Spring 2023

Examining the Interest of Business School Students and the Gender Gap in Careers of Data Science and Analytics

Logan M. Lopus
University of New Hampshire, Durham

Examining the Interest of Business School Students and the Gender Gap in Careers of Data

Science and Analytics

by

Logan Lopus

Thesis Advisor: Dr. Billur Akdeniz Talay

Honors Thesis submitted to Peter T. Paul College of Business and Economics

University of New Hampshire

May 2023

Authors Note:

Correspondence concerning this article should be addresses to Logan Lopus, University of New

Hampshire, Durham, NH 03824. Email: logan.lopus@unh.edu

Table of Contents

Abstract

Professionals in the data science and analytics field are in high demand. Recently, business schools have introduced various academic programs to train students in those fields. However, what makes business school students interested in these career fields is not entirely known. Research questions such as who the major influencers are for business school students' career choices or whether there are any differences between genders in terms of their awareness, readiness, and interest in data science and analytics careers remain to be answered. Therefore, this study examines the segmentation of business school students in how they prepare for careers, drivers of interest for careers in data science and analytics fields, differences between genders, and business school students' major influencers. The results show that business school students can be divided into three different segments as *Financial Return Seekers*, *Wholesome College Experience Seekers*, and *Role-Model Seekers*. Using these segments colleges can better target students in raising their awareness, readiness, and interest for data science and analytics. Findings also show that both awareness and readiness positively affect a student's interest in data science and analytics careers. There were also differences found between men and women, where women scored lower with awareness, interest, and readiness to pursue careers in data science and analytics. Lastly, the research provided that parents and faculty are the major influencers of business school students' careers decisions. Based on the results there are many opportunities for business school leadership and faculty to help students become more aware of the career path, with support around the identified segments, and efforts to increase participation of women with data science and analytics.

Keywords: Business School Interests, Careers Paths, Cluster Analysis, Driving Factors and Influences, Gender Differences

Introduction

The data science and analytics field are newer job profession growing rapidly. Professionals in this field are in high demand, but there is a shortage of qualified candidates to fill these positions. In 2011, the McKinsey Report projected that by 2020, the United States would require an additional 1.5 million data science and analytics professionals and 140,000-190,000 more professionals with great analytic skills (Berman & Bourne, 2015). Like many other STEM professions, the field of data science and analytics has struggled to uphold gender diversity from early on. Although many colleges have developed curricula and programs to better prepare students for careers in data science and analytics, there is still a shortage of students, especially women, pursuing this career path.

Research can shed light on how to target students and encourage more women to enter data science and analytics careers. A better understanding of business school students' attitudes toward careers, factors that drive their decision-making, and influencers within their lives will lay the groundwork for innovative programs and changes to existing programs to better reach the target audiences.

This thesis investigates:

1. What are the key segments of business school students in how they prepare for careers after they graduate?

2. What are the drivers of a business school student's interest in pursuing a career in data science and analytics fields?

3. What are the differences between genders in terms of their awareness, readiness, and interest in careers in data science and analytics?

4. Who are the major influencers for business school students' careers and their choice for the area of study?

This thesis will use an online Qualtrics survey to collect data from Peter T. Paul College students at the University of New Hampshire, to gather their attitudes toward data science and analytics careers, and to identify influential factors in their career-related decisions. Multiple methods will be used to analyze the data including cluster analysis, multiple regression, t-tests, and descriptive statistics.

The analyses produced several key findings. The cluster analysis created three segments, each interpreting the factors that prepare students best for careers in data science and analytics. These segments were *Financial Return Seekers*, *Wholesome College Experience Seekers*, and *Role-Model Seekers*. *Financial Return Seekers* are motivated by their success after college and how to gain the most success. *Wholesome College Experience Seekers* are motivated by developing proficient skills and having a genuine interest in the subject. And the last segment, *Role-Model Seekers*, are motivated by real-world experiences and role models within college.

Multiple regression analysis revealed that gender, awareness, and readiness for careers in data science and analytics significantly drive a student's interest in pursuing this field. Furthermore, significant differences were found between male and female students in their awareness, readiness, and interest in data science and analytics careers. Parents and faculty were identified as the primary influencers for business school students' career and area of study decisions, followed by mentors, peers, and advisors. These findings provide a basis for future programs and changes aimed at increasing the number of business school students pursuing careers in data science and analytics, with a specific focus on encouraging more women to enter this field.

The rest of the thesis is organized as follows. Next, I will discuss the background literature on the various aspects of how business school students perceive career choices, past

attempts at creating more interest in data science and analytics, differences within gender and the relation to data science and analytics, and lastly breaking down influencers of business school students. After that, I will introduce the research questions and predictions of the outcome followed by explaining the methodology of the survey in more depth. Wrapping up I will share the results found from the research followed by a discussion of the results, including recommendations based on the research. To end the thesis, the conclusion will tie together the main points.

Literature Review
Factors that Drive Business Students' Interest in Data Science and Analytics Careers

There can be numerous factors that influence business school students toward their chosen choice of major in college. As your college major is a major life decision, outlining your potential future career path. Jeri Beggs, John Bantham, and Steven Taylor conducted a study in 2008 to find the distinguishing factors that influence business school students' areas of study. They identified six categories of influence: Information Search, Match with Interests, Job Characteristics, Financial Considerations, Psycho/Social Benefits, and Major Attributes.

Within this they found the pairing of a subject to the student's interest was the most key factor, examples of this being genuine interest in the subject, personal strengths, and aptitude for the subject. In past studies, genuine interest has also been a strong influencer, as 59 percent of respondents indicated it strongly influenced their choice of major, compared to 10 percent indicating the major being like a parent's occupation as a strong influence.

Their current study ranked job characteristics as the second key factor. Examples of the job characteristic category would be the availability of jobs, flexibility, and job security of

chosen career paths. Lastly, the third key factor is major attributes, examples being the reputation

of the program, the strength of faculty, course availability, and course variety. Students were

well-informed based on these top-ranked categories. However, the qualitative portion of the

study revealed that most students were influenced and gathered information from people they

knew – family members and high school teachers being the main sources of information (Beggs

et al., 2008).

