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Maureen Snow Andrade

Utah Valley University, maureen.andrade@uvu.edu

Eugene Seeley

Utah Valley University, eugene.seeley@uvu.edu

Ron Miller

Utah Valley University, Ronald.Miller@uvu.edu

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Cross-Cutting Skills: The Role of Major

Maureen Snow Andrade
Department of Organizational Leadership
Utah Valley University

Eugene Seeley
Department of Strategic Management and Operations
Utah Valley University

Ronald Mellado Miller
Department of Strategic Management and Operations
Utah Valley University

Corresponding Author: Maureen Andrade, maureen.andrade@uvu.edu

ABSTRACT

Employers want recent college graduates prepared with skills that cut across majors, such as written and oral communication, teamwork, ethical decision-making, critical thinking, and applying knowledge in real-life situations. What is largely unknown is if some fields of study lend themselves to producing these desired skills over others. This is particularly relevant to schools of business, which strive to help students develop professional career skills and often emphasize a range of practical, hands-on, engaged learning activities. This study focused on obtaining the insights of hiring managers about desired skills and areas of study that prepare students with these skills. Survey results were analyzed using ANOVA and Holm post hoc tests. Findings indicated that hiring managers' preferences focused on three main sets of skills: People and Culture, Analysis and Application, and Staying Current. Business dominated the People and Cultures cluster, while STEM dominated the Analysis and Application and Staying Current clusters.

Keywords: cross-cutting skills, essential learning outcomes, recent college graduates, hiring managers, business education

Employers in both public and private sectors report spending considerable time retraining recent college graduates due to their lack of workforce preparation (Jacob & Gokbel, 2018). Employers' expectations of recent college graduates are well-known. They want those prepared with skills that cut across majors, such as written and oral communication, teamwork, ethical decision-making, critical thinking, and the ability to apply knowledge in real-life situations (Association of American Colleges & Universities [AAC&U], 2021; Finley, 2021; Gray, 2023; Hart Research Associates, 2015, 2018; Social Research Centre, 2019). Representing a range of sectors and management levels and both profit and non-profit organizations, employers have identified these outcomes as critical to success in today's economy. These employers consistently place the greatest value on skills and knowledge that apply across majors (Hart Research Associates, 2015; Finley, 2021; Gray, 2023; Social Research Centre, 2019). The studies cited indicate that these are more important than a student's major.

However, it is largely unknown whether some fields of study lend themselves to producing these desired skills more than others. Organizational reports do not examine this and the limited amount of scholarly research available indicates that, for schools of business at least, a gap exists between what higher education institutions produce and what employers want (Azevedo et al., 2012; Bayerlein & Timpson, 2017; Ullah et al., 2018; Jacob & Gokbel, 2018; Wong, 2016). While an overview of the past 50 years of higher education research identifies themes related to debates on assessment frameworks and measures of generic learning outcomes and the need for global citizenship (Ellis, 2020), the researchers were unable to identify any research on the role of disciplines in achieving employer-valued cross-cutting skills.

This knowledge gap is particularly salient to schools of business, which strive to develop students' professional skills and often require a broad range of practical, hands-on, engaged learning activities as part of the coursework, a practice supported by accreditation standards (Association to Advance Collegiate Schools of Business [AACSB], 2020). Graduates from business schools have an enormous impact on a school's reputation. The more effectively business schools prepare students with these skills, widely agreed on as critical, the stronger the school's reputation and the higher their return on investment in students.

This study focused on obtaining the insights of hiring managers pertaining both to desired skills and the degree to which they feel that specific undergraduate majors prepare students with these skills. As will be further established in the literature review, while studies are prevalent on the former, the relationship of majors to specific cross-cutting skills has yet to be examined. Study results have implications for schools of business and other disciplinary areas. Knowing if business schools are perceived as graduating students with these skills, valued by most employers beyond a specific major, provides leaders with evidence of mission fulfillment in preparing students for future employment, and assists in meeting accreditation requirements (AACSB, 2020). The objective of this quantitative study was to determine if hiring managers prefer some areas of study over others in the hiring process due to their perceptions of the abilities of students graduating in these areas. Data was collected from a Qualtrics survey and analyzed statistically to determine hiring managers' views on cross-cutting skills associated with specific areas of study.

Literature Review

Increasingly, higher education is considered unsustainable due to issues with return on investment, decreased government funding, low persistence rates, low job placement rates, unresponsive curricular processes, slow decision-making, and failure to meet industry needs (Jacob & Gokbel, 2018). This has resulted in a call for accountability, involving the identification of quality indicators and data to understand students' experiences, and greater emphasis on teaching effectiveness (Devlin & Samarawickrema, 2022). Experiential learning, in which higher education institutions partner with industry to identify learning outcomes and prepare students with needed skills as opposed to more traditional models that view instructors as the curricular experts, can help address this gap (Alpaydin & Kültür, 2022; Jacob & Gokbel, 2018; Gray, 2023; Social Research Centre, 2019). Calls for accountability

are leading to an examination of student learning outcomes and more innovative pedagogical approaches to meet society's needs and address the disconnect between universities, and specifically schools of business, of inadequate preparation of graduates with cross-cutting skills (Azevedo et al., 2012; Jacob & Gokbel, 2018).

Despite this call, only some business schools administer employer and alumni surveys to measure their success. Studies in this area are dated, with no current research indicating a change in practice (Kelley et al., 2010; Martel & Calderon, 2007; Pringle & Michel, 2007; Wheeling et al., 2015). Business schools are most focused on job placement and salary information to measure their impact, not the level of career preparation in terms of learning outcomes (Andrade et al., 2019). Guidance on assurance of learning accreditation requirements indicates a compelling need to offer curricula that meet internal and external stakeholders' needs and demonstrate improvement of learning and achievement of learning outcomes (Kehal, 2020). This emphasis on industry collaboration regarding employer-valued learning outcomes suggests a critical need to determine if schools of business meet expectations.

Efforts to assess higher education learning outcomes across countries have been attempted but failed due to a lack of curricular commonalities and other issues. The Assessment of Higher Education Learning Outcomes project, sponsored by the Organization for Economic Co-operation and Development, is designed to assess the knowledge and skills of university students in their final year across 17 countries on both cross-cutting skills such as communication critical thinking, analytical reasoning, and problem-solving as well as discipline-specific knowledge and skills failed due to cost, criticisms of methodological approaches, and difficulties in comparing across different institutions, programs, curricula, and countries (Álvarez, 2022). This also suggests possible reasons for the lack of progress on the part of higher education institutions in meeting employer expectations. The initiative provides evidence of the value of cross-cutting skills and the need to assess them to inform teaching and learning practice within higher education institutions.

Hiring Managers' Perspectives

Research has sought input from hiring managers regarding valued skills and college graduates' preparation levels since at least the 1990s. A decades-old national survey in the U.S. found that for business graduates, communication skills were the most valued skill by hiring managers, followed by technical skills, human relations, problem-solving, and software and information systems expertise (Ray et al., 1994). In a more recent but somewhat dated study, over 90% of employers identified communication, teamwork, professionalism, and problem-solving as essential (Casner-Lotto & Barrington, 2006; Casner-Lotto et al., 2009). More recently, hospitality managers reported valuing willingness to learn, teamwork, and oral communication, while students identified oral communication, time management, and hospitality industry knowledge (Jiang & Alexakis, 2017). In another study, college graduates viewed self-discipline, timeliness, and prioritization as valued by employers (Landrum et al., 2010).

Gaps have been identified in professional preparation, such as curricula mismatched with accounting standards in Australia, specifically, judgment, knowledge, application, communication, teamwork, and self-management, indicating that graduates in these programs are unprepared for professional

expectations and standards (Bayerlein & Timpson, 2017). Similarly, a review of accounting modules in the UK found a lack of emphasis on deeper learning (Ullah et al., 2018). In Hong Kong, business programs typically do not focus on learning outcomes or industry perspectives in identifying these outcomes (Wong, 2016). Similarly, U.S. information systems programs are reportedly unsuccessful in preparing graduates for the industry (Pratt et al., 2014).

Employer-Valued Skills

The importance of cross-cutting skills to employers has been consistent over time albeit with some variation by profession (AAC&U, 2002, 2021; Finley, 2021; Gary, 2023; Hart Research Associates, 2015, 2018). The preponderance of research in this area has been sponsored by professional organizations which conduct employer surveys. These overwhelmingly indicate the importance of essential learning outcomes and identify the level of importance that employers have to various skills. The most highly valued skills are oral and written communication, teamwork, work ethic, problem-solving, and analytical skills (Gray, 2023; Hart Research Associates, 2015; Social Research Centre, 2019).

Educational outcomes and quality have taken precedence for organizations such as the Organization for Economic Co-operation & Development (2020), the Australian Tertiary Education Quality and Standards Agency, which sponsors a Quality Indicators for Learning and Teaching survey (Social Research Centre, 2019), and the World Bank (2021). The World Bank, for instance, asserts that success in today's labor market will require cognitive skills, including critical thinking, creativity, problem-solving, socio-emotional skills (e.g., interpersonal skills, leadership, teamwork, grit), technical skills, and digital skills. However, in other cases, data collection focuses only on job placement rather than a deeper analysis of adequate preparation regarding employer-valued skills (Social Research Centre, 2019). This has also been a limitation of business school assessment practice (Andrade et al., 2019). Focusing on job placement alone as a measure of success ignores employer insights on how well recent college graduates are prepared for the workforce with the cross-cutting skills needed for career success.

Large-scale employer surveys substantiate the claim that a liberal education, as opposed to specific job training, plays a significant role in developing the knowledge and skills needed for career success, as does breadth and depth of learning, personal aptitude, and mindset (e.g., work ethic, persistence), and applied learning experiences, which give applicants a clear advantage in hiring (AAC&U, 2021; Finley, 2021). Younger employers value civic-related outcomes more than older employers (AAC&U, 2021; Finley, 2021). However, employers still see a gap in the preparation of recent college graduates with these cross-cutting skills (AAC&U, 2021; Finley, 2021; Hart Research Associates, 2015).

