# Engineering Technology Students and Faculty—Bridging Perspectives

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## Abstract

This paper examines the definitions of success held by engineering technology students and faculty members in engineering technology. The staff of a large engineering technology program in the United States found how students prioritize the elements of success and how faculty thought students would prioritize the elements of success to be divergent. Anecdotal observations from conversations with students and faculty sparked an interest in discovering how attuned faculty members are to their students' frame of reference when defining the elements of success.

Staff collected data from students and faculty and shared the results with those attending the annual opening meeting for engineering technology faculty and staff. Faculty were intrigued by the data, which these researchers found meaningful and worthy of publication.

Initial analysis of the survey data collected from students and faculty was done at a high level. Findings reveal significant disparities between student and faculty perspectives, shedding light on the challenges in aligning educational objectives and expectations. Potential root causes contributing to the discrepancy were discussed during the staff retreat. A leading consideration was the individual survey takers' lens or personal reference point and how that lens could impact a faculty member's interpretation of how students perceive success. Further discussions centered around factors that may influence how students view success, such as parental work habits, availability of information on the World Wide Web, and other topics such as the most recent pandemic. Others spoke about the continued need to teach foundational theory, regardless of how students define success.

Based upon the survey data and anecdotal evidence provided by faculty in various settings, this study offers practical recommendations for fostering improved communication and understanding between engineering technology students and faculty, aiming to enhance the educational experience for all stakeholders involved. By recognizing and addressing these disparities, institutions can work towards a more harmonious learning environment catering to the diverse needs and aspirations of engineering technology students and faculty members. At a very high level, this research contributes to the ongoing discourse on effective pedagogical strategies and collaborative learning environments in higher education.


## Introduction

This paper explores the intricate landscape of beliefs held by engineering technology students and faculty members within the domain of engineering technology. The impetus for this research arose from a wise observation made by the staff of a distinguished engineering technology program in the United States. They discerned a notable incongruence between the students' sentiments and the beliefs the faculty harbored regarding the academic environment. These anecdotal observations prompted a crucial realization that a comprehensive investigation was

imperative. Consequently, a decision was made to conduct a thorough survey encompassing the department's entire student and faculty body. This survey aims to delve into the nuances of beliefs held by both groups, unraveling the intricacies of their perspectives and discerning any disparities that might exist. Through this exploration, the paper aims to contribute insights that foster a more harmonious understanding between students and faculty, facilitating an environment conducive to effective teaching and learning in engineering technology.

## Literature Review

To approach the problems faced by engineering technology students and faculty, it may be helpful to examine their belief structures. The following sections provide a detailed analysis of these structures and their impact, along with a brief outline of instruments and theories that can assist faculty in interpreting survey results and applying them to their own situation.

**Effective Teaching and Learning.** One of the most essential aspects of effective teaching is understanding the beliefs and knowledge that students bring to the classroom [1]. Every student has unique experiences, biases, and preconceptions that shape how they learn. By taking the time to understand these factors, educators can tailor their teaching methods to better align with students' existing knowledge and misconceptions, creating a more effective and engaging learning experience for everyone involved. This requires a deep understanding of each student's strengths and weaknesses and the ability to identify and address gaps in their knowledge [2]. By doing so, educators can help their students develop a more accurate and comprehensive understanding of the subject matter, leading to more success in the classroom and beyond.

**Understanding and Addressing Misconceptions.** Understanding and addressing misconceptions among students in the classroom is a crucial aspect of effective teaching. Misconceptions can hinder the learning process and create barriers to grasping new concepts. Teachers must actively engage with their students to identify and comprehend these misconceptions [3]. This involves creating an open and supportive learning environment where students feel comfortable expressing their thoughts and asking questions. By fostering a culture of curiosity and inquiry, educators can uncover and address misconceptions early. Furthermore, personalized feedback and targeted interventions can provide clarity and correct misunderstandings [4]. Teachers should also encourage collaborative learning, allowing students to discuss and challenge each other's ideas, promoting a deeper understanding of the subject. In essence, recognizing and tackling misconceptions enhances individual learning and contributes to a more enriching and practical educational experience for the entire classroom.

**Motivation and Engagement**: Student motivation and the faculty's ability to engage students are interconnected elements that significantly impact the overall learning experience. Student motivation is a key determinant of academic success, influencing their willingness to invest time and effort in their studies. Faculty members play a pivotal role in fostering this motivation by

employing engaging teaching methods, creating interactive and dynamic learning environments, and demonstrating a genuine passion for the subject matter [3, 5]. The ability of faculty to connect with students on a personal and intellectual level enhances motivation, as students are more likely to be inspired when they feel a sense of relevance and enthusiasm from their instructors [6]. Effective engagement involves recognizing and catering to diverse learning styles, incorporating real-world examples, and encouraging active participation. When faculty members proactively address their students' individual needs and interests, it cultivates a positive learning atmosphere, promoting intrinsic motivation and a desire to excel academically [7]. The symbiotic relationship between student motivation and the faculty's ability to engage creates an environment conducive to meaningful and impactful learning experiences.

**Cultural Sensitivity**: Students often bring a rich tapestry of artistic and personal beliefs to the learning environment, shaping their perspectives and influencing their approach to education. Recognizing and understanding these diverse beliefs is crucial for faculty to foster an inclusive learning environment. Cultural and personal backgrounds can significantly impact a student's learning style, preferences, and expectations [8]. Faculty members who take the time to understand and appreciate these diverse beliefs demonstrate a commitment to creating an inclusive space that respects and values the uniqueness of each student. By acknowledging and incorporating diverse perspectives into the curriculum, educators enrich the learning experience and empower students to connect their cultural or personal identities with their academic journeys. This approach promotes a sense of belonging, encourages open dialogue, and contributes to a more vibrant and supportive educational community where all students feel seen, heard, and respected [9, 10].

**Feedback and Assessment.** Understanding students' beliefs is a fundamental aspect of effective teaching, especially when designing assessments and offering constructive feedback [11-13]. A student's beliefs about their abilities, the importance of the subject matter, and their learning process can significantly influence their performance. Educators attuned to these beliefs can tailor assessments to align with diverse learning styles, ensuring a fair and comprehensive evaluation. Moreover, awareness of students' beliefs aids educators in recognizing their current position in the learning journey. This insight enables the customization of feedback, addressing specific misconceptions or reinforcing positive aspects of their understanding. By considering students' beliefs, educators can provide guidance that resonates with individual perspectives, promoting a more supportive and personalized learning environment. Ultimately, this approach fosters a deeper connection between educators and students, facilitating a collaborative and practical educational experience.

**Enhancing Critical Thinking.** Comprehending the diverse beliefs held by students provides faculty with a unique opportunity to foster critical thinking within the educational setting. Armed with insight into students' perspectives and preconceptions, educators can strategically challenge and encourage critical thought. By understanding what students believe, instructors can guide

them through analyzing and evaluating their beliefs and assumptions. This approach promotes a deeper level of engagement with the subject matter, encouraging students to question, explore alternative viewpoints, and develop a more nuanced understanding of complex concepts [14, 15]. It enhances their cognitive abilities and equips them with valuable skills for navigating the uncertainties of the real world. In essence, by leveraging an awareness of students' beliefs, faculty can create an environment that not only imparts knowledge but also cultivates the essential skill of critical thinking, empowering students to approach learning with a discerning and analytical mindset.

**Adapting Curriculum.** Faculty's awareness of students' prior knowledge and beliefs is pivotal in tailoring curriculum and course materials to enhance the overall learning experience. By understanding the diverse backgrounds and perspectives students bring to the classroom, educators can make informed adjustments to the curriculum. This proactive approach allows faculty to align the content with students' existing knowledge, making it more accessible and relatable. Recognizing the importance of building on prior understanding, instructors can bridge gaps and create connections between new concepts and what students already know. This facilitates a smoother learning process and fosters a sense of relevance and engagement. Adapting course materials to reflect students' beliefs ensures that the educational content resonates with their experiences, promoting a more inclusive and effective learning environment. In essence, the thoughtful curriculum adjustment based on student's prior knowledge and beliefs contributes to a more personalized and meaningful educational journey [16, 17].

**Personalized Learning.** Acknowledging and understanding students' individual beliefs empowers educators to personalize instruction, ultimately enhancing the overall learning experience. Every student brings unique perspectives, learning preferences, and prior knowledge to the educational setting. By recognizing and incorporating these individual beliefs into the instructional approach, educators can tailor their teaching methods to meet the diverse needs of their students [18]. Personalized instruction considers variations in learning styles, interests, and cultural backgrounds, creating a more individualized and practical learning journey. This approach fosters a deeper connection between the instructor and the student and promotes a sense of ownership and engagement in the learning process. Ultimately, recognizing and valuing individual beliefs allows educators to create a learning environment responsive to students' diverse needs, leading to a more personalized and enriching educational experience [19].

**Professional Development for Faculty.** A nuanced understanding of what students believe is invaluable in shaping faculty training and professional development. By delving into students' beliefs, educators gain insights that can enhance their teaching strategies [20, 21]. This awareness allows faculty to identify and address common misconceptions that students may harbor, enabling the development of targeted interventions. The training process can focus on equipping instructors with the skills and knowledge needed to navigate and correct these misconceptions effectively. Furthermore, understanding student beliefs guides the tailoring of

teaching methods to align more closely with students' perspectives and cognitive processes. By incorporating this awareness into professional development programs, faculty members can refine their instructional approaches, fostering a more responsive and adaptive teaching environment. A symbiotic relationship between understanding student beliefs and faculty development ultimately contributes to a continuously evolving and effective educational landscape.

**Evaluating the Efficacy of Teaching Strategies.** Understanding the evolution of students' beliefs over time provides faculty with a valuable feedback loop to assess the effectiveness of their teaching methods. By observing shifts in students' perspectives, instructors can gauge the impact of their instructional approaches on the learning journey. This insight allows faculty to identify successful strategies and areas requiring adjustment. The ability to track changes in students' beliefs serves as a dynamic measure of teaching effectiveness, offering valuable information on classroom engagement and comprehension levels. Faculty members can use this feedback to refine their teaching methods, tailoring approaches to better align with the evolving needs of their students. This iterative process of assessment and refinement contributes to a continuous improvement cycle, fostering a teaching environment that is responsive, adaptive, and committed to providing an optimal learning experience for students [22-24].

**Student Success and Retention**: Recognizing and addressing students' beliefs plays a pivotal role in influencing their overall success and retention rates within an academic setting. When educators take the time to understand the diverse beliefs and perspectives that students bring into the learning environment, it creates a foundation for support and understanding. This acknowledgment fosters a sense of connection and validation, making students feel heard and valued. As a result, students are more likely to persist in their studies as they sense a supportive atmosphere that aligns with their individual needs and aspirations. This positive impact on retention rates goes beyond the academic realm, extending to students' overall well-being. By creating an environment that values and addresses their beliefs, educators contribute significantly to students' holistic success and fulfillment in their educational journey [25-27].

**Ethical Considerations**: Certain beliefs, especially those entrenched in ethics, morality, and religion, can be deeply ingrained and highly sensitive for students [28, 29]. Faculty members with a nuanced understanding of these beliefs are better equipped to navigate discussions and teachings related to these delicate topics. Recognizing these matters' sensitivity enables educators to approach them with the utmost care, ensuring a respectful and inclusive learning environment. By acknowledging and understanding the diverse ethical, moral, and religious perspectives within the student body, faculty can tailor their communication and instructional methods, fostering an atmosphere of sensitivity and respect [30]. This approach facilitates meaningful discussions and helps create an educational environment that values diverse perspectives, promoting a harmonious and inclusive atmosphere where students feel both understood and respected [31].

Delving into students' beliefs and understanding how faculty interprets and addresses them is paramount in cultivating a positive, effective, and inclusive learning environment. This process allows educators to establish meaningful connections with their students, fostering mutual respect and understanding. By recognizing and respecting diverse beliefs, instructors can tailor their approaches, leading to more engaging and effective teaching methods. Ultimately, this comprehensive understanding contributes to creating an inclusive educational space where students feel valued, supported, and empowered to embark on meaningful learning experiences [32].

**Engineering Technology Students**

To properly assess engineering technology students, it is crucial to know their background and area of study. In this instance, we are dealing with students pursuing engineering technology degrees. These students spend fifty percent of their time learning engineering theory in the classroom and fifty percent of their time proving and testing those theories in the lab [33]. They view their learning environment as crucial to their education and professional development [34]. Here are some common perspectives they might have:

**Practical Application.** Engineering technology programs are known for their emphasis on the practical application of concepts learned. Engineering technology students are typically motivated by the unknowns of proving and testing theoretical knowledge in well-equipped labs. Their experiences ranges from routine lab assignments to real-world applications in industry settings.

**Relevance to Industry.** Students enrolled in engineering technology programs often perceive their learning environment as being closely connected to industry needs and practices. They value the fact that the curriculum is tailored to equip them with the ability to think critically, analyze options, and create solutions that are industry applicable on day one of their career.

**Teamwork and Collaboration.** Collaboration with peers is often necessary for engineering projects, simulating real-world working conditions. Engineering technology students value working in teams, learning communication, problem-solving, and effective contribution in a group.

**Access to Technology and Industry-Grade Equipment.** Access to cutting-edge technologies and industry-grade equipment, including software, machinery, instruments, and other resources necessary for their field of study, is highly valued by them.

**Supportive Faculty and Staff.** A supportive and knowledgeable faculty is crucial. Students value professors who are approachable, accessible, and have practical experience in the field. They appreciate staff who are helpful with administrative matters and technical support.

**Networking Opportunities.** Students often recognize the importance of networking for their future careers. They appreciate opportunities to interact with industry professionals, attend conferences, participate in internships, and engage with alumni.

**Flexibility and Adaptability.** Given the rapidly evolving nature of technology and engineering fields, students may value a learning environment that fosters adaptability. This could include exposure to emerging technologies, cross-disciplinary learning, and a curriculum that can adapt to industry shifts.

**Safety and Compliance.** In fields like engineering technology, safety is paramount. Students should feel that their learning environment is safe and that there are protocols in place to ensure compliance with industry and regulatory standards.

**Access to Resources and Materials.** Students appreciate having easy access to textbooks, research materials, online resources, and software. They value a well-maintained library, digital resources, and a reliable internet connection.

**Inclusion and Diversity.** A welcoming and inclusive environment is crucial for all students, regardless of their background, gender, race, or other personal characteristics. It is important that every student feels a sense of belonging and has opportunities to thrive.

**Feedback and Assessment:** Clear feedback and effective assessment methods are crucial for students to understand their progress and areas for improvement. They appreciate a learning environment that offers constructive feedback and fair evaluations.

Individual perspectives can vary widely, and not all engineering technology students will share the same views. Additionally, the specific program, institution, and cultural context can influence how students perceive their learning environment.

**Engineering Technology Faculty**

Engineering technology faculty members typically believe that students need a combination of technical knowledge, practical skills, critical thinking abilities, and soft skills to succeed in their chosen field [35]. Here are some common beliefs and priorities that engineering technology faculty may hold regarding their students' needs:

**Strong Technical Foundation:** Faculty members often emphasize the importance of a solid understanding of core engineering principles and concepts. They believe that students should have a strong foundation in mathematics, physics, and other relevant technical subjects.

**Practical Application:** Practical application is often considered crucial in engineering technology programs. Faculty members believe that students should have ample opportunities to

work with equipment, conduct experiments, and engage in real-world projects to apply theoretical knowledge.

**Problem-Solving Skills:** Engineering technology faculty often stress the development of problem-solving skills. They believe that students should be able to analyze complex issues, identify solutions, and implement them effectively.

**Critical Thinking and Analytical Skills:** Faculty members value students who can think critically and analyze situations from multiple perspectives. They encourage students to approach problems in a systematic and logical manner.

**Adaptability and Innovation:** Given the rapidly evolving nature of technology and engineering fields, faculty members believe that students should be adaptable and open to learning new technologies and methods. They encourage an innovative mindset that allows students to stay current with industry trends.

**Communication Skills:** Effective communication is considered a vital skill for engineers and engineering technologists. Faculty members believe that students should be able to convey their ideas clearly and concisely, both in written and oral forms.

**Teamwork and Collaboration:** Engineering projects often require collaboration with colleagues, so faculty members emphasize the importance of teamwork skills. They believe that students should be able to work effectively in diverse groups.

**Ethical and Professional Conduct:** Faculty members believe that students should understand and adhere to ethical standards in engineering practice. They emphasize professionalism, integrity, and responsibility in their coursework and projects.

**Time Management and Organization:** Engineering technology programs can be demanding, and faculty members often believe that students need effective time management and organizational skills to succeed. They encourage students to plan and prioritize their work efficiently.

**Life-Long Learning Mindset:** Engineering and technology fields are constantly evolving, so faculty members believe that students should have a mindset of continuous learning. They encourage students to seek out opportunities for professional development and further education.

**Awareness of Industry Trends and Practices:** Faculty members often believe that students should be aware of current industry trends, best practices, and emerging technologies. They may encourage students to engage with industry professionals, attend conferences, and participate in internships.

**Resilience and Perseverance:** Engineering technology faculty members understand that students may encounter challenges and setbacks. They believe that resilience and the ability to persevere through difficulties are important qualities for success in the field.

It is important to note that individual faculty members may have their own specific beliefs and priorities, and these can also be influenced by the specific program, institution, and cultural context in which they teach. Additionally, faculty members may actively engage with students to understand their individual needs and tailor their teaching approach accordingly.he grand challenges of engineering and architecture must be considered. These challenges encompass a wide array of complex issues that require innovative solutions to address societal needs and advance technological frontiers. The U.S. National Academy of Engineering (NAE) has identified a set of Grand Challenges that cover various realms of human concern, including sustainability, health, vulnerability, and the overall quality of life [36]. These challenges aim to highlight the critical role that engineering plays in addressing major societal problems and shaping the future [37]. Critiques have been raised regarding the NAE's Grand Challenges, with some scholars arguing that they maintain a traditional view of engineering and may not fully address social relevance [38]. However, the NAE's initiative has been recognized as visionary and essential, with the challenges being described as "visionary, terribly important, and do-able" by Charles Vest, the former President of the National Academies of Engineering [39]. The Grand Challenges for Engineering serve as a framework for educational initiatives, such as semester-long projects and courses, to expose students to the role of engineers in tackling global challenges and fostering critical thinking [40, 41]. Incorporating these challenges into engineering education helps students understand the complexity of real-world problems and the interdisciplinary nature of addressing them [42]. Furthermore, the Grand Challenges extend beyond traditional engineering domains, with applications in fields like environmental engineering, where they are crucial for achieving sustainability in developing regions [43, 44]. These challenges also intersect with other disciplines, such as biology and law, emphasizing the need for a multidisciplinary approach to problem-solving [45]. To fully achieve student desires and subsequent faculty goals, further consideration of these challenges is necessary.

## Research Questions

Staff members were curious about how current engineering technology students define success and whether engineering technology faculty members understand how students currently define success. Given that people’s priorities and perspectives are influenced by their own experiences, staff members wondered if the baseline perspectives of faculty members would influence their ability to reflect the perspectives of their students. The objective of the study was to determine if engineering technology faculty have a similar understanding of success as their students, realizing the faculty's personal interpretation of success could influence the answers provided from the student's perspective. Additionally, staff also wondered how much a faculty member's definition of success impacts their curriculum and whether the intended outcomes still align with

the ideal outcomes defined by current students and industry. Therefore, the following research questions are developed to share the results of the informal survey performed by staff.

> *RQ1. How often do engineering technology faculty understand their students' definition of success?*
>
> *RQ2. How does the ET faculty's understanding of student-defined success influence the curriculum they teach?*
>
> *RQ3. Do the outcomes developed or chosen by faculty in the field of engineering technology contribute to, detract from, or affect students' expectations for success?*

## Methodology

To address the research questions raised by the staff, we surveyed the engineering technology program's faculty and students. The following explains how we extracted the answers from the questions posed to them.

After discussing and observing specific incidents, the staff came up with questions. These questions were added to Qualtrics and sent to the faculty and staff. The list of questions can be found in Appendix A. The link was shared with 78 faculty and 1347 students. The faculty involved in this study are located at this university's main campus and remote campuses throughout the state. The faculty met before the start of the academic semester, discussed the survey results, and shared responses that will be utilized to support responses to RQ2 and RQ3.

