Comparing Student Satisfaction in a Master's Data Analytics Program, Based on Related Employment

John Stewart
stewartj@rmu.edu

Gary Alan Davis
davis@rmu.edu

Department of Computer and Information Systems
Robert Morris University
Moon Township, PA, USA

Abstract

Consideration of program satisfaction, whether accurately measured or not, has been a main focus of higher education. Student satisfaction exit surveys have been one method of gauging educational effectiveness. However, questions remain as to who is in a better position to adequately evaluate the effectiveness of an academic program. Specifically, are those working in the field more qualified to assess a program than those graduates with no working experience? In this study, we reviewed the responses from an exit survey of graduating students (n= 221) in a Data Analytics Master's level program to compare the satisfaction levels of those working in data analytics to those who are not. An evaluation of responses to specific exit survey questions was undertaken to determine if a discrepancy exits between the student satisfaction of these two subject groups in a fairly new Master's level program in Data Analytics. One area we were specifically interested in was the level of satisfaction with the software tools chosen for the courses in the program. Student responses to open-ended questions were examined in an attempt to determine what technical aspects of the M.S. in Data Analytics program may be improved, with respect to content and software tools specifically required by industry. The student responses and current curricular content were also evaluated in light of model Data Science and Analytics curricula, such as curricular recommendations published by the Association for Computing Machinery (ACM).

Keywords: Data Analytics, Data Science, Higher-Education, Master's Degree, Student Feedback, Curriculum Development, Data Analytics / Data Science Model Curriculum

1. INTRODUCTION/LITERATURE REVIEW

Surveying students to determine how to improve higher education programs has been seen as potentially useful for some time. However, the implications of flawed or erroneous surveys may result in grade inflation and poor teaching performance (Stroebe, 2020). The objective of student satisfaction surveys, is to determine where limitations exist, where curricula can be improved, and how change can be managed (McCuddy et al., 2008). From a marketing perspective, some institutions of higher education have touted their high student satisfaction scores as a way to attract more students to their academic programs (University of Bolton, 2021).

The necessity of tools to determine the effectiveness of continuous improvement may

be critical in an environment where there is considerable competition. For example, an executive Master's in Business Administration (MBA) program may use an exit survey to gain insight into how to attract and retain qualified students in an increasingly competitive field of MBA programs (Capozzoli & Gundersen, 2013). In our post-Covid world, student satisfaction has become critical to student retention, and ultimately, the survival of many colleges and universities (Ochnio, et al., 2022). Due to Covid or budgetary reasons, the satisfaction among college students has been further strained by the increasing trend toward more online and eLearning in higher education curricula (Candrlic, et al., 2020).

Higher Education faces a number of pressures including: limited budgets, a shrinking pool of potential students, the continually increasing expectations of students, and increasingly-stringent requirements of accrediting bodies. For these reasons, colleges and universities are looking for ways to differentiate themselves, but still provide flexible, high-quality education programs that have the goal of attracting more students. Since colleges and universities wish to maintain reputations and deliver high quality programs, these institutions have made continual efforts to measure the quality of degree programs via student satisfaction surveys.

Such assessments of student satisfaction are not without shortcomings. The potential negative effects of such assessments include the potential for confusing information, conflicting outcomes, misinterpretation of information, or even the improper application of the results. Despite the potential for misuse, satisfaction surveys provide considerable direct information, and can be the catalyst for change, and provide actionable information for continuous improvement of existing programs (Capozzoli & Gundersen, 2013).

2. RESEARCH METHODOLOGY

The focus of this work was to determine if differences exists in the feedback from a Master's in Data Analytics program, between those with and without work experience in Data Analytics. Student feedback to specific questions in a post-program exit survey were evaluated. Our study included only students in a Master of Science (M.S.) in Data Analytics. The dataset used for the current study consisted of 221 Master's-level students who were enrolled an M.S. in Data Analytics degree program. The degree program consisted of fully-online, fully on-ground, and hybrid (i.e., partial online, partial on-ground) courses. It should be noted that Master's level students enrolled in the program can complete their degree using any mixture of these three course delivery formats.