Similarly, research sponsored by the National Association of Colleges and Employers indicates that 60% of employers value problem-solving and teamwork skills, with 50% emphasizing work ethic, analytical skills, written communication, and technical skills in the hiring process (Gray, 2023). The value of broad skills that can be applied across work contexts, including mindsets such as work ethic and persistence, as well as skills associated with the liberal arts such as civic and community-mindedness, are identified as top priorities by business executives and hiring managers across sectors; business size, and geographic location (Finley, 2021). Internships, a high-impact practice, and other forms of experiential or applied

learning have been identified as making graduates highly competitive in job searches (Gray, 2023; Kuh et al., 2017; Finley, 2021).

The stream of research on employer-valued skills includes the identification of essential learning outcomes in 2002 up to the present (AAC&U, 2002, 2021; Finley, 2021; Gary, 2023; Hart Research Associates, 2015, 2018). Findings suggest the need for a broad-based education rather than job-specific training. Although access to higher education in the United States is widely available, success varies with ongoing concerns regarding quality and graduation rates, particularly for specific populations of students and suggests the need for a greater understanding of factors contributing to the development of employer-valued skills (AAC&U, 2002, 2021; Finley, 2021).

While it is unknown what percentage of higher education institutions have adopted the essential learning outcomes identified as part of the Liberal Education and America's Promise initiative, or the effectiveness of related assessment endeavors on the part of individual institutions or collectively, 13 university state systems have formed a formal collaborative focused on raising the quality of learning in higher education through the adoption of learning outcomes, high impact practices, and related assessment (AAC&U, 2019a). The Liberal Education and America's Promise initiative was a U.S.-based initiative from 2005 to 2018 that established a framework of learning outcomes, high-impact educational practices, and authentic measures of assessment that distinguish a U.S. liberal arts university education from a technical education (Schneider, 2021). These essential learning outcomes reflect employer-valued cross-cutting skills.

For over two decades, institutions have been working to establish essential learning outcomes across disciplines, integrate them into the curriculum, and measure the degree to which college graduates attain them (Schneider, 2021). The benchmarking of rubrics to measure these learning outcomes has occurred nationally (AAC&U, 2013, 2019b; McConnell & Rhodes, 2017). No research to this point, however, has sought to determine if these outcomes are more evident in recent college graduates from some majors over others at a national or local level.

Although previous research has established the critical value of cross-cutting skills and a call to action on the part of higher education institutions to better prepare students for future employment (AAC&U, 2002; Finley et al., 2021; Hart Research Associates, 2006a, 2006b, 2008, 2010, 2013, 2015, 2018), research related to the major area of study and associated employer perspectives appears non-existent. This review has found that employers typically do not find recent college graduates prepared with needed cross-cutting skills and that disciplinary areas within schools of business are not aligned with industry standards (AAC&U, 2002; Bayerlein & Timpson, 2017; Finley et al., 2021; Hart Research Associates, 2006a, 2006b, 2008, 2010, 2013, 2015, 2018; Jiang & Alexakis, 2017; Pratt et al., 2014; Ullah et al., 2018; Wong, 2016). Such insights are needed to inform curricular planning, student learning outcomes assessment, and student workforce preparation.

Given the lack of research in this area, we surmise that hiring managers, based on their experience, will differentiate majors according to their likelihood in producing recent college graduates with specific cross-cutting skills. The choice of hiring managers is consistent with previous studies on employer-

valued cross-cutting skills, which has sought insights from business executives, hiring managers, employers, and students on workforce preparedness (AAC&U, 2002; Finley et al., 2021; Hart Research Associates, 2006a, 2006b, 2008, 2010, 2013, 2015, 2018). Future research should include additional stakeholders.

Further, as business schools seek to prepare graduates for managerial positions, and cross-cutting skills are usually an intentional part of that curriculum, we hypothesize that hiring managers will rank recent college graduates in business higher on cross-cutting skills than those from other disciplinary areas. Managerial positions require the skills identified in previous employer surveys as highly valued, and as such, business schools aim to prepare students with these skills. Accredited business schools require evidence of assurance of learning, specifically that that learning outcomes are measured and achieved (AACSB, 2020). Employers are looking for skills that will help recent college graduates attain managerial positions both in the short- and long-term such as communication, problem-solving, critical thinking, working with diverse others, and decision-making (AAC&U, 2002; Finley et al., 2021; Hart Research Associates, 2006a, 2006b, 2008, 2010, 2013, 2015, 2018).

Hypothesis

Undergraduate business programs explicitly prepare students for management positions. Even though there are many specific skills in various business disciplines (e.g., marketing, finance, accounting, etc.), business programs include both explicit instruction in many of these cross-cutting skills (e.g., required classes in business communications and organizational behavior) as well as ample opportunities to exercise and develop those skills with in-class assignments. Therefore, the following hypothesis is proposed: Hiring managers will rank recent college graduates in business higher on cross-cutting skills than those from other disciplinary areas.