The authors cleaned the data. The researcher removed responses from students who did not answer all the questions to ensure accuracy. Out of 451 students, responses from 387 students were considered complete. Similarly, 65 faculty members responded, and after removing incomplete data, 60 complete responses remained. Overall, the responses to the survey and contribution to this work account for nearly 29% of the engineering technology student population.

## Findings

In response to the research questions, the findings section is divided into three parts to delineate what responses support each research question.

### Engineering Technology Faculty Understanding of Student Definition of Success (RQ1)

To gain insight into how faculty members perceive students' definition of success, we compared the data obtained from questions 2, 3, and 4. This comparison provides a better understanding of how to address research question 1. In Figure 1, we present the responses to Question 2 that were ranked first by percentage. This helps us comprehend the students' definition of success factors and how they differ from the faculty's understanding.

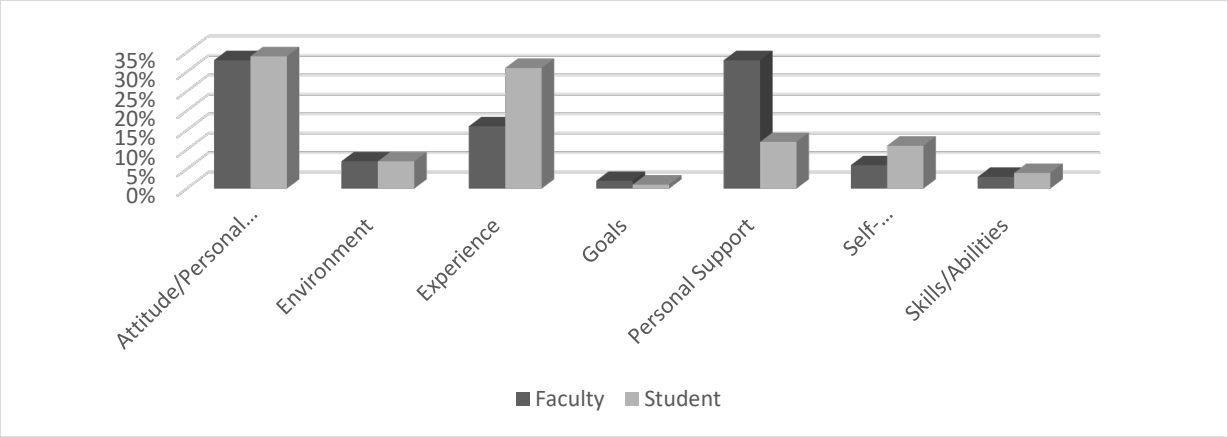


*Figure 1. Percent Comparison of Q2 Factors Contributing to Student Success – Most Important (faculty n=60, students n=387)*

After comparing the factors contributing to success that were chosen first, Figure 2 shows the last or one chosen of least significance by percentage from the response to Qestion 2.

Question 3 aimed to determine the statement that best represents students' definition of success. The questionnaire presented five options and an open response. Figure 3 displays the choices made by faculty and student participants. Those who selected "Other" provided an ad hoc response, which is shared after the figure.

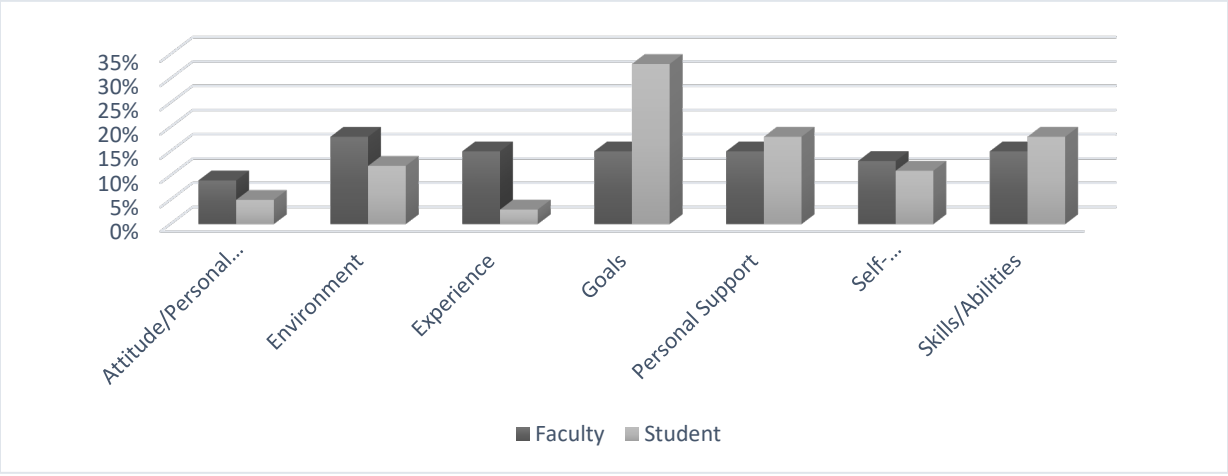


*Figure 2. Percent Comparison of Q2 Factors Contributing to Student Success – Least Important (faculty n=60, students n=387)*

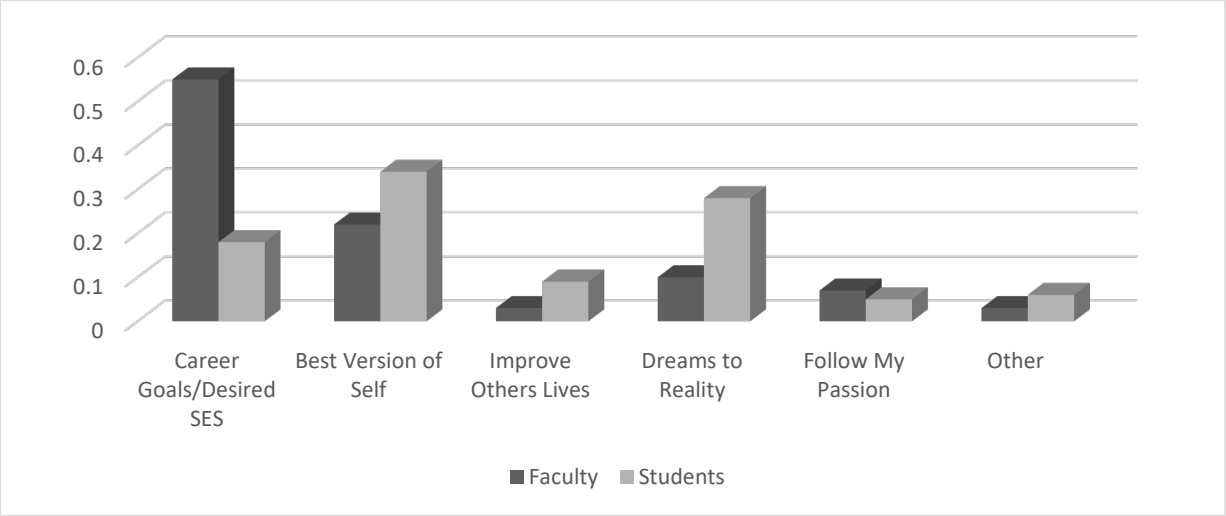


Figure 3. Percent Comparison of Q3 Faculty vs Student – Definition of Success *(faculty n=60, students n=378)*

The survey asked students to indicate their concerns regarding the academic program. Some respondents chose "Other" and provided open-ended responses. While some students did not respond to this question, those who did chose "Other" and mentioned various concerns such as grades and graduation. The summarized responses are presented below:

- Being able to adapt to change at points in my life comfortably and efficiently.
- Working to improve myself and bring those around me up to a high standard of excellence.
- Being Happy; Being happy in the life I am living.
- Being satisfied with my life and accomplishments, Achieving any goals, career or not.
- Freedom; Financial and Time Freedom; Being financially and mentally stable.
- Continuous improvement; completing objectives.
- Success to me would be similar to option A. However, success does not necessarily have to be tied to your career or socioeconomic status. If you set a goal for yourself, no matter how seemingly insignificant it may be, and you achieve it, you are successful.
- Accumulate knowledge to optimize myself and gain mastery over my environment.
- A mix of achieving career goals, bettering myself, and giving back to improve people's lives.
- You don't have to be a millionaire to consider yourself successful and just because you didn't fulfil the expectations of others doesn't mean you can't consider yourself successful because you fulfilled your own goals instead.
- Become my best self for the sake of those around me.

Question 4 was designed to learn more about the students' thoughts regarding college and if it was necessary to be successful. Figure 4 provides a visual of those responses.

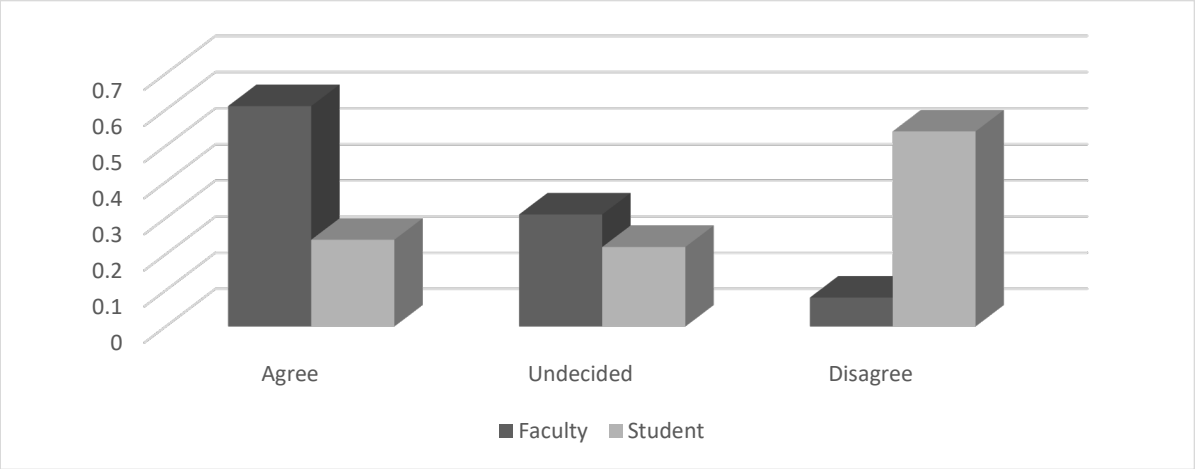


*Figure 4. Percent Comparison of Q4 Faculty vs Student – -College Education Necessary (faculty n=59, students n=387)*

**Engineering Technology Faculty Understanding Influence the Taught Curriculum (RQ2)**

Discussion during the faculty meeting focused on three areas: what characteristics support student success in each course, factors of success in course completion, and success through the lens of a senior engineering technology student. Reviewing the responses utilizing word clouds based upon the top attributes for each section, each is shown in Figure 5-7.


