impact Practices Variable Questions Impacting Employability*

***High-Impact Practices was positively related to students' perceptions of Employability (P= .001 was significant at P < 0.05), supporting H1.*** High-Impact Practices (HIPs) share several traits: They require meaningful student and faculty interactions, demand significant time and effort, provide outside-the-classroom learning opportunities, encourage diverse interactions with others, and provide meaningful and frequent feedback. Participation in these practices can be life changing (Kuh, 2008).

Bennett et al. (2020) argue that the student learning that makes for a strong employability claim comes from years, not semesters; through comprehensive programs, not solitary modules; and in whole environments, not single classes. Little (2001) contends that if graduate employability is multi-dimensional that we, "need to have a good understanding of these various dimensions before we can try to begin to use

graduate employability as one indicator (among many) of the quality of higher education. We also need to understand what influence higher education institutions can have on their graduates' employment destinations (p. 122)."

One survey participant shared that they,

*"studied professional theoretical knowledge, and published two articles in the Campus Network Journal, during the study I was given the opportunity to go to the internship visit, to understand how the theory applied to the actual work, this has been a very valuable experience for me."*

High-Impact Practices are designed to be *mini* job experiences, where students can immerse themselves somewhat into subject or career areas of interest to them. These experiences are popular for students because they get a taste of what that career field might be like, but it also gives employers the opportunity to appeal to future professionals. The support shown for this hypothesis was not surprising.

**High-Impact Practice:** Examples include service-learning, research with faculty, field experiences, internships, study abroad, etc. High-Impact Practices (full NSSE: Questions 11(a), 11(d), 11(e)) were measured by the modified NSSE through survey questions: 7(a), 7(b), and 7(c). *These results are also shared with the outcome Graduate Education Intention.*

**Q7. Which of the following have you done or do you plan to do before you graduate?**
*Response options: Done or in progress, Plan to do, Do not plan to do, Have not decided*
(a) Participate in an internship, co-op, field experience, student teaching, or clinical placement

(b) Participate in a study abroad program

(c) Work with a faculty member on a research project

*Ten Reflective and Integrative Learning Variable Questions Impacting Employability*

***Reflective and Integrative Learning was positively related to students'***

***perceptions of Employability (P = .10 was not significant at P < .05), not supporting***

***H2***. Personally connecting with course material requires students to relate their

understanding and experiences to the content at hand. Instructors emphasizing reflective

and integrative learning motivate students to make connections between their learning

and the world around them, reexamining their own beliefs and considering issues and

ideas from others' perspectives (The Trustees of Indiana University, 2020).

The most significant learning experience for one survey participant included,

*"Learning the stories and struggles of my professors and fellow students who*

*immigrated to America has made the most impact on my view of American*

*society."*

The lack of support for this hypothesis was surprising but may be an unintended

outcome of COVID-19. Because of the reclusive nature of learning during the pandemic,

individuals were less able to connect to one another through forced virtual classrooms,

with faculty – many of whom were ill-prepared to transition without notice to an

unfamiliar pedagogical method. This lack of personal connection to peers and instructors

may have impacted this study's participant's ability to consider issues from other

perspectives. Too, with the highly chaotic state of the world through 2019-2021, students

might have been much less able to make connections between what they were learning at

college and the world around them.

Reflective and Integrative Learning (full NSSE: Questions 2(a), 2(b), 2(c), 2(d),

2(e), 2(f), 2(g)) and was measured by modified NSSE survey questions: 1(a), 1(b), 1(c),

2(a), 2(b), 2(c), 2(d), 2(e), 2(f), and 2(g).

**Q1. During the current school year, about how often have you done the following?**
*Response options: Very often, Often, Sometimes, Never*
(a) Explained course material to one or more students
(b) Prepared for exams by discussing or working through course material with other students
(c) Worked with other students on course projects or assignments

**Q2. During the current school year, about how often have you done the following?**
*Response options: Very often, Often, Sometimes, Never*
(a) Combined ideas from different courses when completing assignments
(b) Connected your learning to societal problems or issues
(c) Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments
(d) Examined the strengths and weaknesses of your own views on a topic or issue
(e) Tried to better understand someone else's views by imagining how an issue looks from their perspective
(f) Learned something that changed the way you understand an issue or concept
(g) Connected ideas from your courses to your prior experiences and knowledge

*Four Quality of Interactions Variable Questions Impacting Employability*

***Quality of Interactions was positively related to students' perceptions of***

***Employability perceptions (P = .80 was not significant at P < .05), not supporting H3***.

Interactions with faculty can positively influence the cognitive growth,

development, and persistence of college students. Through their formal and informal

roles as teachers, advisors, and mentors, faculty members model intellectual work,

promote mastery of knowledge and skills, and help students make connections between their studies and their future plans (The Trustees of Indiana University, 2020). College environments characterized by positive interpersonal relations promote student learning and success. Students who enjoy supportive relationships with peers, advisors, faculty, and staff are better able to find assistance when needed, and to learn from and with those around them. Quality of Interactions captures faculty's perceptions of the quality of students' interactions with faculty, staff, and other students (The Trustees of Indiana University, 2020).

This study participant shared,

*"My summer class prompted me to become very accustomed to talking to strangers. I had a few photo projects where I walked throughout [town] and took pictures and interviewed workers in the community, local businesses, local artists, etc. I see others and smile. I felt pure joy when this District of Columbia employee recognized me and remembered our interview. I couldn't help but smile and feel even more determined to truly make a positive impact as well as create lasting connections. I am building my village here."*

Participants responded to (Q11) asking if they could start over again [at the same institution] would they – 46.7% said *probably yes*, with another 38.6% stating *definitely, yes*.

According to the 2018 National Student Satisfaction and Priorities Report (Levitz, 2018), "Two-thirds of college students attending a four-year college or university that was their first choice say they are satisfied with their college experience. But that satisfaction drops to half for students at an institution that was their second choice, and to

just one in three for students enrolled at their third choice." This study also found that

83.5% of the respondents stated *yes*, they intended to return to their institution next year,

10.1% said *no* they did not intend to return, and 6.4% said they were *not sure*.

The quality of respondent interactions with faculty at their institution were

reported at 41.2% *good*, 25.3% *averag*e, and 26.4% *excellent*. Respondents reported that

31.4% that they *plan to* (c) Work with a faculty member on a research project, but only

15.5% stated that they *have done or are doing this*. More than half 56.3% do not plan to

(b) Participate in a study abroad program, while 24.3% *have not yet decided*.

Respondents reported that 34.8% are *done or are in progress* (a) Participate in an

internship, co-op, field experience, student teaching, or clinical placement, but 51% state

that they *plan to do*. Regarding the respondents' (d) My goal is to be accepted into a

graduate program in the future, 47% *strongly agree*, while 8.4% *strongly disagree*.

Given that undergraduate students were forced to attend classes virtually before

and/or during the time that this study was conducted, the lack of support for this

hypothesis may have been due to students not being able to establish, continue or

contribute the quality of relationships positively to their perceptions of employability.

Too, students may not see higher education and professional relationships as having

carry-over or significant impact on one another, but more of being mutually exclusive.

Quality of Interactions (full NSSE: Questions 13(a), 13 (b), 13(d), and 13(e)) was

measured by modified NSSE survey questions: 10(a), 10(b), 10(d), and 10(e).

**Q10. Indicate the quality of your interactions with the following people at
your institution.**
*Response options: 1=Poor to 7=Excellent, Not Applicable*
(a) Students

(b) Alumni
(d) Staff
(e) Corporate Partners of the University

*Ten Development of Transferable Skills Variable Questions Impacting Employability*

***Development of Transferable Skills was positively related to students'***

***perceptions of Employability (P = .001 was significant at P < .05), supporting H4.***

Development of Transferable Skills examines activities that develop useful and

transferable skills for the workplace and beyond (e.g., verbal and written fluency, critical

thinking, creative thinking, problem solving, project management, and time management)

(The Trustees of Indiana University, 2020). These are learned and innate skills that will

impact an individual's personal and professional life for the rest of their natural life.

Employers want employees who can manage their time, contribute meaningfully to a

project team, as well as help solve issues that arise in a creative and competent manner.

One study participant stated, *"One of my clinical classes focused on diversity and*

*acceptance. The professor encouraged us to think critically about how potential*

*clients will perceive us, and how to make them more comfortable."*

For the modified NSSE, the gender variable, women were over-sampled at 66.1%

over men at 30.7% and other genders 1.9%, while (1.3%) chose not to respond.

EducationData.org (2021) reports that since 2000, the enrollment rate among White

females, aged 18 to 24, increased from 41% to 44%, while during the same time Black

females between the ages of 18 and 24 increased from 35% to 40%. Women are 24.7%

more likely to enroll in higher education than men are, with 55.5% of undergraduate and

graduate students are women.

The support for this hypothesis was in-line with what employers expect from

entry-level employees, no matter the industry. Knowing how to manage one's time, solve

problems, think creatively, and express thoughts verbally and in written form are the

baseline of what undergraduates are expected to bring to the employment table.

Development of Transferable Skills (full NSSE: Questions 1(h), 6(a), 6(b), 6(c),

18(a), 18(b), 18(c), 18(d), 18(e)) were measured by modified NSSE questions: 1(d), 5(a),

5(b), 5(c), 9(a), 9(b), 9(c), 9(d), 9(f), and 9(g) These questions are also shared with

Entrepreneurial Acumen.

**Q1. During the current school year, about how often have you done the following?**
*Response options: Very often, Often, Sometimes, Never*
(d) Given a course presentation

**Q5. During the current school year, about how often have you done the following?**
*Response options: Very often, Often, Sometimes, Never*
(a) Reached conclusions based on your own analysis of numerical information (numbers, graphs, statistics, etc.)
(b) Used numerical information to examine a real-world problem or issue (unemployment, climate change, public health, etc.)
(c) Evaluated what others have concluded from numerical information

**Q9. How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?**
*Response options: Very much, Quite a bit, Some, Very little*
(a) Writing clearly and effectively
(b) Speaking clearly and effectively
(c) Thinking critically and analytically
(d) Analyzing numerical and statistical information
(f) Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.)
(g) Solving complex real-world problems

*Four Higher-Order Learning Variable Questions Impacting Employability*

**Higher-Order Learning was positively related to students' perceptions of Employability (P = .20 was not significant at P < .05), not supporting H5.**

Higher-Order Learning captures how much students' coursework emphasizes challenging cognitive tasks such as application, analysis, judgment, and synthesis (The Trustees of Indiana University, 2020).

*"Molecular biology helped tie a lot of concepts for me, but the undergraduate research has been the most enlightening,"* stated another participant. Still another participant shared, *"Academically, the classes where I have been challenged to know the material and apply it in hypothetical situations,"* were the significant learning experiences.

The lack of support for this hypothesis was unexpected, given that undergraduates would be expected to be able to apply knowledge, analyze situations, exercise good judgement, and synthesize multiple pieces of information at one time. Due to the majority of faculty being forced to teach in a virtual format, without the benefit of face-to-face interaction, lab sessions, or even curriculum design training, students had to stumble through many of their classes alongside instructors who were learning how to teach in a whole new manner. Because both faculty and students were struggling to find their way in traditional classrooms, then an all-virtual, then a hybrid environment, deeper meaning

may not have been possible, when surface learning was the best that could be expected during such a crisis time.

Higher-Order Learning (full NSSE: Questions 4(b), 4(c), 4(d), 4(e) was measured by modified NSSE survey questions 4(a), 4(b), 4(c), and 4(d).

> **Q4. During the current school year, how much has your coursework emphasized the following?**
> *Response options: Very much, Quite a bit, Some, Very little*
> (b) Applying facts, theories, or methods to practical problems or new situations
> (c) Analyzing an idea, experience, or line of reasoning in depth by examining its parts
> (d) Evaluating a point of view, decision, or information source
> (e) Forming a new idea or understanding from various pieces of information

**Findings of the Present Study Impacting Graduate Education Intention**

The initial sample size was $N = 864$. Using IBM® SPSS® Amos 27, I conducted data screening for the two dimensions of Graduate Education Intention (HIP and SFI), one of which was also shared with the one other outcome (HIP with Employability). None of the variables exhibited a high level of skewness (Bulmer, 1979) or kurtosis (Westfall, 2014) at +/- 1.00. Specifically, the skewness values ranged from .101 to -.498, and kurtosis values ranged from -.025 to -.014 across the two dimensions of Graduate Education Intention. Univariate outliers were examined using z-scores, based on Field (2005) cutoff of 3.29 for extreme cases. No outliers were detected for HIP or SFI. Multivariate outliers were examined using Mahalanobis distances, with a cutoff of 13.816 based on 2 *df* at $P < .001$. Only one case exceeded this value, but I did not remove from the data because HIP data are also shared with EMP. The resulting sample size was $N = 864$.

**Data Screening Summary for Six Graduate Education Intention Variable Questions**

*Three High-Impact Practice Variable Questions Impacting Graduate Education Intention*

***High Impact Practices was positively related to Graduate Education Intention (P = .39 was not significant at P < .05), not supporting H6.***

A participant's most significant learning experience was, *"Applying class curriculum in field labs, including the geotechnical engineering lab, construction materials lab, the surveying lab, and more."*

The lack of support for this hypothesis seemed surprising, since service-learning, research with faculty, internships, and field experiences are all ways in which undergraduates can participate, learn, and experience *deep dives* into their areas of interest or study. However, since the pandemic shut down all in-person experiences, even work experiences, the participants of this study may have different and fewer experiences, which resulted in lesser graduate education intentions.

High-Impact Practices (NSSE: Questions 11(a), 11(d), 11(e)) were measured by RRBC Survey Questions 7(a), 7(b), and 7(c). *These results are also shared with Employability. (See HIP Impacting EMP above for questions)*

*Three Student-Faculty Interactions Variable Questions Impacting Graduate Education Intention*

***Student-Faculty Interactions was positively related to Graduate Education Intention (P < .05 was significant at P < .001), supporting H7.***

When faculty members interact with students, both in and outside of the classroom, they learn firsthand how academic experts think about and solve problems. In

essence, these faculty become mentors, guides, and role models for current and lifelong

learning. Faculty interaction with students can positively or negatively influence

development, cognitive growth, as well as persistence of undergraduate students.

Students are better able to make important connections between their college courses and

post-graduate situations and concepts when they observe faculty members, who serve as

formal and informal instructors, advisors, and mentors, modeling intellectual work and

promoting mastery of knowledge and skill.

One participant stated, *"I really enjoyed my Organic Chemistry class. Primarily*

*because the professor was so passionate and dedicated to the class."* However, another

participant stated their most significant learning experience was, *"How to communicate*

*with administration and faculty professionally."*

According to the 2018 U.S. Census (Schmidt, 2019), "Despite an overall decline

in school enrollment, the number of people enrolled in graduate and professional school

in the United States jumped 8.1% from 2011 to 2018."

