

An Advisor's Perspective On The Retention Of Engineering Technology Students

**By
Charles C. Bittle and Mitty C. Plummer
University of North Texas**

Abstract

This paper describes retention of eight types of students entering Engineering Technology (ETEC) majors. The first type of student is the freshman entering the University straight from high school. The second type is the student from the same University that changes majors. The third type is the high school student taking courses at the University and receiving dual high school credit. The fourth type is the transfer student from another University. The fifth type is the transfer student that actually took courses at a Junior College. The sixth type is the transfer student entering the University straight from high school but received dual Junior College credit for high school courses. The seventh type is the transfer student with military service and courses. The eighth type is the international student. Retention problems are discussed for each type. Advice is given for the retention of each type.

I. Introduction

The University of North Texas (UNT) has a Student Information Management System (SIMS) that contains the academic history of over 30,000 active students and thousands of inactive students. SIMS identifies students as follows: ¹

- a. Entering from a high school.
- b. Changing majors,
- c. Texas Academy of Mathematics and Science (TAMS) student,
- d. Transferring from another University,
- e. Transferring from a Junior College,
- f. Transferring with military service courses,
- g. An international student,

The order of the above list and the categorization of students into specific types below have no specific meaning other than students have to be identified for discussion purposes. It is assumed that other Universities have a student information management system that identifies students in a similar manner.

Advisors use SIMS to study a student's academic history to develop a degree plan for the student. The advisor can spot an academic problem relating to the student's retention. This is the time to offer the University's tutoring services. Instructors use SIMS to study a student's

academic history to determine if the student has the required prerequisites for a course. The instructor can spot an academic problem relating to the student's retention. This is the time to send the student to an advisor for tutoring services. The Engineering Technology Department at UNT has a minimum student to instructor ratio of 15:1 and a maximum student to instructor of 39 to 1¹. SIMS and a small student to instructor ratio allow both advisors and instructors to become familiar with a student's academic records and problems relating to student retention.

Student retention is an important indicator of program effectiveness when viewed from an administrative perspective. This paper discusses the different types of students and the likely areas of interest to them in their eventual retention. Authors of this paper have 33 years of combined advisory, teaching and retention experience. Their experience with student retention is offered for each student type.

II. Type 1 Student.

This type of student is the freshman entering the University straight from high school. The student goes to freshmen orientation and takes a mathematics placement test. The test results show what mathematics class the student will take the first semester. The student's advisor develops a course schedule based on the test results. If early orientation periods are attended, classes are still open and the freshman can register for all classes.¹

Authors experience indicates this type of student is the easiest to retain. Although many freshmen place in calculus I, some students are placed in remedial algebra even though the student had high school algebra and calculus I¹. The student then takes college algebra and pre-calculus. The student will have the Math skills and prerequisites to start ETEC courses.

III. Type 2 Students.

This type is the student from the same University that changes majors¹. This student usually stated to orientation personnel the desire to work with computers. Orientation personnel place the student in the computer science major. All the computer science majors at the UNT are required to take the digital logic course in the ETEC Department. During the digital logic course, the student visits with the ETEC advisor and changes majors. The student usually states, "Orientation personnel placed me in the wrong major."

Authors experience indicates that this type of student is easy to retain. Most of these students have completed several core and Math courses that are prerequisites for ETEC courses¹. This makes them well prepared for ETEC courses and happy to be an ETEC major.

IV. Type 3 Students.

This type is the high school student taking courses at the University and receiving dual high school credit. During the student's sophomore year in high school, the student applies for the Texas Academy of Mathematics and Science (TAMS) program. The Texas Legislature created

the TAMS program in 1987 to allow talented Texas high school to complete their first two years of college while earning a high school diploma.²

Authors experience indicates that this type of student is hard to retain in the ETEC major. The student earns about 60 semester hours² and has proven to be an outstanding student¹. Universities offer these students four-year scholarships in other majors.

V. Type 4 Students.

This type is the transfer student from another University. The student has usually attended multiple universities and has a large number of semester hours. The student has some technical courses that apply to the ETEC major. It takes this type of ETEC student more than two years to graduate. ETEC and core courses are usually full at the time transfer students register and they have to take elective courses that are open.¹

Authors experience indicates that retention of this type of student is not predictable. Although some of this type of student graduates with an ETEC degree¹, many are professional students that keep on transferring to other university.

VI. Type 5 Students.

This type is the transfer student that actually took courses at a Junior College. The student has about 65 semester hours of core and technical courses. This type of student takes more than 2 years to complete the four-year degree. ETEC and core courses are usually full the first semester and the student has to take elective courses that are open.¹

Authors experience indicates that this type of student is easy to retain. These students usually phases in to the ETEC major without a major academic problem¹. The student has invested too much time in the ETEC major to change. Also, a University that does not have an ETEC major is not set up for a transferring ETEC student and does not give the student credit for ETEC technical courses taken at a University or Junior College.

VII. Type 6 Students.

This type is a transfer student that SIMS shows entering from a Junior College¹ but actually the student entered the University straight from high school. The student informs the advisor of entering the University straight from high school and receiving dual Junior College credit for high school courses.

Universities do not give credit for high school courses. Universities have agreements with Junior Colleges to transfer Junior college semester hours. For example, the Junior College accepts the high school's algebra and calculus courses as Junior College level courses. Then, the University accepts the Junior College courses as University level courses.¹

The student would normally have been a Type 1 student and required to take the mathematics placement test. However, the student has bypassed the mathematics placement test by being a transfer student.

Authors experience indicates that retention of this type of student is not predictable. The ETEC advisor or instructor does not know that this student came straight from high school unless the student informs the advisor and instructor. For example, an instructor discovers a student with the required calculus prerequisites for a course ¹ cannot work simple algebra problems in their courses. The student makes some bad grades and changes to another major or drops out of the University ¹. The student needs a tutor to keep up with course work. If the student had entered as a Type 1 student, the deficiency in mathematics would have been discovered.

VIII. Type 7 Students.

This type is the transfer student with military service and courses. The student has many semester hours of core and technical courses from military colleges and usually has some hours from the time before entering military service. However, many military courses do not apply to the ETEC major. This type of student takes more than 2 years to complete the four-year degree. Typically, they can take only one or two courses per semester. ETEC and core courses are usually full at the time transfer students register and they have to take elective courses that are open. ¹

Authors experience indicates that this type of student has risky retention. The principal risk of losing this student comes from unaccredited programs that offer excessively large numbers of hours for military training. Frequently, employers do not know the significance of the Accreditation Board for Engineering and Technology (ABET) accreditation nor do they discriminate in their hiring or promotion based on the degree's origin. The best approach to retaining these students might be through industrial regulatory authorities to assure that unaccredited programs receive less consideration than degrees from fully accredited programs. A second means of increasing the differentiation would be to limit, through the professional licensing agencies, seeking of professional licenses to graduates from fully accredited programs.

IX. Type 8 Students.

This type is the international student. ¹ These students enter at all levels, freshman through senior ¹. They have to take at least 12 semester hours every semester and maintain a grade point average of 2.5 to remain in the United States. These students have to pass an English examination before starting ETEC courses.

Authors experience indicates that this type of student is easy to retain. The student has invested too much time in the ETEC major to change. Also, a University that does not have an ETEC major is not set up for a transferring ETEC student and does not give the student credit for ETEC technical courses taken at a University or Junior College.

X. Conclusion

Authors conclude that the early recognition of the student's background and interests is essential to having positive impacts on the retention of the individual. Once an academic problem relating to their retention is discovered, the University should provide a tutor for the student. This will increase the odds of a successful outcome and graduation of the student.

XI. Recommendations

Instructors should learn to use the SIMS type system at their University. They can study the student's academic history and spot an academic problem relating to the student's retention. This is the time to send the student to an advisor for tutoring services. Not all academic problems relating to the student's retention can be found in SIMS type systems. For example, the instructor finds a student with the required calculus prerequisites for a course¹ cannot work a simple algebra problem. Instead of allowing the student to continue in the course and make a failing grade, send the student to an advisor for help.

Advisors should advise all students to attend early orientation periods while classes are open. If the student has the required prerequisites, the student can start taking ETEC courses. Advisors need to watch for Type 4, 6 and 7 students. Type 4 needs to be advised on completing the ETEC major and not be a professional student. Type 6 needs tutors early on to prevent the student from receiving bad grades. Type 7 needs to be advised of the ABET accreditation and what it means after graduation. Retention of Type 3 is out of the adviser's hands. The University must provide scholarships for these TAMS students to compete with other universities.

XII. Acknowledgments

Authors thank the University of North Texas for supporting the preparation of this paper and for the generous travel allowances that permitted travel to make this presentation.

XIII. Reference

1. University of North Texas Document, Student Information Management System (SIMS), Reference Manual, Screens 3, 4, 7, 20, 48 and 651, August 17, 1996
2. University of North Texas Document PS36969-8/01, *TAMS: Texas Academy of Mathematics and Science*, Available: <http://www.tams.unt.edu>

Author Biographies

CHARLES C. BITTLE has been a Lecturer at the University of North Texas since 1997. He earned his B.S.E.E. at Lamar State School of Technology in 1960 and his M.S.E.T. at the University of North Texas in 2000. Mr. Bittle served in the U.S. Federal Service for 32 years as System Engineer, Program Manager and General Manager. He is a registered Professional Engineer in Texas.

MITTY C. PLUMMER is an associate professor at the University of North Texas since 1992. He earned his BSEE, MENE, and PhD from Texas A&M. He worked in a variety of industrial positions for 22 years before joining UNT.