This study also found that 65 percent of the students surveyed reported having never

changed their major, pointing to it becoming increasingly difficult for students to easily change

their majors between enrollment issues and the costs of switching. This study recommended

delaying the decision for an area of study as long as possible. The authors claim that colleges are

asking college students to decide on a major when they are potentially not developmentally ready

(Beggs et al., 2008). Allowing students more time to test their interests throughout introductory

classes and start using other sources of information that colleges provide to students.

Looking specifically at programs related to data science and analytics, how are these

specific programs attracting students and retaining them? At a small, liberal arts university, two

faculty members were tasked with creating a data science and analytics degree from scratch. The

program was designed within the business school to approach students with little to no technical

experience. Through this they used engagement in the introductory classes, applying data science

and analytics through the lens of marketing, accounting, etc. Through this exposure, faculty

encouraged students to enroll in entry-level classes. Since the major was new to the University,

the faculty focused on creating a community around the data science and analytics program to

engage students outside of the classroom. They did this by holding resume reviews, workshops,

starting two new clubs, and forming a data science and analytics discussion series to bring in

faculty from various fields to share real-world applications and opportunities (Rosenthal &

Chung, 2020).

This project revealed that active learning played a critical role in attracting and retaining

students within the data science and analytics major. As the class sizes grow this can be difficult

to achieve but suggest developing a strong mentorship program within the major to help students

who feel frustrated or overwhelmed by the curriculum to help retain them. Lastly, it was critical

to create a community around the major and encourage students to go beyond the classroom

when it comes to learning (Rosenthal & Chung, 2020).

Overall, a starting point would to be encourage and support student awareness and

exploration within introductory courses using the factors such as match with interest, job

characteristics, and major attributes. Once students commit and are driven towards data science

and analytics, show students the real-world applications and re-enforce the relevance for future

career paths within data science and analytics.

Awareness, Readiness, and Interest in Data Science and Analytics

Colleges of business have experienced a rise in enrollment in recent years, but that trend

has not been matched by women majoring in information systems (IS). In 2011, this study asked

the question about the occurrence, "Why don't more women major in information systems?".

This study suggests that in recruiting female students for data science and analytics career paths,

the best actions would be to help encourage and develop an interest in the field of study. Women

who decided to pursue IS may already have a genuine interest in the field and were not attracted

to matters like job-related factors. Other ways to aid in recruitment is for those in the IS industry

to address misconceptions about an IS career and find ways to show the positive dimensions of the IS career (Croasdell et al., 2011).

Another study conducted in 2017 sought to increase women's interest by creating awareness of the field and preparing students with skills and knowledge of careers in data science and analytics. This study used a freshman-required class to test their hypothesis through projects assigned within the class. The students would take a pre-survey and a post-survey to allow the researchers to find any changes in interest in information systems. The project they worked on was based on the four factors the researchers believed to influence women the most being knowledge of IS profession, knowledge of creativity of IS work, awareness of and connection with female peers, and awareness of and connection with female role models. Once the class had been completed the researchers found there was no increase in interest for the IS major among participants.

However, they did notice that 42 percent of participants reported their chosen major was decided in high school (Reed et al., 2017). Adding to that, today with high college costs, students feel the pressure to finish college quicker, leading students to not consider major changes once they have committed. The researchers concluded that focusing efforts on students before college could be the answer to increasing interest in IS. Lastly, from this study, they found that the females who participated would be willing to change if they found more interest in another major (Reed et al., 2017).

Gender-Related Differences and Approaches to Data Science and Analytics

As the perception of careers in data science and analytics still has room for improvement, the perception of data science and analytics at younger ages is also affecting women's interest.

As the researchers of, "How Can Universities Best Encourage Women to Major in Information Systems?" analyzed over 20 years of studies to identify the main factors why women's interest in data science and analytics is being affected and found many factors relating to women at an early age. These include but are not limited to lack of access or exposure to computers, negative/positive influence of parents, lack of interest in the data science and analytics curriculum taught in primary and secondary school, and lastly low self-efficacy and low confidence in knowledge and technological abilities (Reed et al., 2017).

As women grow up all these factors affect their perception of a career in data science and analytics. This study attempted to reteach the idea that data science and analytics are both isolating and uncreative but found that college students have already spent the last 18 years influenced by this notion (Reed et al., 2017).

There are solutions to changing women's perceptions about data science and analytics career paths. Carnegie Mellon attracted more women to their computer science program by changing their culture, which included specifically choosing a more diverse student body and creating a women's organization to dispel industry myths and rumors. They changed their culture by specifically choosing a more diverse student body, bringing students with experience and those without any experience in computer science together in their program. Alongside student selection, they created a women's organization to help dispel industry myths and rumors about the career. But this complete change in university culture is not as easily replicable for others, as Carnegie Mellon was able to pick and choose students with their low acceptance rate to create the desired goal. (Reed et al., 2017).

However, the research, is outdated, as these studies and data collections were conducted over five years ago or more. Researchers need to conduct newer data collection and studies to get

a fuller idea of why women are choosing (or not) to enter the data science and analytics careers and what is (or not) working to retain women.

Overall, attracting more women to data science and analytics career provides an array of opportunities for companies as diversity in the workplace boosts creativity and innovation, creates more significant opportunities for professional growth, and allows for better decision-making (Stahl, n.d.). More specifically, for gender diversity in the workplace, having correct proportions of women and men on a team result in greater collective intelligence than unproportioned teams (Murray, 2019). Not only will teams work together better, but a McKinsey report from 2015 found that if women's equality could be advanced, the global GDP could add $12 trillion to growth in 2025 (Murray, 2019). If companies were to incorporate more gender diversity, they could find themselves with more innovation and profitability than before (Liu, 2022, p.4).