Interactions with faculty can positively influence the cognitive growth,

development, and persistence of college students. Through their formal and informal

roles as teachers, advisors, and mentors, faculty members model intellectual work,

promote mastery of knowledge and skills, and help students make connections between

their studies and their future plans. Kim and Sax (2009) discuss Pascarella's (1980)

intensive analysis of the literature, which suggests that statistically significant positive

associations exist between student-faculty interactions and the following: educational

aspirations and career plans, personal and intellectual development, academic

achievement, satisfaction with college, and college persistence.

Support for this hypothesis was expected since graduate school is heavily

dependent upon the student-faculty interaction. The better undergraduate student-faculty

interactions are, even if these relationships move from in-person to virtual due to a global

pandemic, the stronger the potential a student might be drawn to graduate school, where

those relationships are even stronger and more important.

Student-Faculty Interactions (full NSSE: Questions 3(a), 3(b), 3(c)) was measured

by modified NSSE survey questions: 3(b), 3(c), and 10(c).

> **Q3. During the current school year, about how often have you done the following?**
> *Response options: Very often, Often, Sometimes, Never*
> (b) Worked with a faculty member on activities other than coursework (committees, student groups, etc.)
> (c) Discussed course topics, ideas, or concepts with a faculty member outside of class

> **Q10.  Indicate the quality of your interactions with the following people at your institution.**
> *Response options: Very often, Often, Sometimes, Never*
> (c) Faculty

**Findings of the Present Study Impacting Students' Perceptions of Entrepreneurial Acumen**

*Data Screening Summary for Ten Entrepreneurial Acumen Variable Questions*

The initial sample size was $N = 864$. Using IBM® SPSS® Amos 27, I conducted

data screening for the single dimension of Graduate Education Intention (DTS). DTS did

not exhibit a high level of skewness (Bulmer, 1979) or kurtosis (Westfall, 2014) at +/-

1.00. Specifically, the skewness = .158 and kurtosis = -.209. Univariate outliers were examined using z-scores, based on Field (2005) cutoff of 3.29 for extreme cases. No outliers were detected for DTS. Multivariate outliers were examined using Mahalanobis distances, with a cutoff of 10.828 based on 1 *df* at *P* < .001. No cases exceeded this value. The resulting sample size was *N* = 864.

***Development of Transferable Skills was positively related to students' perceptions of Entrepreneurial Acumen (P < .05 was significant at P < .001), supporting H8.***

Smith and Paton (2014) argue that [in the U.K.] an alternative option to entrepreneurship education should be ensconced in HE however, although while there are many HEI's experienced in specific initiatives, they have less knowledge of campus-wide and inter-departmental provision. They further argue that embedding transferable skills into the curriculum, produces more sustainable and consistent results than when dictated to faculty by administration, especially when implemented through an integrated and systematic transferable skills framework. Collins et al. (2004) argues, "Today's graduate currency or 'value' is in the ability to manage and apply knowledge in action and in an entrepreneurial context, and not only in the ability to acquire and assimilate knowledge."

Zamfir et al. (2013) argue that developing enterprising graduates in higher education is vital to "economic and social capacity-building that underpins a knowledge economy." Fostering an entrepreneurial mind-set and skillset throughout undergraduate education is pivotal to the post-graduate success of career-ready students (Bjornali & Støren, 2012).

*"Although it wasn't directly related to a school subject, the most significant learning experience I've had here is how to manage my time. I was always an overachiever in K-12 but it always came easy and I was told what to do and when to do it. In college, I had to learn to prioritize my to-do list, create my own schedule, and manage time all on my own. That is a lifelong skill I will have forever so I think it is the most significant,"* shared another participant.

Entrepreneurs need to have a wide variety of skills in order to be successful in today's world market, so support for this hypothesis was no surprise. Being able to manage one's times, think creatively, solve problems, and articulate and verbalize your thoughts is expected at the bare minimum of any new business owner. The better one is at being able to learn and master these key skills and then transfer them to their business or industry, the more success one might have when performing such skills, like managing a new research and design project, for their own business.

Development of Transferable Skills (full NSSE: Questions 1(h), 6(a), 6(b), 6(c), 18(a), 18(b), 18(c), 18(d), and 18(e)) were measured by modified NSSE survey questions 1(d), 5(a), 5(b), and 5(c). These questions are also shared with Employability. *(See DTS Impacting EMP above for questions)*

**Implications for Practice**

Expected educational practice contributions include the introduction of the RRBC and provide new findings contrasting between the modified NSSE, active learning, and existing NSSE models, in addition to adding to the body of knowledge regarding

educational practice and Connected Curriculum. As well as contributing to the body of

knowledge regarding Connected Curriculum.

> *"The most significant learning experience was in a building physics class where*
>
> *the instructor actually cared about what we learned and outwardly expressed that*
>
> *he wanted us to improve,"* shared one study participant. Another stated, *"A T.A.*
>
> *taught me stuff that my professor did not, showing that the professor you get is*
>
> *more important than the class material."*

This study contributes to practical higher education knowledge by showing how

research and relationship-based activities impact undergraduate graduate education

intention and students' perceptions of employability and entrepreneurial acumen –

providing a conceptual curriculum framework that U.S. higher education administrators

and educators can begin to consider using to integrate active research, evidence-based

classroom processes, and academic/professional relationships into higher education.

Practitioners will find this study's practical independent variables insightful in

how they impact the post-graduation outcomes of employability, graduate education

intention, and entrepreneurial acumen. For academic professionals looking to make a

difference in the collegiate experiences of their students, this study identifies potential

ways to increase student engagement and satisfaction through undergraduate research

activities and professional relationships.

The Research and Relationship-Based Curriculum conceptual framework was

developed in response to the gaps between college graduation and obtaining a first job,

getting accepted to a graduate program, or starting a new business. Based on the findings

of this study, RRBC constructs are supported in undergraduate education, where research

activities are currently left to the discretion of faculty and professional relationships are not an organic outcome of all college courses. The independent variables provide an initial outline of how higher education might begin to move in the direction of preparing student scholars for the workforce.

**Study Limitations**

The limitations of this study include the sample population, which only included four, degree-granting universities in the U.S. Midwest, during the summer semester, which was only open for participation for three weeks. Because the full NSSE survey was distributed on three of the four study campuses during the previous spring semester, responses may have been negatively impacted by lack of participation. Because this is a new, conceptual framework, there is no previous data available for comparison. Too, because of the RRBC complexity, only a portion of the model could be examined in this study.

The COVID-19 global pandemic I consider to be a two-fold limitation to this study in that the quality of higher education satisfaction, exposure to research and relationships, as well as the three outcomes student perceptions of post-graduation employability and entrepreneurial and graduate education intention have all been impacted in unprecedented ways. Undergraduate students were forced to move to virtual classrooms with little preparation, faculty were forced to moved to a new teaching medium (many without preparation, experience or training), and HEIs were forced to close research facilities and faculty moved to remote offices. These changes went hand-in-hand with other challenges faced by undergraduate students, such as no international

travel, sickness and death of loved ones, personal health scares, loss of jobs and homes, etc.

COVID-19 precipitated a second study limitation – the personal higher education research experience of the author, who was forced to move to a completely virtual classroom format midway through graduate school. This impacted the author, as a student and as a researcher, requiring all research to be conducted online, via online interviews, surveys, and meetings.

The ethnicity counts $N = 864$ were problematic, white 64.1% undergraduate students appeared to have been over-represented, while Black 10.2% and Hispanic 8.5% students were under-sampled. The other three ethnic groups were marginally reported, with 11% reporting another ethnicity not listed and 4.1% preferring not to respond. According to EducationData.org (2021), 12 million or 55.2% of college students are White or Caucasian, which is slightly lower than our study. However, these counts were consistent with the demographics of the Midwest US and representative of the local population of the state where our four universities were located, as well as the two neighboring states where a significant number of students were represented.

According to an Institute of International Education (Moody, 2020), 2019/2020 report of international students studying in U.S. colleges, of the reported 19,720,000 total number of students enrolled, only 851,957 (or 5.5%) of the students were international students. The student status $N = 864$ results that were self-reported on the modified NSSE were slightly higher than the national average, with 3% international student response and 97% self-reporting as not an international student.

**Recommendations for Future Research**

Expected research contributions include improved conceptual definitions of the original RRBC constructs and the development of additional theoretical linkages (i.e., research hypotheses) with their accompanying rationale. This study also adds to the body of knowledge through the exploration and integration of the 14 distinct RRBC dimensions – *K12 students, undergraduate students, graduate students, lifelong learners, faculty, academic departments, higher education institution* (singular), *higher education network* (multiple HEIs), *dissemination outlets, broader impacts, alumni, government, industry,* and *research*.

It further provides improved conceptual definitions of the original RRBC constructs, Connected Curriculum, as well as the development of additional theoretical linkages (i.e., research hypotheses) with their accompanying rationale.

Finally, some constructs in the research model may be modeled as formative instead of reflective. Thus, an alternative analysis technique such as Partial Least Squares regression could yield interesting results.

Exploring a more diverse sampling of higher education institutions, including the growing population of traditional higher education institution alternatives (e.g., online only colleges, technical colleges, and professional certification programs) would be insightful and the potential to contrast the data from traditional college would be interesting. Having insight from students who chose alternative higher education would make this research much richer and might provide additional data into why some students are transitioning away from a traditional four-year college degree.

It would be impactful to see an iteration of this study that looks at post-graduation success. Looking back, what could have been done by HEIs to positively impact undergraduate employability, graduate education intention, and entrepreneurial acumen? What was experienced on campus that made a positive difference in student perceptions? Which experiences or relationships negatively impacted student perceptions?

For future research, it would be meaningful to examine the RRBC conceptual framework from any of its 14 dimensions, as well as how faculty are currently incorporating research activities and professional relationship opportunities into their coursework. It might also be significant to test all possible hypothetical RRBC outcomes, like the additional analysis testing that I did on an alternate SEM regression weights model, where nine of the 18 possible hypotheses were significant (see Table 7)

*Table 6 SEM Regression Weights for All Possible RRBC Hypotheses (Alternate Model) (9/18 hypotheses significant)*

| Dependent Variables | Independent Variables | Regression Weight Estimate | Standard Error | Critical Ratio | *P*-value $\leq$ 0.05 |
|---|---|---|---|---|---|
| Employability | <-- HIP | 6.61 | 2.84 | 2.33 | *** (significant) |
| Employability | <-- RIL | .23 | .37 | .63 | .53 (not significant) |
| Employability | <-- QI | .01 | .14 | .09 | .93 (not significant) |
| Employability | <-- DTS | .88 | .27 | 3.29 | *** (significant) |
| Employability | <-- SFI | -1.31 | .66 | -1.97 | *** (significant) |
| Employability | <-- HOL | -.15 | .27 | -.57 | .57 (not significant) |
| Graduate Education Intentions | <-- HIP | -.28 | .75 | -.38 | .70 (not significant) |
| Graduate Education Intentions | <-- SFI | .25 | .19 | 1.31 | .19 (not significant) |
| Graduate Education Intentions | <-- HOL | -.29 | .15 | -2.03 | *** (significant) |
| Graduate Education Intentions | <-- RIL | .73 | .18 | 4.08 | *** (significant) |
| Graduate Education Intentions | <-- DTS | .09 | .13 | .70 | .49 (not significant) |

| | | | | | |
|---|---|---|---|---|---|
| Graduate Education Intentions | <-- QI | .16 | .07 | 2.15 | *** (significant) |
| Entrepreneurial Acumen | <-- DTS | .93 | .15 | 6.01 | *** (significant) |
| Entrepreneurial Acumen | <-- HIP | 3.07 | .93 | 3.30 | *** (significant) |
| Entrepreneurial Acumen | <-- RIL | .27 | .19 | 1.47 | .14 (not significant) |
| Entrepreneurial Acumen | <-- QI | -.03 | .07 | -.44 | .66 (not significant) |
| Entrepreneurial Acumen | <-- HOL | .00 | .15 | .01 | .10 (not significant) |
| Entrepreneurial Acumen | <-- SFI | -.60 | .23 | -2.65 | *** (significant) |

**General Conclusions**

Crow and Dabars (2015) observed that the U.S. higher education system combines two successful elements that originated in earlier iterations of the university: "the college model with its broad education, as promoted by Newman, and the graduate phase in which teaching and research are combined in a manner that can be traced back to the ideas of Von Humboldt" (p.33). It is often claimed that this combination is what makes the U.S. higher education system the most successful in the world (Van der Zwaan, 2017).

However, current educators and administrators cannot rely on past successes, they must question, evaluate, and confront long-term changes, as well as those disruptive factors that have led, or will lead, to rapid and fundamental changes to higher education today. College degrees no longer hold the prestige and employability status they once offered the privileged few who were able to afford a higher education. HEIs must now continually reinvent their educational value and offer undergraduate students an edge when it comes to key student satisfaction factors like increased perceptions of

employability, greater acceptance into graduate programs, as well as more positive perceptions of confidence and experience in entrepreneurial acumen.

One study participant shared that, *"overcoming an unhealthy relationship with education in order to see what I am learning as a chance to gain knowledge rather than be measured by grades,"* was their most significant learning experience. While still another shared that through their collegiate experience, they were, *"Learning to believe in myself again."* Education is life changing. However, education has not changed with life and higher education is struggling to hang onto traditional undergraduate students as cheaper and faster alternatives become available and widely accepted by industry.

The Research and Relationship-Based Curriculum was designed to define, spotlight, and inspire educational stakeholders through a research-intensive, relationship-based curriculum that crisscrosses academic departments, blurs traditional research borders, and inspires students to become lifelong researchers through planned, collaborative, evidence-based, and meaningful research activities throughout their undergraduate education.

Although this study relies on various important relationships and cognitive skills, research should be linked to teaching and students should receive systematic training in how to conduct good research throughout their education (Von Humboldt, 1810). Von Humboldt's university model was strengthened by a collective, public mission, where research and education were inextricably linked and seen as a benefit to society as one combined entity (Boulton & Lucas, 2008).

By adopting Von Humboldt's expansion of the ideal of *Bildung* (German term for *education*), which in this educational context refers to a student who becomes a

researcher by *actively* participating in research (Nordenbo, 2002), I developed the RRBC with the belief that research is an activity between a student and an instructor. *Bildung* connotes individual student transformation, but it delves deeper and refers to the need for envisaging an esteemed picture (*Bild*) of oneself, then working toward the *self* that is visualized (Fung, 2017). Schneider (2012) defines *Bildung* as an action to create a self that is prized. Reindal (2013) characterizes *Bildung* as the call 'to take responsibility for the humanity in one's own person and to contribute to the on-going conversation between educated persons' (p. 537). Thus, there is also a responsibility on the side of the undergraduate student to imagine who they want to be and to work towards that vision through their academic studies, active research, and establishing academic relationships.

This *Bildung* philosophy was fully embraced, while developing RRBC, that becoming employable, ready for graduate education, or starting a business is a joint venture and the process is *between* a student and a HEI – with a cost, commitment, and lifelong benefits to both (Thomas, 2016).

# References

Agrawal, T. (2014). Skill development in India: An examination. *Journal of Education and Work*, *27*(6), 629–650.

