

WIP: Eagle ExCEL-Engineers Connect, Engage, and Learn: An At-Risk Advising Program

Dr. Elizabeth A. Powell, Tennessee Technological University

Dr. Beth Powell has a doctorate in Rhetoric and Composition from the University of Louisville. Her research is in engineering communication, and she works as the Assistant Director for the College of Engineering Student Success Center at Tennessee Tech University.

Mr. Harry T Ingle Jr., Tennessee Technological University

Harry Ingle, Jr., a Nashville native, graduated from Tennessee Technological University with his B.S. in Business Administration and Masters of Arts in Educational Psychology & Counseling. Mr. Ingle is currently pursuing his Doctorate of Education in Educational Leadership with a concentration in Higher Education Administration at Tennessee State University in Nashville, TN (ABD). He currently serves as the Director of Diversity, Recruitment, and Student Success for the College of Engineering at Tennessee Technological University. Additionally, Mr. Ingle works as an adjunct for the English department, where he regularly teaches students how to communicate during oral presentations effectively. Mr. Ingle serves as the Faculty Advisor for the Omicron Phi Chapter of Alpha Phi Alpha Fraternity, Inc., National Society of Black Engineers (NSBE) chapter, Society for Hispanic Professional Engineers (SHPE), and Engineering Joint Council (EJC) at Tennessee Tech University. Additionally, he serves as the Chairman of the Putnam County Library Board of Trustees and the Chief Financial Officer for Cookeville IMPACT Inc., a non-profit organization in Cookeville, TN, that works to motivate and empower people of color in the Upper Cumberland region and beyond. Mr. Ingle is also an Ambassador for the Putnam County Chamber of Commerce and works to serve his community year-round.

Dr. Kumar Yelamarthi, Tennessee Technological University

Kumar Yelamarthi received his Ph.D. and M.S degree from Wright State University in 2008 and 2004, and B.E. from University of Madras, India in 2000. He is currently the Associate Dean for the College of Engineering at Tennessee Tech University. He did serve as the Director for the School of Engineering and Technology, and Professor of Electrical & Computer Engineering and at Central Michigan University (CMU). He did serve as the chair for Electrical Engineering and Computer Engineering programs at CMU. His research interest is in the areas of wireless sensor networks, Internet of Things, assistive devices, mobile robots, embedded systems, and engineering education. He has published over 150 articles in archival journals and conference proceedings and delivered over 75 talks in these areas. He has served as a chair, technical program committee chair, treasurer for several IEEE/ASME/ASEE international conferences, and as a reviewer and panelist for numerous externally funded proposals. He served as the general chair for 2016 ASEE NCS Conference, 2011 ASEE NCS conference, Technical Committee Member for IEEE ISVLSI, IEEE MWSCAS, IEEE WF-IoT, and currently serves on the editorial board for International Journal of Forensic Software Engineering. He has served as the Chair of IEEE Northeast Michigan Section, and vice-chair for ASEE North Central Section. He served as PI, co-PI, and senior personnel in several externally funded grants from organizations such as NSF, NASA, and the regional industry. He is a founding advisor for the IEEE Student Chapter at CMU, an elected member of Tau Beta Pi engineering honor society, Omicron Delta Kappa national leadership honor society, a senior member of IEEE, and a senior member of IETI.

WIP: Eagle ExCEL-Engineers Connect, Engage, and Learn: An At-Risk Advising Program

Abstract

Eagle ExCEL is a new at-risk advising program for College of Engineering (CoE) undergraduate students at Tennessee Technological University implemented by professional academic advisors in the CoE Student Success Center. Advisors meet with academically at-risk students to set goals and identify resources. The program was created in fall 2021 to assist the over 10% of CoE students identified as at-risk (on warning, probation, or return from suspension). This work in progress (WIP) paper describes the program and reports on an evaluation of the first year of the program. Program directors have determined that it has had success in helping students return to good standing, with recommendations for academic support services geared towards undergraduate engineering majors.

Introduction and Background

Attrition has long been a major concern in engineering education [1]-[2], with much research conducted to better understand factors impacting retention and persistence [2]-[3]. Student GPA is continually cited as a factor for attrition: at-risk students, it has been found, may have difficulties returning to good standing and even graduating [4]-[7]. In fact, historical data from Tennessee Tech show that College of Engineering undergraduates whose first year GPA is below the 2.0 required to graduate are at very high risk of not continuing: only 5.7% of students whose first year GPA was in this category, throughout the years 2003-2013, graduated [8]. Moreover, retention rates for engineering students of color at this institution have historically been lower than white students. Clearly, retention efforts are needed to assist at-risk students to be successful, both at this university and more broadly in engineering education.