Methods

Hiring managers who employ recent college graduates were invited to complete an online survey about their hiring practices. Obtaining input from external stakeholders helps higher education institutions form critical networks to inform the curriculum (Jacob & Gokbel, 2017). Participants were recruited through a Qualtrics distribution channel. Qualtrics is an online survey management system. Participants in this sample were screened to meet two criteria: currently or recently working in a human resources office and working in an organization that hires recent college graduates. A research panel consists of people pre-qualified to participate in research and representing a range of demographics. A total of 153 hiring managers responded, for a 100% response rate, representing 10 sectors across the U.S. (See Figure 1). Forty-two percent of respondents were female, and 58 percent were male. Information on age was optional; 80% of respondents included this information. The mean age was 41 years old. The mean number of years the respondents' companies had been in business was 43.

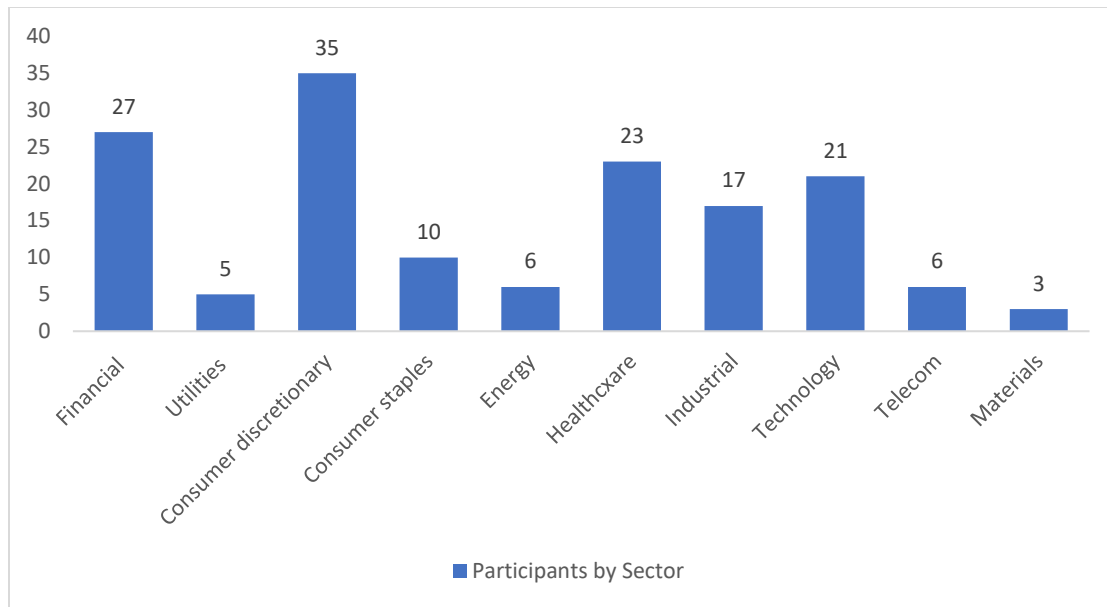


Figure 1. Survey participants by sector.

The literature review and study objectives informed the survey. It focused specifically on identifying hiring managers' associations between specific cross-cutting skills and college major. The survey was validated by administering it to a pilot group of hiring managers and examining the data to determine if the questions were sound and measuring what they were expected to measure. Adjustments were made as needed. The list of cross-cutting skills used in the study is based on AAC&U's employer studies, specifically Hart Research Associates, 2015. As explained in the literature review, these items have been consistently studied over time and originated from employer and recent college graduate interviews (Hart Research Associates, 2006), with subsequent survey research continuing to examine various aspects of the value of cross-cutting skills.

In the current study, hiring managers were asked to identify which majors they associated with each learning outcome indicated in Table 1. Majors were grouped into the categories listed in Table 2. For example, hiring managers were asked: "To what extent do recent college graduates in each of the disciplinary areas below possess skills in *ethical judgment and decision-making*?" Participants responded using a 6-point Likert scale with answer choices as follows: *not at all*, *to a small extent*, *to a moderate extent*, *to a considerable extent*, *to a great extent*, or *not applicable or no opportunity to judge*. See the appendix for further information. The survey also collected demographic data and information about the job sector and company size.

The list of categories of majors in Table 2 was identified from the College Board, a non-profit organization dedicated to expanding access to higher education (see <https://bigfuture.collegeboard.org/explore-careers/majors>), and also by NICHE. This organization provides college profiles to prospective students (see

<https://www.niche.com/colleges/majors/#protective-services>). The sector list follows the Global Industry Classification Standard.

Table 1
Cross-Cutting Skills

1. Effective oral communication is important for entry level-positions in my company.
2. The ability to work effectively with others in teams,
3. The ability to effectively communicate in writing.
4. Ethical judgment and decision-making.
5. Critical thinking and analytical reasoning skills.
6. The ability to apply knowledge and skills to real-life problems.
7. The ability to locate, organize, and evaluate information from multiple sources.
8. The ability to innovate and be creative.
9. Staying current on changing technologies and their applications to the workplace.
10. The ability to work with numbers and understand statistics.
11. The ability to analyze and solve problems with people from different backgrounds and cultures.
12. Awareness of and experience with diverse cultures and communities within the United States.
13. Staying current on developments in science.
14. Staying current on global developments and trends.
15. Awareness of and experience with cultures and societies outside of the United States.
16. Proficiency in a language other than English.