Ahlfeldt, S., Mehta, S., & Sellnow, T. (2005). Measurement and analysis of student engagement in university classes where varying levels of PBL methods of instruction are in use. *Higher Education Research & Development*, *24*(1), 5-20.

Altbach, P. G., Reisberg, L. & Rumbley, L.E. (2010). Tracking a global academic revolution. *Change*, March/April 2010, *42*(2), 30-39, March/April. Taylor & Francis, Ltd. http://www.jstor.com/stable/20696219

Alves, H. (2011). The measurement of perceived value in higher education: a unidimensional approach. *The Service Industries Journal*, *31*(12), 1943-1960.

Anderson, G. (2021). Survey: College graduates don't feel employable. *Inside Higher Ed*, May 26, 2021. https://www.insidehighered.com/quicktakes/2021/05/26/survey-college-graduates-dont-feel-employable

APA Dictionary of Psychology. (2020). Total Effect. https://dictionary.apa.org/total-effect

Arbuckle, J. L. (2020). Amos (Version 27.0) [Computer Program]. Chicago: IBM SPSS.

Arthurs, L. A., & Kreager, B. Z. (2017). An integrative review of in-class activities that enable active learning in college science classroom settings. *International Journal of Science Education*, *39*(15), 2073-2091.

Ashby, I., Caskurlu, S., & Exter, M. (2018). Evolving roles of faculty at an emerging hybrid competency-based transdisciplinary program. *The Journal of Competency-Based Education, 3*(1), e01059-n/a. https://doi.org/10.1002/cbe2.1059

Association of American Universities (AAU), (2011). University research: The role of federal funding. https://files.eric.ed.gov/fulltext/ED517263.pdf

Association of American Universities (AAU), (2019). By the numbers: AAU universities conduct critical research. https://www.aau.edu/sites/default/files/AAU-Files/Who-We-Are/AAU-BTN-2021-Horiz.pdf

Astin, A. W. (1970). The methodology of research on college impact, part one. *Sociology of Education*, 43, 223–254.

Astin, A. W. (1977). Four critical years: Effects of college on beliefs, attitudes, and knowledge. San Francisco, CA: Jossey-Bass.

Astin, A. W. (1984) Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, *25*(4), 297–308.

Astin, A. W. (1991). Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education. San Francisco, CA: Jossey-Bass.

Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development, 40*(5), 518-529.

Axelson, R. D., & Flick, A. (2010). Defining student engagement. *Change: The Magazine of Higher Learning*, *43*(1), 38-43.

Azoulay, P., Jones, B., Kim, J. D., & Miranda, J. (2018). Research: The average age of a successful startup founder is 45. *Harvard Business Review*, (11).

Baron, R. M., & Kenny, D. S. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.

Barroso, A., & Schopoulos, S. (2021). College graduates in the year of COVID-19 experienced a drop in employment, labor force participation. Pew Research Center, May 14. https://www.pewresearch.org/fact-tank/2021/05/14/college-graduates-in-the-year-of-covid-19-experienced-a-drop-in-employment-labor-force-participation/

Bautista, A., Tan, L. S., Ponnusamy, L. D., & Yau, X. (2016). Curriculum integration in arts education: Connecting multiple art forms through the idea of 'space'. *Journal of Curriculum Studies*, *48*(5), 610-629.

Beal, M., Borg, M. O., & Stranahan, H. A. (2019). The Onus of Student Debt: Who is Most Impacted by the Rising Cost of Higher Education?. *International Research Journal of Applied Finance*, *10*(8), 219-231.

Bean, J. P., & Eaton, S. (2000). A psychological model of college student retention. In J. Braxton (Ed.) *Rethinking the departure puzzle: New theory and research on college student retention*, pp. 48–61, Memphis, TN, University of Vanderbilt Press.

Bennett, D. (2012). A creative approach to exploring student identity. *International Journal of Creativity and Problem Solving*, *22*(1), 27-41.

Bennett, D., Knight, E., & Rowley, J. (2020). The role of hybrid learning spaces in enhancing higher education students' employability. *British Journal of Educational Technology*, *51*(4), 1188-1202.

Bentler, P. M. & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588-606.

Billing, D. (2003). Generic cognitive abilities in higher education: An international analysis of skills sought by stakeholders. *Compare: A Journal of Comparative and International Education*, *33*(3), 335-350.

Bjornali, E. S., & Støren, L. A. (2012).  Examining competence factors that encourage innovative behaviour by European higher education graduate professionals. *Journal of Small Business and Enterprise Development*, *19*(3), 402–423.

Bloom, B. S. (1956). *Taxonomy of Educational Objectives*. Vol. 1: Cognitive domain. New York: McKay, *20*(24), 1.

Boulton, G., & Lucas, C. (2008). What are universities for? Leuven: League of Research Universities.

Bourgeois, E. (2002). Higher education and research for the ERA: Current trends and challenges for the near future. Final Report of the STRATA-ETAN expert group. *Foresignt for the development of higher education/research relations.* Bruxelles: Commission européenne, DG Recherche.

Bourner, T., & Millican, J. (2011). Student-community engagement and graduate employability. *Widening Participation and Lifelong Learning*, *13*(2), 68-85.

Boyd, B. K., Bergh, D. D., & Ketchen Jr, D. J. (2010). Reconsidering the reputation—performance relationship: A resource-based view. *Journal of Management*, *36*(3), 588-609.

Boyd, E., & Fales, A. (1983). Reflective Learning. *Journal of Humanistic Psychology*.

BrckaLorenz, A., Garvey, J. C., Hurtado, S. S., & Latopolski, K. (2017). High-impact practices and student–faculty interactions for gender-variant students. *Journal of Diversity in Higher Education*, *10*(4), 350–365. https://doi.org/10.1037/dhe0000065

Brennan, J. (1987). *CNAA Graduates: Their Employment and Their Experience After Leaving College: A Summary Report of a Survey of CNAA Graduates: a CNAA Development Services Project Conducted at Bulmershe College of Higher Education.* CNAA.

Brockbank, A. (2006). *Facilitating Reflective Learning Through Mentoring and Coaching*. Kogan Page Publishers.

Brubacher, J. S., & Rudy, W. (2017). *Higher Education in Transition: A History of American Colleges and Universities*. Routledge.

Bulmer, M. G. (1979). *Principles of Statistics*. Dover.

Burner, T., Supinski, L., Zhu, S., Robinson, S., & Supinski, C. (2019). The global skills shortage Bridging the Talent Gap with Education, Training and Sourcing. *Society for Human Resource Management*.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*(2), 81-105.

Cengage/Morning Consult, (2019). New Survey: Demand for "Uniquely Human Skills" Increases Even as Technology and Automation Replace Some Jobs. https://www.cengagegroup.com/news/press-releases/2019/new-survey-demand-for-uniquely-human-skills-increases-even-as-technology-and-automation-replace-some-jobs/

Caruth, G. D. (2018). Student engagement, retention, and motivation: Assessing academic success in today's college students. *Participatory Educational Research*, *5*(1), 17-30.

Cherry, K. (2021). *Self-Determination Theory and Motivation*. https://www.verywellmind.com/what-is-self-determination-theory-2795387

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 3, 7.

Clancey, W. J. (1995). *A Tutorial on Situated Learning*.

Cole, D. (2007). Do interracial interactions matter? An examination of student-faculty contact and intellectual self-concept. *The Journal of Higher Education*, *78*(3), 249–281.

Collins, L., Hannon, P. D., & Smith, A. (2004). Enacting entrepreneurial intent: the gaps between student needs and higher education capability. *Education+ training*. https://doi.org/10.1108/00400910410569579

Council on Undergraduate Research. (n.d.). About CUR. Retrieved from http://www.cur.org/about.html

Craig, R. (2018). *A New U: Faster + Cheaper Alternatives to College*. BenBella Books.

Crow, M. M. & Dabars, W. B. (2015). *Designing the New American University*, John Hopkins University Press.

Deci, E.L., & Ryan, R.M. (1985). Conceptualizations of Intrinsic Motivation and Self-Determination. In: *Intrinsic Motivation and Self-Determination in Human Behavior. Perspectives in Social Psychology*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4899-2271-7_2

Deemer, E. D., Navarro, R. L., Byars-Winston, A. M., Jensen, L. E., & Chen, C. P. (2020). Investigating graduate education and undergraduate research intentions of college science students. *Journal of Career Assessment*, *28*(1), 43-58. https://doi.org/10.1177/1069072718823777

Doerschuk, P. (2004). A research and mentoring program for undergraduate women in computer science. Proceedings of the *34th ASEE/IEEE Frontiers in Education Conference*, S2H-7 – S2H-12.

Dong, S. (2019). The effects of first-generation status on student engagement and outcomes at liberal arts colleges. *Journal of College Student Development*, *60*(1), 17-34.

Doyle, M. P. (Ed.). (2000). *Academic excellence*. Tucson, AZ: Research Corporation.

Ducoff, N. (2021). College Must Change. *Inside Higher Ed*, April 5. https://www.insidehighered.com/admissions/views/2021/04/05/colleges-must-change-if-they-are-going-continue-attract-students-opinion

Ebert, K., Axelsson, L., & Harbor, J. (2015). Opportunities and challenges for building alumni networks in Sweden: A case study of Stockholm University. *Journal of Higher Education Policy and Management*, *37*(2), 252 – 262. https://doi.org/10.1080/1360080X.2015.1019117

EducationData.org, (2021). *College Enrollment & Student Demographic Statistics*. https://educationdata.org/college-enrollment-statistics

Egan, J. D., McBrayer, J. S., Wells, P., & Tolman, S. (2021). Exploring undergraduate leadership program attributes from the alumni lens. *The College Student Affairs Journal, 39*(1), 73.

Endo, J. J., & Harpel, R. L. (1982). The effect of student-faculty interaction on students' educational outcomes. *Research in Higher Education*, *16*(2), 115-138.

Ewell, P. T. (2010). *The U.S. National Survey of Student Engagement* (NSSE). In D. D. Dill & M. Beerkens (Eds.), Public policy for academic quality: Analyses of innovative policy instruments. New York, NY: Springer.

Ewell, P. T., & Jones, D. P. (1993). Actions matter: The case for indirect measures in assessing higher education's progress on the national educational goals. *Journal of General Education*, *42*(2), 123–148.

Field, A.P. (2005). *Discovering Statistics Using SPSS* (2nd ed.). London: Sage.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, *82*(2), 221–234. http://dx.doi.org.ezproxy.umsl.edu/10.1037/0021-9010.82.2.221

Foley, N. F. (2020). Don't Forget About Graduate Students. *The Chronicle of Higher Education*. March 31, 2020. https://www.chronicle.com/article/dont-forget-about-graduate-students/

Forbes, (2019). *Student loan debt statistics in 2019: A $1.5 trillion crisis*. Editors' Pick, Feb 25, 2019. https://www.forbes.com/sites/zackfriedman/2019/02/25/student-loan-debt-statistics-2019/?sh=6c2d2c20133f

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Fosnacht, K., & Gonyea, R. M. (2012). The dependability of the NSSE 2012 pilot: A generalizability study. Paper presented at the annual meeting of the *Association for Institutional Research*, New Orleans, LA.

Frost, N., & Taylor, R. (2001). Patterns of change in the university: The impact of 'lifelong learning' and the 'world of work'. *Studies in the Education of Adults*, *33*(1), 49-59.

Fung, D. (2016b). Introducing the Connected Curriculum framework. *Connected Curriculum for Higher Education*: UCL Press.

Fung, D. (2017). *Connected Curriculum for Higher Education.* (T. Mathews Ed.), UCL Press.

García-Aracil, A., & Van der Velden, R. (2008). Competencies for young European higher education graduates: labor market mismatches and their payoffs. *Higher Education*, *55*(2), 219-239.

Garrett, R. (2021). The new higher education: College alternatives are food news for students and colleges. Encoura. https://encoura.org/the-new-higher-education-college-alternatives-are-good-news-for-students-and-colleges/

Gaskin, J. & Lim, J. (2016). *Model Fit Measures*, AMOS Plugin. Gaskination's StatWiki. http://statwiki.kolobkreations.com

Gedye, S., Fender, E., & Chalkley, B. (2004). Students' undergraduate expectations and post-graduation experiences of the value of a degree. *Journal of Geography in Higher Education*, *28*(3), 381-396.

Gibb, S. (2014). Soft skills assessment: Theory development and the research agenda. *International Journal of Lifelong Education*, *33*(4), 455-471.

Glen, S. (2016). *Standardized beta coefficient: Definition & example*. From StatisticsHowTo.com: Elementary statistics for the rest of us! https://www.statisticshowto.com/standardized-beta-coefficient/

Gonyea, R.M., Kish, K.A., Kuh, G.D., Muthiah, R.N., & Thomas, A.D. (2003). *College Student Experiences Questionnaire: Norms for the Fourth Edition*. Bloomington, IN: Indiana University Center for Postsecondary Research, Policy, and Planning.

Gorsuch, R. L. (1983). *Factor Analysis*. 2nd edition. Lawrence Erlbaum Associates. Hillsdale, NJ.

Grigg, C. (1965). *Recruitment to graduate study: College seniors' plans for postgraduate education and their implementation the year after commencement*. Atlanta: Southern Regional Education Board.

Gurin, P., & Katz, D. (1966). Motivation and aspiration in the negro college. Ann Arbor, Michigan: University of Michigan Survey Research Center, *Institute for Social Research*.

Hanover Research, (2016). *McGraw-Hill Education 2016 Workforce Readiness Survey*. Retrieved from https://s3.amazonaws.com/ecommerce-prod.mheducation.com/unitas/corporate/ideas/2016-student-workforce-readinesssurvey-expanded-results.pdf

Harding, R. (2007). *Graduate entrepreneurship in the UK: Summary report from GEM UK data*, National Council for Graduate Entrepreneurship - NCGE, Birmingham.

Harvey, L. (Ed.) (1993). *QHE Update*. The University of Central England, Birmingham.

Harvey, L. (2003). Deconstructing employability', forthcoming

Hawkins, P. & Winter J. (1995). Skills for graduates in the 21st Century. Cambridge: *Association of Graduate Recruiters*. This is a general view of what employers' value.

Healy, M., & Jenkins, A. (2009). *Developing undergraduate research and inquiry*. York, UK: HE Academy. Retrieved from www.heacademy.ac.uk/assets/documents/resources/ publications/ DevelopingUndergraduate_Final.pdf

Higher Education Academy, (2015). *Framework for embedding employability in higher education*. UK: HEA. https://www.heacademy.ac.uk/enhancement

Higher Education Statistics Agency, (2017). *Graduates' Employment*. https://www.hesa.ac.uk/news/20-07-2017/graduates-employment

Holden, R.J., Jameson, S., & Walmsley, A. (2007). New graduate employment in SMEs: still in the dark?, *Journal of Small Business and Enterprise Development*, *14*(2), 211-27.

Holmes, L. (2013). Competing perspectives on graduate employability: Possession, position or process? *Studies in Higher Education*, *35*(4), 538-554.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55.

IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp.