At Tennessee Tech, an intervention for these at-risk students has been developed based on evidence-based practices in academic advising [9]-[10] and the general research that shows academic advising has a positive effect on student retention [11]-[15]. The intervention described in this paper, Eagle EXCEL (Engineers Connect, Engage, and Learn), was developed to follow the NACADA mission to promote and support “quality academic advising in institutions of higher education to enhance the educational development of students” [16], especially through “proactive” or “intrusive” advisement, an approach focused on reaching out to students, rather than waiting for students to reach out to advisors [17].

Eagle ExCEL consists of one-on-one mandatory meetings between students identified as at-risk via their academic standing (warning, probation, or return from suspension) and their academic advisors to discuss academic standing, barriers to academic success, resources available to students at the university (such as tutoring), and goals and strategies for returning to good standing. During that meeting, another important component of the program is utilized: an Academic Success Plan, a contract that helps advisors and advisees determine barriers to and resources for success. In addition to meeting with advisors, advisees are encouraged to seek out resources for their unique needs, such as tutoring, supplemental instruction, mental health counseling, and financial aid, in addition to others. Incentives for advisees to meet with the

advisor include placing a hold on the student's account, and, once they meet with the advisor, lifting the hold. An academic planner is also offered to students for assistance with time management. Overall, the approach of this program is to be proactive and to assist students with problem-solving and trouble-shooting ways to improve their academic standing. This work in progress paper will provide preliminary results and recommendations from an evaluation of the program's first year.

Research Questions

The purpose of this study was to evaluate to what extent the at-risk advisement program has reached its short, medium, and long-term outcomes. The following questions were addressed:

1. To what extent does student participation in the program increase their understanding of academic standing, student success skills, and knowledge of student success resources on campus?
2. To what extent does student participation in the program change their behavior to include more application of student success skills and usage of academic success resources?
3. To what extent does the at-risk advising program assist students in returning to good standing at the university?
4. What improvements must be made to retention inputs and processes to improve outcomes?

Methods

The evaluation of Eagle ExCEL used quantitative and qualitative methods. Following is an overview of the design and methods.

Participants

Participants for the evaluation include undergraduate engineering students who have participated in Eagle ExCEL through meetings with advisors and filling out an Academic Success Plan. These students are categorized as academically at-risk. In addition, participants include academic advisors for the College of Engineering who are implementing the program.

Procedures

Evaluation data collection took place after academic advising for fall 2022 registration. Interviews were conducted with academic advisors, and a survey was distributed to students who filled out an Academic Success Plan. However, Academic Success Plans have been collected throughout the entirety of the program.

Analyses

Descriptive statistics were used to determine percentages of students' perceptions of the program through their survey responses. Interview data from advisees was summarized and analyzed for common themes. The Academic Success Plans were analyzed using descriptive statistics, again for commonalities. Finally, institutional data were analyzed to determine changes in GPA scores between semesters.

Results and Discussion

Preliminary results are as follows:

Question 1: Student knowledge

In a survey, students indicated their familiarity with various campus resources their advisors discussed with them. In the results, students indicated that they were most familiar with academic advising and tutoring but lacked familiarity with most other resources. While students are given specific information about resources during their advisement session, it is possible that they are familiar with advisement because that is a required service, and they are familiar with tutoring because tutoring is very visible—it takes place in the College’s Student Success Center. Other services may be less visible and therefore less utilized.

Question 2: Student application

Students took a survey asking to rate their usage of campus resources; they also filled out a Student Success Plan with their advisors to identify barriers to their academic success and resources to help overcome those barriers. Results from the survey indicate that students make little use of campus resources; however, they practice other student success skills such as setting goals and joining study groups. A possible explanation for this lack of usage of campus resources such as tutoring may be due to personal challenges, such as coming to campus at specific times, or due to the stigma attached to seeking help from peer tutoring or similar services [18].

Question 3: Academic standing

These data are still being analyzed; however, an initial analysis shows that average GPA for at-risk students who met with academic advisors, as of May 2022, is 2.24, and over half have returned to Good Standing. However, 20% of these at-risk students have been placed on suspension. More analyses will be conducted for this work in progress to determine differences in demographics, as well.

Question 4: Implementation fidelity

Academic advisors were interviewed to determine their processes implementing this program. Advisors reached out to at-risk students to set up a meeting; during the meeting, they filled out the Academic Success Plan together, using that document as a springboard for discussing barriers, resources, and goals. Results indicate that advisors are consistent in their approaches to work with at-risk students, with additional unique services offered by individuals as a supplement to the overall approach. Unique services included resources advisors individually had created or collected over the years, such as GPA calculators and study skills guidelines.

Conclusions and Recommendations

The results from this evaluation of an at-risk advisement program provides important information helpful not just for building this individual program, but also for more broadly gaining insight into the barriers faced by academically at-risk students, as well as what resources are going to help them achieve their goals. While 63% of students from the fall semester returned to good standing, nearly a fifth were placed on suspension. Recommendations for improving the program are based on these results as well as the literature that suggests that peer support, mentoring, and personal counseling can have a positive effect on student retention [2], [6]. Students focused on resources that were more directly under their control, such as study groups and goal-setting; however, they were less likely to use resources such as tutoring, supplemental instruction, and counseling services. More research is needed to determine how to overcome barriers and potential stigmas to using these additional resources.