Table 2
Major Areas of Study

Arts
Business
Education
Health Professions
Humanities and Liberal Arts
Emergency and Protective Services
Science, Technology, Engineering, & Math
Trades and Personal Services

Results

A 16 (Questions) x 7 (Skillsets) analysis was run to examine the hypothesis. For a graphical representation, see Figure 2. A repeated measures ANOVA was run on the questions by skill set variables in the Jamovi software platform based in R (R Core Team, 2021; The Jamovi Project, 2022; Lenth, 2020, Singmann, 2018). See Table 3 for more detail. There were significant main effects for Skills, $F(7,462)=12.64, p<.001$, and for Question, $F(15, 990)=3.49, p<.001$, as well as a significant interaction, $F(105,6930)=3.71, p<.001$. Holm post hoc tests (Haynes, 2013) were then run; details can be seen in Table 4. Figure 3 shows the standard errors for each of the skill sets analyzed.

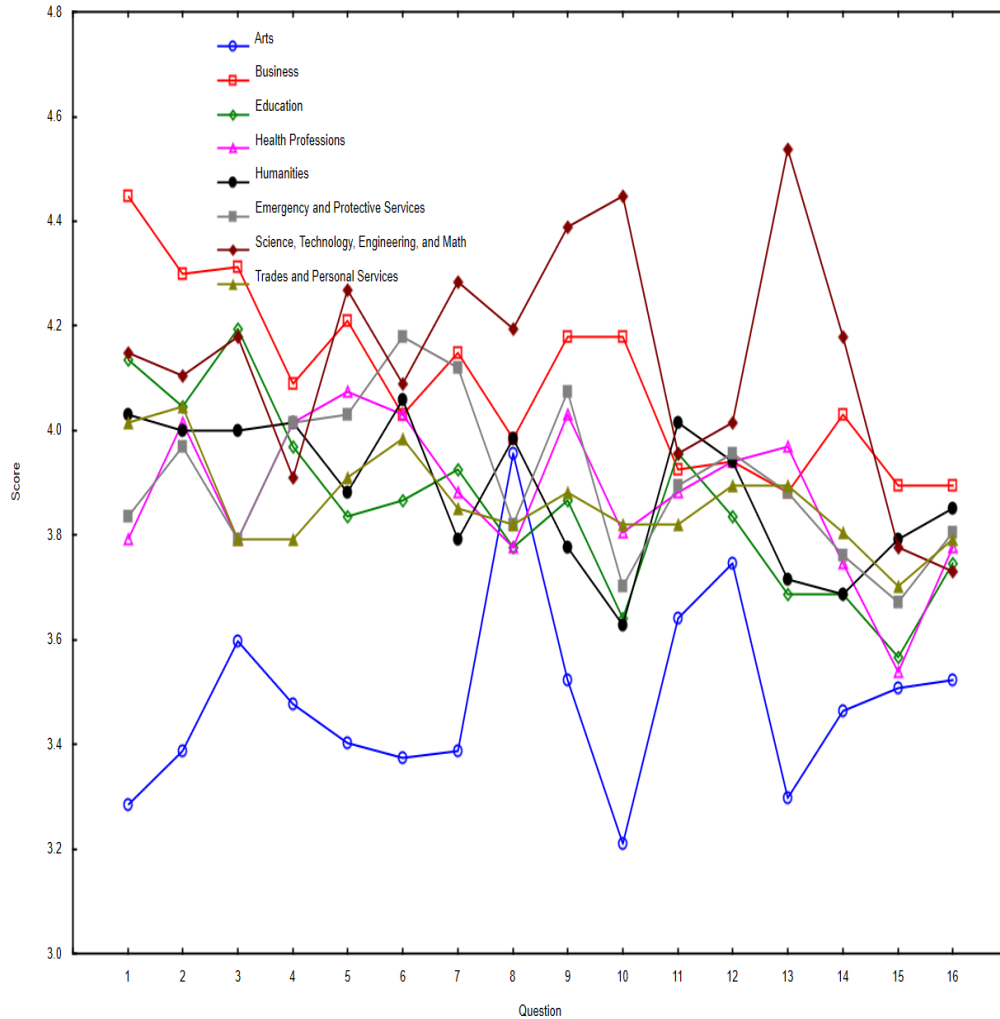


Figure 2. Ratings for areas of study by question.