Isador, G. (2021). *12 Surprising Entrepreneur Statistics to Know in 2021*. https://www.northone.com/blog/small-business/entrepreneur-statistics

Massi, L., & McKinzie, C. R., & Gesquiere, A. J., & Seal, S. (2014). The influence of student-faculty interactions on post-graduation intentions in a Research Experience for Undergraduates (REU) program: A case study paper presented at *2014 ASEE Annual Conference & Exposition*, Indianapolis, Indiana. 10.18260/1-2--23159

Jackson, D. (2017). Developing pre-professional identity in undergraduates through work-integrated learning. *Higher Education*, *74*(5), 833-853. Retrieved August 31, 2021, from http://www.jstor.org/stable/26448806

Jackson, D., & Hancock, P. (2010). Developing non-technical skills in undergraduate degrees in business and their transfer to the workplace. *Education Research and Perspectives*, *37*(1), 52-84.

Jackson, K., Lower, C. L., & Rudman, W. J. (2016). The crossroads between workforce and education. *Perspectives in Health Information Management*, 13(Spring), 1–11. https://perspectives.ahima.org/wp-content/uploads/2016/03/Crossroads-betweenWorkforce-and-Education_041816.pdf

Jackson, S. A. (2003). *The quiet crisis: Falling short in producing American scientific and technical talent*. Best.

Jain. R., & Jain, J. (2013). Conceptualization, measure development and empirical assessment of career-oriented attitudes and employability of technology graduates. *Vision: The Journal of Business Perspective*, *17*(2), 143-157.

Jones, J., & Canuel, R. (2013). Supporting the dissemination of undergraduate research: an emerging role for academic librarians. *Proceedings of the Association of College and Research Libraries* (ACRL), pp. 538-545.

Jones, S. K., & Mina, M. (2018). Designing a Curriculum that Helps Students Create Connected Narratives in Electrical Engineering. Paper presented at the *2018 ASEE Annual Conference & Exposition*, Salt Lake City, Utah, June.

Jöreskog, K. G., & Sörbom, D. (1984). LISREL-VI user's guide 3rd edn. IN: *Scientific Software*, Mooresville.

Kane, S. T., Healy, C. C., & Henson, J. (1992). College students and their part-time jobs: Job congruency, satisfaction, and quality. *Journal of Employment Counseling*, *29*(3), 138–144.

Kardash, C. M. (2000). Evaluation of an undergraduate research experience: Perceptions of undergraduate interns and their faculty mentors. *Journal of Educational Psychology*, *92*(1), 191–201.

Katkin, W. (2003). The Boyer Commission Report and its impact on undergraduate research. *New Directions for Teaching and Learning, 2003*(93), 19-38. https://doi.org/10.1002/tl.86

Keeling, R., & Hersh, R. (2011). *We're losing our minds: Rethinking American higher education*. Springer.

Keiler, K. C., Jackson, K. L., Jaworski, L., Lopatto, D., & Ades, S. E. (2017). Teaching broader impacts of science with undergraduate research. *PLoS Biology, 15*(3), e2001318-e2001318. https://doi.org/10.1371/journal.pbio.2001318

Kemp, I. J., & Seagraves, L. (1995). Transferable skills--can higher education deliver? *Studies in Higher Education*, *20*(3), 315. https://doi-org.ezproxy.umsl.edu/10.1080/03075079512331381585

Kim, Y. K., & Sax, L. J. (2009). Student-faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. *Research in Higher Education*, *50*(5), 437–459.

Kinkead, J. (2003). Learning through inquiry: An overview of undergraduate research. *New Directions for Teaching and Learning*, 93, 5–17.

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory Into Practice*, *41*(4), 212–218.

Kuh, G. D. (2001). Assessing what really matters to student learning: Inside the National Survey of Student Engagement. *Change: The Magazine of Higher Learning*, *33*(3), 10–17.

Kuh, G. D. (2008). Excerpt from high-impact educational practices: What they are, who has access to them, and why they matter. *Association of American Colleges and Universities*, *14*(3), 28-29.

Kuh, G. D. (2009). The National Survey of Student Engagement: Conceptual and empirical foundations. *New directions for institutional research*, 141, 5-20.

Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *The Review of Higher Education*, *24*(3), 309-332.

Kuh, G. D., Schuh, J. H., Whitt, E. J., Andreas, R., Lyons, J., Strange, C. C., Krehbiel, L. E., & MacKay, K. A. (1991). *Involving colleges: Successful approaches to fostering student learning and development outside the classroom*. San Francisco, CA: Jossey-Bass.

Kuh, G. D., Kinzie, J., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2006a). *What matters to student success: A review of the literature* (Report commissioned for the National Symposium on Postsecondary Student Success: Spearheading a Dialog on Student Success). Washington, DC: National Postsecondary Education Cooperative.

Kuh, G. D., J, Kinzie, Cruce, T., Shoup, R., & Gonyea, R. M. (2006b). Connecting the dots: Multifaceted analyses of the relationships between student engagement results from the NSSE and the institutional policies and conditions that foster student success. *Final report to Lumina Foundation for Education*. Bloomington, IN: Indiana University Center for Postsecondary Research.

Knight, P. T., & Yorke, M. (2002). Employability through the curriculum. *Tertiary Education and Management*, *8*(4), 261-276.

Knight, P. T., & Yorke, M. (2003). Employability and Good Learning in Higher Education. *Teaching in Higher Education, 8*(1), 3–16. https://doi.org/10.1080/1356251032000052294

Kyriazos, T. A. (2018). Applied Psychometrics: Writing-Up a Factor Analysis Construct Validation Study with Examples. *Psychology*, 9, 2503-2530. https://doi.org/10.4236/psych.2018.911144

Laursen, S. L., Hunter, A.-B., Seymour, E., Thiry, H., & Melton, G. (2010). *Undergraduate Research in the Sciences: Engaging Students in Real Science*. San Francisco, CA: Jossey-Bass.

Lave, J. (1991). Situated learning in communities of practice. Perspectives on Socially shared cognition, 2, 63– 82. http://doi.org/10.1037/10096-003

Lave, J., & Wenger, E. (1991). Situated Learning. *Legitimate Peripheral Participation*, Cambridge: University of Cambridge Press.

Lawrence, J. H., & Blackburn, R. T. (1985). Faculty careers: Maturation, demographic, and historical effects. *Research in Higher Education*, *22*(2), 135-154.

Leak, A. E., Sciaky, E., Lenaburg, L., Bianchini, J. A., & Scott, S. (2018). Essential Elements of Collaboration: Understanding How Chemistry Graduate Students Experience Collaboration through International Research Visits. *Journal of Chemical Education*, *95*(5), 749-757.

Lear, J. L., Ansorge, C., & Steckelberg, A. (2010). Interactivity/community process model for the online education environment. *Journal of Online Learning and Teaching*, *6*(1), 71-77.

Lees, D. (2002b). Graduate Employability: Literature Review. Available on the LTSN Generic Centre website as EMP006, http://www.ltsn.ac.uk/application.asp?app=resources.asp&process=full_record&section=generic&id=190

LeGrand, K., Yamashita, L., Trexler, C. J., Vu, T. L. A., & Young, G. M. (2017). Developing food science core competencies in Vietnam: The role of experience and problem solving in an industry-based undergraduate research course. *Journal of Food Science Education*, *16*(4), 118-130.

Levitz, R. N. (2018). *National Student Satisfaction and Priorities Report*. Washington, DC.

Lewis, A., & Smith, D. (1993). Defining higher order thinking. *Theory into Practice*, *32*(3), 131–137.

Lewis, C. J. (2012). I need to see you to be you: examining the relevance of role modeling on female STEM career choice (Master's thesis).

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1–55.

Little, B. (2001). Reading between the lines of graduate employment. *Quality in Higher Education*, *7*(2), 121-129.

Locke, E. A., & Latham, G. P. (1990). *A Theory of Goal Setting and Task Performance*. Englewood Cliffs, NJ: Prentice Hall.

Locke, E. A., & Latham, G. P. (2006). New directions in goal-setting theory. *Current Directions in Psychological Science*, *15*(5), 265-268.

Lopatto, D. (2004). Survey of undergraduate research experiences (SURE). First findings. *Cell Biology Education*, *3*(4), 270–277.

Lopatto, D. (2007). Undergraduate research experiences support science career decisions and active learning. *CBE—Life Sciences Education*, *6*(4), 297–306. doi:10.1187/cbe.07-06-0039

Lucas, A. F. (2000). Leading academic change: Essential roles for department chairs. *The Jossey-Bass Higher and Adult Education Series*. Jossey-Bass Publishers, 350 Sansome Street, San Francisco, CA 94104.

Lucas, W. A., Cooper, S. Y., Ward, T., & Cave, F. (2009). Industry placement, authentic experience and the development of venturing and technology self-efficacy. *Technovation*, *29*(11), 738-752.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psycho*logy, *51*(1), 201-226. https://doi.org/10.1146/annurev.psych.51.1.201

Mancuso, M., Desmarais, S., Parkinson, K., & Pettigrew, B. (2010). *Disappointment, Misunderstanding and Expectations: A Gap Analysis of NSSE, BCSSE and FSSE*. Toronto, ON: Higher Education Quality Council of Ontario.

Martinez, P. (2021). *The Educational Pipeline: An Examination of K-12 Discipline Disparities and the College Process*. University of California, Los Angeles.

Marton, F., & Säljö, R. (1976b). On qualitative differences in learning. II: Outcome as a function of the learner's conception of the task. *British Journal of Educational Psychology*, *46*(2), 115–127.

Marton, F. & Saljo, R. (1997). Approaches to learning. In F. Marton, D. Hounsell, & N. Entwistle (Eds.), *The Experience of Learning*. Edinburgh: Scottish Academic Press.

Maskooki, K., Rama, D. V., & Raghunandan, K. (1998). Internships in undergraduate finance programs. *Financial Practice and Education*, 8, 74–82.

McCarthy, A., & Garavan, T. (2006). Post feedback development perceptions: Applying the theory of planned behavior. *Human Resource Development Quarterly*, *17*(3), 245–267.

McGrath, J. E., & Kelly, J. R. (1986). *Time and Human Interaction: Toward a Social Psychology of Time*. Guilford Press.

McIntyre, J., and Solomon, N. (1999). The policy environment of work-based learning, globalisation, institutions and the workplace. In *Proceedings of the First International Conference on Researching Work and Learning*, Leeds. University of Leeds, pp. 385-95.

McNeill, M., Gosper, M., & Xu, J. (2012). Assessment choices to target higher order learning outcomes: The power of academic empowerment. *Research in Learning Technology*, *20*(3), 1-14. https://doi.org/10.3402/rlt.v20i0.17595

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Merkel, C. (2003). Undergraduate research at the research universities. *New Directions for Teaching and Learning*, 93, pp. 39-53.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied Multivariate Research: Design and Interpretation*. Sage Publications.

Miller, L., Biggart, A. & Newton, B. (2013). Basic and employability skills. *International Journal of Training and Development*, *3*(17), 173–175.

Minocha, S., Hristov, D. & Reynolds, M. (2017). From graduate employability to employment: policy and practice in UK higher education. *International Journal of Training and Development*, *21*(3), 235-248. doi:10.1111/ijtd.12105

Mintz, S. (2020). K-12 Trends and Future of Higher Education. *Inside Higher Ed.* November 9, 2020. https://www.insidehighered.com/blogs/higher-ed-gamma/k-12-trends-and-future-higher-education

Moody, J., (2021). A guide to the changing number of U.S. universities. *U.S. News & World Report*. https://www.usnews.com/education/best-colleges/articles/how-many-universities-are-in-the-us-and-why-that-number-is-changing

Morley, L. (2001). Producing new workers: Quality, equality and employability in higher education. *Quality in Higher Education*, *7*(2), 131-138.

Murtonen, M., & Balloo, K. (Eds.). (2019). *Redefining scientific thinking for higher education: Higher-order thinking, evidence-based reasoning and research skills*. Springer Nature.

National Academies of Sciences, Engineering and Medicine. (2017). Undergraduate research experiences for STEM students: Successes, challenges, and opportunities. Washington, DC: The National Academies Press. https://doi.org/10.17226/24622

National Conferences on Undergraduate Research (nd.) https://www.cur.org/what/events/students/ncur/

National Institutes of Health. (2011). NOT-OD-10-019: Update on the Requirement for Instruction in the Responsible Conduct of Research.

National Science Foundation. (2003). Exploring the concept of undergraduate research centers: A report on the NSF workshop. Arlington, VA: Author.

National Science Foundation Proposal & Award Policies & Procedures Guide. (2020). June, pp. III-1 – III-2. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg&WT.z_pims_id=0

National Survey of Student Engagement. (2020). *A fresh look at student engagement—Annual results 2013*. Bloomington, IN: Indiana University Center for Postsecondary Research.

Nelson Laird, T., Shoup, R., & Kuh, G. D. (2005a). Deep learning and college outcomes: Do fields of study differ? Presentation at the annual forum of the *Association for Institutional Research*, Chicago, IL.

Nelson Laird, T., Shoup, R., & Kuh, G. D. (2005b). Measuring deep approaches to learning using the National Survey of Student Engagement. Presentation at the annual forum of the *Association for Institutional Research*, Chicago, IL.

Nordenbo, S. E. (2002). Bildung and the Thinking of Bildung. *Journal of Philosophy of Education*, *36*(3), 341-352.

Oakey, R.P., Faulkner, W., Cooper, S.Y., & Walsh, V. (1990). *New Firms in the Biotechnology Industry: Their Contribution to Innovation and Growth*. Frances Pinter, London.

Orr, J. A., Vinebrooke, R. D., Jackson, M. C., Kroeker, K. J., Kordas, R. L., Mantyka-Pringle, C., Van den Brink, P. J., De Laender, F., Stoks, R., Holmstrup, M., Matthaei, C. D., Monk, W. A., Penk, M. R., Leuzinger, S., Schäfer, R. B., & Piggott, J. J. (2020). Towards a unified study of multiple stressors: divisions and common goals across research disciplines. *Proceedings. Biological Sciences*, *287*(1926), [20200421]. https://doi.org/10.1098/rspb.2020.0421

Otter, S. (1992). *Learning Outcomes in Higher Education.* (Leicester, Unit for the Development of Adult Continuing Education). Oxford University Press, (2021). https://languages.oup.com/about-us/

Pace, C. R. (1964). *The influence of academic and student subcultures in college and university environments*. Los Angeles, CA: University of California Los Angeles.

Pace, C. R. (1969). An evaluation of higher education: Plans and perspectives. *Journal of Higher Education*, *40*(9), 673–681.

Pace, C. R. (1980). Measuring the quality of student effort. *Current Issues in Higher Education*, *2*, 10–16.

Pace, C. R. (1982). Achievement and the quality of student effort. Washington, DC: *National Commission on Excellence in Education*.

Pace, C. R. (1998). Recollections and reflections. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research*, *13*, pp. 1–34. New York, NY: Agathon.

Papert, S. (2000). What's the big idea? Toward a pedagogy of idea power. *IBM Systems Journal*, *39*(3.4), 720–729.