References

- [1] ASEE. "Engineering by the Numbers: ASEE Retention and Time-to-Graduation Benchmarks for Undergraduate Engineering Schools, Departments and Programs." <https://ira.asee.org/wp-content/uploads/2017/07/2017-Engineering-by-the-Numbers-3.pdf> (accessed May 27, 2022).
- [2] B. N. Geisinger and D. Rajraman, "Why they leave: Understanding student attrition from engineering majors," *International Journal of Engineering Education*, vol. 29, no. 4, pp.914-925, 2013.
- [3] L. A. Jackson, P. D. Gardner, and L. A. Sullivan, "Engineering persistence: Past, present, and future factors and gender differences," *Higher Education*, vol. 26, no. 2, pp. 227-246, 1993.
- [4] R. A. Berkowitz and K. O'Quin, "Predictors of graduation of readmitted "at risk" college students," *Journal of College Student Retention: Research, Theory, & Practice*, vol. 8, no. 2, pp. 199-214, 2006.
- [5] J. M. Lindo, N. J. Sanders, P. Oreopoulos, "Ability, gender, and performance standards: Evidence from academic probation," *American Economic Journal: Applied Economics*, vol. 2, no. 2, pp. 95-117, 2010, DOI: 10.1257/app.2.2.95
- [6] E. Sneyers and K. De Witte, "Interventions in higher education and their effect on student success: a meta-analysis," *Educational Review*, vol. 70, no. 2, pp. 208-228, 2018, DOI: [10.1080/00131911.2017.1300874](https://doi.org/10.1080/00131911.2017.1300874).
- [7] N. Bowman and N. Jang, "What is the purpose of academic probation? Its substantial negative effects on four-year graduation," *Research in Higher Education*, 2022, DOI: <https://doi.org/10.1007/s11162-022-09676-w>.
- [8] Student Success Collaborative, https://sscir.eab.com/app/index.html#/2003-8-15/2013-5-13/ALL_MAJORS/X/X/home/ (accessed May 27, 2022).
- [9] S. B. Robbins, I-S Oh, H. Le, and C. Button, Christopher, "Intervention effects on college performance and retention as mediated by motivational, emotional, and social control factors: Integrated meta-analytic path analyses," *Journal of Applied Psychology*, vol. 94, no. 5, pp. 1163-1184, 2009, DOI: 10.1037/a0015738.
- [10] C. Cairncross, T. VanDeGrift, S. Jones, Sharon, and L. Chelton, "Best practices for advising at-risk first-year engineering students, 7th First Year Engineering Experience Conference, August 3-4, Roanoke, VA, 2015, https://pilotscholars.up.edu/cgi/viewcontent.cgi?article=1049&context=egr_facpubs
- [11] W. R. Habley, "Key concepts in academic advising. In *Summer Institute on Academic Advising Session Guide* (p.10). Manhattan, KS: NACADA The Global Community for Academic Advising, 1994.

- [12] C. Holland, C. Westwood, and N.Hanif, "Underestimating the relationship between academic advising and attainment: A case study in practice," *Frontiers in Education*, vol. 5, 2020, DOI=10.3389/educ.2020.00145.
- [13] A. Khalil and J. Williamson, "Role of academic advisors in the success of engineering students," *Universal Journal of Educational Research*, vol. 2, no. 1, pp. 73-79, 2014, <https://files.eric.ed.gov/fulltext/EJ1053985.pdf>.
- [14] M. Uddin, "Best practices in advising engineering technology students for retention and persistence to graduation," *The Journal of Technology, Management, and Applied Engineering*, vol. 36, no. 1, pp. 2-13, 2020, https://cdn.ymaws.com/www.atmae.org/resource/resmgr/jtmae/Best_Practices_in_Advising_E.pdf
- [15] V. Tinto, *Increasing student retention*, San Francisco, CA, USA: Jossey Bass, 1987.
- [16] NACADA, <https://nacada.ksu.edu/> (accessed May 27, 2022).
- [17] J. Cannon, J. Intrusive advising 101: How to be intrusive without intruding. Academic Advising Today, *NACADA*. <https://nacada.ksu.edu/Resources/Academic-Advising-Today/View-Articles/Intrusive-Advising-101-How-to-be-Intrusive-Without-Intruding.aspx> (accessed May 27, 2022).
- [18] G. Ciscell, L. Foley, K. Luther, R. Howe, and T. Gjsedal. "Barriers to Accessing Tutoring Services among Students Who Received a Mid-Semester Warning. *Learning Assistance Review*, vol. 21, no. 2, pp. 39-54, 2016.