Table 3
Repeated Measures ANOVA

Within Subjects Effects					
	Sum of Squares	df	Mean Square	F	p
Questions	59.3	15	3.951	3.49	< .001
Residual	1120.8	990	1.132		
Skillsets	286.3	7	40.896	12.64	< .001
Residual	1495.1	462	3.236		
Questions * Skillsets	158.3	105	1.508	3.71	< .001
Residual	2814.2	6930	0.406		

Note. Type 3 Sums of Squares

Between Subjects Effects					
	Sum of Squares	df	Mean Square	F	p
Residual	3564	66	54.0		

Note. Type 3 Sums of Squares

Table 4
Post Hoc Tests

Post Hoc Comparisons - Skillsets							
Comparison							
Skillsets	Skillsets	Mean Difference	SE	df	t		p _{holm}
Art	- Bus	-0.60448	0.0981	66.0	-6.1617		< .001
	- Edu	-0.37220	0.0995	66.0	-3.7398		0.008

Post Hoc Comparisons - Skillsets

Comparison						
Skillsets	Skillsets	Mean Difference	SE	df	t	p_{holm}
	- Health	-0.39272	0.1048	66.0	-3.7485	0.008
	- Hum	-0.39925	0.0996	66.0	-4.0082	0.004
	- E&PS	-0.42071	0.1050	66.0	-4.0054	0.004
	- STEM	-0.65205	0.1056	66.0	-6.1736	< .001
	- Trade	-0.37780	0.0838	66.0	-4.5057	< .001
Bus	- Edu	0.23228	0.0824	66.0	2.8175	0.096
	- Health	0.21175	0.0757	66.0	2.7988	0.096
	- Hum	0.20522	0.0765	66.0	2.6825	0.120
	- E&PS	0.18377	0.0804	66.0	2.2847	0.307
	- STEM	-0.04757	0.0676	66.0	0.7040	1.000
	- Trade	0.22668	0.0687	66.0	3.2999	0.028
Edu	- Health	-0.02052	0.0606	66.0	0.3388	1.000
	- Hum	-0.02705	0.0449	66.0	0.6022	1.000
	- E&PS	-0.04851	0.0645	66.0	0.7519	1.000
	- STEM	-0.27985	0.0842	66.0	3.3243	0.028
	- Trade	-0.00560	0.0720	66.0	0.0778	1.000
Health	- Hum	-0.00653	0.0605	66.0	0.1080	1.000
	- E&PS	-0.02799	0.0408	66.0	0.6859	1.000

Post Hoc Comparisons - Skillsets

Comparison						
Skillsets	Skillsets	Mean Difference	SE	df	t	p _{holm}
	- STEM	-0.25933	0.0745	66.0	-3.4805	0.018
	- Trade	0.01493	0.0665	66.0	0.2245	1.000
Hum	- E&PS	-0.02146	0.0590	66.0	-0.3639	1.000
	- STEM	-0.25280	0.0826	66.0	-3.0611	0.051
	- Trade	0.02146	0.0687	66.0	0.3124	1.000
E&PS	- STEM	-0.23134	0.0744	66.0	-3.1080	0.047
	- Trade	0.04291	0.0564	66.0	0.7607	1.000
STEM	- Trade	0.27425	0.0642	66.0	4.2691	0.002

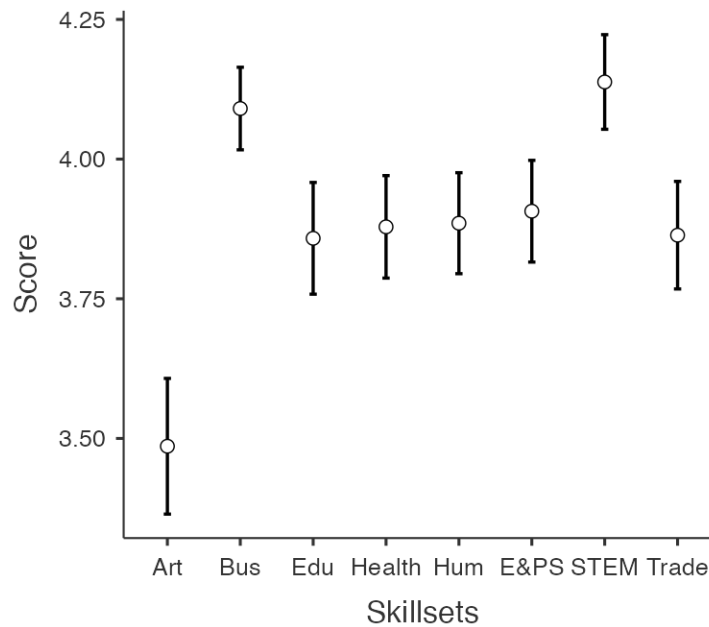


Figure 3. Standard errors.

The study supported the hypothesis that recent college graduates in business will be ranked higher on cross-cutting skills than graduates from other disciplines. Two types of majors stood out in most of the skills. Business and Science, Technology, Engineering, and Math (STEM). Hiring managers' preferences focus on three main sets of skills: People and Culture, Analysis and Application, and Staying Current. These categories were determined by grouping similar learning outcomes. People and Cultures include human interaction skills that apply across fields (e.g., communication, teamwork) and intercultural and linguistic proficiencies. The Analysis and Application category synthesizes learning outcomes for obtaining, evaluating, and organizing information. The Staying Current groups together the outcomes related to currency in disciplinary knowledge. See Table 5 for these clusters.