Pascarella, E.T. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research*, *50*(4), 545-595.

Pascarella, E. T., & Terenzini, P. T. (1991). *How College Affects Students: Vol. 1. Findings and Insights from Twenty Years of Research*. San Francisco, CA: Jossey-Bass.

Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students: Vol. 2. A Third Decade of Research*. San Francisco, CA: Jossey-Bass.

Performance Indicators Research Group, Bourke, P., Linke, R. D., & Ramsden, P. (1991). *Performance indicators in higher education*. Australian Government Pub Service.

Petrella, J. K., & Jung, A. P. (2008). Undergraduate Research: Importance, Benefits, and Challenges. *International journal of exercise science*, *1*(3), 91–95.

Pew Research Center. (2016). *The State of American Jobs*. https://www.pewresearch.org/social-trends/2016/10/06/the-state-of-american-jobs/

Phillips, R. (2018). Why do so few university graduates start their own businesses? *The Guardian*. https://www.theguardian.com/education/2018/dec/14/why-do-so-few-university-graduates-start-their-own-businesses

Pike, G. R. (2006a). The convergent and discriminant validity of NSSE scalelet scores. *Journal of College Student Development*, *47*(5), 551–564.

Pike, G. R. (2006b). The dependability of NSSE scalelets for college-and department-level assessment. *Research in Higher Education*, *47*(2), 177–195.

Pool, L. D., & Sewell, P. (2007). The key to employability: Developing a practical model of graduate employability. *Education & Training*, *49*(4), 277–289.

Price, M. (2017). 7 reasons why you shouldn't go to college and 4 things to do instead. *HuffPost*, September 6, https://www.huffpost.com/entry/7-reasons-why-youshouldn_1_b_5501111?guce_referrer=aHR0cHM6Ly93d3cuYmluZy5jb20v&guce_refer rer_sig=AQAAAKV1qxUG-xCvdYhLbxbtjr0GfD0w9tdW3zB3oepOyFZAo6N23WXAyQDFVGoIh0XqRHq Xpwu5hB6Hi29NGreTVH4BXribbhyD9Dr2O9fvaXokKgYU8miOJiG

Qualtrics (2021) https://www.qualtrics.com/blog/calculating-sample-size/

Rankin, W. (2016a). http://unfoldlearning.net/2016/11/28/natural-learning/

Rankin, W. (2016b). http://unfoldlearning.net/2016/12/09/formal-learning/

Rankin, W. (2017). https://web.archive.org/web/20171102230002/https://www.iasb.com/bulletin/nb0315.cfm#a12

Rasmussen, E. A., & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation*, *26*(2), 185-194.

Raymond, M. A., McNabb, D. E., & Matthaei, C. F. (1993). Preparing graduates for the workforce: The role of business education. *Journal of Education for Business*, *68*(4), 202–206.

Reindal, S. M. (2013). Bildung, the Bologna process and Kierkegaard's concept of subjective thinking. *Studies in Philosophy and Education*, *32*(5), 533–549.

Reschly, A. L., & Christenson, S. L. (2012). Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S. J. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of Research on Student Engagement,* pp. 3–19. New York, NY: Springer.

Richardson, S., & Radloff, A. (2014). Allies in learning: critical insights into the importance of staff–student interactions in university education. *Teaching in Higher Education*, *19*(6), 603–615. https://doi-org.ezproxy.umsl.edu/10.1080/13562517.2014.901960

Roberts, N. C., & King, P. J. (1991). Policy entrepreneurs: Their activity structure and function in the policy process. *Journal of Public Administration Research and Theory*, *1*(2), 147-175.

Robertson, M. & Wilkinson, D. (2006). *Student Entrepreneurial Intentions Survey 2005-06*, Centre for Graduate Entrepreneurship in Yorkshire, Leeds.

Roizen, J., & Jepson, M. (1985). *Degrees for Jobs: Employer Expectations of Higher Education*. Open University Press.

Roland, J. (2013). 4 Effects of K-12 Coding Programs for Higher Ed. *Campus Technology*, October 3. https://campustechnology.com/articles/2013/10/03/4-effects-of-k12-coding-programs-for-higher-ed.aspx

Saint Amour, M. (2020). Report: Which Employability Skills Are Students Missing?. *Inside Higher Ed*. https://www.insidehighered.com/quicktakes/2020/06/10/report-which-employability-skills-are-students-missing

Schmidt, E. (2019). Overall postsecondary school enrollment dips since 2011. U.S. Census, America counts stories behind the numbers: School enrollment: College down, graduate school up. https://www.census.gov/library/stories/2019/12/school-enrollment-college-down-graduate-school-up.html

Schneider, K. (2012). The subject-object transformations and 'Bildung'. *Educational Philosophy and Theory*, *44*(3), 302–311.

Schreiber, J. B. (2008). Core Reporting Practices in Structural Equation Modeling. *Research in Social and Administrative Pharmacy*, *4*(2), 83-97. https://doi.org/10.1016/j.sapharm.2007.04.003

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, *99*(6), 323-338.

Schroeder, C. (2011). *Coming in from the Margins: Faculty Development's Emerging Organizational Development Role in Institutional Change*. Sterling, VA: Stylus.

Schumacker, E., & Lomax, G. (2016). *A Beginner's Guide to Structural Equation Modelling*. 4th edtn.

Schwartz, M. (2003). The role of advising in undergraduate research. *The Mentor: Innovative Scholarship on Academic Advising*, 5. DOI: 10.26209/MJ561685

Seipel, S. H. (2018). Stakeholder Perceptions: The Impact of a University-based Laboratory School on a Campus-based University Educator Preparation Program. University of Missouri-Columbia.

Seymour, E., Hunter, A. B., Laursen, S. L., & DeAntoni, T. (2004). Establishing the benefits of research experiences for undergraduates in the sciences: First findings from a three-year study. *Science Education*, *88*(4), 493-534.

Shuttleworth, M. (2019). What is convergent validity and discriminant validity? *Education*, January 26. https://www.ecwausa.org/what-is-convergent-validity-and-discriminant-validity/

Smith, A. M., & Paton, R. A. (2014). Embedding enterprise education: A service based transferable skills framework. *The International Journal of Management Education*, *12*(3), 550-560.

Smith, M. F. (2004). Growing Expenses, Shrinking Resources: The States and Higher Education. A*cademe*, *90*(4), 32-35.

Song, V. (2021). COVID-19 Has Widened the Skills Gap. But It Also Presents an Opportunity to Close It. EdSurge. https://www.edsurge.com/news/2021-02-01-covid-19-has-widened-the-skills-gap-but-it-also-presents-an-opportunity-to-close-it

Spronken-Smith, R. A., Brodeur, J. J., Kajaks, T., Luck, M., Myatt, P., Verburgh, A., ... & Wuetherick, B. (2013). Completing the research cycle: A framework for promoting dissemination of undergraduate research and inquiry. *Teaching and Learning Inquiry*, *1*(2), 105-118.

Statista (2022). *Number of business establishments less than 1 year old in the United States*, March 1994 to March 2020. https://www.statista.com/statistics/235494/new-entrepreneurial-businesses-in-the-us/

Sullivan, H. S. (Ed.). (2013). *The Interpersonal Theory of Psychiatry*. Routledge.

Suvedi, M., Ghimire, R. P., & Millenbah, K. F. (2016). How prepared are undergraduates for a career?. *NACTA Journal*, *60*(1a), 13.

Swanson, L. H., & Coddington, L. R. (2016). Creating partnerships between teachers & undergraduates interested in secondary math & science education. *Teaching and Teacher Education, 59*, 285-294. https://doi.org/10.1016/j.tate.2016.06.008

Tabachnick, B.G. & Fidell, L.S. (2007). *Using Multivariate Stat*istics (5th ed.). New York: Allyn and Bacon.

Taylor, S. M. (1988). Effects of college internships on individual participants. *Journal of Applied Psychology*, *73*(3), 393–401.

The Trustees of Indiana University. (2020). https://nsse.indiana.edu/ and
        https://fsse.indiana.edu/

Thistlethwaite, D. L. (1960). College press and changes in study plans of talented
        students. *Journal of Educational Psychology, 51*, 222-234.

Thistlethwaite, D. L. (1962). Fields of study and development of motivation to seek
        advanced training. *Journal of Educational Psychology, 53*, 53-64.

Thomas, L. (2016). Developing inclusive learning to improve the engagement, belonging,
        retention, and success of students from diverse groups. In *Widening Higher
        Education Participation,* pp. 135-159, Chandos Publishing.

Tinto, V. (1975). Dropouts from higher education: A theoretical synthesis of the recent
        literature. *Review of Educational Research*, *45*(1), 89–125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*
        (2nd ed.). Chicago, IL: University of Chicago Press.

Tolley, G. (1991). Enhancing learning through work placements, in: A. Adams, M.
        Brewer, I. Marshall., G. Tolley & T. Whelan (Eds) *And It Must Count: Work-
        based Learning for Academic Credit in Higher Education*, London, LET.

Tomlinson, M. (2007). Graduate employability and student attitudes and orientations to
        the labour market. *Journal of Education and Work*, *20*(4), 285–304.

Tomlinson, M. (2012). Graduate employability: a review of conceptual and empirical
        themes. *Higher Education Policy*, *25*(4), 407-421.

Towers, N., Santoso, A.S., Sulkowski, N. & Jameson, J. (2020). Entrepreneurial
        capacity-building in HEIs for embedding entrepreneurship and enterprise creation
        – a tripartite approach. *International Journal of Retail & Distribution
        Management*, *48*(8), 881-899. https://doi.org/10.1108/IJRDM-06-2019-0185

Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell
        (Eds.), *Using Multivariate Statistics* (4th ed.). Needham Heights, MA: Allyn &
        Bacon.

Umbauch, P. D., & Wawrzynski, M. R. (2005). Faculty do matter: The role of college
        faculty in student learning and engagement. *Research in Higher Education*, *46*(2),
        153–184.

U.S. Census Bureau. (2020). *Income and Poverty in the United States: 2019*. September
        15, 2020. Report Number P60-270, Jessica Semega, Melissa Kollar, Emily A.
        Shrider, and John Creamer.
        https://www.census.gov/content/dam/Census/library/publications/2020/demo/p60-
        270.pdf

U.S. Department of Education, National Center for Education Statistics. (2021). *Digest of
        Education Statistics, 2019* (NCES 2021-009), Chapter 3.

Van der Zwaan, B. (2017). *Higher Education in 2040. A Global Approach*. Amsterdam
        University Press.

Von Humboldt, W. (1810). *Ueber die innere und äußere Organisation der höheren
        wissenschaftlichen Anstalten* in Berlin.

Wadsworth, B. J. (1996). *Piaget's Theory of Cognitive and Affective Development: Foundations of Constructivism*. Longman Publishing.

Wesson, K. (2012). From STEM to ST2REAM. Reassembling our disaggregated curriculum. *Education Week*, *32*(9), 25-27.

Westfall, P. H. (2014). Kurtosis as Peakedness, 1905–2014. R.I.P. *The American Statistician, 68*(3): 191–195. Retrieved 15 May 2016 from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4321753/

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing Reliability and Stability in Panel Models. *Sociological Methodology*, *8*(1), 84-136.

Whitchurch, C., & Gordon, G. (2017). *Reconstructing Relationships in Higher Education: Challenging Agendas.* Taylor & Francis.

White, D. A. (2018). Faculty behaviors influencing intent to pursue graduate education among RN-BSN students. *Teaching and Learning in Nursing*, *13*(2), 108-112.

Whitt, E. J., Edison, M., Pascarella, E. T., Nora, A., & Terenzini, P. T. (1999). Interactions with peers and objective and self-reported cognitive outcomes across three years of college. *Journal of College Student Development*, *40*(1), 61–78.

Woodall, T., Hiller, A., & Resnick, S. (2014). Making sense of higher education: Students as consumers and the value of the university experience. *Studies in higher education*, *39*(1), 48-67.

Yorke, M. (2005). Formative assessment in higher education: Its significance for employability, and steps towards its enhancement. *Tertiary Education and Management*, *11*(3), 219-238.

Yorke, M. (2006). Employability in Higher Education: What It Is-What It Is Not: Learning & Employability Series 1. *The Higher Education Academy*, York. http://www.heacademy.ac.uk/assets/documents/tla/employability/id116_employability_in_higher_education_336.pdf

Zainol, N., Abidin, S. Z., & Yazid, N. A. (2014). Industry Involvement in Undergraduate Research Project for Chemical Engineering (Biotechnology) Programme. In *2014 International Conference on Teaching and Learning in Computing and Engineering*, April, pp. 196-200, IEEE.

Zamfir, A.M., Lungu, E.O., &; Mocanu, C. (2013). Entrepreneurship among higher education graduates in 13 European countries. *Theoretical and Applied Economics, 20*(11): 73-82. November 2013.

Zeegers, P. (2004). Student learning in higher education: A path analysis of academic achievement in science. *Higher Education Research and Development*, *23*(1), 35–56.

Zilvinskis, J., & Dumford, A. D. (2018). The Relationship Between Transfer Student Status, Student Engagement, and High-Impact Practice Participation. *Community College Review*, *46*(4), 368–387. https://doi.org/10.1177/0091552118781495

Zydney, A. L., Bennett, J. S., Shahid, A., & Bauer, K. W. (2002). Impact of undergraduate research experience in engineering. *Journal of Engineering Education, Washington, D.C., 91*(2), 151-157. https://doi.org/10.1002/j.2168-9830.2002.tb00687.x

## Appendix A. Ethics Memo

**Paradigms and Ethics**

**University of Missouri – St. Louis**
**Ethics Memo for DBA Scientific Dissertation Research**

**Researcher**

Michelle Pipes

**Faculty Sponsor**

University of Missouri – St Louis
Dr. Dinesh Mirchandani

**Purpose of the Code of Ethics**

The purpose of this code is to establish a set of principles and procedures to guide the researcher to achieve the goals and objectives of the research project ethically. The code outlines the obligations of the research team members through each phase of the project, from the design of the research through the publication and communication of the findings. This code recognizes that research conducted should be meaningful and ensure that benefits outweigh any possible risks or harm.

**Principles**

<u>Harm to Participants</u>

No research undertaken will cause harm to participants, researchers, or other persons directly or indirectly involved in the research. The types of questions asked will be related to current and prior employment. Any cultural, religious, gender, or other differences in a research population will always be handled sensitively and appropriately. Relevant ethical standards of research practice will always be adhered to during this study.

Specific populations are vulnerable in human subjects' research, including people who cannot competently understand the information regarding a study and cannot give valid consent. Such populations may include individuals with psychiatric, cognitive, or developmental disorders, and substance abusers. The topic of this research does not require engaging with vulnerable subjects, and for that reason, it will be avoided. Each of the researchers has committed to evaluating whether subjects may be vulnerable and

whether they are competent to consent or would need to be excused from the project.

