AC 2010-1462: PROPOSED FRESHMEN EXPERIENCE COURSE

Thomas Dobrowski, Purdue University-North Central

Proposed Freshmen Experience Course

Abstract

There are many college campus's moving towards Freshmen Experience courses as part of a General Education. While at first glance this may appear appropriate "on paper", a one size fits all approach does not seem logical for such varied plans of study. Each college places academic emphasis in different areas. This makes a "one size fits all" approach to a freshman experience course weak as the expectations that the faculty will have of their students will vary with the degree program. It makes more sense to group these types of courses within departments with parallel plans of study and common goals. It would therefore be logical that engineering and engineering technology colleges develop their own entry level freshmen courses to be administered by in house faculty, with faculty of other departments coming as needed.

Areas of concentration could include the importance and application of courses not directly in the department (physics, math), communication (written and oral), ethics (both professionally), and cheating.

Introduction

Over the past two years, this campus has been embroiled in a debate on offering a General Education (commonly referred to as "Gen Ed") component to the curriculum. The intent is to expose all the students to the same core classes in English, math, science, and liberal arts. Students will then have a "well rounded" education in the hopes of graduating well rounded citizens. The problem comes when the plan is executed. The General Education Committee on campus is trying a "one size fits all" approach that the College of Engineering and Technology has vehemently opposed. Because students in this discipline typically start at a higher level of Mathematics than most, say, Liberal Arts major's, would make implementation difficult. Also, while such courses in philosophy and sociology are important, to require them without increasing the number of credit hours to receive a degree means that a decrease elsewhere has to occur, and if the university core classes are untouchable, the only area that this can occur is in the technical field (students' major). It is probably safe to say that the employers of all of our future graduates probably do not currently feel that our students need more social science, but one can bet that they would like to see more math, English, and technical courses. It is the department's point of view that all courses that are not taught within the department are themselves General Education courses, thereby making the General Education requirements a moot point. However, are the current courses yielding the desired results?

Twenty years of teaching experience has shown a perceived decline in the students' math, communication, and, shall we say, ethical decision making capabilities. While the top students today would have been top students twenty, thirty, etc. years ago, it seems that the "average" student has seen a decline in their skills. Teaching a course in Materials Testing for twenty years has been a source of great pleasure and searing frustration. The course itself is wonderful in that it reinforces the theoretical background that the students have been taught in the prerequisite courses,

while simultaneously exposing the students to hands on testing with real world applications. The goal of the class is for the students to take data derived from laboratory tests and put the raw data into a form which is useful. The laboratory reports are to be written so that someone who is intelligent, but not necessarily an expert in this field, can understand the significance of why the test was performed, and the outcomes of the test. This course is taught in the third year, so in addition to the prerequisites for the course, the students have already had four semesters of mathematics, as well as two semesters of English, including Technical Writing. The problem seems to be that the lessons learned in math and (especially) English are not being effectively applied to later courses.

Freshman Experience Course

One of the courses proposed by the General Education Committee for the campus is a "Freshmen Experience" course to be taught as a two part course in both the Fall and Spring semesters of the freshmen year. This course is to introduce the student to the rigors of college education and is to be team taught by faculty members of the different colleges in the university. The problem is that the expectations of an Engineering Technology student are certainly different than that of a liberal arts major. However, the General Education Committee may be on to something here. While the current proposal on this campus would probably have a minimal impact on Engineering Technology students, perhaps a Freshmen Experience course dedicated to Engineering Technology students and taught by Engineering Technology faculty would be more beneficial. The course would be set up to educate the freshmen students on what is to be expected of them over the course of their academic careers (and beyond) and how to approach their courses. Emphasis would be placed on how to apply the mathematics that they will learn to applications in their field, communications (both written and oral) so that their intended audience understands them, and importance of ethical decision making. It seems that one major fault is that the students, in taking these core courses, do not yet realize their importance later in their academic careers. The Engineering Technology Freshmen Experience course would educate them on the importance of these courses, and how they will impact them later in the program, as well as in life.

An important aspect of this course is that it should be team taught. Engineering Technology programs typically have multiple disciplines, and representatives from each area should be involved in the course. Such an approach would provide many benefits. First, the students are exposed to different viewpoints, but all within the Engineering Technology family. Also, it will expose them to some faculty members who they might not otherwise see for some time (those faculty members who teach primarily upper level courses).

Areas of Concentration

While the students background in mathematics seems adequate (and has been the least of the problem areas), there are still areas of concern with problem solving. The first problem seems to come in when the problem itself is presented differently that the student is used to. Math courses tend to have problems with "Given" and "Find" in them. Practical Engineering Technology problems are typically "word" type problems that more closely reflect real world applications and situations. Realistically, there is no difference in the math skills required to solve such problems, but the student's ability to recognize what is given and what is asked for seems to be lacking.

Early training in being able to recognize what is given and what is needed in a story problem will well suit the students in later years. The second area of concern is that students seem to have difficulty analyzing problems and recognizing alternate paths for problem solving. The mathematics courses teach the students fundamentals very well. The problems seems to be that the students are well equipped for getting from point "A" to point "B", but lack the ability to improvise when the path to solve a problem is not a well defined and there is a need to pull concepts from other (sometimes multiple) areas are needed in order to solve a problem, sometimes comically referred to as "you cannot get there from here". The Freshmen Experience course can help emphasize to the incoming students that in "real life", the path to the answers are not always clear cut. Also, there are multiple instances in Engineering Technology when there can be multiple ways to solve a problem. While they will not have had most of their courses in mathematics yet, example problems using courses they would have had in high school, say, Trigonometry and/or Geometry, can be utilized. Students, who typically hate "word" problems coming out of high school, must be made to understand that problems in the "real" world are not as clear cut as "given" and "find" problems are, but very closely (if not exactly) resemble "word" problems. The importance on how to break down word problems and put into what is given and what has to be found is essential, as these are the types of problems that they will encounter in their careers.

Another area that remains puzzling is the students' ability to communicate effectively. Prior to the aforementioned Materials Testing course, students who follow the plan of study take two English Composition courses, one Fundamentals of Public Speaking course, and a Technical Writing course (in addition to the required prerequisites). Yet, in reading written reports turned in over the years, they have seemingly gotten worse. In the area of technical reports, the students seemingly have no idea on what constitutes an effective paper. The problem would seem to stem in that what an English professor thinks a technical paper contains differs greatly from what an Engineering Technology professor believes should be in one. Technical reports in Engineering/Technology typically answer/contain the following:

- Why was the paper written, what is its importance?
- What was found and why?
- What was the thought process to reach the conclusions?
- What is the theoretical basis of this report?
- Test data clearly presented and put into a useful form.

The main problem with many of today's students is that after reading reports, the reader has no idea of what the paper is about or why it was written, not accounting for the grammatical and spelling errors. A Freshman Experience course could develop in students the following concepts:

- An understanding of the techniques of measurement used in testing and the limitations of resulting data.
- An understanding of the practical limitations of the equipment and instruments which produce discrepancies between theoretical and actual behavior of materials.
- Analysis of experimental results.
- The preparation of technical reports which include analysis and interpretation of data and results.

Students should be taught that it be required that technical reports (or any written work, for that matter):

- Are clear, concise, and accurate in statement and computation.
- Be written with a person, other than the instructor, as its reader, in mind.
- Be complete in itself without reference to other sources for comprehension. In other words, there should be no need to have to research elsewhere to "fill in the blanks".
- Use correct English (especially spelling) as this will leave an indelible impression on the reader.

One concept that would be helpful would be for the (individual) College to agree on a format so as to standardize the setup of technical reports. Introducing the freshmen to this format would allow them to utilize it in other courses (such as technical report writing) so that they are comfortable with the format as they enter courses within their major that utilize report writing.

Another important aspect of a Freshmen Experience course would be to perform exercises that introduce the concept of group work. Most high schools do not place any emphasis on group work yet this is essential to Engineering Technology. Communication between group members is paramount for the success of any endeavor. Effective communication must be emphasized early on so that the student understands that to successfully function as a member of a group, clear oral and written communication is required. Case studies detailing incidences were there was a lack of or unclear communication and the resulting consequences could be effectively added to reinforce the concept.

An important area of concentration would be the study of ethics. What is ethics? Merriam-Webster defines ethics as "the discipline dealing with what is good and bad and with moral duty and obligation"[1]. First of all, why include ethics in a Freshman Experience course, or anywhere for that matter? Simple. Ethical behavior is important for everyone but particularly for people in Engineering Technology because of the potential consequences. Being from a construction background, the Hyatt Regency (Kansas City, Missouri) walkway collapse in 1981 is a prime example and an often used case study. In this case, a change was made to the design (it was disputed who approved the change) to a walkway, and during a dance the ensuing structural failure killed 114 people and injured more than 200. In addition to the loss of life, the ensuing lawsuits bankrupted companies, and several professional licenses were lost. The ethical failings in this case were numerous. The designer failed to provide a thorough review of the proposed design change because of time constraints, the contractor failed to wait for a signed and stamped revision, and the owner did not want to pay for additional inspection (even though there had been a structural failure of the roof during construction one year before the walkway collapse).

Further, anyone think that there is not a problem with cheating in their programs? A study by Professor Donald L. McCabe of Rutgers University indicates that overall, there is. The following table summarizes a survey of students and illustrates the percentages of cheating among students:

Source	Private Campus with Honor Code	Large Public University with Modified Honor Code*	Campuses with No Honor Code
Exams	23%	33%	45%
Written Work	45%	50%	56%

The study was originally done to determine the effectiveness of honor codes. However, the numbers themselves are frightening in that a high percentage of students admit to cheating, even under rigid Honor Code systems with extreme penalties. Professor McCabe also states that "perhaps equally disturbing is the ease with which many of these students are able to justify or rationalize their cheating. And often they find a convenient way to place the "blame" on others—other students who cheat; faculty who do a poor job in the classroom; institutions that don't try very hard to address the issue of cheating; and a society that supplies few positive role models when it comes to personal integrity[1]"

In twenty years of teaching, the author feels that a fundamental shift has occurred in the attitudes of students. Students caught cheating years ago seemed to show genuine remorse and typically cited time constraints or other factors for their cheating. Students today have a more casual attitude towards cheating and typically fall into two categories, the "so what" group, and the "ignorant" group. The "so what" group has the attitude "so the worse that can happen is that I fail the class and have to pay next semester to retake it". The second (ignorant) group tends to say something along the line of "so I copied a few lines off the internet, that's not cheating". In the case of the second group, they must be educated as to what constitutes cheating, including plagarism, and how to avoid it (footnoting, etc.). The first group is much more difficult to work with. They would appear to have an attitude towards cheating that has been developed over their lifetime. It must be remembered that by the time they arrive on campus, the average age of these students is eighteen. They probably cheated (and got away with it) through their high school years and have weighed the risks and rewards and decided that it is easier to cheat than to work for their grades. Reversing in four years what has developed in eighteen is not an easy matter. A Freshman Experience class could start the initial work on the importance of ethical behavior (starting with, but not ending with cheating in school) and the possible consequences of ignoring it. If from the very beginning of their academic careers, the concept of ethics is introduced (beyond their existing viewpoints), an emphasis is placed on ethics throughout their career, students are more likely to embrace and adhere to the concept. Those students who do not adhere to ethics in their academic careers are quite likely to carry their views into their professional careers.

Classroom discussions on case studies (such as the Hyatt Regency) are extremely beneficial because they not only help the students become active participants in the class, but they also help prepare them for such circumstances that they might actually encounter in their careers. Case studies provide the instructor with excellent examples of "real world" situations and are worthy of inclusion in engineering/technology curriculum because many of today's engineering successes

were obtained because of analysis of past failures. Experience shows that students respond well to case studies because they really happened. Quite often, students who are inundated with "theoretical" information tend to lose focus. But add practical applications or real world examples, and their interest rapidly returns. Bringing in guest speakers from industry also is a great idea because of the students view them as working in the areas that they themselves would like to work. In addition, the guest speakers can (hopefully) reinforce what the instructors have already discussed in the class.

Another suggested topic would be the work required to successfully complete a program. The Dean of Student's speech (at another institution) to all incoming freshmen always started with "this is not the 13th grade". His point is that the rigors of college are much greater than that of high school and that an adjustment is quickly needed. Most freshmen see that unlike high school, course are not necessarily taught on a daily basis, and wrongly assume that the workload is proportionately reduced. Students try to quantify time put in an assignment with accomplishment with questions such as "How many hours should this laboratory write up take me to do?". They do not understand what former UCLA coach John Wooden once said, "Don't confuse activity for accomplishment". Students work at their own pace, and only through hard work, which cannot be quantified in terms of time, can the task be completed. It is here that perhaps by bringing in upper level students (of varying skill levels) or recent graduates who can discuss what work to expect, they will get a better understanding of what it will take to be successful.

Conclusion

The purpose of having an Engineering Technology Freshmen Experience is to try to get as much out of the students in their academic careers as possible. Students tend to place emphasis on the classes within their major, and put on a back burner those classes that they deem unnecessary. If through this introductory course or courses, the faculty of the College and/or Department can show the students the type of analytical thinking that they will be doing in the future, then perhaps the mathematical courses will take on new meaning and the Freshmen Experience class would have served a purpose. If by showing them the importance that all forms of communication will play in their future academic and post academic careers, there might be a greater interest in the English and communication courses that they will take. If this happens, then the Freshmen Experience course would have done its job. And finally, if students start in the Freshmen Experience course to develop a sense of what is ethically right and wrong and chose the right path, everyone benefits.

One final thought. The purpose stated by this campus's General Education Committee was to graduate well rounded students as they enter society. It seems that as Engineering Technology educators, our goals for our students include:

- