Advising, the Key to Retention

Thomas B. Slack,
The University of Memphis

Abstract--In the current environment, degrees in the fields of Engineering Technology are an increasing choice of students. Here are time proven ways to retain those students once they have chosen such a path.
Index Terms--Engineering Technology, Retention, Advising

I. Introduction

At the present time, many factors in the world contribute to the need for more technical knowledge in the workplace. As networking technology, specifically web access grows to the 300 million users mark[1], pressure to keep up pushes business to require a higher level of technical competence in its staff. Technical complexity is increasing in most work environments.

The world economy also increases the competition for high quality technical help. No longer are most graduates of advanced degrees choosing to stay in the United States for work. The growing job markets in south Asia and Europe make them a more and more attractive alternative for new MS and PhD graduates, who are, themselves, still primarily from foreign countries[2].

Amid this demand, failing secondary education in the United States has reduced the preparation level of many students[3], which understandably reduces their ability to complete a technical degree. Many colleges have reported rising attrition rates in engineering at the Bachelors level[4]. There are also reports of rising stress among college freshman[5].

Increasingly, new students, and also transfer students unable to do the higher mathematics necessary for engineering degrees, are choosing to pursue engineering technology. Unfortunately, even without the stronger emphasis on the calculus required by the engineering degree, the rigorous nature of the technical material itself is often daunting to such students.

Here are time proven ways to retain students once they have chosen such a path. There are no panaceas here, only common sense. Even if you already know and do these things, they are so important that they deserve an occasional review.

II. The fundamental needs of the student

A person must gain something to be willing to take part in anything. The things that a student might gain by technical study are varied and cannot really be listed in full. However, all students have these fundamental needs:
- A need to identify with, and be accepted by the technical community to which they aspire.
- A need for the knowledge and skills of technology.
- A need to be challenged.

These are not, of course, the only needs of students. However, these needs are those that can be easily affected by a teacher. They are pointed out because teachers and especially teachers in the capacity as curriculum advisors can have a significant impact on them.

III.   Identity and acceptance within the technical community

> *"Friendship is the only cement that will ever hold the world together."*
> *Woodrow Wilson*

By the time a person is in college he or she generally has many friends and has identified with many groups, some of these identities will continue into their experience at college. This is especially true at urban institutions like the University of Memphis where most of the student body commutes to school. Regardless of the identifications a person may have made in prior life, they need to make new ones with the technical community or they will not persevere. No one tends to go where they are not accepted.

Teachers, especially advisors have an opportunity to demonstrate this acceptance by knowing their students. This can be a daunting task, especially if you advise over 100 students. Still, knowing your students is always seen as a major part of acceptance.

A willingness to help is also important, for example: A transfer student the author advises has a significant language barrier. Her brother came in her first semester to help her with registration, and did translation for her. She transferred in with a fairly high level of science and math. Generally, the university's central advising staff advises new students before they are turned over to the major department, and so she arrived at my office with a schedule of classes already selected. This schedule contained remedial English for foreign students, as it should. But it also contained the standard general education classes that are given to all students (History, Art appreciation etc). Although these classes are usually considered fairly easy, they require a significant amount of reading in English, a skill that this student simply did not have.

With some dealing with red tape, these classes were replaced with classes that were essentially repeats of technical classes that she had already passed.   By repeating classes where she was already proficient in the subject, she could learn English in an environment that was more familiar to her. If she had continued with the schedule as outlined, she would probably have dropped out of school in frustration.

While not a typical student, she turned out to be a very competent one. Without this kind of care, such students will fail, but with it, they can succeed. By allowing her to identify with the

technical people in the science and math classes while she was learning English, a fundamental need was met.

IV. Knowledge of the subject

"Education is what survives when what has been learned has been forgotten."
  B. F. Skinner

It is self evident to teachers that a person must master the subject to survive in the real world. But often students have a faulty view of their own need for the knowledge of the subject. An attitude of "if I can just graduate and get a job, I will be okay" often pervades student thought. Each semester is a kind of book, which is open and then closed at the final exam. Sometimes it seems that the mind opens and closes the same way, and whatever knowledge obtained is lost somewhere inside.

Instilling a desire for knowledge of the subject itself seems hopeless under these conditions. This seems even more true to teachers who had a strong desire to know the subject themselves as students, and do not relate to a student who is only there for the grade and not the subject.

It must be remembered that it is the demand for technical competence by society that is driving people to technical careers. Students seem different to teachers today partly because they are different. Society is demanding more technically competent workers. Students often do not have the same internal desires that they once had.

However, students actually do have a desire for relevant information, but it seems to them that much of the information that they are being force-fed is not relevant to their situation. The fact that the teacher is a much better judge of relevance is itself irrelevant to this discussion. The teacher must establish the relevance of the subject for the student in order to instill the desire to learn it.

Again, during advising, relevance can be significantly reinforced. Course work has prerequisites for a reason. The curriculum outline that is given can be explained in terms of why the courses are ordered as they are. Knowing that the subject will be needed and used again provides an incentive for retaining it. Insistence that the prerequisites be honored reinforces the accumulative nature of technical material.

A student that approaches a class unprepared invites failure. Lack of preparation not only chances the loss of the student's interest, but it makes the teacher of the class suffer through unprepared students. If many students are deficient in the prerequisites, it lowers the level of a whole class.

In Computer Engineering Technology at the University of Memphis we have adopted a policy of using a pretest in each course, which covers the material in the prerequisites. The students complained when this new policy was first implemented, but the quality of instruction has improved by removing from the class unprepared students.

This may seem a strange point to make when talking about retention of students, but it is significant because of the need of the students to master the subject matter. Students should not be retained at the expense of reducing the standards of competence. Industry does not want more people who do not know what they are doing, but industry wants more technically competent people.

V. Challenge and accomplishment

> *"The heights by great men reached and kept were not attained by sudden flight, but they while their companions slept, were toiling upward in the night."*
> *Henry Wadsworth Longfellow*

Filling a need for challenge and accomplishment is the last of the stated needs. Everyone has a need for challenge and accomplishment, but young people have special needs to prove themselves, both to themselves and to others. Many students appear to accept the minimum standard in academic achievement. They are looking for a C or at best a 2.5 GPA instead of going for an A. In light of the workloads that some of these students have-they are parents, have full time jobs, and are full time students-the minimum standard appears acceptable to them.

A recent study[6] demonstrates the perhaps obvious conclusion that students who get a D in Algebra Trig do not do well in The Calculus. In fact, they fail at a rate of about 60%. Technical expertise tends to build up from basic principles to levels of higher knowledge, as mentioned above. For this reason, accepting low performance is a formula for eventual failure. In Computer Engineering Technology at the University of Memphis we have adopted a policy of not allowing a D in any technical course, even those at the lower levels.

During advising, the need for challenge can be significantly reinforced by simply expecting more from a student. Simply stating you think they can do A-quality work may be very important to them. It may be the first time in a long time that anyone has said so.

Retention appears to be directly correlated with performance[4]. By encouraging higher performance, you encourage retention. The fact that a significant sacrifice must be made to achieve a degree may actually have a positive effect on the desire and commitment of students to pursue it. The effect of sacrifice on commitment has long been shown to be a positive one, assuming that you can get the student to make the sacrifice.

So, how do you instill in students a sense of the challenge of learning technology? One clue may be found in student's evaluation of teacher approachability. A recent study[7] found that the single most important factor given by students characterizing teachers as approachable was that they "go beyond the call of duty."

Students become committed to learning as they see teachers who are committed to teaching. Outside of the classroom opportunities, like technical competitions and other service functions, give the teacher and advisor the credibility leverage that is needed to get commitment from

students. The advising session is, again, the best opportunity to approach students with such challenges.

VI. Summary

Quality advising and mentoring is the key to retention. During one-on-one talks with students, a teacher can help to fulfill three of the basic needs that students have: acceptance in the technical community, the desire for the knowledge of a subject, and a sense of challenge and accomplishment.

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THOMAS B. SLACK

Mr. Slack is Assistant Professor of Computer Engineering Technology at the Herff College of Engineering at The University of Memphis. He has 22 years of industrial experience in the areas of computers and network technology. He has his BSE in Electrical Engineering from Arizona State University and his MS in Computer Engineering from Carnegie-Mellon University.