Our focus in this analysis was to identify any existing differences in the reported satisfaction levels of the program for those employed in the field of Data Analytics, versus those who are new to the field. Assuming that those working in the field have a view of industry expectations of Data Analytics graduates, a measurable disparity in satisfaction levels could possibly be an indication that there are deficiencies in our preparation of students to meet the expectations of potential employers in the field. The current study relied on the following statements to determine student satisfaction:

1. In total, my educational experience has prepared me for entry into the work force in my specialty. (Work Prep)

2. I have an ability to apply knowledge of Data analytics to the discipline. (Apply Knowledge)

3. My studies at [A University in the Northeast] prepared me for a career that is related to my Master's Degree. (Career Prep)

Each participant (i.e., graduating student) was asked to rate each statement using the following ordinal scale: Strongly Agree, Agree Neutral, Disagree, and Strongly Disagree. The possible responses on the ordinal scale provide objective, quantitative information. However, our objective in interpreting the survey results is to determine if there is a significant difference in the perceived or interpreted quality of program based on the background of the student. More specifically, are there differences in the reported satisfaction level of experienced data analysts versus those who have no specific experience in the discipline?

Any measurable difference in the results between our two populations (i.e., employed in Data Analytics and not employed in Data Analytics) should be investigated. It might be questioned as to whether there may be possible deficiencies in program content and lack of exposure to critical software tools. Overall, our study sought to answer the questions, "How does the current Master's degree program meet

the needs of employers who hire our M.S. in Data Analytics graduates?" and "How does the current program curriculum compare with model curricula for Data Science and Analytics?" While a direct measure of employer satisfaction may not exist, the current study sought to answer this question based on an analysis of student satisfaction levels.

The current study was limited, in that a small percentage of graduating students were employed in positions that are related to their Master's degree. The number of graduates working in a field related to their Master's degree was determined by the following exit survey question: "I am currently employed in a job that is related to my Master's degree." Out of the 221 graduating students who completed the exit survey, only 82 (37%) reported that they currently work in a job that is directly related to their Master's degree. In order to address the imbalance in the dataset and capture a higher percentage of graduates working in a Data Analytics-related position, the survey would have to be repeated at some point in the future (e.g., five years after graduation).

In addition to the closed-ended question results on an ordinal scale, the exit survey also included several open-ended questions. The goal of the open-ended questions was to determine if differences might exist between the *Field-Employed* (FE) and *Non-Field Employed* (Non-FE) students, in terms of their satisfaction with program content and software tools taught. This comparison allowed for more detailed and specific information, since graduating students can better elaborate on their Master's degree experience. The analysis of the open-ended responses was seen as an effort to identify ways that the degree program could be improved. Specifically, the objective was to identify, in the opinion of each group, the degree to which the Master's degree program should be more technical. There was also an interest in determining if the current Master's degree program covered Data Analytics concepts and topics at a sufficient level of detail. In other words, in the opinion of the members of each group, is the M.S. in Data Analytics covering all the sub-disciplines of analytics? Further, is there a measurable difference in the results with respect to FE versus Non-FE graduating students?
Evaluating the specific responses of FE students is a way to determine if the program might be lacking any meaningful and/or substantive technical components. Does the M.S. in Data Analytics program adequately cover current technical topics that are now required skills by industry, such as Machine Learning and Big Data Analytics? And, does the program provide a high enough level of exposure and training in current software tools and platforms used in industry, such as R, Python, Spark, and Hadoop?

The specific open-ended questions from the survey that were used to determine if a disparity exists between the views of the FE and Non-FE graduates were the following:

1. What aspects of the [A University in the Northeast] Master's Degree program do you feel need to be changed? (Need Changed)

2. What additional comments/suggestions do you have regarding your [A University in the Northeast] Master's Degree program? (Additional Comments)

Within the text of these open-ended questions, the respondents' sentiments were determined and key words were counted. This approach was used to determine the percentage of each group that found the program lacking in content and/or training in specific software tools.

In order to determine whether a delineation exists between the FE and non-FE respondents we compared the distribution of results using the Fisher Exact Test. Independence tests are used to determine if there is a significant relationship between two categorical variables.

