



Engineering Care:

The Vital Role of Academic Advisors in ECE Undergraduate Student Success



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This study spotlights the vital care work that the undergraduate academic-career advisors contribute to student success and the Bradley Department of Electrical and Computer Engineering (ECE). It demonstrates how academic advisors greatly impact students' development into successful engineers by drawing on data from thousands of encounters the advising team had with undergraduate students over a semester. Though the majority of these encounters are academic, undergraduate students also discuss numerous concerns ranging from their mental health and physical well-being to financial strains, career decisions, and even app development. In a department with about 1,100 undergraduate students, this work of caring for the undergraduates' broader needs is largely unseen and unrecognized.

This report addresses how faculty can better recognize and support care work in the ECE department through a reflection and reevaluation of the undergraduate academic advisors contribution to undergraduate student success, collaboration and communication, and mutual empowerment.

"I don't believe I would be where I am today if it were not for votes of confidence from people like them."

-ECE Alumni

Care is not a new concept within engineering, but it is often overlooked. Care is not just being nice, nor is it a sentiment. Instead, care is a series of conscious choices and actions that enable students to successfully matriculate through the program to become successful engineering professionals. ECE students succeed because of care from a variety of people and often fail without it.

In 2016, the Bradley Department of Electrical and Computer Engineering received a National Science Foundation (NSF) “Revolutionizing Engineering Department” (RED) grant to attract and retain a more diverse body of undergraduate students that would be prepared for a broad range of careers. The grant transformed the sophomore curriculum, introduced project-based learning into the classroom, created a critical service learning class, and provided opportunities for undergraduate students, faculty, and department stakeholders to share their experiences through various outlets.

The grant also supported a baseline study that revealed the need to further study the importance of *care* in the department. Interviews with faculty members, undergraduates, industry advisory board members, alumni, and undergraduate academic-career advisors explored the necessary components for becoming an engineer. Participants readily identified rigor, analytical reasoning, and comprehension. They also described a concept that they had a harder time naming: when faculty members take the extra time to explain a concept or when a GTA guides a student through labs.

“I did better in the class because I was like, this professor cares about me...so I think I should also care about the class.”

-ECE Undergraduate Student

All members of the ECE department are care workers whether teaching, meeting students during office hours, fostering professional network opportunities, or assisting students in understanding difficult concepts. However, undergraduate students have needs that go beyond the classroom. Undergraduate students have health concerns, fears of not belonging, worries about money, family issues, and countless other experiences that affect their academic performance and ultimately impact their ability to successfully graduate. Many of these concerns are addressed by the ECE academic - career advisors. Though the undergraduate academic advisors are the primary providers of care for issues that go beyond the classroom, their work is largely unseen.

Engineering education research has proven the importance of academic advising to student success. Yet faculty are often not aware of the advisors' contributions. As one faculty member confided, "I don't exactly know their duties . . . to take care of the general health of the academic situation of the students?"

This lack of awareness about what advisors contribute stems from multiple factors. Advising doesn't have the "scientific" rigor and mathematical foundation that engineers tend to value. Additionally, the advisors have degrees in education and the social sciences rather than in ECE. The current advising team is all women, embedded in a predominantly male discipline. Thus, the work of academic advising is often rendered *invisible* through gender, social background, education, and other factors.

To bring visibility to the undergraduate advisors and better recognize their value to the department, this paper introduces the academic-career advisors, shows all that they do, and it answers a request from one of the advisors: "I feel like there should be a stronger relationship between the faculty and the advisors. And I think that would be a direct correlation back to the students."

"I don't exactly know their duties...to take care of the general health of the academic situation of the students?"

-ECE Faculty

1

Student Support

Advisors are trained to approach the many needs of undergraduate students [2].

2

Happier Students

Engineering students that receive quality advisement report more satisfaction with their undergraduate experience [3,4].

3

Student Retention

Academic advisors are one of the reasons engineering students stay in their engineering program [5,6].

4

Increased Diversity

Academic advisors are associated with higher numbers of graduates that are women and from underrepresented and underserved communities [7].

5

Life Preparation

Academic-career advisors are trained to address the many complicated issues that may arise regarding adjusting to campus life, job preparation, and academic challenges [8].

6

Confident Students

Academic advising helps students develop self-confidence in their academic studies while providing necessary social support [9,10].

Meet the ECE Undergraduate Academic Career Advisors

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Mary Brewer
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Mary believes that building relationships is one of the most important aspects of being an academic advisor. Mary earned her B.A. in Psychology from Kentucky Christian University and earned her M.A. in Higher Education and Student Affairs from Virginia Tech. She lives in Blacksburg with her husband Gary and their spoiled cat Chester. In her spare time, she enjoys reading, watching her niece play volleyball and soccer, going to live music events, and leading worship at her church.



Susan Broniak
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Susan's academic advising career is fueled by her passion for helping people. Susan earned her B.S. from Louisiana State University and her M. S. in Education and Human Development from George Washington University. Prior to academic advising, Susan worked as a teacher in the Montgomery County Public School System. Susan is a proud Hokie by marriage to her husband Brian. She enjoys music, photography, supporting the Hokies, hiking, and traveling with her husband.



Nicole Gholston
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Nicole's goal is to help students become independent and confident. She earned her B.A. in Psychology and her M.A. in Higher Education Administration from the University of Louisville. She has worked in transfer advising; new student & transfer orientation; and event planning at several universities. She lives in Christiansburg with her husband Kendrick and their two children. In her spare time, Nicole enjoys traveling, baking, and spending time with family.



Kimberly Johnston
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Kimberly has held numerous positions in academic advising and teaching, human resources, and real estate management. She is passionate about encouraging others to attend college and achieve their dream jobs. She holds a B.S. in Interdisciplinary Studies with a Professional Writing Concentration from Old Dominion University and a M.S. in Management from Liberty University. Kimberly is married to her husband Steve and has two children. In her free time, she mentors students, advocates for breast cancer, and spoils her grandson.

During the Fall 2020 semester, the academic advisors collected data on the concerns, questions, and needs of ECE undergraduate students. The four ECE academic advisors had almost 1700 interactions with students virtually or through email. A descriptive analysis of these visits revealed over 2000 topics and concerns. This data represents not only the scope of the advisors' expertise, but also reveals the breadth of the needs and concerns that impact the ECE students' ability to flourish within the program.

1,699

Student Meetings

Due to Covid-19, these meetings were held virtually or through email communication.

2,495

Student Concerns

The total number of topics and concerns that the students brought to the ECE academic-career advisors.

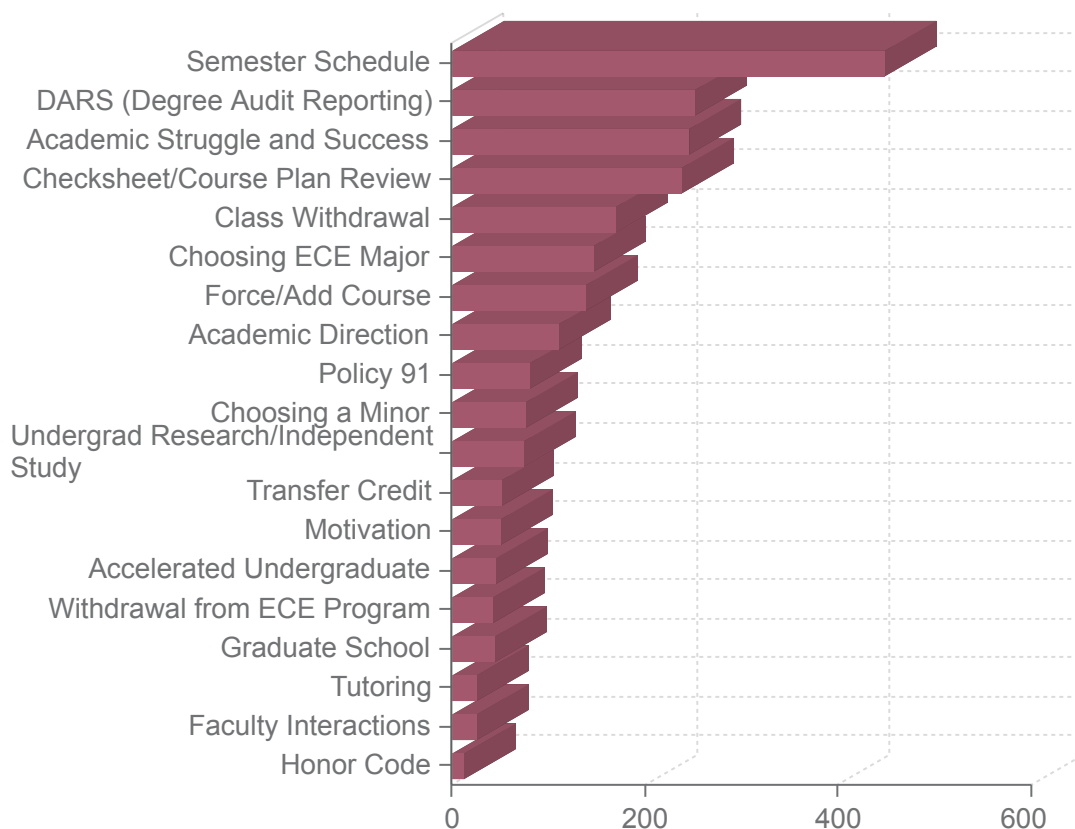
“Often we are a sounding board for how to address an issue with a roommate, faculty, or even their parents/guardian. We assist with major, minor, and career options and create academic plans (for Policy 91 & SAP appeals or graduation). We assist if a student needs to disallow credits, wants to study abroad, needs tutoring, food or medical assistance, is looking for an internship, or tips for a job interview.”

ECE Undergraduate Students' Academic Needs

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Academic advising is a significant activity of the undergraduate advisors. The majority (91%) of their student interactions addressed academic needs. However, the categories reflect that the advisors' work was not simply focused on the checklist. The advisors help students through many other concerns that impact their overall academic success such as choosing a major, locating resources and strategies to be a successful student, and guidance with faculty interactions.

Academic Advising Topics



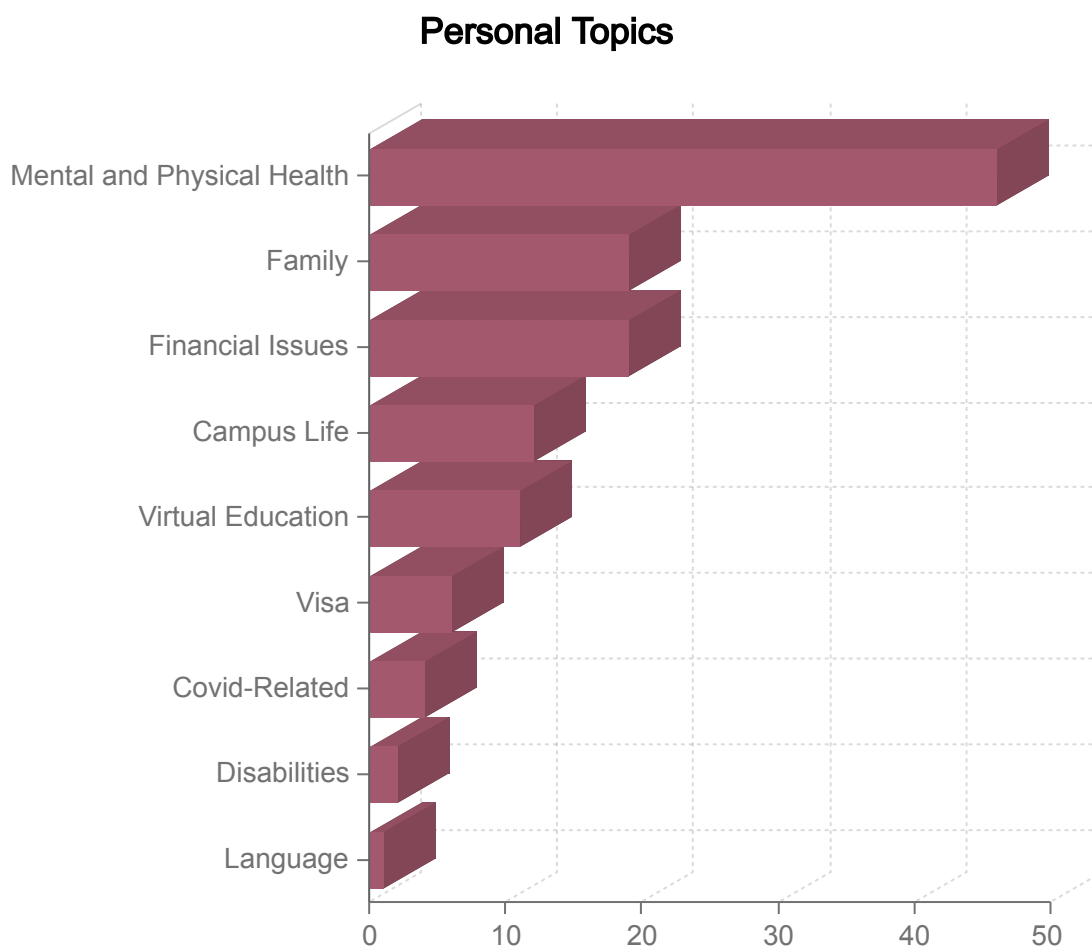
"My advisor, Ms. Gholston, was the first person I talked to when having hesitations about succeeding in a class, but she always believed in me and encouraged me to stay."

