

Academic Support Services and Student Engagement: Strategies to Improve Student Retention and to Promote Student Professional Development

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Abstract – Retaining and graduating students within their initially selected major (or in another information technology and engineering major) presents many challenges for both the high profile and lower profile categories of students alike. In addition to having a solid foundation in mathematics and science, research literature shows that academic support services and activities that engagement students in their learning and learning environment improve retention and graduation. With this as a backdrop, this paper provides an overview of a systematic process that has been implemented to increase retention and graduation rates for various categories of undergraduate students who enroll in one of The Volgenau School of Information Technology and Engineering majors at George Mason University. More specifically, this paper describes the strategies and their associated activities that are the focus of our efforts. These strategies are centered on the following: 1) Quality educational programming; 2) Supportive educational environments; 3) Active and collaborative learning; 4) Student-faculty interactions; 5) Enriching educational experiences; and 6) Challenging academic programs. This paper should be of interest to other engineering schools that are examining retention models employed by various engineering school, with special attention to their undergraduate students who are their best and brightest as well as students who are of a lower profile.

Keywords: Retention, Supportive Services, Engagement, Graduation.

INTRODUCTION

The Volgenau School of Information Technology and Engineering (VSIT&E) at George Mason University (GMU) offers seven undergraduate majors. Total enrollment in these seven undergraduate programs is approximately 2200, with the largest group of students enrolling in the Bachelors of Science in Information Technology (BS-IT) program. As with most large State universities, academic backgrounds of entering students can vary significantly, even for students choosing the same major. Additionally, degree requirements for different majors within the VSIT&E run the gamut, from mathematics, science, and computing intensive courses for the engineering and computer science programs to the somewhat more business and applications oriented courses for the BS-IT program [6].

Persistence through graduation often, but not always, depends on how successful the student is in what Suresh [4] refers to as “barrier” courses. Barrier courses, for engineering majors for example, include courses in the areas of calculus, physics, and computing. In order to study the experience of graduates (i.e., persisters) who “struggled” to persist in engineering, Suresh classified students in three groups based on their performance in the barrier courses. Students with grades in the A and B ranges, who had never failed a barrier course, were called “sailers” or group I. Students with grades in the B and C range, who may or may not have repeated a course to improve a grade, were identified as “plodders” or group II. Students with grades of C, D, F (and W and R for withdrawals and resignations,

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respectively), and who had repeated one of more of the barrier courses one or more times, were identified as “struggling persisters” or group III. [4]

Retaining and graduating students within their initially selected major (or in another VSIT&E major) presents many challenges for all categories of students, including some of the “sailers” who might “stop out” (e.g., to pursue a work opportunity or who might transfer prematurely to another competitive institution or program). A review of the retention related research literature reveals that academic support services and activities that engagement students in their learning and learning environment improve retention and graduation [3].

For a number of reasons, getting students to enroll in a VSIT&E major upon entering the University is becoming more and more challenging. Increasingly, students who are well prepared for technical majors are entering Mason’s “University Undeclared” option. Mason’s University Undeclared students have little to no contact with our VSIT&E faculty. This lack of association with our faculty advisors increases the likelihood that these students will not pursue majors within the VSIT&E, or they will not include the requisite “barrier” courses in their schedules early on during their enrollment. When prospective engineering students do not enroll in barrier courses during the first year of college, there is greater likelihood that they will not retain key technical knowledge needed for subsequent courses and that their graduation will be delayed.

Although students frequently change majors within the VSIT&E, rarely do students come to a VSIT&E major from some non-VSIT&E major. For these reasons, it is important to reach out to and engage students in their engineering and computing learning environment early on to increase the likelihood of persistence through graduation. Though not a focus of this paper, the findings above make a strong case for continuing to reach out to students while they are still in high school trying to decide whether or not to pursue a major in the areas of engineering or computing.