Fisher's exact test is preferred over the X^2 Chi-Square Test (when the sample is small and when one or more of the contingency cells is less than 5 (McCrum-Gardner 2008; Bower 2003). This is the case with the survey data. For each of our three questions, we compared the FE and non-FE distributions of responses using Fisher's Exact Test. The Null Hypothesis is there is no association between FE and non-FE respondents relative to each survey question. The alternative hypothesis would state that there is a statistically-significant association between the FE and non-FE respondents relative to the specific question. The results are shown in Table 1.

Survey Question	p-value
Prepared for Career	3.737e-05
Prepared for Workforce	0.1877
Apply Knowledge	0.0442

Table 1: Results of Fisher's Exact Test

The results for two of the questions related to the ability of graduates to apply their knowledge, and whether they feel prepared for the workforce. The results indicate that there is no difference in the perspectives of graduates surveyed whether they were currently employed in a job related to data analytics or not. However, there is an apparent statistically-significant difference in the different groups of respondents specific to preparation for a career in data analytics. Is it possible that the FE respondents view the program more favorably in terms of preparing graduates for a career? The results in Table 3 show a more favorable view of career preparation by FE students, as opposed to non-FE students. This may indicate that the Master's program is meeting the needs and expectations of those knowledgeable about data analytics and the requirements and outlook for the long-term view of the industry.

The literature indicates that the usual rule for deciding whether the χ^2 approximation is good enough is that the Chi-square test is not appropriate when the **expected** values in one of the cells of the contingency table is less than 5. In such a case, Fisher's exact test is preferred (McCrum-Gardner, 2008; Bower, 2003).

Sampling Method

A post-curriculum survey of a total of 221 graduates from a Master of Science in Data Analytics program was performed in this study. This total of 221 student subjects was comprised of all graduating students from the program during the past four years. Most questions on the exit survey involved an ordinal scale of measurement (i.e., Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree).

An evaluation of the responses to open-ended questions was also performed in order to evaluate the inclusion of certain keywords (e.g., Python, R, SQL, Machine Learning, Big Data, Data Mining, et al.). The analysis of these keywords was conducted in order to determine how well the Master's in Data Analytics program is meeting the technical expectations of students. The text responses from the graduating students were split in order to isolate keywords for counting. Subsequently, a percentage of the total was determined in order to make a comparison.

The addition of the two open-ended questions helped determine the shortcomings of the M.S. in Data Analytics program (i.e., what aspects of the program should be improved?). These specific open-ended questions were structured to determine, from the graduating students, whether the program should require more components related to the specified keywords. The responses to the open-ended questions were analyzed to determine if there is a significant lack of inclusion of specific content and skills in the program. In evaluating these, the objective was to determine whether FE students had responses listing specific software tools and Data Analytics sub-disciplines, thereby giving insight into industry expectations and/or limitations of the program's curriculum.

Research Questions

The research questions evaluated in this study were as follows:

R_1 Is there a difference in the perception of workforce preparation between graduates of the program who are employed in the field of data analytics and those who are not?

R_2 Do students with Data Analytics work experience (and those without Data Analytics work experience) have measurably different perceptions as to whether the Master of Science in Data Analytics program adequately prepares them for a career in Data Analytics?

R_3 Is there a difference in satisfaction with the technical aspects of the Master of Science in Data Analytics program, as indicated by the graduating students' mention of specific keywords in their responses to open-ended survey questions (e.g., R, Python, and SQL), based on their current employment in Data Analytics?

R_4 Do those graduates employed in Data Analytics perceive a need for more in-depth use of specific software tools such as R, Python, and SQL (and more coursework in technical topics, such as Machine Learning, Big Data, and Data

Mining) than those who are not employed in the field?

The objective of the current study was to gain insight from the research questions by comparing the differences in *Field-Employed* (FE) and *Non-Field Employed* (Non-FE) response percentages and from visualizations of this data. Comparisons were made among the different responses, and also by determining the frequency in use of specific keywords. The keyword analysis was used to determine whether a difference existed between FE and Non-FE students, with respect to the inclusion of certain topics and tools within the Master's degree program. The keyword analysis was also used to determine if the current degree program should be augmented to include more attention to certain data analytics tools and topics.