Integrity & Confidentiality

Interviews will be conducted professionally by the University of Missouri - St. Louis doctoral student, Michelle Pipes, and under the supervision of Dr. Dinesh Mirchandani, Doctor of Business Administration (DBA) Faculty. Deception of research participants will not occur, and the researcher will be transparent with the goals of study and methods for data collection. All research results, analyses, and interpretations will first be reviewed by the researchers to ensure accuracy and avoid misunderstanding. Any conflicts of interest will be declared to the University of Missouri - St. Louis Institutional Review Board (IRB), to research participants, and in any dissemination of findings. The researcher will provide an accurate representation of all collected research data.

Informed Content

Participation in this research is voluntary.  Research participants will be free from coercion and not pressured to participate in any way and may leave the project at any time with no possibility of penalty. In addition to the informed consent completion, participants will be verbally reminded of their consent and rights at the beginning of the interview.

The informed consent will specify the following: The purpose of the investigation; the procedures; the risks; any benefits, or absence of them, to the individual or to others in the future or to society; a statement that individuals may decline to participate and also will be free to withdraw at any time without giving a reason; the level of feedback to be offered; the time required and an invitation to ask questions. The informed consent will also provide the University of Missouri - St. Louis contact details so that participants may report any possible concerns about the conduct of the study. Research participants will have a minimum of 24 hours to review the informed consent and consult relevant parties where necessary.

Privacy and confidentiality

The collection of personal information will be limited to what is deemed necessary to complete the related research. The researcher is committed to maintaining the security of Personal Identifiable Information (PII) and any other sensitive information. We will use pseudonyms, appropriate physical security of records, and security safeguards for computer and network systems. The researcher has the responsibility to protect against unauthorized access and disclosure of PII. This responsibility includes ensuring that access or disclosure is only made to or by authorized individuals, and reasonable measures are taken to prevent any unauthorized access, disclosure, loss, or theft of information. All information obtained in the course of research will be considered privileged information and should under no circumstances be publicly disclosed in a fashion that would identify any individual or organization except when required by law or with the express consent of the research participant.

Privacy and confidentiality will be assured by storing redacted interview data on a secured Drive, with access limited to the Researcher, Michelle Pipes.

- Password protection will be placed on individual documents used to ensure digital data is secured.
- The researcher will redact any PII (i.e., names, addresses, corporations, etc.) from the transcript as soon as it is received.
- Informed consent will be handled with care and stored in a secure physical location on the University of Missouri - St. Louis campus.

Communication with Participants

Potential research participants will receive communicated information from the researcher in advance. The research will be explained in easy-to-understand language.

Risk Mitigation

IRB-approved research will be conducted by the University of Missouri - St. Louis doctoral student, Michelle Pipes, and under the direction of Dr. Dinesh Mirchandani. The researcher listed on Page 1 has completed the Collaborative Institutional Training Initiative (CITI) certifications of:

- Social and Behavioral Research
- Social and Behavioral Responsible Conduct of Research

Dissemination of Research Findings

The researcher must disseminate their research findings. Research participants will be offered access to a summary of the research findings. Any reports to the public will protect the confidentiality of the participant, be clear and understandable, and accurately reflect the outcome of the study.

Conflict of Interest

To avoid bias or stress, since the researcher is currently employed in the aerospace industry, the research will not interview anyone within her direct chain of command.

**Appendix B. Supplemental Modified NSSE Data and Variables Data Screening**

| Descriptive Statistics | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | | Kurtosis | |
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| High Impact Practices | 864 | 1.00 | 4.00 | 2.5081 | .57785 | .101 | .083 | -.025 | .166 |
| Reflective Integrative Learning | 864 | 1.00 | 4.00 | 2.1939 | .53970 | .246 | .083 | -.054 | .166 |
| Quality of Interactions | 864 | 1.00 | 5.00 | 2.4823 | .74271 | .232 | .083 | .258 | .166 |
| Development of Transferable Skills | 864 | 1.00 | 4.00 | 2.2612 | .56338 | .158 | .083 | -.209 | .166 |
| Higher Order Learning | 864 | 1.00 | 4.00 | 2.1481 | .72932 | .278 | .083 | -.336 | .166 |
| Student Faculty Interaction | 864 | 1.00 | 4.33 | 2.8156 | .67545 | -.498 | .083 | -.014 | .166 |
| Valid N (listwise) | 864 | | | | | | | | |

*Modified NSSE Table 1 Modified NSSE Table 1 Modified NSSE Descriptive Statistics for Six IVs*

| Model Summary[b] | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .493[a] | .243 | .238 | .878 |

a. Predictors: (Constant), Higher Order Learning, High Impact Practices, Quality of Interactions, Reflective Integrative Learning, Development of Transferable Skills

b. Dependent Variable: How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? - e. Acquiring job- or work-related knowledge and skills

*Modified NSSE Table 2 Employability Model Summary*

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 212.172 | 5 | 42.434 | 55.003 | <.001[b] |
| | Residual | 661.935 | 858 | .771 | | |
| | Total | 874.106 | 863 | | | |

a. Dependent Variable: How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? - e. Acquiring job- or work-related knowledge and skills

b. Predictors: (Constant), Higher Order Learning, High Impact Practices, Quality of Interactions, Reflective Integrative Learning, Development of Transferable Skills

*Modified NSSE Table 3 Employability ANOVA*

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -.435 | .182 | | -2.390 | .017 |
| | High Impact Practices | .216 | .053 | .124 | 4.059 | <.001 |
| | Reflective Integrative Learning | .054 | .071 | .029 | .762 | .446 |
| | Quality of Interactions | .162 | .042 | .120 | 3.845 | <.001 |
| | Development of Transferable Skills | .691 | .070 | .387 | 9.891 | <.001 |
| | Higher Order Learning | 6.346E-5 | .052 | .000 | .001 | .999 |

a. Dependent Variable: How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? - e. Acquiring job- or work-related knowledge and skills

*Modified NSSE Table 4 Employability Coefficients*

**Correlations**

| | | Employability | High Impact Practices | Reflective Integrative Learning | Quality of Interactions | Development of Transferable Skills | Higher Order Learning |
|---|---|---|---|---|---|---|---|
| How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? - e. Acquiring job- or work-related knowledge and skills | Pearson Correlation | 1 | .218** | .299** | .247** | .459** | .274** |
| | Sig. (2-tailed) | | <.001 | <.001 | <.001 | <.001 | <.001 |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |
| High Impact Practices | Pearson Correlation | .218** | 1 | .220** | .124** | .187** | .145** |
| | Sig. (2-tailed) | <.001 | | <.001 | <.001 | <.001 | <.001 |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |
| Reflective Integrative Learning | Pearson Correlation | .299** | .220** | 1 | .235** | .555** | .533** |
| | Sig. (2-tailed) | <.001 | <.001 | | <.001 | <.001 | <.001 |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |
| Quality of Interactions | Pearson Correlation | .247** | .124** | .235** | 1 | .271** | .195** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | | <.001 | <.001 |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |
| Development of Transferable Skills | Pearson Correlation | .459** | .187** | .555** | .271** | 1 | .562** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | | <.001 |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |
| Higher Order Learning | Pearson Correlation | .274** | .145** | .533** | .195** | .562** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | <.001 | |
| | N | 864 | 864 | 864 | 864 | 864 | 864 |

**. Correlation is significant at the 0.01 level (2-tailed).

*Modified NSSE Table 5 Pearson's Correlation Coefficient for Employability and Six IVs*

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .201[a] | .040 | .038 | 1.310 |

a. Predictors: (Constant), Student Faculty Interaction, High Impact Practices

b. Dependent Variable: After my undergraduate graduation, I plan to do the following: - d. My goal is to be accepted into a graduate program in the future.

*Modified NSSE Table 6 Graduate Education Intention Model Summary*

**ANOVA**[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 62.023 | 2 | 31.011 | 18.082 | <.001[b] |
| | Residual | 1476.615 | 861 | 1.715 | | |
| | Total | 1538.638 | 863 | | | |

a. Dependent Variable: After my undergraduate graduation, I plan to do the following: - d. My goal is to be accepted into a graduate program in the future.

b. Predictors: (Constant), Student Faculty Interaction, High Impact Practices

*Modified NSSE Table 7 Graduate Education Intention ANOVA*

**Coefficients**[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .844 | .240 | | 3.519 | <.001 |
| | High Impact Practices | .137 | .081 | .059 | 1.691 | .091 |
| | Student Faculty Interaction | .346 | .069 | .175 | 5.007 | <.001 |

a. Dependent Variable: After my undergraduate graduation, I plan to do the following: - d. My goal is to be accepted into a graduate program in the future.

*Modified NSSE Table 8 Graduate Education Intention Coefficients*

**Correlations**

| | | Graduate Education Intention | High Impact Practices | Student Faculty Interaction |
|---|---|---|---|---|
| After my undergraduate graduation, I plan to do the following: - d. My goal is to be accepted into a graduate program in the future. | Pearson Correlation | 1 | .111** | .193** |
| | Sig. (2-tailed) | | .001 | <.001 |
| | N | 864 | 864 | 864 |
| High Impact Practices | Pearson Correlation | .111** | 1 | .297** |
| | Sig. (2-tailed) | .001 | | <.001 |
| | N | 864 | 864 | 864 |
| Student Faculty Interaction | Pearson Correlation | .193** | .297** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | |
| | N | 864 | 864 | 864 |

**. Correlation is significant at the 0.01 level (2-tailed).

*Modified NSSE Table 9 Pearson's Correlation Coefficient for Graduation Education Intention and Two IVs*

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .238[a] | .057 | .056 | 1.029 |

a. Predictors: (Constant), Development of Transferable Skills

b. Dependent Variable: After my undergraduate graduation, I plan to do the following: - e. I am determined to use my scientific research knowledge in my future career.

*Modified NSSE Table 10 Entrepreneurial Acumen Model Summary*

**ANOVA**[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 54.848 | 1 | 54.848 | 51.823 | <.001[b] |
| | Residual | 912.309 | 862 | 1.058 | | |
| | Total | 967.156 | 863 | | | |

a. Dependent Variable: After my undergraduate graduation, I plan to do the following: - e. I am determined to use my scientific research knowledge in my future career.

b. Predictors: (Constant), Development of Transferable Skills

*Modified NSSE Table 11 Entrepreneurial Acumen ANOVA*

**Coefficients**[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .790 | .145 | | 5.455 | <.001 |
| | Development of Transferable Skills | .447 | .062 | .238 | 7.199 | <.001 |

a. Dependent Variable: After my undergraduate graduation, I plan to do the following: - e. I am determined to use my scientific research knowledge in my future career.

*Modified NSSE Table 12 Entrepreneurial Acumen Coefficients*

**Correlations**

|  |  | Entrepreneurial Acumen | Development of Transferable Skills |
|---|---|---|---|
| After my undergraduate graduation, I plan to do the following: - e. I am determined to use my scientific research knowledge in my future career. | Pearson Correlation | 1 | .238** |
|  | Sig. (2-tailed) |  | <.001 |
|  | N | 864 | 864 |
| Development of Transferable Skills | Pearson Correlation | .238** | 1 |
|  | Sig. (2-tailed) | <.001 |  |
|  | N | 864 | 864 |

**. Correlation is significant at the 0.01 level (2-tailed).

*Modified NSSE Table 13 Pearson's Correlation Coefficient for Entrepreneurial Acumen and DTS IV*
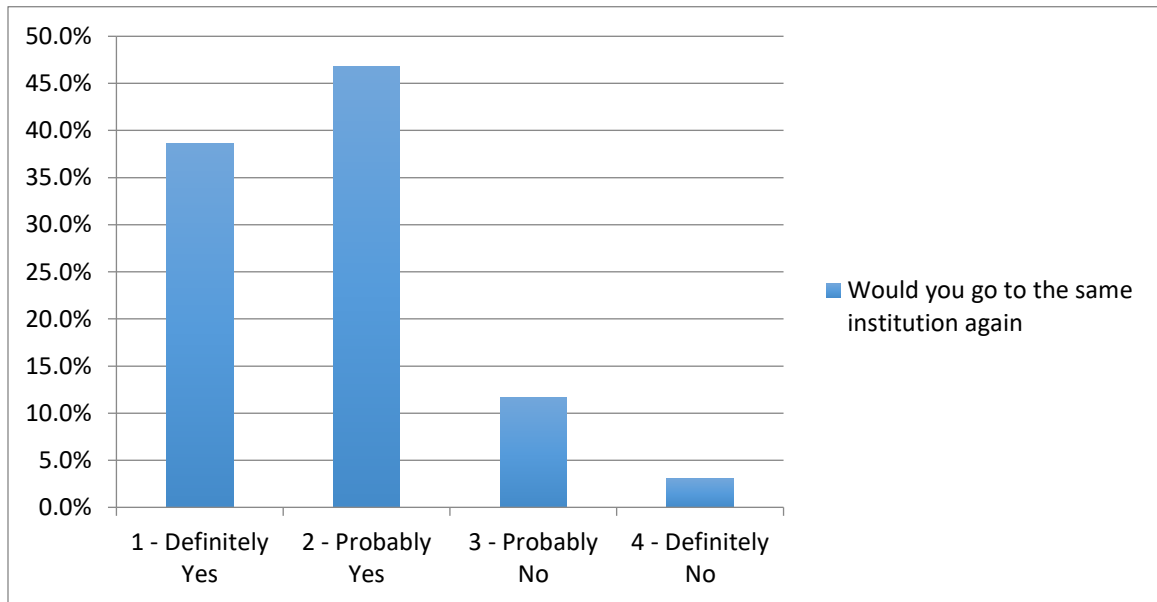