In the following section, we discuss systematic and comprehensive processes that have been implemented to increase retention and graduation rates as well as promote professional development for the various categories of undergraduate students who enroll in a VSIT&E major. We also discuss some strategies that are more tailored to the needs of the high profile student.

COMPREHENSIVE AND SYSTEMATIC PROCESSES FOR STUDENT RETENTION

As confirmed by Suresh [4], there are significant cost associated with the attrition phenomenon from the perspective of the university, the students, and the nation. Efforts to increase the rate of return on resources invested in education by increasing retention rates for students in all VSIT&E majors are not new; however, there has been an increased emphasis in this area over the past year. According to research results provided by Suresh [4], it is far more expensive to recruit new students than it is to retain them. Discussions similar to the ones being lead by the Spellings Commission [10] and similar agencies are expected to continue over the coming years, and these discussions will ultimately lead to increased emphasis on accountability. Attrition raises red flags and questions about the institution’s effectiveness. Costs to the students, while not always monetary in nature, take the form of a loss of self-confidence, lack of motivation, loss of self-respect, and loss of momentum in the journey to academic achievement [4].

Student retention requires the combined efforts of VSIT&E departments and the VSIT&E Student Services Office, which is managed by the Associate Dean. The VSIT&E departments increase the likelihood of retention by providing quality and challenging academic programs, while the Student Services Office focuses on student support services and student professional development.

The departments, which are directly responsible for academic program quality and national accreditation are attuned to guidelines provided by the Accreditation Board for Engineering and Technology (ABET). On the other hand, the Associate Dean’s Office, which is responsibility for student professional development and quality of student life, must pay closer attention to additional data, such as student responses to the various categories of questions on the National Survey of Student Engagement [8] and similar student surveys. In fact, the types of questions on the National Survey of Student Engagement played a crucial role during our processes of selecting strategies and activities for inclusion in our student retention and engagement plan.

During this overview of our VSIT&E student retention related activities, we will not go into any additional detail regarding where the division of responsibility for various retention strategies, activities, or events reside (i.e., whether with a VSIT&E department, the Associate Dean's Office, or accomplished jointly by the VSIT&E departments and the Associate Dean's Office). Even though the timing of individual strategies, activities, and events within the semester (and whether or not implementation is more appropriate during the first, second, third, or fourth year in the student's career) is important, these details will not be covered in this paper either. What will be presented, however, is an overview of the strategies and their associated activities that have been the focus of our efforts to improve student retention and to promote student professional development. These strategies, activities, and events are centered on providing the following in support of student success:

- Quality educational programming.
- Supportive educational environments.
- Active and collaborative learning.
- Student-faculty interactions.
- Enriching educational experiences.
- Challenging academic programs.

Our goal is to significantly increase the number of students enrolling in a VSIT&E undergraduate programs who receive their degrees. A special focus will also be on minority students who are under-represented in science, technology, engineering, and technology (STEM) majors. Even though our retention plan is comprehensive, robust, and optimistic, whether a student is retained and graduates ultimately rests with the students [7]. Therefore, our major challenge is to motivate and inspire the student to establish high goals and strive to achieve them.

Quality Educational Programming

The availability of quality educational programs is of utmost importance to the retention process. As stated earlier, VSIT&E academic departments have primary responsibility for ensuring the quality of their educational programs. Additionally, VSIT&E department ensure that students are aware of the various paths through academic programs (e.g., via concentrations within programs) that might be more closely aligned with the student's interests. For the "quality educational programming" strategy, we include the following activities for retaining students in their majors:

- Requirements for degree are clear.
- Recommended sequences of courses and timings are appropriate.
- Prerequisite courses prepare students for subsequent courses.
- Course scheduling accommodates student needs.
- Course offerings provide flexibility in building multi-semester plans of study.
- Latest concepts incorporated into courses.

Special effort is made to ensure that all VSIT&E educational programs are well-rounded and expansive and that our courses incorporate the latest concepts associated with current practice. We have assembled full-time faculty with exceptional credentials. Our location here in the Northern Virginia high technology community allows us to attract high quality adjunct faculty from the local high technology sector and the nation's governmental agencies. These adjuncts can provide many opportunities for our students to address real problems with the latest strategies and tools. In addition to providing excellent academic programs, VSIT&E departments review their advising-related publications on an ongoing basis to reduce the likelihood that mistakes are made by students.

Important also is the inclusion of course objectives in the syllabi and that these course syllabi are published on the department's Web site. It is also important for the instructors to have high student expectations, as well as for the exams, projects, and assignments given to reflect the objectives of the course. Instructors keep office hours, and they

are approachable and encouraging. Students are expected to spend significant time studying, and they are given significant writing assignments such as course papers and reports. Most VSIT&E programs require a culminating senior design or other capstone project experience.

Supportive Educational Environment

The Annual National Freshman Attitude Report describes the attitudes and motivations of first-year students nationally at the beginning of their undergraduate experience. According to information provided in the Second Annual National Freshman Attitudes Report [9], ninety-five percent of entering first-year students brings a strong desire to complete their education. In order for students to attain their dream of succeeding academically, thriving socially, and developing professionally, a supportive educational environment is essential.

Those activities and events that are necessary in order to provide a “supportive educational environment” include the following:

- Advising information via classroom visits to lower division VSIT&E major related core courses.
- Peer Advisor and student support services.
- Support via the Learning Resources Center needed to cope with academic problems.
- Advising information via email, Web sites, flyers, and regular mail.
- Studying and interacting with other students.

Although a shared responsibility, the Associate Dean’s Office takes primary responsibility for the majority of the student support related activities and events. When freshman and transfer students arrive on campus for New Student Orientation, emphasis is placed on meeting regularly with academic advisors, networking with other students, participating in student organizations, and attending career related events.

To the extent possible, students are challenged to envision where they would like to be working after four years of study here within the VSIT&E. To motivate and inspire students during New Student Orientation sessions, our new students are given resumes of several recent graduates who have received excellent employment and/or further study opportunities. These include, e.g., programs in law, business, medicine, as well as engineering and computing graduate programs. Students are given some additional materials that illustrate how they can start building their resumes early on, as well as continuously throughout their stay here at Mason. Care is taken to select resumes from some students who have completed the same major in order to demonstrate how we provide for student individuality within the major. Students are given information related to coping with various problems that they might encounter, and contacts and directions on identifying other support resources as needed.

Students are encouraged to form study groups, and they are made aware of VSIT&E Peer Advisor services that can help with this effort. Approximately 20 students are employed as VSIT&E Peer Advisors each semester. These Peer Advisors are students who are capable of helping with the wide range of “barrier” courses (e.g., Calculus I and II, Physics I and II, Computer Science I and II), and they serve as role models for new VSIT&E students. Success or failure in any or all of the barrier courses, which are usually taken during the first and second years, determines whether or not a student persists in engineering. The value of Peer Advisors who can help new students form study groups and adjust to the college environment is confirmed by Smith [3] whose research found that finding friends was extremely stressful for many students and greatly influence whether they remained in the University.

Students are encouraged to both participate in and become leaders in VSIT&E student organizations, and students are encouraged to prepare and present proposals that can be used to obtain resources for financing their student organization related activities. Even though some students participate in non-major related student organizations, participation in existing VSIT&E and other technical organization is strongly encouraged, and support is provided for students who wish to start new student organizations at both the VSIT&E major- and School-level. Ample information on policies and procedures to avoid mistakes as well as information regarding financial aid and scholarship related resources are provided in a timely manner. In addition to arranging field trips to the Washington area’s resources and facilities (e.g., to private industry and governmental agencies), student secure internships and part-time work opportunities with these organizations.

Smith [3] purports that “student engagement” is more of a predictor of student retention at a university than the student’s academic achievement. Contrary to the belief that traditionally high-risk students were being lost in greater numbers, the data provided by Smith [3] actually suggests that of those students who left the university after one year, most were academically competitive and financially viable.

Active and Collaborative Learning

According to Farvardin [1], the following are three ways to ensure that the time and money we invest in engineering education realize payoffs and that we produce well-trained engineers who will indeed realize their dreams:

- 1) Recruit students more likely to thrive in the challenging engineering school environment.
- 2) Make engineering come alive from the first day of class, with high-quality, innovative courses, in state-of-the-art facilities, taught by faculty members who care.
- 3) Create a complete academic experience that offers students exciting opportunities, useful guidance and a sense of community.

Regardless to level of preparation, retention efforts must begin from the point when students first indicate that they will be attending one of our VSIT&E majors. When students arrive on campus for New Student Orientation, they are encouraged from the very first day to actively identify students who are in their classes and who can be contacted (e.g., via Email, phone, Facebook). These students are encouraged to begin networking and collaborating on assignments and projects within the guidelines and constraints established by the instructors. More and more universities across the nation are recognizing the value of providing opportunities for new students to get to know other students and to engage in active and collaborative learning. For example, to ease the home-sickness among out-of-state students, the University of Connecticut (UConn) has implemented “Huskies Away from Home” [2]. This peer-to-peer program makes arrangements for upper-class students to mentor new students who share some common experience, such as coming from the same background and/or hometown.

Research literature shows that students who work in groups are far more successful than those who study along. Additionally, the quality of life for these students tends to be better, and these students are more likely to remain at the university and to complete their selected degree. It is for the reasons provided above that we focus on the following types of activities when providing for an “active and collaborative” learning environment to improve student retention:

- Students working with other students on non-academic activities.
- Students participating in course-related community-based project.
- Students organizing/planning social events for other students.
- Students working on group projects both in-class and outside-class.
- Students tutoring or being tutored by other students.

Students are encouraged to ask both instructors and other students questions in class. Students who support each other during their studies often develop strong relationships that continue long after graduation. By preparing to tutor other students, Peer Advisors and other students who tutor students often learn materials in must greater depth than they would have otherwise. Students are also encouraged to seize opportunities to make oral presentations in class; therefore, enhancing their overall ability to communicate. Gatherings (e.g., academic seminars and social events) that bring together students who have similar interests and abilities (e.g., high quality and competitive students) are provided.

Again, the nature of students’ experiences with barrier courses and the factors that impact on performance have significant implications for attrition in engineering programs [4]. Performance in barrier courses can be improved when students engage in active and collaborative learning. Additionally, sharing of experiences with other students can change the attitudes of students who may be questioning their ability to make it through their program.

Student-Faculty Interactions

Students in the VSIT&E generally receive excellent academic advising, and they have a very good relationship with our faculty members. Students and student organizations are strongly encouraged to plan and organize events requiring faculty participation. The following are among the activities and events that promote strong “student-faculty interactions,” enhancing student retention, professional development, and graduation:

- Meetings of student groups associated with special knowledge areas.
- Technical seminars that are open to students.
- Quality academic advising by faculty.
- Sufficient academic advisor office hours.
- Opportunities to discuss grades or assignments with an instructor.
- Opportunities to discuss class schedule and academic plan with faculty advisor.
- Opportunities to discuss career plans with faculty and staff.

Most course sections have less than 50 students, and both graduate and undergraduate student assistants are available to assist students with any problems that they might encounter. Student input is solicited on academic policies and procedures, and feedback provided to administrators and staff on programs and services has been positive. Students are encouraged to communicate with instructors, especially when it is unclear why they received an undesirable grade on an examination, assignment, or project. Students discuss a variety of ideas and issues with instructors both inside and outside the classroom, and instructors generally provide appropriate and timely responses to issues raised by students.

Enriching Educational Experiences

Charles Vest’s [5], who is President Emeritus of The Massachusetts Institute of Technology (MIT), primary message regarding engineering education is that making universities and engineering schools exciting, creative, adventurous, rigorous, demanding, and empowering milieus is more important than specifying curricular details. Because of our location here in Northern Virginia, we have many opportunities to implement programs that are aligned with Vest’s primary message. Students in the VSIT&E benefit from frequent requests from companies for meetings. Attendance at luncheon meetings of engineering and computing professional organizations provides enriching educational experiences. These students gain quality real world work related knowledge and skill. Our location also provides many opportunities for students to participate in community service or volunteer work experiences.

The following are some key activities and events that provide for “enriching educational experiences,” promoting student retention, professional development, and graduation:

- Practicum, internship, co-op, and other field experiences.
- Interaction with practitioners.
- Major related seminars and other similar non-course activities.
- Independent study or other “self-designed” educational experience.
- Special topics courses arrangements.
- Work with faculty/researchers on non-course projects.

Our location in the Washington, D. C. area provides many opportunities for students to attend exhibits (e.g., fine arts, social/political, and technical). Additionally, many excellent events and activities are hosted on Mason’s campus, again, because of our location and the quality of our facilities.

Because of the diversity of the Washington area and the George Mason University student body and faculty, our students can have serious conversations with students/faculty of different nationalities, localities, backgrounds, beliefs, and personal values, special programming is provided to encourage these types of interactions.

Challenging Academic Programs

An increasing number of high profile students are enrolling in VSIT&E programs as a result of increases in the number and size of scholarships we can offer. As the number of high profile students continues to grow, more opportunities can be provided for VSIT&E students to attend challenging classes whose enrollments are restricted to extremely competitive students. Because most programs have a synthesis course requirement, some students pursue multidisciplinary courses with faculty from across schools/departments.

As pointed out earlier, many students who have “sailed” through the “barrier” courses will transfer to other institutions or programs if they do not have opportunities to participate in “challenging academic programs” and activities. Others may be enticed prematurely to sign on as full-time employees because of their unique abilities. The following are among the activities and events that will challenge the best and brightest students; therefore, retaining, graduating, and contributing to their professional development:

- Research experience for undergraduates (REU).
- Presentations at regional and national conferences.
- Publishing papers in scholarly journals.
- Making advanced course substitution/waiver options for program degree requirements.
- Exceeding requirements for some courses.
- Entering group competitions against other teams from other universities.

Even though students do not routinely write thesis as part of their academic programs, students are encouraged to seek opportunities to publish papers that result from research related experiences. Because of the globalization of today’s workforce, students are encouraged to take additional courses that broaden their preparation for the future workforce (e.g., by taking courses in foreign languages, management).

SUMMARY

An increased emphasis has been placed on retention within the VSIT&E. This is a move in the right direction, since research shows that it is more expensive to recruit new students than it is to retain them. This paper has provided an overview of systematic and comprehensive plans and programs that have been implemented to increase retention and graduation rates, as well as promote professional development for the various categories of undergraduate students who enroll in a VSIT&E major. We also provide some strategies that are more tailored to the needs of the high profile student.

Student retention requires the combined efforts of VSIT&E departments and VSIT&E Student Services Office. Since the nature of students’ experiences with barrier courses have significant implications for attrition in engineering programs, Peer Advisors and other student support related activities are provided, and departments that administer these barrier courses provide tutoring services as well. Students are strongly encouraged to participate in active and collaborative learning activities to improve their performance in barrier courses and/or to make these courses less intimidating.

Many, many strategies, activities, and events comprise the approach that we have implemented to retain students through graduation. Some educators claim that a high quality academic program is the key to student retention. Others argue that student involvement in campus life is the key. Vest’s [5] primary argument is that “making

engineering schools exciting, creative, adventurous, rigorous, demanding, and empowering milieus” is more important than specifying curricular details. The retention plan developed and implemented by the VSIT&E is based on a synthesis of these philosophies, and the plan represents a comprehensive process for retaining students, providing professional development opportunities, and moving students toward graduation.

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