The Influence of Role-Models

Some in education believe that the reason for the gender gap in analytical roles is due to the way that women learn differently than men. Their solution for this is to teach girls to code differently and separately from men through various programs. These hypotheses have been proven incorrect through numerous studies and data from college enrollment and the overall recruitment of women into analytical roles. These studies show that it is not women's lack of ability or their learning style holding them back. Instead, it is a lack of women mentors in these careers and industries to support and encourage other young women.

However, due to the small number of women in analytical roles, only so many women mentors are available. A solution proposed by the article is to train teachers at all grade levels in

the basics of programming literacy, so students have more relatable role models to have inspiration. This solution could fix the shortage of women mentors. Still, a study done in 2015 on the influences of Undergraduate Major choices found that for both genders, teachers and counselors have a limited impact on students when it comes to the choice of college major (Geyfman et al., 2015).

With female role models in short supply and teachers not as influential as needed, what can be done to fill this mentorship gap, and does mentorship make enough of a difference in creating a pipeline of women into analytical roles? A study done in 2011 on the benefits of female role models found that when it came to recruiting women in STEM fields, the gender of the mentor is equally effective. This comes from correlation data gathered from several STEM Departments at Princeton, the University of Michigan, and Whittier College, where women were just as likely to report a male role model as a female role model for influencing them to pursue STEM.

However, this study did find that when it comes to the retention of women in the STEM field a female role model does impact other women. Using female role models for women who are already in STEM helps curve the harmful effects of negative stereotypes in STEM. An example of this is a study where women who are highly identified with math performed better on math tests if they encountered a female role model portrayed as highly competent in math compared to a highly competent male role model. From this data collected, the female role model is more effective in the retention of women in STEM and for recruitment of women in STEM, both male and female role models are just as effective (Drury et al., 2011).

Methodology

Objectives

I conducted primary research through data collection with an online survey. To collect primary data involving human subjects, I sought Institutional Review Board approval from UNH IRB, and the survey was approved. The survey collected data on business school students' overall perception of careers in data science and analytics. The survey focused on other areas as well, gathering factors that influence students, people who influence students, and demographic questions.

I analyzed the data using multiple methods, the first being cluster analysis to understand the different segments of Paul College students in terms of the factors they find important in pursuing a career in data science and analytics. I used regression analysis to examine the drivers of business school students' interest in these careers. I conducted t-tests to understand whether there is a significant difference between male and female Paul College students in terms of their awareness, interest, and readiness for these careers. Lastly, I used visualization techniques to understand the key influencers for students and the type of resources that business school students seek about career choices.

Survey Design and Distribution

The survey had a total of 16 questions, including open-ended, Likert scale, ranking, and demographic questions. The purpose of the survey was to collect data on awareness, interest, and readiness for careers within data science and analytics, alongside their main influencers and perception of mentors. The survey can be referred to in Appendix 1.

Likert scale questions were used to gauge the awareness and readiness of students on a scale of strongly disagree to strongly agree and their interest to pursue a career in the field of data science and analytics on a scale of extremely unlikely to extremely likely. We added display logic to the questions to help get a deeper understanding of why students are not aware or why they are interested. I asked students to mark the importance of varying factors they value the most using a Likert scale from not at all important to extremely important. After evaluating the factors, students used a Likert scale from strongly disagree to strongly agree to indicate to what extent they feel ready to pursue data science and analytics careers. This scale was also used for students to indicate their knowledge and relationships with mentors.

We prompted students with a drag-and-drop question about Paul College's resources to place resources that they feel provide them with a competitive advantage or indicate that there are not enough resources to have a competitive advantage. This allowed students to select each resource individually and place it in either box or leave it in neutral. A ranking question was used to have students rank influencers in their area of study and career choices. Finally, I used multiple-choice questions to gather demographics. The demographics included the area of study, class standing, gender, and first-generation status.

To gather data for this study, an online survey was created using Qualtrics and distributed through the Spring 2023 subject pool at the Paul College Behavioral Lab at UNH. The survey was distributed to business school students aged 18 years or older, ranging from freshmen to seniors, who were currently taking at least one class at Paul College. Thanks to the Paul College Behavioral Lab, a total of 117 students were able to fully complete the survey.

Results

Descriptive Statistics

The respondents consist of 62 percent female and 38 percent male. The class standings of respondents were 1 percent freshman, 68 percent sophomore, 29 percent junior, and 3 percent senior. Only 13 percent identified as first-generation business school students.

I also collected information on the study area, as Paul College offers Business Administration, Economics, and Hospitality Management. Only 7 percent of respondents were not Business Administration majors. Students studying Business Administration at Paul College will not declare their options or focus until the end of their sophomore year, and they can choose more than one focus. Out of the Business Administration respondents, 26 percent were in finance, 24 percent were in marketing, 16 percent in accounting, 13 percent in management, 8 percent in information systems & business analytics, 4 percent in entrepreneurial studies, and 3 percent in international business & economics.

Cluster Analysis

Using Enginius Software, the data gathered from the survey was analyzed into segments. The segments were defined by factors that students felt were important in preparing them to pursue a career in data science and analytics, as seen in Question 8 (Appendix 1). The data were clustered into three segments:

1. Segment 1: *Financial Return Seekers*
2. Segment 2: *Wholesome College Experience Seekers*
3. Segment 3: *Role-Model Seekers*

Using both the segment description (Appendix 2) and the segmentation space (Appendix 3) it became clear the motivators and characteristics of each segment as seen below.

Financial Return Seekers: This segment was identified as the smallest segment at 16 percent of the population (Appendix 4). These students are motivated by salary potential and job security, as these were the highest attributes on average for this segment. These students were identified as do-it themselves learners and look to those with success in their chosen career path. This identification comes from the segment space in Appendix 3 where attributes Certifications and Speakers are positively correlated.