Table 5
Clusters of Attributes

Cluster	Attributes
People and Cultures	1. Effective oral communication is important for entry level-positions in my company.
	2. The ability to work effectively with others in teams,
	3. The ability to effectively communicate in writing.
	4. Ethical judgment and decision-making.
	11. The ability to analyze and solve problems with people from different backgrounds and cultures.
	12. Awareness of and experience with diverse cultures and communities within the United States.
Analysis and Application	15. Awareness of and experience with cultures and societies outside of the United States.
	16. Proficiency in a language other than English.
	5. Critical thinking and analytical reasoning skills.
	6. The ability to apply knowledge and skills to real-life problems.
Staying Current	7. The ability to locate, organize, and evaluate information from multiple sources.
	8. The ability to innovate and be creative.
	10. The ability to work with numbers and understand statistics.
	9. Staying current on changing technologies and their applications to the workplace.
	13. Staying current on developments in science.
	14. Staying current on global developments and trends.

Business dominated the People and Cultures cluster with the highest average score in all skills, the ability to analyze and solve problems with people from different backgrounds and cultures, for which humanities scored the highest. STEM dominated both the Analysis and Application and Staying Current clusters. In only one category, the ability to apply knowledge and skills to real-life problems, did another major exceed STEM. Emergency and Protective Services scored the highest for this skill. Business and

STEM dominated the categories with statistically significant leads in most skill sets. Most areas had no statistically significant difference between business and STEM majors. This clearly shows a preference among hiring managers for business and STEM.

Discussion

The authors next reviewed the hypothesis and discussed the findings to previous research. It should be noted that while the value of cross-cutting skills is well-established, as indicated in the literature review, the current research contributes a more nuanced understanding of possible variations in the importance of these skills and hiring managers' perceptions of university majors associated with the skills. Previous studies indicate that choice of major is not a significant factor in hiring decisions (Hart Research Associates, 2015).

The high scores for business majors related to the People and Cultures category may not seem intuitive since one might associate people and cultures with the humanities. However, business programs significantly emphasize developing people skills, such as teamwork, working with diverse others, and oral and written communication, ethics, and decision-making to prepare graduates to manage organizations effectively. International business and the global nature of most major corporations entail understanding and working with people from other cultures and the advantages of foreign language skills. Additionally, business schools often have advisory councils that encourage the development of these broader traits. They also hire former executives who bring their work experience into the classroom, which may lead to greater alignment with the attributes that hiring managers seek in new employees. This is not to say that business schools do this well (Andrade, et al., 2019; Azevedo et al., 2012; Bayerlein & Timpson, 2017; Ullah et al., 2018), but they do tend to have close industry links which inform the curriculum.

The Analysis and Application cluster is ideally suited to STEM majors. Most of these majors are organized around problem-solving and the analysis needed to solve problems. The fact that hiring managers view these majors as the best in this cluster confirms the emphasis on problem-solving for these majors (albeit not problem-solving with diverse others). The single exception to STEM's dominance in these clusters is Emergency and Protective Services, which scored highest in applying knowledge and skills to real-life problems. This may be because students in these majors shadow professionals in their fields, and thus have ample opportunity to see the practical application of their coursework. STEM programs, like business, have a significant amount of coursework related to students successfully working in their designated careers. As with business schools, many STEM programs hire experienced engineers and technologists to teach, which helps programs align their coursework with the specific skills that hiring managers seek. These factors all contribute to the Staying Current cluster of skills.

It should also be noted that the study calls into question possible beliefs that business and STEM degree programs focus primarily on disciplinary knowledge rather than cross-cutting skills, which may be more associated with liberal arts majors. According to the findings, employers feel otherwise and view business and STEM majors as being well-prepared with a range of skill sets, particularly when compared to graduates from other majors. Employers are looking for packages of skills, not individual skills, and

degree programs should continue their efforts to provide employers with graduates that meet their needs in all these areas.

The study results indicate that Business and STEM programs successfully prepare students more than other majors with these cross-cutting skills, at least in the minds of hiring managers. Most, if not all, of these cross-cutting skills are compatible with other majors, as they are all broad skills, and indeed, most universities have identified many of these skills as expected outcomes for all graduates. Other academic programs might benefit from considering how business and STEM degrees prepare students with these skills, and then applying what can be used in their programs.

Implications and Conclusions

The main contribution of this research is its examination of hiring managers' views on which bachelor's degrees prepare students most effectively in the various skills considered important for new hires. The hypothesis predicted hiring managers would rank recent college graduates in business higher than those from other disciplinary areas. The results revealed that employer preferences formed clusters around three skill sets: People and Cultures, Analysis and Application, and Staying Current. Business dominated the first cluster, with STEM dominating the other two.

Higher education institutions have emphasized teaching and assessing broad learning outcomes for a few decades. However, to this point, research has primarily focused on establishing that employers are seeking specific cross-cutting skills in recent college graduates and which of these are most valued (AAC&U, 2002; Casner-Lotto & Barrington, 2006; Finley et al., 2021; Hart Research Associates, 2015, 2018; Landrum et al., 2010). The current study took a new angle in examining hiring managers' views of which disciplines are most effective in producing which outcomes. This approach is particularly salient given that previous studies ranked learning outcomes in terms of their importance and potential impact on long-term success in the workplace and found that specific degrees were not particularly relevant (Hart Research Associates, 2015, 2018). The findings of this study indicate otherwise by showing that business majors dominate in the People and Cultures category and that STEM graduates dominate in the categories of Staying Current and Analysis & Application, in the opinion of hiring managers.

