Engineering Educators Bringing the World Together
2025 ASEE Annual Conference & Exposition
Palais des congrès de Montréal, Montréal, QC • June 22–25, 2025
Paper ID #46835

Evaluating the Impact of Foundational Engineering Management Courses on Graduate Student Success: A Qualitative and Quantitative Study

Dr. Yooneun Lee, University of Dayton

Dr. Yooneun Lee is an assistant professor with the Department of Engineering Management, Systems and Technology at the University of Dayton. Prior to joining University of Dayton, Dr. Lee worked as a faculty member at the University of Texas at San Antonio.

Dr. Khalid Zouhri, University of Dayton

Dr. Khalid Zouhri is an assistant professor in the Department of Engineering Management, Systems and Technology at the University of Dayton. Prior to joining the faculty at the University, he was an assistant Professor for four years in the Department of

Dr. Philip Appiah-Kubi, University of Dayton

Dr. Appiah-Kubi is an Associate Professor at the University of Dayton (Department of Engineering Management, Systems and Technology). He has a Ph.D. in Industrial and Systems Engineering and a master's degree in Aviation Systems and Flight Testing from Oh

Evaluating the Impact of Foundational Engineering Management Courses on Graduate Student Success: A Qualitative and Quantitative Study

Yooneun Lee, Khalid Zouhri, Philip Appiah-Kubi

Abstract

Graduate programs in Engineering Management typically require students to complete a set of core courses to ensure they have the necessary academic background and foundational knowledge for success in the program. These core courses often include probability, statistics, mathematics, and operations research, tailored to the focus and specialty of the engineering management program. However, many first-year graduate students face challenges in keeping up with these core courses, which can significantly impact their consequent academic success and, ultimately, their professional careers. This study aims to investigate the relationship between graduate students' performance in their first engineering management course and their overall academic success through both qualitative and quantitative analysis. As this course serves as a prerequisite for future coursework, it plays a crucial role in shaping students' academic trajectories. By analyzing the connection between initial course performance and overall GPA, we seek to gain valuable insights to better support graduate students throughout their academic journey.

Introduction

Graduate programs in the Engineering Management (EM) program are designed to equip students with the interdisciplinary knowledge and skills necessary to tackle complex technical and managerial challenges. To ensure students are adequately prepared, most programs require completion of core courses in areas such as probability, statistics, mathematics, and operations research. These courses lay the groundwork for advanced studies and professional success. However, many first-year graduate students encounter significant challenges in these foundational courses, which can influence their subsequent academic performance and career readiness.

The analysis of student performance in their first engineering graduate program is a critical aspect of evaluating the effectiveness of the program and preparing graduates for successful careers in the field of engineering. Graduate engineering programs are designed to provide students with the knowledge, skills, and experience needed to succeed in a challenging and rapidly-evolving field. By analyzing student performance, program administrators and faculty can identify areas where students may be struggling and make adjustments to the curriculum and program structure to better prepare graduates for success. Additionally, the analysis of student performance can provide valuable feedback to faculty and administrators, helping them to continually improve and adapt the program to meet the changing needs of the industry. Overall, a thorough analysis of student performance in the first year of an engineering graduate program is an essential component of ensuring that graduates are well-prepared to succeed in their careers and make meaningful contributions to the field of engineering [1].

The analysis of student performance in their first engineering graduate program has been a key aspect of evaluating the effectiveness of such programs for many years. In the past, this analysis was often limited to relatively simple metrics such as course grades and retention rates [2]. However, with the advent of more sophisticated data analysis techniques and advances in educational research, it is now possible to conduct much more comprehensive analyses of student performance in engineering graduate programs. Today, the analysis of student performance in the first year of an engineering graduate program may involve a wide range of metrics and techniques, including assessments of research and project performance, professional development opportunities, and more. These advanced analytical techniques provide program administrators and faculty with a more nuanced understanding of how students are performing in the program and where improvements can be made to better prepare graduates for successful careers in engineering [3]. Overall, the analysis of student performance in engineering graduate programs has evolved significantly over the years, becoming increasingly sophisticated and data-driven, with a greater focus on using data to drive continuous improvement in these important educational programs [4,5].

The analysis of student performance in their first engineering graduate program can provide valuable insights into the effectiveness of the program and the potential for future success. There are several key factors that can be examined to evaluate student performance [6,7]:

- Course grades: Course grades can provide an indication of how well students are mastering the material in the program. By examining grade distributions and identifying patterns in performance, program administrators can identify areas where students may be struggling and make adjustments to the curriculum as needed.
- Retention rates: Retention rates can provide an indication of how engaged and committed students are to the program. High retention rates suggest that students are satisfied with the program and are likely to continue on to graduation.
- Research and project performance: In many engineering graduate programs, students are required to complete research projects or design projects. By evaluating the quality and originality of these projects, program administrators can assess the level of creativity and innovation in the student body.
- Professional development: Many graduate engineering programs offer opportunities for students to participate in professional development activities, such as internships or co-op programs. By evaluating the participation and success of students in these programs, program administrators can assess the potential for future employment and success in the field.

Overall, a comprehensive analysis of student performance in an engineering graduate program can provide valuable feedback for program administrators and faculty to make adjustments to the program to improve student success and prepare graduates for success in their careers and ensure they make meaningful contributions to the field in engineering.

In this study, we evaluate impact of an introductory graduate course on overall student performance and investigate key success factors by conducting quantitative and qualitative analysis of the EM graduate program at the University of Dayton. The EM program currently offers two graduate degrees: the Doctor of Engineering in Systems Engineering and Management and the Master of Science in Engineering Management. The curriculum is structured to provide students with a balance technical and managerial competencies through combination of core required courses and specialized electives that allow for domain-specific expertise development [8].

A fundamental requirement of the program is ENM 500: Probability and Statistics for Engineers, an introductory graduate-level course in probability and statistics. The course serves as a foundational prerequisite for subsequent coursework, helping students develop essential analytical and statistical reasoning skills [9].

In the analysis that follows, we examine the performance of students in four elective courses that require ENM 500 as a prerequisite, assessing how their foundational knowledge in probability and statistics influences success in more advanced coursework. The four courses and their titles are as follows [9]:

- ENM 534: Decision Analysis
- ENM 560: Quality Assurance
- ENM 561: Design of Experiments

- ENM 565: Reliability

Qualitative Analysis

To evaluate students' perspectives on the first engineering class, UD's Student Evaluation of Teaching (SET) serves as a standardized course feedback mechanism, allowing students to provide input on both the course content and the instructor. A full list of survey questions is provided in the appendix. Among these, the following two questions are particularly relevant for assessing students' experiences with the course:

- Q1: *This course stimulated my interest in the subject (Stimulation of Interest).*
- Q2: *This course increased my understanding of the subject (Increased Understanding).*

Responses to these questions offer valuable insights into students' engagement, perceived learning, and overall satisfaction. The feedback presents a mix of positive outcomes, frustrations, and constructive criticisms, which can inform future course design and instructional strategies.

Student responses to Q1 reveal polarized experiences. Some students noted that the course stimulated their pre-existing interest in data analytics, as illustrated by a comment stating, "This course definitely stimulated my interests in the subject...I have ventured into learning many other related things on my own and that has been cool." This highlights the course's potential to reinforce enthusiasm among students already inclined toward the subject.

However, several students expressed negative experiences, citing stress, health issues, and a lack of engagement. One student commented, "Stimulated stress, health issues, and hatred toward this course," while another noted, "It seemed that there was intense pressure to solve homework problems... This distracted me from my interest and curiosity in the subject material." These sentiments suggest that the heavy workload and pacing may have detracted from the students' ability to engage meaningfully with the material. A recurring theme in the feedback is the desire for open discussions, collaboration, and hands-on applications, as one student stated, "Why are we learning the material? It should extend beyond problem-solving, especially at the graduate level." These comments underscore the importance of aligning the course's structure and teaching methods with student expectations for deeper engagement and contextual understanding.

For Q2, some students acknowledged that the course contributed to their understanding of statistical tools, as noted in the response, "I did understand the background processes of statistical tools which was good and interesting." This indicates that the course provided valuable foundational knowledge for certain students.

Conversely, other students emphasized the challenges they faced in grasping the material, often attributing their understanding to self-study rather than classroom instruction. For instance, one student stated, "All my understanding of the course was done outside of the classroom trying to figure out the homework." Another remarked, "I am not sure about this. What I would say is that this course made me aware of things I needed to know and then I went ahead to erect structures to learn their use and applicability." These responses suggest that while the course introduced critical concepts, its effectiveness in facilitating in-depth understanding within the classroom setting was limited. This disconnect may point to the need for clearer instruction, more interactive teaching approaches, or better-aligned assessments to reinforce in-class learning.

The qualitative feedback provides important insights into the student experience:

1. Pacing and Workload: Several comments highlight the intense pace and workload as barriers to both stimulating interest and enhancing understanding. Adjusting the course schedule to allow for more in-depth exploration and discussion could mitigate these issues.
2. Engagement and Application: Students expressed a desire for more collaborative and applied learning opportunities, such as discussions, real-world applications, and experimental learning. Incorporating these elements could foster greater interest and deeper comprehension.
3. Support for Diverse Backgrounds: Some students entered the course with pre-existing aversions or challenges, such as a dislike for statistics or limited prior knowledge. Providing supplemental resources or scaffolding could help bridge these gaps and ensure more equitable learning outcomes.
4. Alignment of Homework and Classroom Instruction: The feedback indicates a disconnect between homework and classroom learning. Ensuring that assignments complement and reinforce in-class instruction could enhance students' understanding and reduce the reliance on self-study.

By addressing these issues, the course can better meet the diverse needs of graduate students, fostering both interest and understanding in the subject matter.

Quantitative Analysis

In this section, we investigate the following two hypotheses:

- Hypothesis 1: The first graduate course is positively related to students' overall GPA.
- Hypothesis 2: Students' performance in an engineering prerequisite course is positively related to future courses that require the prerequisite.

To test these hypotheses, we conducted a quantitative analysis using a dataset that includes the total enrollment of 303 graduate students across three programs: (1) Master of Science in Engineering Management (MSEM), (2) Master of Science in Management Science (MSMS), and (3) Master of Science in Systems Engineering (MSSE), spanning the academic years from 2018 to 2023. Grades were analyzed using the grading scale employed at the University of Dayton, where A is equivalent to 4.0, A- to 3.7, B+ to 3.3, B to 3.0, B- to 2.7, C to 2.0, and F or W to 0.

The curriculum of the University of Dayton's Engineering Management Department offers two key courses for first-semester graduate students: ENM 500: Probability and Statistics for Engineers and ENM 505: Management of Engineering Systems. ENM 500 serves as an introductory course in probability and statistics, primarily designed for students pursuing MSEM and MSMS degrees. ENM 505 introduces systems engineering concepts and processes, using the Systems Engineering Body of Knowledge as its foundation, and is tailored for MSSE and MSMS students. These foundational courses are pivotal in establishing the academic groundwork for subsequent coursework.

Correlation Analysis

The analysis highlights the relationship between graduate students' performance in ENM 500 and their success in subsequent coursework (ENM 534, ENM 560, ENM 561, and ENM 565), as well as their overall GPA. By incorporating statistical significance testing, the study evaluates both the strength and reliability of these relationships. Pearson correlation coefficients and corresponding p-values were calculated, allowing for a robust interpretation of the results. Significant correlations were identified between ENM 500 and other key courses, indicating that early academic performance in this foundational course is a critical predictor of subsequent success. The inclusion of p-values enhances the rigor of the findings, confirming that these observed correlations are unlikely to have occurred by chance. These insights emphasize the need for targeted academic interventions to support students in ENM 500, ensuring a strong foundation for their academic and professional journeys. The detailed results are summarized in Table 1 below.

Table 1: Correlation with p-values

Metric	Correlation_with_ENM500	P_value
ENM534	0.1951	0.1423
ENM560	0.3969	0.0002
ENM561	0.2293	0.0706
ENM565	0.8068	0.0001
GPA	0.7397	0.0000

The correlation table illustrates the relationship between ENM 500 grades and various metrics, including subsequent course grades and overall GPA, along with their associated p-values. The correlation between ENM 500 and ENM 534 is relatively weak, with a value of 0.1951, and the corresponding p-value of 0.1423 suggests this relationship is not statistically significant. This result indicates that ENM 500 may have a limited direct influence on performance in ENM 534, or that other factors play a more dominant role.

For ENM 560, the correlation is stronger at 0.3969, accompanied by a highly significant p-value of 0.0002. This finding suggests that performance in ENM 500 has a meaningful positive relationship with grades in ENM 560, supporting the idea that ENM 500 provides a critical foundation for this subsequent course. Similarly, ENM 561 shows a weak-to-moderate correlation of 0.2293, with a p-value of 0.0706. While the relationship is suggestive of some positive association, it is not statistically significant, indicating that additional factors might contribute to performance in ENM 561.

The relationship between ENM 500 and ENM 565 is particularly strong, with a correlation of 0.8068 and a p-value of 0.0001, demonstrating a highly significant and robust positive relationship. This result emphasizes the critical role of ENM 500 as a predictor of success in ENM 565. Additionally, the correlation with overall GPA is 0.7397, with a p-value of less than 0.0001, underscoring the importance of ENM 500 in shaping overall academic trajectories. Together, these findings highlight the varying degrees of influence ENM 500 exerts on subsequent academic outcomes and confirm its foundational importance in the curriculum.

Partial Regression/Residual Analysis

The partial regression model is a type of ordinary least squares (OLS) regression. In this context:

- The statistical model describes the relationship between the dependent variable (e.g., grades in a subsequent course) and independent variables (e.g., ENM 500 grades and GPA).
- The general statistical model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

  where

  - $Y =$ dependent variable (grades in a subsequent course)
  - $X_1 =$ independent variable (ENM 500 grades)
  - $X_2 =$ independent variable (overall GPA)
  - $\beta_0, \beta_1, \beta_2 =$ parameters to be estimated
  - $\epsilon =$ error term

The model is parameterized by coefficients (β_1, β_2) that quantify the contribution of each predictor variable to the dependent variable. In Table 2, the regression outputs provide parameter estimates (β) for ENM 500 and GPA, along with their statistical significance (p-values). For example, β_1 measures the unique contribution of ENM 500 grades to the dependent variable, controlling for GPA.

Residual Analysis

The residual plots generated examine whether (1) the relationship between predictors and the dependent variable is appropriately modeled and/or (2) assumptions like linearity and homoscedasticity are met. By estimating these parameters and validating the residuals, the partial regression model serves as a statistical and parameterized framework to test hypotheses and interpret the unique contributions of ENM 500. The parameter values from the partial regression model are extracted and displayed in Table 2 below, including the intercept, coefficients for ENM 500 and GPA, R-squared values, and p-values.

Table 2: Partial Regression Model Parameters

Course	Intercept	Beta_ENM500	Beta_GPA	R-squared	p-value_ENM500	p-value_GPA
ENM534	0.7338	-0.2420	1.0741	0.4212	0.0035	0.0000
ENM560	-1.2394	-0.0553	1.3891	0.7653	0.3940	0.0000
ENM561	-1.1287	-0.1660	1.4513	0.3541	0.3319	0.0000
ENM565	-2.9983	-0.1193	1.8921	0.8825	0.3775	0.0001

The observation that the coefficients for ENM 500 are negative for all four courses is intriguing. While this may appear counterintuitive, it warrants further investigation into potential multicollinearity and confounding effects. A negative coefficient does not necessarily imply that higher ENM 500 grades are detrimental. Instead, it might suggest that, after accounting for GPA, students with higher ENM 500 grades exhibit less variability in their subsequent course performance. However, this interpretation requires careful consideration, and additional analysis should be conducted to validate and better understand these findings.

Residual Plots

Residual plots for ENM 534, ENM 561, ENM 560, and ENM 565 against ENM 500 grades are presented in Figure 1. Each plot depicts the residuals (the differences between observed and predicted values) plotted against ENM 500 grades, with a reference line at zero to emphasize deviations.

The residual plots suggest that the linear regression model fits reasonably well, with no significant systematic patterns observed. However, certain features, such as outliers and clustering, warrant further investigation. For example, in some plots, points with large residuals—particularly at lower ENM 500 grades (e.g., around 1.5)—may indicate potential outliers. These points could disproportionately influence the regression results and should be carefully examined for possible data entry errors or to determine if they represent true anomalies. Addressing these outliers might improve the robustness of the model.

Additionally, the spread of residuals does not appear to increase or decrease systematically with ENM 500 grades, which is a positive indication of homoscedasticity (constant variance). This consistency supports the assumption of equal variance in the residuals, enhancing confidence in the model's validity. If necessary, robust regression techniques could be employed to mitigate the influence of outliers and refine the overall fit.

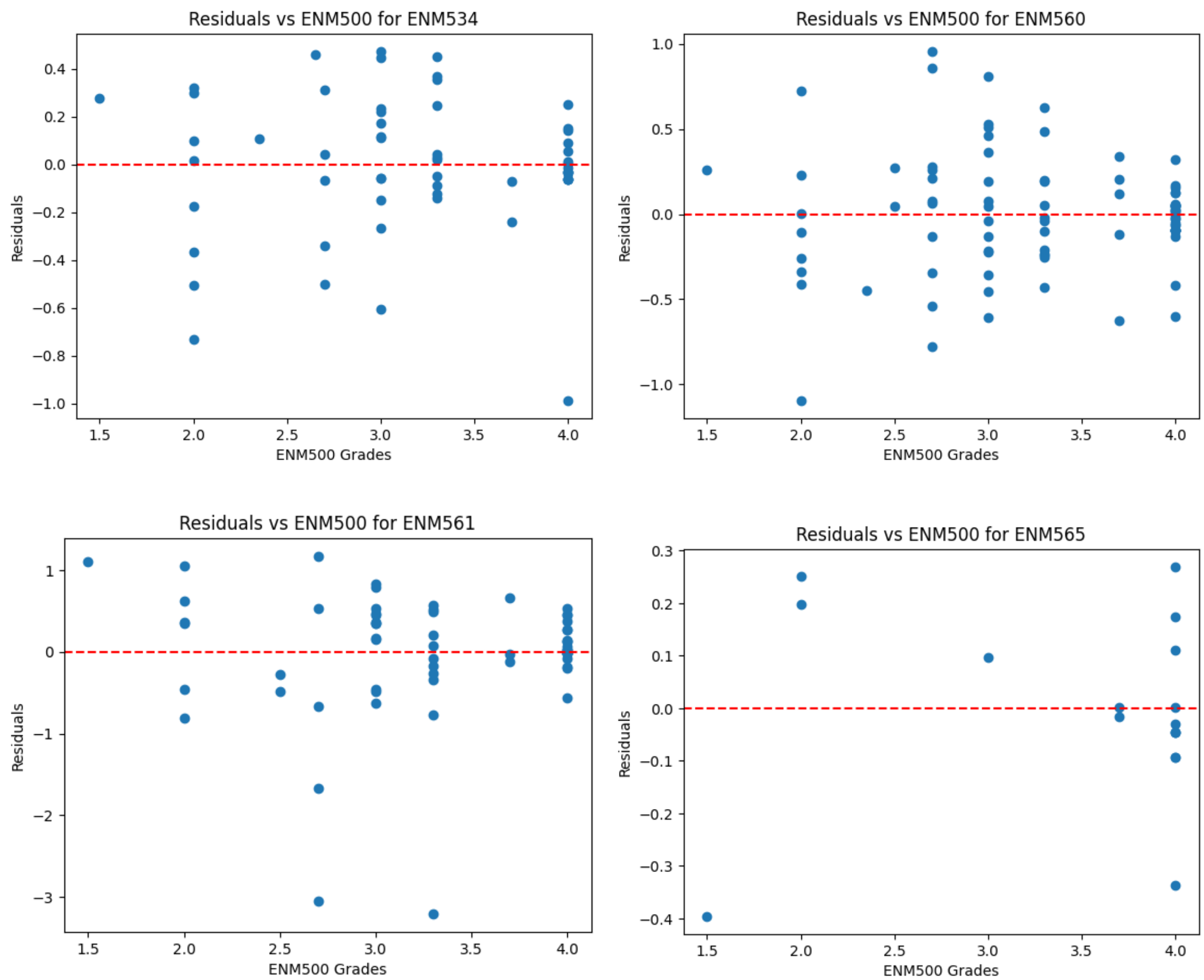

Figure 1: Residual Plots

Summary of Results

To bolster the hypothesis and present a robust argument, we integrate the findings from the correlation analysis and the Partial Regression/Residual Analysis. This combination provides a more comprehensive and nuanced understanding of the relationships between ENM 500, subsequent coursework, and overall GPA.

The correlation analysis offers an overarching view of the linear relationships between ENM 500, its prerequisite courses, and overall GPA. The strong positive correlations demonstrate that higher performance in ENM 500 is associated with better outcomes in subsequent courses and an improved overall GPA. This analysis underscores the role of ENM 500 as a key predictor of academic success, laying a strong foundation for further examination.

The Partial Regression/Residual Analysis builds upon these insights by addressing confounding factors, particularly GPA. This method isolates the unique effect of ENM 500 on students' performance in each subsequent course, independent of their overall academic ability as reflected by GPA. Residual plots and statistical metrics (R-squared values and p-values) provide further validation of significant relationships and reveal variability unexplained by the model. These results specifically reinforce Hypothesis 2, confirming that ENM 500 contributes distinctively to performance in courses that rely on it as a prerequisite.

Discussions

To further evaluate the impact of ENM 500 and overall GPA, we assessed potential multicollinearity within the regression model. Given that overall GPA inherently overlaps with both ENM 500 performance (X1) and the dependent variable (subsequent course performance), Variance Inflation Factor (VIF) statistics were computed. The results indicate low to moderate multicollinearity, with VIF values ranging from 1.33 (ENM 560) to 5.31 (ENM 565). While the inclusion of overall GPA provides insight into the relative importance of course-specific performance versus overall academic achievement, the higher VIF value for ENM 565 (5.31) suggests a stronger multicollinearity effect, which may influence coefficient interpretations. In particular, this could contribute to unexpected negative coefficients observed in the regression analysis. Future research should explore alternative modeling approaches, such as hierarchical regression or regularization techniques, to further disentangle these effects and enhance predictive accuracy.

Table 3: Variance Inflation Factor (VIF) for ENM 500 and GPA

Course	VIF (ENM 500 & GPA)
ENM 534	2.095
ENM 560	1.332
ENM 561	1.405
ENM 565	5.313

While multicollinearity analysis suggests that ENM 500 and overall GPA are closely related, this does not diminish the importance of ENM 500 as a foundational course. Rather, it reinforces the idea that early academic success is strongly associated with later performance. However, caution is required in interpreting these findings, as lower performance in the first course may not necessarily cause a lower overall GPA. Instead, various factors, including individual preparedness, external challenges, and course design, could influence both initial and overall performance.

By synthesizing these findings, the correlation analysis establishes a broad pattern, while the partial regression analysis delves deeper into the causative dimensions of these relationships. Together, they affirm the dual role of ENM 500: as a determinant of overall academic trajectories (Hypothesis 1) and as a significant factor in prerequisite-dependent courses (Hypothesis 2). This integrated perspective highlights the critical importance of early academic support for students in ENM 500, given its cascading impact on their academic and professional success.

Through the integration of these two analyses, the hypotheses are validated with both breadth and depth. This combined methodology not only strengthens the study's conclusions but also delivers actionable insights for curriculum development and targeted academic interventions, ultimately advancing student success within Engineering Management programs.

Conclusion

Graduate students’ performance in their first engineering course plays a critical role in shaping their academic trajectory toward a master’s degree. In this study, we conducted a comprehensive quantitative analysis to explore the relationship between performance in the first graduate course and overall GPA. The results highlight that students’ performance in the core course is positively correlated with their overall academic outcomes.

To complement the quantitative findings, qualitative feedback from student surveys offers valuable insights into their impressions and experiences in their first graduate course. Students expressed concerns about the ability to connect course concepts to future coursework and the challenges posed by high workloads and fast-paced schedules. Some students noted that while the course stimulated their interest, they faced difficulties engaging deeply with the material due to these external pressures. This feedback underscores the importance of creating a supportive learning environment that fosters both interest and understanding in the foundational course.

Moving forward, further analysis is needed to investigate the factors that impact students' experiences and perceptions in their first graduate course. A key insight from both the quantitative and qualitative findings is that while ENM 500 serves as an essential foundation, students often struggle to connect its concepts to later coursework. This suggests that instead of covering all probability and statistics concepts in a single prerequisite course, integrating these topics into subsequent courses could improve retention and application. By introducing probability and statistics within the context of decision analysis, quality assurance, experimental design, and reliability modeling, students may engage more effectively with the material when they see its direct relevance. Student feedback indicates that many find it difficult to apply statistical concepts learned in ENM 500 when they later encounter them in specialized courses. This reinforces the need for a more distributed and application-driven learning approach. Additionally, efforts should be directed at incorporating hands-on and collaborative activities that strengthen connections between foundational and advanced topics. Restructuring how probability and statistics are introduced throughout the curriculum not only enhances learning outcomes but also ensures that students develop the analytical skills necessary for long-term academic and professional success. By aligning coursework more closely with practical applications, this curriculum reform ultimately benefits students by providing a more cohesive and meaningful learning experience.