Wholesome College Experience Seekers: This was the largest segment, representing 50 percent of the population (Appendix 4). This segment is motivated by the skills and experiences gained at college. The highest averages for attributes were Genuine Interest, Proficient Skills, and Curriculum. Then on the segment space, Salary Potential and Internships were positively correlated in addition to the previously listed. From this, these students prioritize knowledge and want to develop a genuine interest in the topic while trying to understand and be proficient at the topics and skills learned.

Role-Model Seekers: This segment was represented by 34 percent of the population (Appendix 4). The highest average attributes were Genuine Interest, Internships, and Job Security. Within the segment space, attributes Mentor, Business in Practice, Faculty, and Advisors were all positively correlated. This segment is motivated by role models and real-world experience, wanting to combine their passion with their career in the most practical way. They value advice from professionals and those who have experience.

Multiple Regression and Mean Differences Across Genders

Using Stata, a multiple regression was run using students' potential interest in pursuing a career in data science and analytics as the dependent variable and comparing the dependent variable to student's awareness of data science and analytics careers and their readiness to pursue it. As seen in Appendix 5, the regression coefficients were significant with the p-values for each variable (except one) being less than 0.05.

From the regression, awareness and readiness positively affect a student's interest in data science and analytics significantly. Awareness has a lower effect, at $\beta = 0.25$, compared to readiness, at $\beta = 0.45$, on the impact of a student's interest in data science and analytics careers. Another variable that ran with the dependent variable of interest to pursue a data science and analytics career was gender. Gender had a negative effect of $\beta = -0.37$ in interest of pursuing data science and analytics and was significant. The negative effect means that males are more likely to be interested in careers in data science and analytics than females.

This data is also backed by some of the descriptive statistics on lack of awareness of careers in data science and analytics would lead to less interest. For example, respondents who selected that they were not aware of careers in data science and analytics were prompted to say why they are not aware. Over 13 percent selected they did not know that this career path was an option, leaving comments like the following, "Feels like not enough information is provided and I can't make events about it" and "Confusion on what it is, lack of information". This also trends into interest to pursue a data science and analytics career as only 28 percent of students surveyed are potentially interested in this career path.

In addition to the regression, I ran t-tests to understand better whether there was any significance in gender and the variables of awareness, readiness, and interest (Appendix 6). The results show that the means for the female group are significantly lower than the male group in

each of the three variables. The highest averages for both genders were in awareness, with males

(3.50) and females (2.97), a p-value of 0.009. The second highest everywhere was interest, with

males (3.00) and females (2.30), a p-value of 0.004, and lastly, the averages for readiness were

males (2.50) and females (2.07), a p-value of 0.028 (Appendix 6).

Major Influencers and Business School Resources

Previous research indicated that family was one of the main information sources students

turn to, so students were asked to rank key their influencers. On a scale of 1 for most influential

to 6 for least influential, the results showed *Parents* at 2.31 and *Faculty* at 2.82 being the highest-

ranked influencers for business school students. Followed by Mentors at 3.40, Peers at 3.5, and

Advisors at 3.75 (Appendix 7). This data supports past research on parents being the top

influencer in students' lives (Reed et al., 2017).

Even though *Mentors* did not score as high overall in influencers of students, they are still

considered a key factor as the literary review highlights. Students were asked if they currently

had a mentor. Only 38 percent reported having a mentor, while 62 percent agreed that mentors

are essential in making decisions. Unsurprisingly, 53 percent said they are unsure of how to find

a mentor or where to start, pointing to students not having enough resources related to the topic.

Lastly, 68 percent said they would like more opportunities within Paul College to find mentors.

Paul College offers a variety of opportunities for students to pursue, so they can gain

skills and experience, as seen in Appendix 8. Areas that were found to be satisfactory to a

majority over 75 percent of respondents, were College Curriculum, Clubs or Organizations,

Faculty, and Career Services. However, the areas where students felt they needed more support

were Promoted Interest in the Subject, Mentorship Opportunities, Experimental Learning

(Business in Practice), and Guest Speakers. Specifically, Mentorship Opportunities stood out at 72 percent of respondents who felt that more could be done, aligning with the data above.

Discussion

The first research question was the key segments of business school students in how they prepare for careers after graduation. Through segmentation analysis, it was clear that there is not one way to approach business school students to try and increase awareness and readiness, as students can fall into three different segments. However, one segment as seen in Appendix 3, shows that the *Financial Return Seekers* do not represent as much of the student population. Targeting the larger two segments to not spread resources thin may result in better returns from their efforts. Using these segments will be the best way for colleges to create effective plans using the outlined factors for each segment like Business in Practice and workshops in class.

Outside of regular required classes for business school students, Paul College requires students to take four Business in Practice classes, where professionals come in and teach 2 credit courses on their industry or skills. Through experimental learning like Business in Practice programs, colleges can target two of the segments, *Wholesome College Experience Seekers* and *Role-Model Seeking* business school students. *Role-Model Seeking* business students will find having real-world professionals and role models the most beneficial. As *Wholesome College Experience Seekers* business students will find skill-building classes and real-world applications the most valuable and beneficial. Paul College business students selected experimental learning and the Business in Practice program as that could be improved. These classes could improve by targeting more topics that develop hard skills within data science and analytics, introducing data science and analytics with lenses of marketing, accounting, finance, etc., or teaching about

mentorship and careers within this profession. Each of these topics can be expanded on in multiple ways and adjusted to target the different segments more specifically.

The second research question was what are the drivers of a business school student's interest in pursuing a career in data science and analytics fields? Research showed that awareness and readiness have a positive effect on the interest of business school students when pursuing a career in data science and analytics as seen in Appendix 5. Research also showed that one of Paul Colleges' stronger resources falls within its faculty. In addition, business school students ranked faculty as their average second most influential person when making decisions. Within all this data, the opportunity to target first-year classes could lead to higher awareness of careers in data science and analytics. In first-year classes, inviting faculty and business professionals to give students an introduction to how data science and analytics could be applicable to other areas of business. This can be done through visiting professor-led hands-on workshops where students learn real applications within a class session or highlighting career opportunities within data science and analytics to boost awareness. Opportunities like these can also be used to target more women, as bringing in more female representation can present more real-world role models to female business school students who are exploring their interests and potential career paths early on in their college careers.