3. RESULTS AND DISCUSSION

The first research question stated: "Is there a difference in the perception of workforce preparation between graduates of the program who are employed in the field of data analytics and those who are not?" In order to answer R_1, the counts of the ordinal responses from the first closed-ended statement in the exit survey was summarized for both FE and Non-FE students. In Table 2, the percentages of the responses are shown for the first closed-ended statement: "In total, my educational experience has prepared me for entry into the work force in my specialty" (in this case, Data Analytics). See Table 2 below (Figure 1 in Appendix).

Category	Non-FE	FE
Strongly Agree	0.302	0.415
Agree	0.590	0.549
Neutral	0.072	0.037
Disagree	0.036	0.000
Strongly Disagree	0.000	0.000

Table 2. Extent to Which the Master's Degree Prepared Student for Workforce

In viewing Table 2, we can see that the FE and Non-FE students, based on comparative percentages in each category, appear to have a generally similar perception of the program to adequately prepare them for the Data Analytics workforce. The results of the Non-FE students have a few more neutral and negative responses about the program.

The second research question stated: "Do students with Data Analytics work experience (and those without Data Analytics work experience) have measurably different perceptions as to whether the Master of Science in Data Analytics program adequately prepares them for a career in Data Analytics?" In order to answer R_2, the counts of the ordinal responses were summarized from the second closed-ended statement in the exit survey. See Table 3 (Figure 2 in Appendix).

Category	Non-FE	FE
Strongly Agree	0.255	0.558
Agree	0.564	0.384
Neutral	0.155	0.035
Disagree	0.027	0.023
Strongly Disagree	0.000	0.000

Table 3. Extent to Which the Master's Degree Prepared Student for a Career in Data Analytics

In Table 3, the count of responses is displayed for the second closed-ended statement: "I have an ability to apply knowledge of data analytics."

Table 3 shows that FE students appear to be more confident in their preparation for a career in Data Analytics. At the same time, the Non-FE student responses seem to be, more skewed towards a negative view of their career preparation by the program. This differentiation is supported by the results of the Fisher's Exact Test (see Table 1).

While we cannot determine the exact reasons behind this disparity, it certainly merits consideration. A variety of possible reasons on an individualized basis may be at the foundation. Perhaps the program lacked the expected rigor, or was not rigorous enough. Or, maybe certain expectations were not met.

The third research question stated: "Is there a difference in satisfaction with the technical aspects of the Master of Science in Data Analytics program, as indicated by the graduating students' mention of specific keywords in their responses to open-ended survey questions (e.g., R, Python, and SQL), based on their current employment in Data

Analytics?" In order to answer R_3, the counts of the ordinal responses from the second closed-ended question were summarized.

In Table 4, the count of responses is displayed for the third closed-ended statement: "My studies at [A University in the Northeast] prepared me to apply my knowledge in Data Analytics." See Table 4 (Figure 3 in Appendix).

Category	Non-FE	FE
Strongly Agree	0.415	0.605
Agree	0.563	0.395
Neutral	0.022	0.000
Disagree	0.000	0.000
Strongly Disagree	0.000	0.000

Table 4. The Master's Degree Prepared Student with Ability to Apply Knowledge

Table 4 shows, again, that, as a percentage, FE students appear to more strongly agree that the program has provided them with the ability to apply their knowledge in Data Analytics. The highest percentages for both groups are in the upper, more positive region. However, the percentages are slightly skewed negatively for the Non-FE students.

The fourth research question stated: "Do those graduates employed in Data Analytics perceive a need for more in-depth use of specific software tools such as R, Python, and SQL (and more coursework in technical topics, such as Machine Learning, Big Data, and Data Mining) than those who are not employed in the field?" The exit survey completed by the graduating students asked the students to list the Master's level courses that they felt were the most helpful to them throughout the degree program. In order to answer R_4, the most helpful courses (as reported by students) were tabulated from the open-ended responses. We evaluated the open-ended statement: "What course or courses in your Master's degree did you feel helped you the most?"

An additional objective was to determine the percentage of students who mentioned specific drawbacks of the program in the open-ended questions. This analysis involved a word count of specific topics and software tools. The answers to the questions "What aspects need to be changed?" and "What additional comments or suggestions do you have regarding the Master's in Data Analytics program?" We are specifically looking for responses that suggested that the program be more rigorous and include more depth on the application of specific skills like Machine Learning, Big Data Technologies, R, Python, and SQL. In the evaluation of the responses, any mention of making the program more rigorous was counted. Any request for more in-depth and/or mention of a lack of these specific skills was included in the count.