Certainly, the literature review presented extensive evidence that employers and higher education institutions find graduates wanting to develop cross-cutting skills (Bayerlein & Timpson, 2017; Pratt et al., 2014; Wong, 2016). In business schools, in particular, information regarding post-graduation outcomes may not even be collected (Andrade et al., 2019), which has serious implications for curricular and pedagogical enhancements. The call issued by Jacob and Gokbel (2018) "to rethink student outcomes [in order] to recognize alternative and innovative solutions for the unsustainable journey of most traditional higher education models" (p. 8) must be informed by data collection within schools of business as well as by research such as represented in the current study.

No research to this point has sought to determine if essential learning outcomes are more evident in recent college graduates from some majors over others at either a national or local level. As such, the current study makes a significant contribution. As concluded in the literature review, more nuanced

research on cross-cutting skills, particularly related to major and employer expectations for entry-level abilities, is critically needed. Employers generally do not find students prepared with needed cross-cutting skills, and programs in business schools may not be aligned with employer expectations (Bayerlein & Timpson, 2017; Ullah et al., 2018; Pratt et al., 2014).

To our knowledge, this study is the first to associate specific employer-valued cross-cutting skills with specific college majors. The study measured hiring managers' experiences with recent college graduates, their majors, and associated skills; however, a limitation might be possible bias in the perceptions of these managers. It is also unclear what evidence they use to make these judgments. Future research might examine this further.

In sum, the key significant finding of the study is the significance of clusters of skills instead of rankings of individual skills and hiring managers' perceptions of the value of specific degrees in terms of their effectiveness in preparing graduates with desired cross-cutting skills. Additionally, the study is significant in establishing the relevance of a business degree in producing graduates with desired clusters of skills.

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Appendix

Survey Questions

To what extent do recent college graduates in each of the disciplinary areas below possess the skills listed (1=low; 10=high).

1. Effective oral communication
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
2. The ability to work effectively with others in teams
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
3. The ability to effectively communicate in writing
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
4. Ethical judgment and decision-making
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services

- Science, Technology, & Math
 - Trades & Personal Services
5. Critical thinking and analytical reasoning skills
- Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
6. The ability to apply knowledge and skills to real-life problems
- Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
7. The ability to locate, organize, and evaluate information from multiple sources
- Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services
8. The ability to innovate and be creative
- Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services

9. Staying current on changing technologies and their applications to the workplace
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services

10. The ability to work with numbers and understand statistics
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services

11. The ability to analyze and solve problems with people from different backgrounds and cultures
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services

12. Awareness of and experience with diverse cultures and communities within the United States
 - Arts
 - Business
 - Education
 - Health Professions
 - Humanities
 - Protective Services
 - Science, Technology, & Math
 - Trades & Personal Services

13. Staying current on developments in science
 - Arts
 - Business

- Education
- Health Professions
- Humanities
- Protective Services
- Science, Technology, & Math
- Trades & Personal Services

14. Staying current on global developments and trends

- Arts
- Business
- Education
- Health Professions
- Humanities
- Protective Services
- Science, Technology, & Math
- Trades & Personal Services

15. Awareness of and experience with cultures and societies outside of the United States

- Arts
- Business
- Education
- Health Professions
- Humanities
- Protective Services
- Science, Technology, & Math
- Trades & Personal Services

16. Proficiency in a language other than English

- Arts
- Business
- Education
- Health Professions
- Humanities
- Protective Services
- Science, Technology, & Math
- Trades & Personal Services

Demographic Section

Name of company (optional)

Identify your company sector

- financial sector - banks, investment funds, insurance companies and real estate firms, among others.
- utilities sector - electric, gas and water companies as well as integrated providers.
- consumer discretionary sector - retailers, media companies, consumer service providers, apparel companies and consumer durables.
- consumer staples sector - food and beverage companies as well as companies that create products consumers are unwilling to cut from their budgets
- energy sector - oil and gas exploration and production companies, as well as integrated power firms, refineries, and other operations.
- healthcare sector - biotechnology companies, hospital management firms, medical device manufacturers and many others.
- industrial sector - aerospace, defense, machinery, construction, fabrication, and manufacturing companies.
- technology sector - electronics manufacturers, software developers and information technology firms.
- telecom sector - wireless providers, cable companies, internet service providers and satellite companies, among others.
- materials sector - mining, refining, chemical, forestry and related companies that are focused on discovering and developing raw materials.

Number of employees (open-ended)

Number of years company has been in business (open-ended)

Number of years you have been with the company (open-ended)

Male/female/other/prefer not to answer

What ethnicity do you primarily identify with?

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White Non-Hispanic
- Hispanic
- Prefer not to answer

Age (optional)