*Figure 5. Most Important Academic and Personal Characteristics*


*Figure 6. Factors of Success in Course Completion*

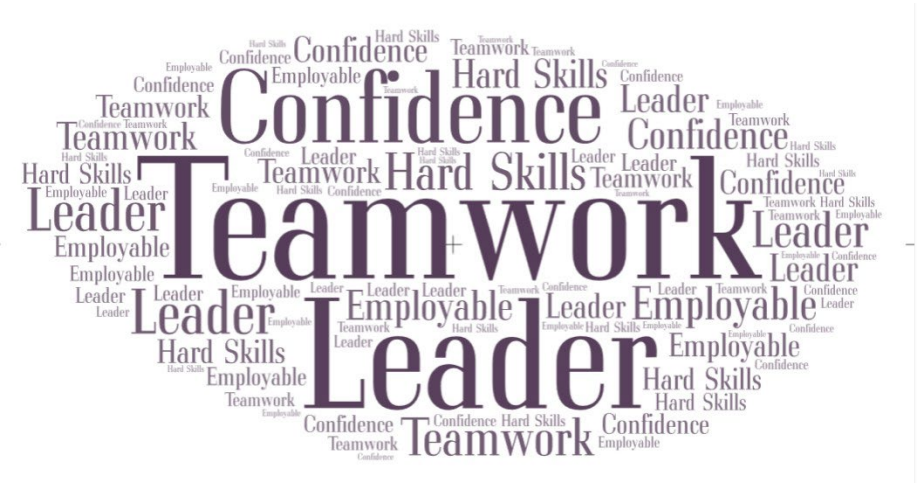


*Figure 7. Factors of Success through the Lens of Faculty of Students at the End of Senior Year*

After reviewing the results of the two surveys and discussing them in the faculty meeting, the outcomes are analyzed for alignment and used to answer the third question. This can be found in the following section.

**Discussion/Conclusion**

The analysis of the surveys and faculty discussion has answered the first two questions. However, the last question requires more reflection, especially since the faculty and students have different responses to the survey questions. It is possible that the course outcomes developed by faculty do not align with the expectations of students for success.

**Engineering Technology Faculty Outcomes Impact on Student Success Expectations (RQ3)**
The outcomes crafted or selected by faculty within the realm of engineering technology play a pivotal role in shaping students' expectations for success. When meticulously designed, these outcomes serve as guiding principles, offering students a clear roadmap toward achieving their academic and professional aspirations. Thoughtfully curated outcomes can inspire students, instilling a sense of purpose and direction within them, thereby bolstering their confidence and commitment to their chosen field. Conversely, ambiguous outcomes or disconnected from real-world applications may hinder students' perceptions of success, leading to disillusionment and uncertainty about their future endeavors. Therefore, these faculty must understand the desires and expectations of the students.

**Factors Contributing to Success – Most Important.** In this case, students and faculty agree that attitudes and personal beliefs in similar amounts contribute to student success; however, that is not the case where faculty find the experience somewhat crucial to students, and students choose that more often as most important. Conversely, faculty choose personal support as something they believe students find a great contributor, while students don't choose that as much. Other factors were chosen as most important more often more closely matched.

**Factors Contributing to Success – Least Important.** Further examination of this data shows that all but one of the choices were ranked by faculty and students at similar levels. The one with a disparity in choice has students choosing goals as the least important of the choices provided and faculty choosing it more often as somewhat crucial to students.

**Definition of Success.** When examining the results of a question asking students about their definition of success, faculty members believed that career goals and desired socio-economic status were the primary desires of students. However, students most often chose "becoming the best version of themselves" and "turning their dreams into reality" as their definitions of success, followed by the faculty's perception of the most chosen options.

The findings of this survey and the discussion among faculty members indicate that it is crucial to support faculty in integrating skill sets that align with the desires and needs of students. However, there seems to be a gap between the expectations of students and faculty. The survey indicates that students want to become the best version of themselves and gain confidence in their abilities as they embark on their careers. Understanding these needs can help faculty provide students with the necessary tools to make a successful transition into their professional lives. It is important for both students and faculty to work together to understand what students want and need to become successful engineers.