In summary, the current study component sought to determine responses that called for a more rigorous and technical program that better prepared students with skills that are required by industry (Stewart, Davis, & Igoche, 2021; Krastev, 2020). We suggest that a quality curriculum and the software tools discussed (R, Python, SQL) are correlated since these are the top tools used in industry by data analysts. Thus, any quality curriculum should incorporate the use of these tools in their courses.

The results of this study showed that nearly one fifth (18.5%) wanted more technical courses and more exposure to software tools, like such as Python, R, and SQL. Breaking down the results between FE and Non-FE students shows that, in Table 5, 19% of the Non-FE and 18.5% of the FE students, as measured by their responses in open ended questions, determined that the program lacked the rigor of technical topics and necessary software tools.

Total	FE	Non-FE
18.5%	19.0%	18.5%

Table 5. Comparison of Percentage of FE and Non-FE Students Looking for more Rigorous Curriculum and Exposure to software Tools

We see that the percentage of students desiring more appropriate software tools is nearly identical between the two groups. Does this result indicate a generally similar awareness of students, regardless of whether they are FE or Non-FE? Tables 6 and 7 list additional comments and suggestions from the graduating students.

Quotation from Graduating Student
Could be beneficial to make one of the programming languages (R/Python) as a required course.
I think that an R language class should be required prior to the data mining course.
I wish Python, R and SQL were Required courses.
I feel that there needs to be more classes utilizing SQL, Python, and potentially R
Possibly make the Python a required course.
More content regarding data lakes and new data storage technologies. AWS, Azure, Hadoop, Spark etc. Companies want to see that we've worked with these technologies or that we can speak on them.

Table 6. Aspects of Master's Degree Program that Need to Be Changed

Quotation from Graduating Student
Need to have a programming language throughout the degree and have all the classes, like BI, Data Mining, Database Management, have you use Python or Java to complete the assignments.
I never went through a class where I actually used Python, R, SAS, SPSS or SQL. I would suggest that it should be a required course since it is what most Data Analyst.
Stronger coding for R and SQL. I learned the basic through courses but I had to learn a lot on my own.
Definitely needs more SQL, possibly a course on it. SQL comes up in many job descriptions but there was very little exposure to it.
Python and R programming languages should be used more prevalently throughout Data Analytics courses.
There is no big data specific training. This is becoming extremely important.

Table 7. Additional Comments/ Suggestions regarding the Master's Degree Program

Comparison to Model Curricula

The results of the current study can be evaluated in light of the model curricula proposed for Data Science and Analytics. The current curriculum of the Master of Science in Data Analytics can be compared to recommended models. The Association for Computing Machinery (ACM) has a recommended curriculum for Data Science and Analytics that includes a competency framework of nine *knowledge areas*. The nine knowledge areas proposed by ACM include: 1) computing fundamentals, 2) data acquirement and governance, 3) data management, storage, and retrieval, 4) data privacy, security, and integrity, 5) machine learning, 6) data mining, 7) big data, 8) analysis and presentation, and 9) professionalism (ACM, 2020, p. 29).

As shown in Table 8, the current required courses in the Master of Science in Data Analytics are compared to the courses/knowledge areas in the ACM Model Curriculum for Data Science and Analytics. As shown in the Table, the current M.S. in Data Analytics curriculum covers seven of the recommended courses/knowledge areas from ACM. The remaining two knowledge areas (i.e., *Machine Learning* and *Professionalism*) could be taken as elective courses, however, they are not currently required. In addition, the current *Data Integration for Analytics* course introduces *Big Data* and discusses it at a cursory level. However, Big Data is not the primary focus of the course.