*Modified NSSE Table Q11. Would you go to the same institution again? 1 - Definitely Yes (38.6%); 2 - Probably Yes (46.7%); 3 - Probably No (11.6%); 4 - Definitely No (3.0%)*
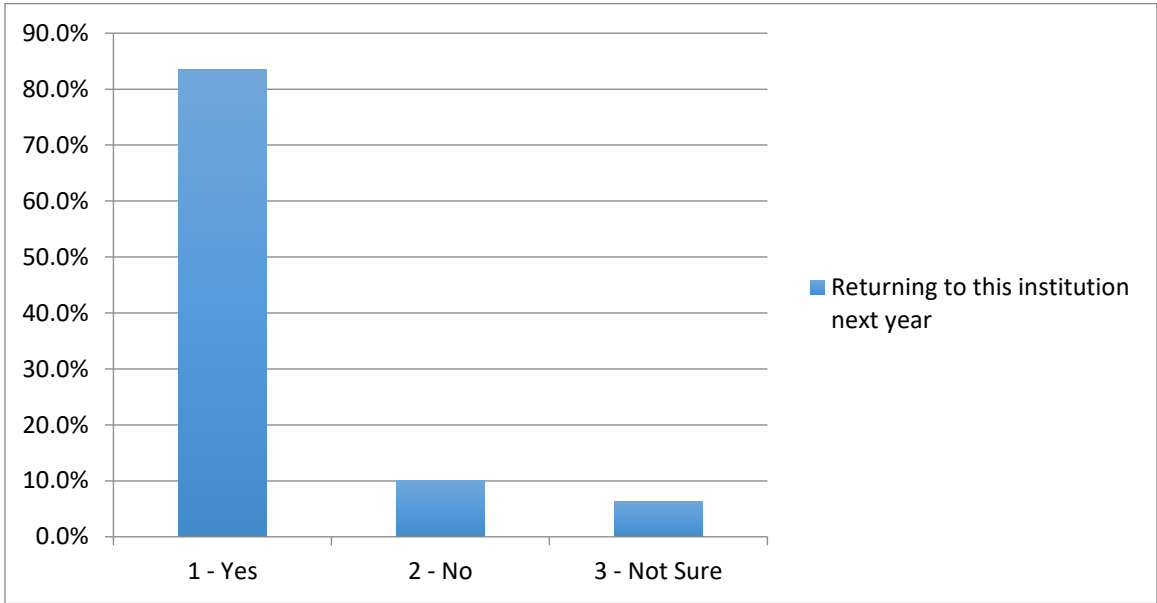
*Modified NSSE Table Q12. Returning to this institution next year?*
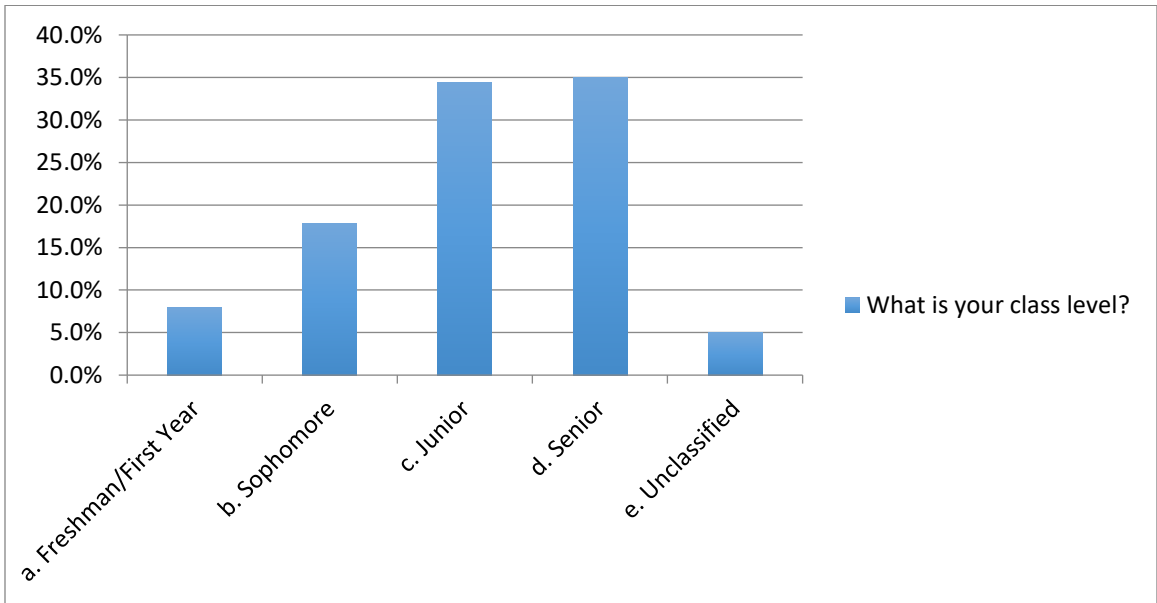


*Modified NSSE Table Q16. What is your class level?*
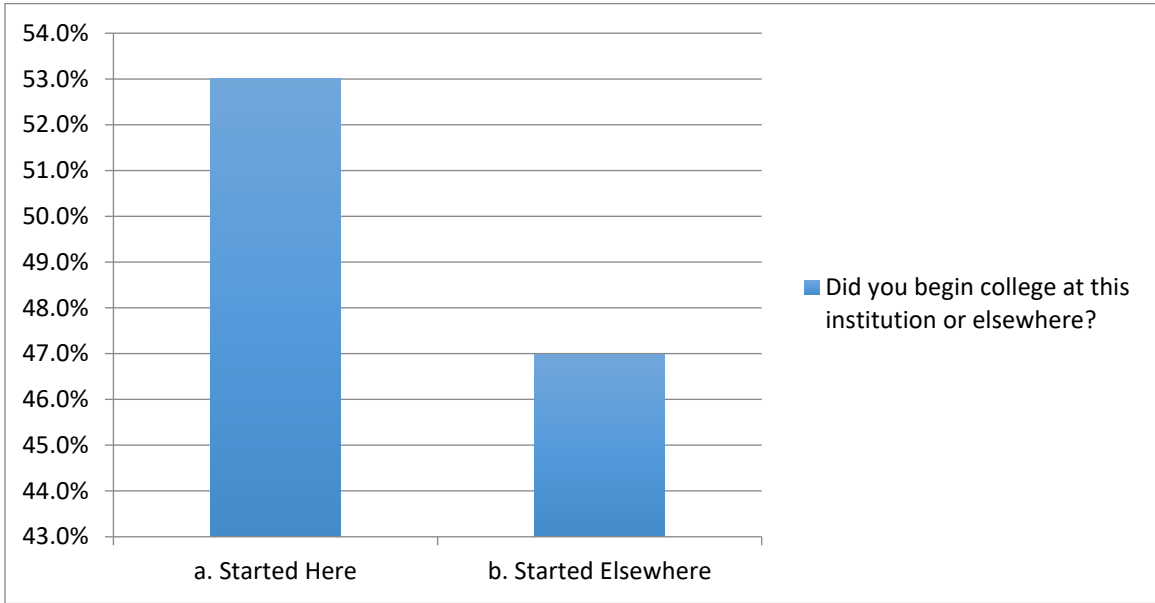
*Modified NSSE Table Q20. Did you begin college at this institution or elsewhere? a. Started Here (53.0%) and b. Started Elsewhere (47.0%)*
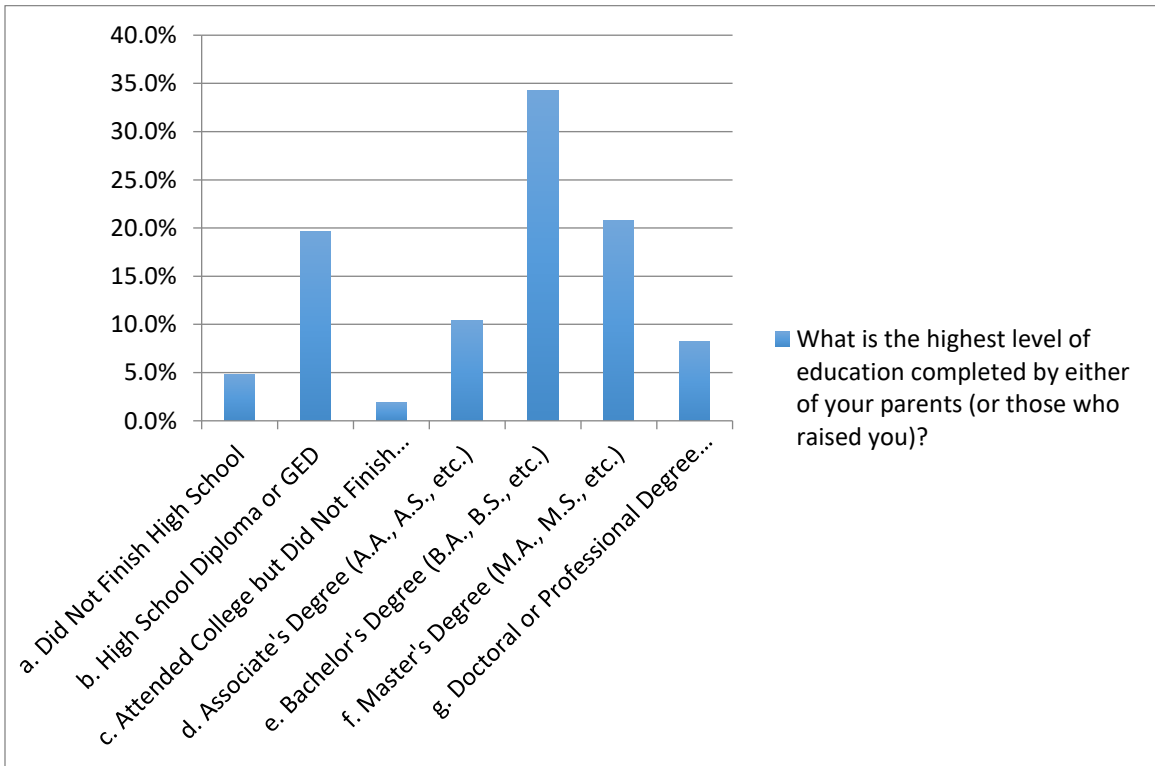


*Modified NSSE Table Q23. What is the highest level of education completed by either of your parents (or those who raised you)?*
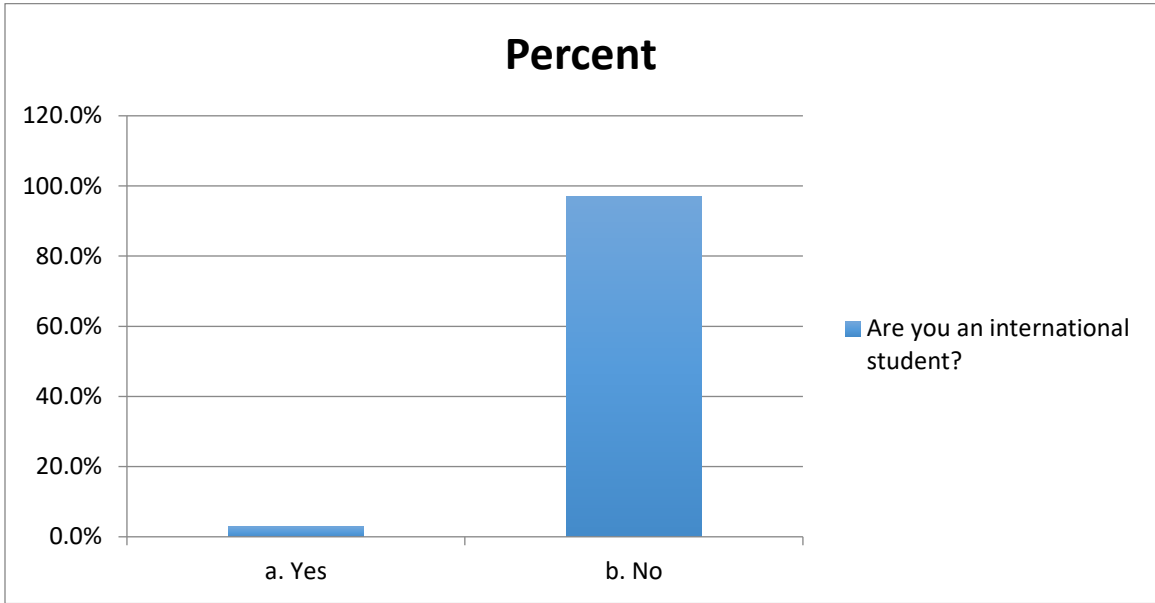
*Modified NSSE Table Q25. Are you an international student? a. Yes (3.0%) and b. No (97.0%)*
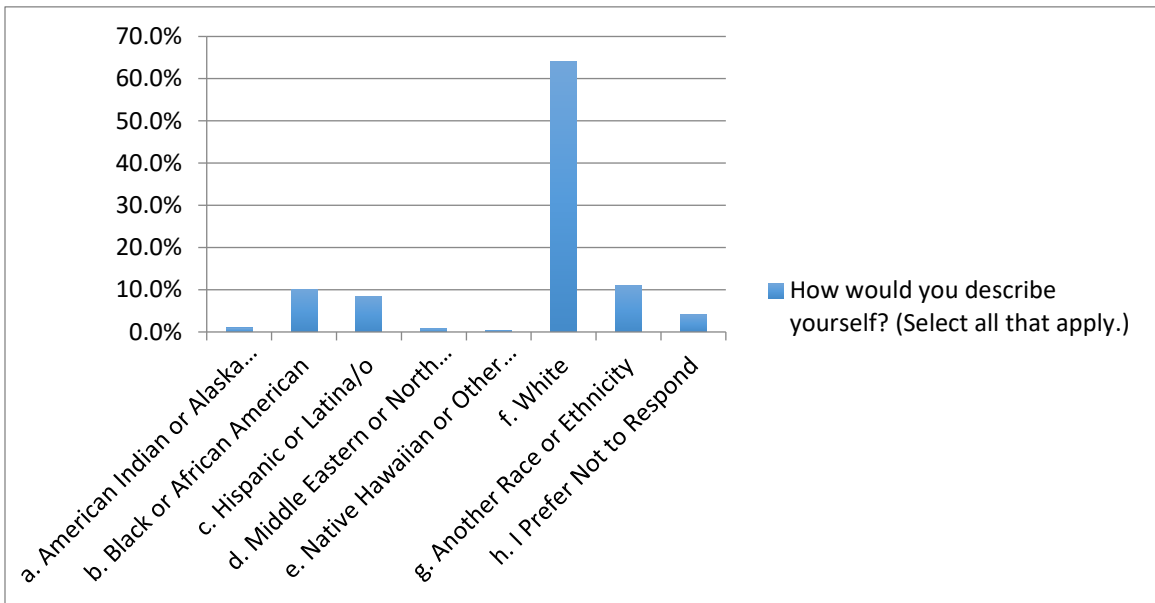


*Modified NSSE Table Q26. How would you describe yourself? (Select all that apply.)*
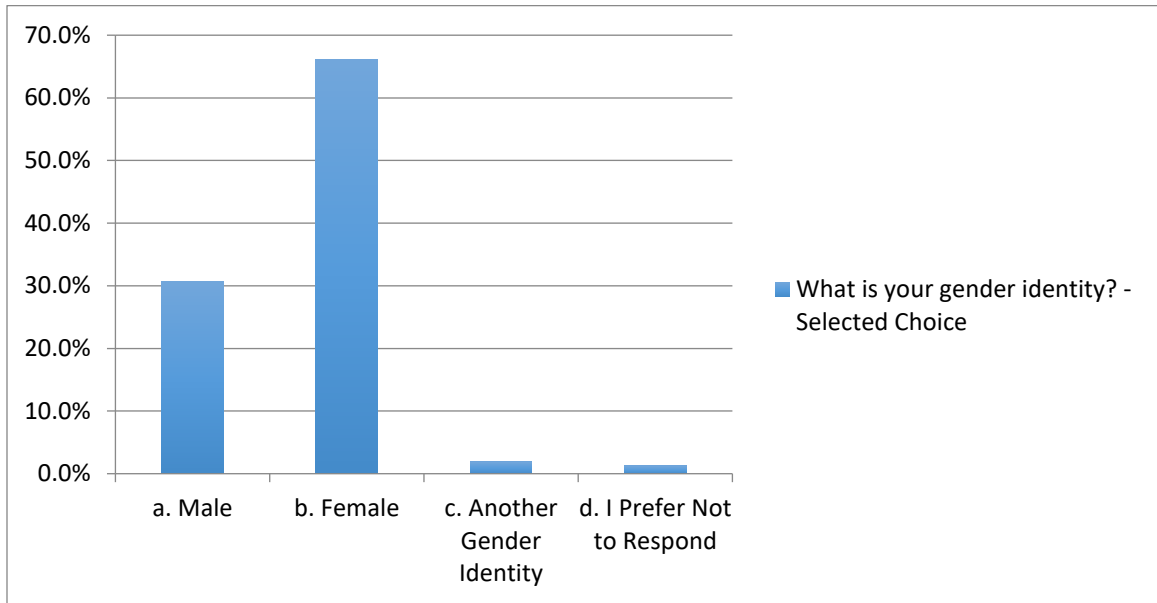
*Modified NSSE Table Q24. What is your gender identity?*

## Appendix C: Modified NSSE Survey Questions

**Research and Relationship Impact on Undergraduates**

**Exploring the Impact Research and Relationship have on Undergraduate Students**
   Principal Investigator:  Michelle Pipes                      PI's Phone Number:  573-202-4006
 Academic Advisor:  Dr. Dinesh Mirchandani            <u>**Summary of the Study**</u>  This study is a research project
conducted by Michelle Pipes at the University of Missouri-St. Louis (UMSL). Your participation in the study is voluntary.
The purpose of this study is to examine research activities and professional relationships in the context of
undergraduate education. This study will take approximately ten minutes in total. Participants who complete the survey
will be entered into a raffle for **Ten (10) $50 Amazon gift cards that will be awarded when the survey closes. You
must complete every question to be eligible for one of the random raffle prizes.** This survey is unique to your
institution, so please don't forward it to others who are ineligible to participate.