The third research question was the differences between genders in terms of their awareness, readiness, and interest in careers in data science and analytics? The research shows that there are more opportunities to help promote more women towards data science and analytics and close the gap between the t-test results (Appendix 6). As student organizations like Women in Business hold annual conferences, collaborating and having the theme be related to careers within data science and analytics would bring more female students together with

professionals in the workspace. Within these conferences, tackling topics about the first steps within the career, work culture and life, and other topics that show how versatile data science and analytics are as a career path. After the conference, holding a networking hour where students can connect with professionals and create relationships could break stigmas and inspire more female students to follow data science and analytics careers. Various other student organizations hold their own conferences, allowing multiple opportunities to bring in diverse types of data science and analytics professionals to create awareness and interest in the professions in all areas of business.

The final research question was, who are the major influencers for business school students' careers and their choice for the area of study? When analyzing the major influencers within business school students' decisions, mentors were on average ranked third. This however could be a poor representation of the influence of mentors due to only 38 percent of students currently having a mentor. As the other 62 percent may have never had a mentor or have yet to experience a proper mentorship experience. This data presents opportunities that could lie within mentorship in which both the literature review and the research point to being highly effective. By creating mentorship programs around data science and analytics, more students may consider careers within the field. Not only will it help overall, but female-specific mentorship programs could lead to more women pursuing the career path. This can be done by creating a mentorship database of volunteered Alumni within data science and analytics and using a processing system to pair interests or facts with the student within the program.

Conclusion

The results of this study presented three segments, , *Financial Return Seekers, Wholesome College Experience Seekers, and Role-Model Seekers*, according to the factors that

business school students find essential in helping them prepare for careers after graduation. The research also showed that both awareness and readiness for data science and analytics careers positively affect a business school student's interest in the career. The research also proved that business school students are significantly not aware, interested, or prepared for careers in data science and analytics, along with women being significantly less aware, interested, and prepared than men. Lastly, the research provided parents and faculty as the major influencers of business school students' careers and area of study decisions. Based on the results, there are many opportunities for colleges to help business school students become more aware of their career path, with support around the identified segments and efforts to increase the participation of women in data science and analytics.

References

Beggs, J. M., Bantham, J. H., & Taylor, S. (2008). Distinguishing the factors influencing college students' choice of major. *College Student Journal*, *42*(2), 381–395.

Berman, F. D., & Bourne, P. E. (2015). Let's Make Gender Diversity in Data Science a Priority Right from the Start. *PLOS Biology*, *13*(7), e1002206. https://doi.org/10.1371/journal.pbio.1002206

Croasdell, D., Mcleod, A., & Simkin, M. (2011). Why don't more women major in information systems? *IT & People*, *24*, 158–183. https://doi.org/10.1108/09593841111137340

Drury, B. J., Siy, J. O., & Cheryan, S. (2011). When Do Female Role Models Benefit Women? The Importance of Differentiating Recruitment From Retention in STEM. *Psychological Inquiry*, *22*(4), 265–269. https://doi.org/10.1080/1047840X.2011.620935

Geyfman, V., Force, C., & Davis, L. (2015). WOMEN IN BUSINESS: INFLUENCES ON THE UNDERGRADUATE MAJOR CHOICES. *Administrative Issues Journal Education Practice and Research*, *5*(2). https://doi.org/10.5929/2015.5.2.2

Liu, S. (2022). Women in tech: A Statista DossierPlus on gender diversity in the global technology industry [DossierPlus]. Statista. https://www-statista-com.unh.idm.oclc.org/study/74785/women-in-tech/

Murray, D. I. (n.d.). Council Post: The Benefits of Gender Diversity at Work. Forbes. Retrieved December 12, 2022, from https://www.forbes.com/sites/forbestechcouncil/2019/03/21/the-benefits-of-gender-diversity-at-work/

Reed, A., Anderson, L., Edberg, D., Simkin, M., & Stiver, D. (2017). How Can Universities Best Encourage Women to Major in Information Systems? 41(29). https://core.ac.uk/reader/301373630

Rosenthal, S., & Chung, T. (Rachel). (2020). A Data Science Major: Building Skills and Confidence.

Proceedings of the 51st ACM Technical Symposium on Computer Science Education, 178–184.

https://doi.org/10.1145/3328778.3366791 Stahl, A. (n.d.). 3 Benefits of Diversity in The

Workplace. Forbes. Retrieved December 12, 2022, from

https://www.forbes.com/sites/ashleystahl/2021/12/17/3-benefits-of-diversity-in-the-workplace/

Appendix

Appendix 1 – Survey

Q1

CONSENT FORM FOR PARTICIPATION IN A RESEARCH STUDY

RESEARCHER AND TITLE OF STUDY
My name is Logan Lopus and I am an undergraduate at the University of New Hampshire. I am conducting research on how college exposure to analytical subjects impacts gender diversity and retention in data science and analytics technology careers. IRB-FY2023-133

WHAT IS THE PURPOSE OF THIS FORM?
This consent form describes the research study and helps you to decide if you want to participate. It provides important information about what you will be asked to do in the study, about the risks and benefits of participating in the study, and about your rights as a research participant. You should:
- Read the information in this document carefully, and ask me or the research personnel any questions, particularly if you do not understand something.
- Not agree to participate until all your questions have been answered, or until you are sure that you want to.
- Understand that your participation in this study involves you to complete the following Qualtrics Survey that will last about 5 minutes.
- Understand that the potential risks of participating in this study are anticipated to be minimal.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this research is to gain a deeper understanding of why students decide to pursue a career in analytics and how we can promote more women to follow a career in data science. The anticipated number of participants who will be involved in the study is 100. Participants must be at least 18 years old to participate in the study.