The exit survey responses from the graduating M.S. in Data Analytics students can be compared to the ACM Curriculum for Data Science and Analytics. In comparing the responses from the graduating students to the nine knowledge areas, many of the open-ended comments from the students tie directly to the knowledge areas. For example, the open-ended response from a graduating student asked for " . . . more content regarding data lakes and new data storage technologies." Specifically, "AWS, Azure, Hadoop, and Spark" were mentioned in the responses. These new data storage technologies and platforms tie directly to the ACM knowledge area of *Big Data*. Adding a specific course to the M.S. in Data Analytics program that is focused on Big Data would address such data storage platforms (both vendor-based and open-source). In addition, many of the graduating students specifically asked for more classes utilizing open-source software tools, such as R and Python. Since R and Python are the two leading, open-source tools for performing machine learning, this request from the students ties directly to the ACM knowledge area of *Machine Learning*. As with a course on Big Data, adding a specific Machine Learning course to the M.S. in Analytics curriculum would address both the recommended knowledge area from ACM, and the request from students for more open-source tools for machine learning.

ACM-Recommended Curriculum	MS in Data Analytics Curriculum
1. Computing Fundamentals	Decision Support Systems
2. Data Acquirement and Governance	Data Integration for Analytics
3. Data Management, Storage, and Retrieval	Database Management Systems
4. Data Privacy, Security, and Integrity	Computer Network Security
5. Machine Learning	*Not required, but can be taken as an elective*
6. Data Mining	Data Mining
7. Big Data	Data Integration for Analytics (Introduction)
8. Analysis and Presentation	Intro to Data Analytics, Geographic Info Systems
9. Professionalism	*Not required, but can be taken as an elective*

Table 8. Comparison to ACM Model Curriculum for Data Science and Analytics

4. CONCLUSIONS

The current study compared the satisfaction levels of recent graduates from a Masters in Data Analytics program who were employed in the data analytics field to those who are not employed in the field. Based on this comparison, this study is able to make some general conclusions and suggestions based on Fisher's Exact Test and visual and cursory trends. The assessment and comparison was made by analyzing both closed and open-ended exit survey questions. Clearly, limited information can be obtained with answers from an ordinal scale of measurement, and criteria for interpretation can be a factor in how the results are interpreted and conclusions are made. In any case, it can be seen that in evaluating the answers to the three closed-ended questions, we can see a slight difference in the perceived view of the program between those who are employed in the field of Data Analytics, and those who are not. From the results of each question, we can see a more pronounced skew towards the negative end of the continuum, as reported by Non-FE graduates. In other words, there is less positive view of the M.S. in Data Analytics program among those graduates who are not currently employed in the field of Data Analytics. The Fisher's Exact Test also shows a significant difference in the perception of the whether the Data Analytics Masters program prepared them for a career in the field between the FE and non-FE survey participants.

Another component of our analysis was a word count of specific topics and software tools. In particular, one open-ended question addressed how the program could be improved. We counted the answers that suggested that the program be more rigorous, and include more depth on the application of specific skills like Machine Learning, Big Data Technologies, R, Python, and SQL. Any mention of making the program more rigorous or more in-depth and/or mentioned a lack of specific skills was included in the count.

The results from the open-ended question responses show that there is very little difference between those employed in the Data Analytics field and those who were not. Approximately 19% of FE and 18.5% of Non-FE students who were surveyed reported that the degree program lacked the rigor and depth required for these skills. Therefore, with nearly a fifth of the students recognizing a lack of specific software skills required by industry, there is arguably a call for improving the current M.S. in Data Analytics program. It should also be noted that the specific software tools mentioned were not suggested, but rather were voluntarily provided by the exit survey participants. Such specific software tools reported by survey participants further strengthens the case that curricular changes are warranted. Additionally, a literature review for this study found that experience in these tools is a clear industry requirement (Mills et al., 2016; Radovilsky & Hegde, 2022; Cegielski, & Jones-Farmer 2016; Bowers et al., 2018).

The current study also compared the current course content of the Master of Science in Data Analytics degree to the model curriculum recommended by the ACM. Specifically, the degree's curriculum was compared to the ACM Model Curriculum for Data Science and Analytics. The comparison identified several gaps in the current curriculum that coincided with requests from graduating students for the inclusion of more Cloud Storage platforms and for more exposure to open-source machine learning tools.