**Final Recommendations and Support for Faculty.** Faculty members who want to improve their teaching practices and enhance student learning experiences should consider the Scholarship of Teaching and Learning (SoTL). SoTL is an area of focus in higher education that

involves the systematic study of teaching and learning processes to enhance educational practices and student outcomes. This scholarly approach requires critical analysis, peer review, and dissemination of educational interventions to contribute to the broader knowledge base of teaching and learning. However, the scholarship of teaching and learning has faced challenges in terms of recognition and reward within academia. The diversity in definitions of SoTL has led to ongoing debates and discussions among scholars regarding its essence and scope. To promote scholarly teaching and advance the scholarship of teaching and learning, faculty learning communities have played a crucial role. These communities provide a platform for educators to engage in collaborative inquiry, share best practices, and develop innovative teaching strategies that are grounded in research and evidence. The scholarship of teaching and learning extends beyond individual disciplines, with studies exploring its application in diverse fields such as psychology, counseling, and service-learning. By incorporating evidence-based practices and theoretical frameworks, educators can enhance their teaching effectiveness and contribute to the continuous improvement of educational practices. Institutions that prioritize and invest in the scholarship of teaching and learning demonstrate a commitment to excellence in teaching and student learning outcomes. By providing resources, professional development opportunities, and incentives for engaging in SoTL, universities can empower faculty members to enhance their teaching practices and contribute to the scholarship of teaching and learning. In conclusion, the scholarship of teaching and learning represents a vital aspect of academic inquiry that seeks to improve teaching practices, enhance student learning experiences, and advance the field of education through evidence-based research and collaboration.

**Future Work**

To ensure that the results produced by faculty align with the changing demands of the engineering and technological landscape, it is important for them to collaborate closely with their students and industry partners. Staying up to date with emerging trends and creating a supportive environment for students to grow and achieve their potential is crucial. This is an ongoing effort that requires continuous work and input from students. The Scholarship of Teaching and Learning (SoTL) is briefly explained to provide a foundation for meeting the goals of both students and faculty. The Grand Challenges of Engineering and Architecture are also mentioned, offering guidance for work in SoTL.

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# Appendix A
# Faculty and Student Survey

**Faculty Survey Questions**

Q1 Please answer the following questions from a SoET student's point of view, meaning your answers will reflect the opinions of your students, rather than your own.

Q2 What factors do your students think contribute to success? Rank the following in order of importance, with 1 being the most important. Click and drag to rank.

- Attitude / Personal Beliefs
- Environment
- Experience
- Goals
- Personal Support
- Self-Discipline / Accountability
- Skills / Abilities

Q3 Which statement most closely aligns with your students' definition of success? Select one answer.

- Achieving career goals and desired socioeconomic status
- Becoming the best version of myself in-spite of challenges
- Improving the lives of others
- Turning dreams into reality through hard work
- Unapologetically following my passion
- Other _____

Q4 Do your students think a college education is necessary to be successful?

- Agree
- Undecided
- Disagree

Q5 How confident do your students feel in their ability to succeed academically and obtain their degree?

- Highly confident
- Moderately confident
- Slightly confident
- Mostly uncertain
- Extremely uncertain

Q6 What type of resources do SoET students want to help them build and maintain their confidence?

**Student Survey Questions**

Q1 Thank you for sharing your thoughts on defining success with the Purdue School of Engineering Technology (SoET). We appreciate your willingness to participate and value your feedback. Your answers will be used to improve the SoET student experience.

Q2 What factors contribute to success? Rank the following in order of importance, with 1 being the most important. Click and drag to rank.

- Attitude / Personal Beliefs
- Environment
- Experience
- Goals
- Personal Support
- Self-Discipline / Accountability
- Skills / Abilities

Q3 Which statement most closely aligns with your definition of success? Select one answer.

- Achieving career goals and desired socioeconomic status
- Becoming the best version of myself in-spite of challenges
- Improving the lives of others
- Turning dreams into reality through hard work
- Unapologetically following my passion
- Other _____

Q4 A college education is necessary to be successful.

- Agree
- Undecided
- Disagree

Q5 How confident do you feel in your ability to succeed academically and obtain your degree?

- Highly confident
- Moderately confident
- Slightly confident
- Mostly uncertain
- Extremely uncertain

Q6 What type of resources can SoET provide to help you build and maintain your confidence?

Q7 Purdue Student Status

- First Year SoET UG Student
- Second Year SoET UG Student
- Third Year SoET UG Student
- Fourth Year SoET UG Student
- Other SoET UG Student

Q8 SoET Major

- Aeronautical Engineering Tech
- Audio Engineering Tech
- Automation and Integration Engineering Tech
- Computer Engineering Tech
- Computer Infrastructure and Network Engineering Tech
- Digital Enterprise Systems
- Electrical Engineering Tech
- Energy Engineering Tech
- Engineering-Tech Teacher Education
- Industrial Engineering Tech
- Mechanical Engineering Tech
- Mechatronics Engineering Tech
- Robotics Engineering Tech
- Smart Manufacturing Industrial Informatics
- Supply Chain and Sales Engineering Tech
- Undeclared

Q11 First Generation Student

- Yes
- No

Q12 Gender

- Male
- Female
- Other
- Prefer not to respond

Q10 Citizenship

- United States Citizen
- Permanent Resident
- International

Q12 Where is your permanent residence located? Select a region of the United States or specify your home country.

- West
- Midwest
- Southwest
- Northeast
- Southeast
- Country _____