WHAT DOES YOUR PARTICIPATION IN THIS STUDY INVOLVE?
You will be asked a range of questions about your knowledge of data science careers, where you have learned about data science, and what has influenced your current decisions. The questions aim to gain a deeper understanding of why you have chosen your career path and how we can target more women to follow data science careers. Other than being at least 18 years old and enrolled in the Paul College SONA pool, there are no criteria for participating in the survey. You can expect the survey to take about 5 minutes.

WHAT ARE THE POSSIBLE RISKS OF PARTICIPATING IN THIS STUDY?
The possible risks of participating in this study are minimal. Your information will be non-identifiable and stored on a secure server.

WHAT ARE THE POSSIBLE BENEFITS OF PARTICIPATING IN THIS STUDY?
There are no direct benefits to participants. There might be anticipated benefits of knowledge for the data science community through the study of careers in data science and how to better equip students.

WILL YOU RECEIVE ANY COMPENSATION FOR PARTICIPATING IN THIS STUDY?
Student participants will be awarded 1 SONA credit for participation in this study, regardless of how long it takes them. You will automatically receive 1 SONA credit at the completion of the study.

DO YOU HAVE TO TAKE PART IN THIS STUDY?
Taking part in this study is completely voluntary. You may choose not to take part at all. If you agree to participate, you may refuse to answer any question. If you decide not to participate, you will not be penalized or lose any benefits for which you would otherwise qualify. You must, however, complete the entire survey to receive the SONA credit.

CAN YOU WITHDRAW FROM THIS STUDY?
If you agree to participate in this study and you then change your mind, you may stop participating at any time. Any data collected as part of your participation will remain part of the study records. If you decide to stop participating at any time, you will not receive SONA credit.

WHAT ALTERNATIVES ARE AVAILABLE IF YOU DO NOT WANT TO PARTICIPATE IN THIS STUDY?
Participation in this study is not part of your required coursework. If you want to earn the extra credit offered for participating in the study but do not want to participate in the study, contact your coursework instructor for an alternative assignment to earn the extra credit.

HOW WILL THE CONFIDENTIALITY OF YOUR RECORDS BE PROTECTED?
I plan to maintain the confidentiality of all data and records associated with your participation in this research. There are, however, rare instances when I may be required to share individually identifiable information with the following:
- Officials at the University of New Hampshire,
- Regulatory and oversight of government agencies.

I also may be required by law to report certain information:
- To government and/or law enforcement officials (for example, child abuse, threatened violence against self or others or hazing). If I believe that such a report is required, I will follow the guidance of the UNH Institutional Review Board for the Protection of Human Subjects in Research (and of the University's General Counsel) in making any such report, in order to provide as much protection for your privacy as possible while still complying with the law.
- To appropriate UNH authorities (e.g., disclosures involving Sexual Violence - which includes sexual harassment, sexual assault, unwanted sexual contact, sexual misconduct, domestic violence, relationship abuse, stalking [including cyber-stalking], and dating violence - must be reported to the UNH Title IX Coordinator or UNH Police).

Further, any communication via the internet poses minimal risk of a breach of confidentiality.

To help protect the confidentiality of your information, data will be stored on the USNH IT secure cloud storage on SharePoint. In the survey, no identifiable information will be collected, and no information will be shared with a third-party data processor. To help protect the confidentiality of your responses, please do not include any identifying information about yourself or others in your responses to open-ended questions. Once de-identified the data may be used for future studies. I will report the results in aggregate descriptive statistics. The results may be used in reports, presentations, and publications.

Q2

Skip to

End of Survey if Click here if you decline t... Is Selected

WHOM TO CONTACT IF YOU HAVE QUESTIONS ABOUT THIS STUDY
If you have any questions pertaining to the research, you can contact Logan Lopus at logan.lopus@unh.edu or Billur Akdeniz Talay at billur.akdeniz@unh.edu to discuss them.

If you have questions about your rights as a research subject you can contact Melissa McGee in UNH Research Integrity Services, 603/862-2005 or melissa.mcgee@unh.edu to discuss them.

○ Click here if you consent to participate in the research study.

○ Click here if you decline to participate in the research study.

Q3

Careers and jobs that focus on data science and business analytics have been on the rise in the recent years. Many companies and business disciplines (e.g., finance, marketing, sales, human resources) rely more on data and the use of analytics in their decision-making. Accordingly, Paul College has created academic programs like Information Systems and Business Analytics (ISBA) and M.S. Business Analytics to help students to gain knowledge and exposure to these fields.

Q4

Indicate to what extent you are aware of what a career in data science and analytics look like?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am aware of what a career in data science and analytics looks like.	○	○	○	○	○

Q5

🔁 Display this question

If   Indicate to what extent you are aware of what a career in data science and analytics look like?   I am aware of what a career in data science and analytics looks like. - Strongly disagree   Is Selected

Or   Indicate to what extent you are aware of what a career in data science and analytics look like?   I am aware of what a career in data science and analytics looks like. - Somewhat disagree   Is Selected

Why are you not aware?

☐ Lack of Interest

☐ Did not know it was a career path

☐ I already know what I want my career to be

☐ Other

Q6

To what extent would you potentially be interested to pursue a career in the fields of data science and analytics.

	Extremely unlikely	Somewhat unlikely	Neither likely nor unlikely	Somewhat likely	Extremely likely
I would be potentially interested in data science and analytics career.	○	○	○	○	○

Q7

Why are you interested in this career? (Please do not include any identifying information)

Q8 | Indicate to what extent the following factors are important in preparing you to pursue a career in t ･☌･

Indicate to what extent the following factors are important in preparing you to pursue a career in the field of data science and analytics.