A number of additional studies support the inclusion of these specific languages in higher education curricula. For example, Jones and

Smith (2020) conducted a survey of introductory programming courses at business colleges within the United States. The researchers found that Python was the most popular language in college-level MIS curricula. The same researchers conducted a 2021 study involving undergraduate students in U.S. colleges and universities. Their 2021 study revealed that the top three programming courses taught in the included schools were Java, Python, and C++ (Smith & Jones, 2021). Finally, Hudithi and Kamran (2021) conducted a comparative study of 22 universities in order to develop a Finance Technology (FinTech) curriculum for a leading business college in the Middle East. Their study, aimed at addressing gaps in existing curricula, found that Python and R Programming are among the most sought-after technology topics in higher education.

Limitations of Study

One noted shortcoming of the current work is the limited amount of available data. In future studies, a larger data set could be evaluated. Natural Language Processing and Machine Learning could also be used to assess general sentiments contained within the open-ended responses from the graduating students. Finally, the exit survey could be repeated with an ordinal measurement scale that includes a ranking from 0 to 10. This revised scale would provide a more refined view of the satisfaction results from the graduating students.

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APPENDIX

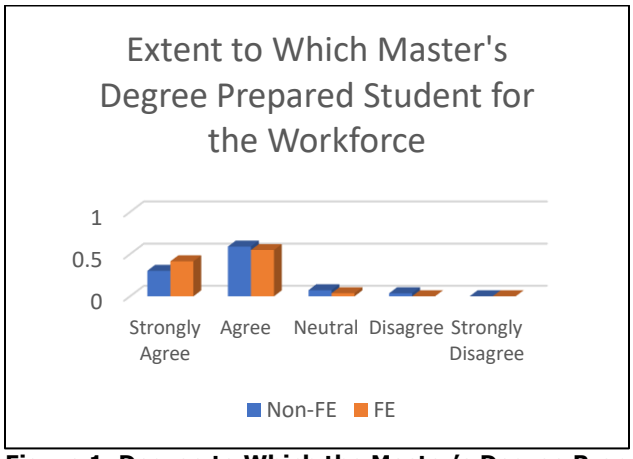

Figure 1. Degree to Which the Master's Degree Prepared Student for Workforce

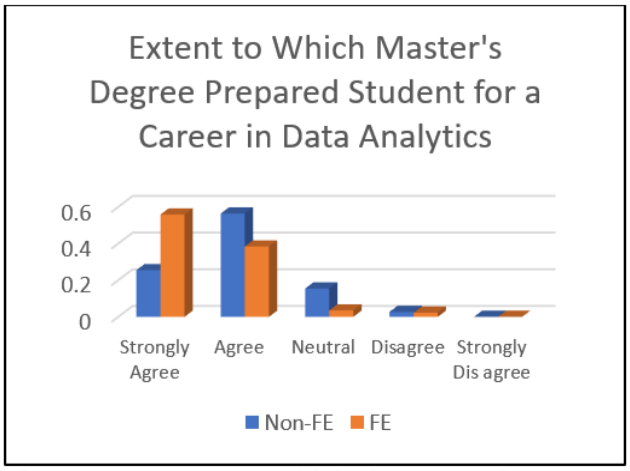

Figure 2. Degree to Which the Master's Degree Prepared Student for a Career in Data Analytics

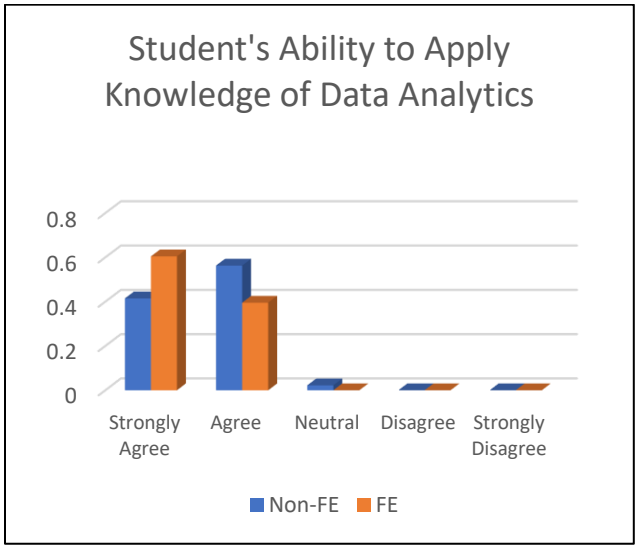

Figure 3. The Master's Degree Prepared the Student to Apply Knowledge