While this study examines the relationship between performance in the introductory probability and statistics course and subsequent coursework, it does not account for variations in course structure, instructional methods, or assessment criteria that may also influence student outcomes. Course syllabi and instructional design play a crucial role in shaping learning experiences, and differences in how statistical concepts are reinforced across courses could impact performance. Future research should consider analyzing course syllabi and instructional strategies to better understand how content delivery and assessment practices influence student performance across the curriculum.

In conclusion, the integration of quantitative and qualitative findings highlights the importance of both academic performance and student experiences in the first graduate course. Addressing these factors holistically can guide curriculum design and instructional strategies, ultimately supporting graduate students in achieving their academic and professional goals.

References

[1] Felder, R. M., & Brent, R. (2004). The intellectual development of science and engineering students: Part 1—Models and challenges. Journal of Engineering Education, 93(4), 269-277.

[2] Kelly, R. M., & Barratt-Pugh, L. G. (1999). Assessment of learning in engineering education: A review of current practice and future trends. Australasian Journal of Engineering Education, 7(2), 13-28

[3] Lindberg, M. J., & Fransson, T. (2004). Can assessment be a driver for developing teaching and learning in engineering education?. European Journal of Engineering Education, 29(2), 163-174.

[4] Prados, R., Colomina, R., & Aracil, R. (2011). A methodology for the analysis of student performance in engineering education. International Journal of Engineering Education, 27(4), 775-787.

[5] Siller, T. J., D'Souza, K. A., & McIntyre, T. J. (2011). Analysis of student performance in a first-year engineering program: The role of high school preparation. Journal of Engineering Education, 100(1), 96-124.

[6] Swaminathan, V., & McComas, J. J. (2016). Using assessment data to improve engineering education: A review of the literature. Journal of Engineering Education, 105(1), 160-192.

[7] Wankat, P. C., & Oreovicz, F. S. (1993). Teaching engineering. New York: McGraw-Hill.

[8] University of Dayton. (2025). Master of Science in Engineering Management, Engineering Management program. Retrieved from https://udayton.edu/engineering/departments/engineering-management-systems-technology/engineering-management-systems/engineering-management-ms/index.php

[9] University of Dayton. (2025). 2024-2025 Academic Catalog, Engineering Management program. Retrieved from https://catalog.udayton.edu/graduate/schoolofengineering/programsofstudy/engineeringmanagement/

Appendix: UD Student Evaluation of Teaching (SET) Survey

The Student Evaluation of Teaching (SET) is a standardized survey used at the University of Dayton to gather student feedback on course structure, instructional effectiveness, and overall learning experience. Below is the full list of SET survey questions used in this study.

Q1	1a. The instructor seemed organized. 1b. (Optional) Comments relating to instructor organization:
Q2	2a. I knew what I was expected to accomplish in this course. 2b. (Optional) Comments related to knowing what was expected in the course:
Q3	3a. The instructor presented the subject matter clearly. 3b. (Optional) Comments related to instructor presenting the subject matter clearly:
Q4	4a. The instructor created an environment that supported my learning. 4b. (Optional) Comments related to supportive learning environment:
Q5	5a. The instructor demonstrated a genuine interest in my success. 5b. (Optional) Comments related to instructor's genuine interest in my success:
Q6	6a. The feedback I received from the instructor improved my learning. 6b. (Optional) Comments related to instructor feedback improving my learning:
Q7	7a. This course stimulated my interest in the subject. 7b. (Optional) Comments related to the course stimulating my interest in the subject:
Q8	8a. This course increased my understanding of the subject. 8b. (Optional) Comments related to my increased understanding of the subject:
Q9	9. If you could take the course over again, is there anything YOU could have done differently in your role AS A STUDENT to improve your learning?
Q10	10. What aspects of this course did you find MOST EFFECTIVE in helping you to learn?
Q11	11. What aspects of this course did you find LEAST EFFECTIVE in helping you to learn, and how do you suggest they should be changed?
Q12	12. Please provide any additional comments you may have.
Q13	13. I learned a great deal from this course
Q14	14. I would recommend this course to other students
Q15	15. I would recommend this instructor to other students