 1.  To participate, you must be an undergraduate student and at least 18 years old. You may participate in this study
only once. Approximately 200 people may be involved in this research, recruited through undergraduate departments
at four Midwestern universities.

 2.   Your participation is voluntary, and you may choose not to participate in this research study or withdraw your
consent at any time. Please note that there may be minimal risks to participating (i.e. boredom, loss of time, etc.).
 3.   Upon completion of the survey, you will see a pop-up screen with a link to a secure webpage where, you can
provide your academic email address to enter the raffle. Your survey responses will never be linked to your email
address. Your contact information will only be used to award the raffle prizes. If you win one of the raffle prizes, you will
be notified by email by the principal investigator.  We will do everything we can to protect your privacy. As part of this
effort, your identity will not be revealed in any publication that may result from this study. In rare instances, a
researcher's study must undergo an audit or program evaluation by an oversight agency (such as the Office for Human
Research Protection) that would lead to the disclosure of your data and any other information collected by the
researcher.

 4.   If you have any questions or concerns regarding this study, or if any problems arise, you may contact the Principal
Investigator, Michelle Pipes, (michellepipes@mst.edu, 573-202-4006). You may also ask questions or state concerns
regarding your rights as a research participant to the Office of Research, at 314-516-5897.
 This survey is adapted from the National Survey of Student Engagement (NSSE) (2020).     **I have read the above
statement and have been given the opportunity to ask questions. I understand I can download a copy of this
consent form for my records.**

   ◯  I consent, begin the survey  (4)

   ◯  I do not consent, I do not wish to participate  (5)

Q1 **During the current school year, about how often have you done the following?**

| | 1 - Very Often (1) | 2 - Often (2) | 3 - Sometimes (3) | 4 - Never (4) |
|---|---|---|---|---|
| a. Explained course material to one or more students (5) | ◯ | ◯ | ◯ | ◯ |
| b. Prepared for exams by discussing or working through course material with other students (6) | ◯ | ◯ | ◯ | ◯ |
| c. Worked with other students on course projects or assignments (7) | ◯ | ◯ | ◯ | ◯ |
| d. Given a course presentation (8) | ◯ | ◯ | ◯ | ◯ |

**Q2 During the current school year, about how often have you done the following?**

| | 1 - Very Often (1) | 2 - Often (2) | 3 - Sometimes (3) | 4 - Never (4) |
|---|---|---|---|---|
| a. Combined ideas from different courses when completing assignments (1) | ○ | ○ | ○ | ○ |
| b. Connected your learning to societal problems or issues (2) | ○ | ○ | ○ | ○ |
| c. Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments (3) | ○ | ○ | ○ | ○ |
| d. Examined the strengths and weaknesses of your own views on a topic or issue (4) | ○ | ○ | ○ | ○ |
| e. Tried to better understand someone else's views by imagining how an issue looks from their perspective (5) | ○ | ○ | ○ | ○ |
| f. Learned something that changed the way you understand an issue or concept (6) | ○ | ○ | ○ | ○ |
| g. Connected ideas from your courses to your prior experiences and knowledge (7) | ○ | ○ | ○ | ○ |

Q3. **During the current school year, about how often have you done the following?**

| | 1 - Very Often (1) | 2 - Often (2) | 3 - Sometimes (3) | 4 - Never (4) |
|---|---|---|---|---|
| b. Worked with a faculty member on activities other than coursework (committees, student groups, etc.) (2) | ○ | ○ | ○ | ○ |
| c. Discussed course topics, ideas, or concepts with a faculty member outside of class (3) | ○ | ○ | ○ | ○ |

Q4. **During the current school year, how much has your coursework emphasized the following?**

| | 1 - Very Much (1) | 2 - Quite a Bit (2) | 3 - Some (3) | 4 - Very Little (4) |
|---|---|---|---|---|
| a. Applying facts, theories, or methods to practical problems or new situations (2) | ○ | ○ | ○ | ○ |
| b. Analyzing an idea, experience, or line of reasoning in depth by examining its parts (3) | ○ | ○ | ○ | ○ |
| c. Evaluating a point of view, decision, or information source (4) | ○ | ○ | ○ | ○ |
| d. Forming a new idea or understanding from various pieces of information (5) | ○ | ○ | ○ | ○ |

Q5. **During the current school year, about how often have you done the following?**

| | 1 - Very Often (1) | 2 - Often (2) | 3 - Sometimes (3) | 4 - Never (4) |
|---|---|---|---|---|
| a. Reached conclusions based on your own analysis of numerical information (numbers, graphs, statistics, etc.) (1) | ○ | ○ | ○ | ○ |
| b. Used numerical information to examine a real-world problem or issue (unemployment, climate change, public health, etc.) (2) | ○ | ○ | ○ | ○ |
| c. Evaluated what others have concluded from numerical information (3) | ○ | ○ | ○ | ○ |

Q6 **After my undergraduate graduation, I plan to do the following:**

| | 1 - Strongly agree (1) | 2 - Somewhat agree (2) | 3 - Neither agree nor disagree (3) | 4 - Somewhat disagree (4) | 5 - Strongly disagree (5) |
|---|---|---|---|---|---|
| a. I intend to learn more about graduate programs in the future. (1) | ○ | ○ | ○ | ○ | ○ |
| b. I intend to continue my education beyond my undergraduate degree. (2) | ○ | ○ | ○ | ○ | ○ |
| c. I intend to apply to graduate programs in the future. (3) | ○ | ○ | ○ | ○ | ○ |
| d. My goal is to be accepted into a graduate program in the future. (4) | ○ | ○ | ○ | ○ | ○ |
| e. I am determined to use my scientific research knowledge in my future career. (5) | ○ | ○ | ○ | ○ | ○ |

Q7. **Which of the following have you done or do you plan to do before you graduate?**

| | 1 - Done or In Progress (1) | 2 - Plan To Do (2) | 3 - Do Not Plan To Do (3) | 4 - Have Not Decided (4) |
|---|---|---|---|---|
| a. Participate in an internship, co-op, field experience, student teaching, or clinical placement (1) | ○ | ○ | ○ | ○ |
| b. Participate in a study abroad program (4) | ○ | ○ | ○ | ○ |
| c. Work with a faculty member on a research project (5) | ○ | ○ | ○ | ○ |

Q8. **During the current school year, to what extent have your courses challenged you to do your best work?**

| | 1 - Far too much (13) | 2 - Slightly too much (14) | 3 - Neither too much nor too little (15) | 4 - Slightly too little (16) | 5 - Far too little (17) |
|---|---|---|---|---|---|
| My courses have challenged me to do my best work (4) | ○ | ○ | ○ | ○ | ○ |

Q9. **How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?**

| | 1 - Very Much (1) | 2 - Quite a Bit (2) | 3 - Some (3) | 4 - Very Little (4) |
|---|---|---|---|---|
| a. Writing clearly and effectively (1) | ○ | ○ | ○ | ○ |
| b. Speaking clearly and effectively (2) | ○ | ○ | ○ | ○ |
| c. Thinking critically and analytically (3) | ○ | ○ | ○ | ○ |
| d. Analyzing numerical and statistical information (4) | ○ | ○ | ○ | ○ |
| e. Acquiring job- or work-related knowledge and skills (5) | ○ | ○ | ○ | ○ |
| f. Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.) (8) | ○ | ○ | ○ | ○ |
| g. Solving complex real-world problems (9) | ○ | ○ | ○ | ○ |
| h. If you are paying attention, please select "Very Little" (11) | ○ | ○ | ○ | ○ |

Q10. **Indicate the quality of your interactions with the following people at your institution.**

| | Excellent (30) | Good (31) | Average (32) | Poor (33) | Terrible (34) |
|---|---|---|---|---|---|
| a. Students (6) | ○ | ○ | ○ | ○ | ○ |
| b. Alumni (2) | ○ | ○ | ○ | ○ | ○ |
| c. Faculty (3) | ○ | ○ | ○ | ○ | ○ |
| d. Staff (4) | ○ | ○ | ○ | ○ | ○ |
| e. Corporate Partners of the University (5) | ○ | ○ | ○ | ○ | ○ |

Q11. **If you could start over again, would you go to the same institution you are now attending?**

| | 1 - Definitely Yes (1) | 2 - Probably Yes (2) | 3 - Probably No (3) | 4 - Definitely No (4) |
|---|---|---|---|---|
| Would you go to the same institution again (4) | ○ | ○ | ○ | ○ |

Q12. **Do you intend to return to this institution next year?**

| | 1 - Yes (1) | 2 - No (2) | 3 - Not Sure (3) |
|---|---|---|---|
| Returning to this institution next year (4) | ○ | ○ | ○ |

Q13. **How many majors do you plan to complete? (Do not count minors.)**

    ◯  a. One  (1)

    ◯  b. More Than One  (2)

*Skip To: Q16. If Q13. = a. One*

Q13B. **If you answered "More Than One" in the previous question**, please enter up to two majors or expected majors (do not enter minors):

_____

Q14. **Please describe the most significant learning experience you have had so far at this institution.**

_____

Q15. Enter your age:

_____

Q16. **What is your class level?**

    ◯ a. Freshman/First Year  (1)

    ◯ b. Sophomore  (2)

    ◯ c. Junior  (3)

    ◯ d. Senior  (4)

    ◯ e. Unclassified  (5)

Q17. **How many courses are you taking for credit this current academic term?**

    ◯ 0  (1)

    ◯ 1  (2)

    ◯ 2  (3)

    ◯ 3  (4)

    ◯ 4  (5)

    ◯ 5  (6)

    ◯ 6  (7)

    ◯ 7  (8)

    ◯ More than 7  (9)

Q18. **Of the above-mentioned courses, how many are taught mostly or entirely online (most or all interactions with instructors and students take place online)?**

○ 0 (1)

○ 1 (2)

○ 2 (3)

○ 3 (4)

○ 4 (5)

○ 5 (6)

○ 6 (7)

○ 7 (8)

○ More than 7 (9)

---

Q19. **What have most of your grades been up to now at this institution?**

○ A (1)

○ A- (9)

○ B+ (2)

○ B (3)

○ B- (4)

○ C+ (5)

○ C (6)

○ C- (7)

○ Lower than C- (8)

Q20. **Did you begin college at this institution or elsewhere?**

○ a. Started Here  (1)

○ b. Started Elsewhere  (2)

Q21. **Since graduating from high school, which of the following types of schools have you attended other than the one you are now attending? (Select all that apply.)**

☐ a. Vocational or Technical School  (1)

☐ b. Community or Junior College  (2)

☐ c. 4-year College or University Other Than This One  (3)

☐ d. None  (4)

☐ e. Other  (5)

Q22. **What is the highest level of education you ever expect to complete?**

○ a. Some College but Less Than a Bachelor's Degree  (1)

○ b. Bachelor's Degree (B.A, B.S., etc.)  (2)

○ c. Master's Degree (M.A., M.S., etc.)  (3)

○ d. Doctoral or Professional Degree (Ph.D., J.D., M.D., etc.)  (4)

**Q23. What is the highest level of education completed by either of your parents (or those who raised you)?**

○ a. Did Not Finish High School  (1)

○ b. High School Diploma or GED  (2)

○ c. Attended College but Did Not Finish High School  (3)

○ d. Associate's Degree (A.A., A.S., etc.)  (4)

○ e. Bachelor's Degree (B.A., B.S., etc.)  (5)

○ f. Master's Degree (M.A., M.S., etc.)  (6)

○ g. Doctoral or Professional Degree (Ph.D., J.D., M.D., etc.)  (7)

---

Q24. **What is your gender identity?**

○ a. Male  (1)

○ b. Female  (2)

○ c. Another Gender Identity  (3) _____

○ d. I Prefer Not to Respond  (4)

---

Q25. **Are you an international student?**

○ a. Yes  (1)

○ b. No  (2)

*Skip To: Q26. If Q25. = b. No*

---

Q25B. **If you answered "yes" that you are an international student, what is your country of citizenship?**

_____

Q26. **How would you describe yourself? (Select all that apply.)**

○ a. American Indian or Alaska Native  (1)

○ b. Black or African American  (2)

○ c. Hispanic or Latina/o  (3)

○ d. Middle Eastern or North African  (4)

○ e. Native Hawaiian or Other Pacific Islander  (5)

○ f. White  (6)

○ g. Another Race or Ethnicity  (7)

○ h. I Prefer Not to Respond  (8)

Q27. **Have you been diagnosed with any disability or impairment?**

○ a. Yes  (1)

○ b. No  (2)

○ c. I Prefer Not to Respond  (3)

*Skip To: Q28. If Q27. = b. No*

Q27B. **Please describe your disability or condition.**

_____

Q28. **Which of the following impacts your learning, working, or living activities? (Select all that apply.)**

☐ a. Sensory disability: Blind or low vision; Deaf or hard of hearing  (1)

☐ b. Physical disability: Mobility condition that affects walking; Mobility condition that does not affect walking; Speech or communication disorder; Traumatic or acquired brain injury  (2)

☐ c. Mental health or developmental disability: Anxiety; Attention deficit or hyperactivity disorder (ADD or ADHD); Autism spectrum; Depression; Another mental health or developmental disability (schizophrenia, eating disorder, etc.)  (3)

☐ d. Another disability or condition: Chronic medical condition (asthma, diabetes, Crohn's disease, etc.); Learning disability; Intellectual disability  (4)

☐ e. A Disability or Impairment Not Listed Above  (5)

_____