-ECE undergraduate student

ECE Undergraduate Students' Personal and Social Needs

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Students are human and their academic capabilities are greatly influenced by personal problems, emotional challenges, a lack of community, and other sources of stress. The advisors are not strangers to guiding students through these challenges as reflected in the data. A majority of the students' personal concerns focused on mental and physical health with family and financial issues coming in second and third, respectively.



“They're lonely and they just need somebody who's like them. If they have trouble making friends, they can join IEEE and they meet other people like them...we can tell them about those type of resources.”

-ECE Academic-Career Advisor

ECE Undergraduate Students' Professional Needs

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In addition to helping students through academic and personal challenges, the advisors are a source of professional career advising. The advisors connect the students to recruiters in industry, ECE alumni, and other sources of professional enrichment such as design teams. Also, the advisors serve the additional role of educating the students in professionalism and resume building. The majority of the students' professional concerns center on internships and the job market.



“I’ve had students come in and say ‘I don’t have anything to put on a resume.’ And I ask, ‘What do you do in your free time?’ ‘I am building this motor for my 1966 Mustang.’ OK. So that’s a really good thing to put on a resume.”

-ECE Academic-Career Advisor

Care for the ECE undergraduate students exists in a multitude of ways whether as an academic-career advisor helping a student navigate the uncertainties of college life or a professor teaching complex concepts. The advisors and faculty have helped thousands of students become successful engineers. Though the advisors are well aware of the faculty, the reverse is not the case. As the ECE department moves forward, consider the following suggestions [13].

1 Reflect on and reevaluate the contributors to student success.

The academic advisors can be forgotten in a culture that views student success through teaching, faculty, and the curriculum. However, remember that student success is closely connected to the care work of the academic advisors.

2 Mutual empowerment of expertise.

Advisors have expertise that may be lost in a department where expertise is synonymous with a specific research topic and teaching. Academic advisors and faculty have different forms of expertise that together contribute to a successful student body and department.

3 Fostering a culture of collaboration, cooperation, and communication.

A decreased aware of advising leads to advisors and their work becoming overly simplified and easily unrecognized by the faculty. A first step is eliminating barriers that hide their contributions within the department.

Learn More About the Advisors and Advising:

- ECE Undergraduate Advising Office: <https://ece.vt.edu/undergrad/advising>
- Academic Advising at Virginia Tech: <https://advising.vt.edu/>
- The National Academic Advising Association (NACADA): <https://nacada.ksu.edu/>
- NACADA Journal: <https://nacada.ksu.edu/Resources/Journal.aspx>

Thank you...

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On a last note, I would like to express my appreciation to the ECE Undergraduate Academic and Career Advisors for all their help on this project. Thank you so much for taking time to collect data during one of the most trying and uncertain semesters. A big "Thank You" to Mary Brewer, Susan Broniak, Nicole Gholston, and Kimberly Johnston for collaborating on this white paper and for all you do!

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Annie Y. Patrick

Doctoral Candidate in the Science, Technology, and Society (STS) Department at Virginia Tech
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of Electrical and Computer Engineering Department

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