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
College Curriculum	○	○	○	○	○
Clubs or Organizations (Atkins, Rines, Voice Z, ect.)	○	○	○	○	○
Advisors	○	○	○	○	○
Faculty	○	○	○	○	○
Genuine Interest in the Subject	○	○	○	○	○
Proficient Skills in the Subject	○	○	○	○	○
Internships	○	○	○	○	○
Salary Potential	○	○	○	○	○
Job Security	○	○	○	○	○
Mentor(s)	○	○	○	○	○
Guest Speakers	○	○	○	○	○
Certifications	○	○	○	○	○
Career Fairs	○	○	○	○	○
Experiential Learning (Business in Practice)	○	○	○	○	○

Q9

Indicate to what extent you feel ready to pursue a career in the field of data science and anayltics?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel ready to pursue a career in data science and analytics.	○	○	○	○	○

Q10

What are the areas that Paul College provides students with enough resources to have a competitive advantage in the job market? (Drag items into appropriate boxes)

Items

College Curriculum

Clubs or Organizations (Atkins, Rines, Voice Z, ect.)

Advisors

Faculty

Promoted genuine interest in the subject

Internship Opportunity (Semester in the City)

Career Services

Opportunity to find Mentors

Guest Speakers

Experiential Learning (Business in Practice)

Other

Provides enough resources.

DOES NOT provide enough resources.

Q11

Who are the key influencers in your area of study and career choices? (To start ranking from 1 to 6, click on one of the items and drag it to prefered rank)

Faculty	1
Parents	2
Number of people of the same gender who work in the field	3
Peers	4
Advisors	5
Mentors	6

Q12

Indicate to what extent you agree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Currently, I have at least one mentor who helps me in navigating potential careers.	○	○	○	○	○
Having a mentor is essential in making the right decisions in job applications.	○	○	○	○	○
I am not sure how I can find mentors to help me do the right planning for my career after college.	○	○	○	○	○
I would like Paul College to provide more opportunities to help me find mentors.	○	○	○	○	○
I do not see the benefit in having a mentor.	○	○	○	○	○

Q13

What is your choice of study?

☐ Finance

☐ Accounting

☐ Marketing

☐ Information Systems & Business Analytics

☐ Entrepreneurial Studies

☐ International Business & Economics

☐ Management

☐ Economics

☐ Hospitality Management

☐ Undecided

Q14

What is your class standing?

○ Freshman

○ Sophomore

○ Junior

○ Senior

Q15

What is your Gender?

○ Male

○ Female

○ Non-binary / third gender

○ Prefer not to say

Q16

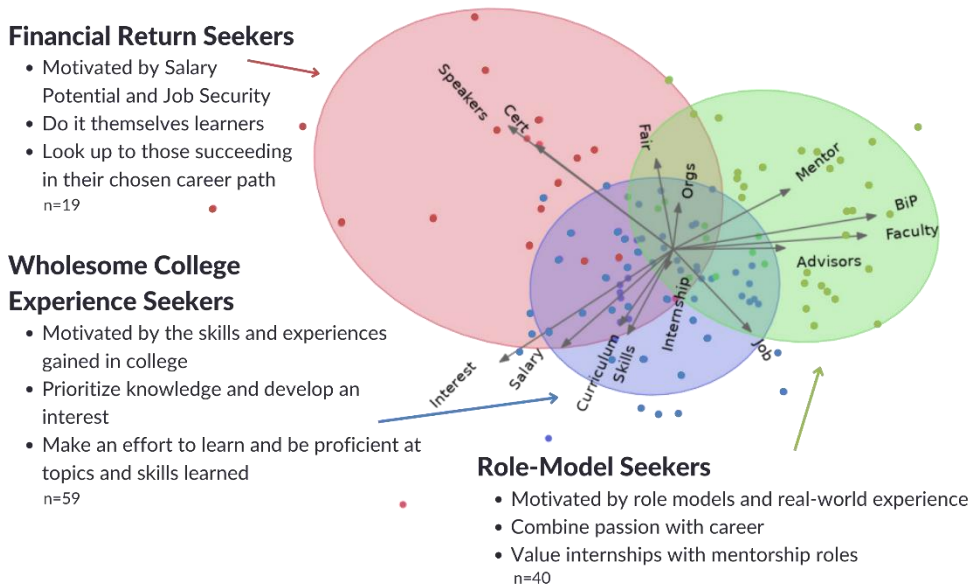## Are you a first-generation college student?

○ Yes

○ No

○ Prefer not to say

Appendix 2 – Segment Description

	Population	Financial Return Seekers	Wholesome College Experience Seekers	Role-Model Seekers
Curriculum	3.92	2.79	4.15	4.10
Orgs	3.12	2.21	2.81	4.00
Advisors	3.42	2.63	3.32	3.93
Faculty	3.69	2.79	3.59	4.25
Interest	4.36	3.16	4.58	4.60
Skills	4.08	2.84	4.31	4.33
Internship	3.78	2.79	3.64	4.45
Salary	4.09	3.53	4.10	4.35
Job	4.17	3.53	4.19	4.45
Mentor	3.55	2.95	3.31	4.20
Speakers	2.55	2.37	2.17	3.20
Cert	3.45	3.05	3.19	4.03
Fair	3.08	2.47	2.78	3.80
BiP	3.62	2.79	3.46	4.25

Segment description. Average value of each segmentation variable, overall for each segment (centroid). Segmentation variables that are statistically different from the rest of the population are highlighted in red (lower) or green (higher).

Appendix 3 – Segmentation Space

Financial Return Seekers
- Motivated by Salary Potential and Job Security
- Do it themselves learners
- Look up to those succeeding in their chosen career path
  n=19

Wholesome College Experience Seekers
- Motivated by the skills and experiences gained in college
- Prioritize knowledge and develop an interest
- Make an effort to learn and be proficient at topics and skills learned
  n=59

Role-Model Seekers
- Motivated by role models and real-world experience
- Combine passion with career
- Value internships with mentorship roles
  n=40

Appendix 4 – Segment Size

	Population	Financial Return Seekers	Wholesome College Experience Seekers	Role-Model Seekers
Size	118	29	59	40
Relative size	100%	16%	50%	34%

Appendix 5 – Multiple Regression

N=117

Variables	Coefficient (β)	Std Error	p-value
Awareness	0.250	0.097	0.011
Readiness	0.457	0.099	0.000
Gender	-0.369	0.200	0.069
Constant	0.981	0.981	0.008
R-squared	0.338		
Adjusted R-squared	0.320		
F(3, 113)	19.25***		

Appendix 6 – T-test Results

Means of Awareness, Interest, and Readiness Compared to Gender

■ Male ■ Female

	Awareness	Interest	Readiness
Male	3.5	3.0	2.5
Female	2.97	2.3	2.07
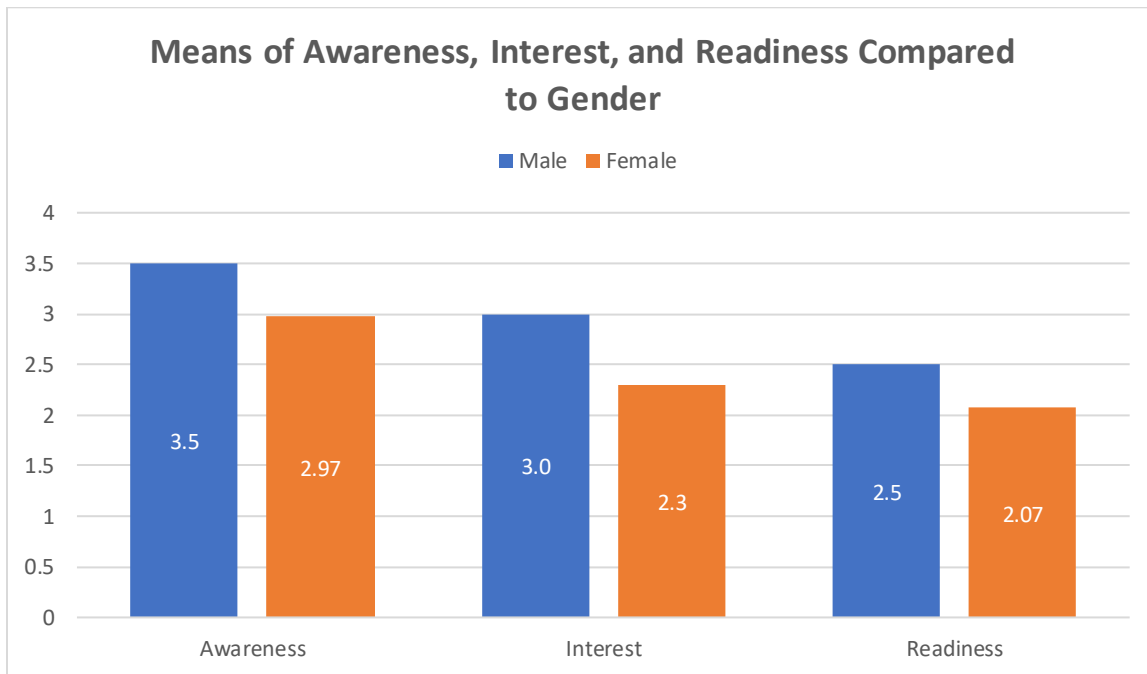
Appendix 7 – Paul College Key Influencers

Ranked (#1 to #6) Key Influencers for College Students in Area of Study and Career Choices
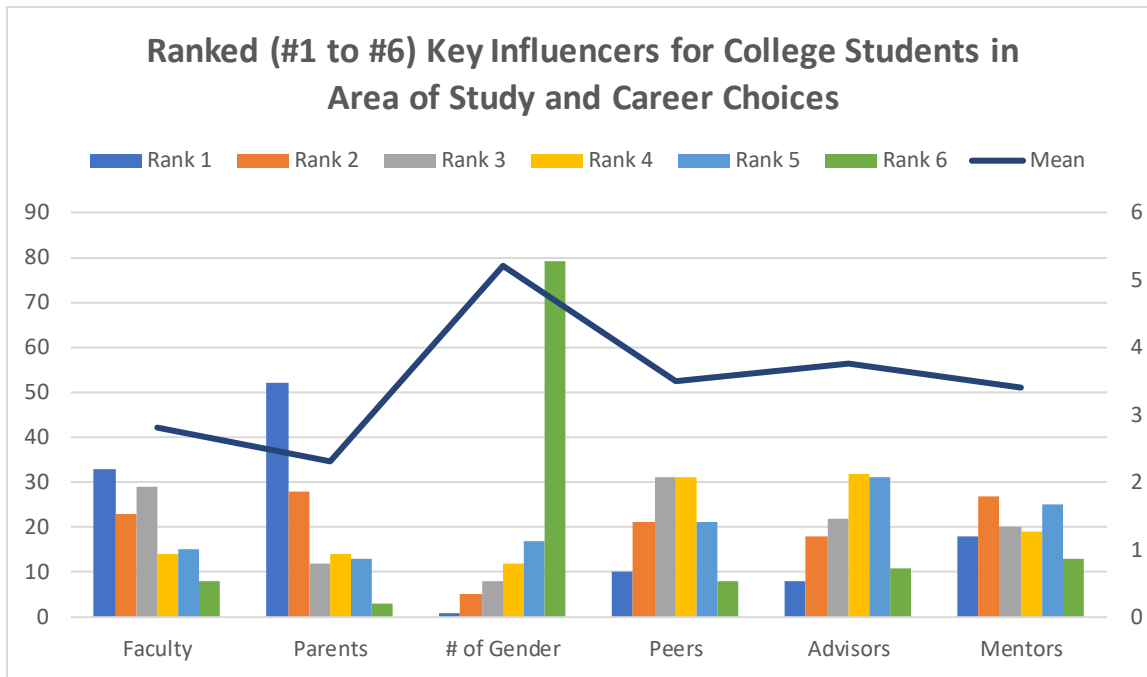
Appendix 8 – Paul College Resources

Areas that College Students Believe Paul College Already Provides Enough Resources vs. Could Provide More Resources for a Stronger Competitive Advantage in the Job Market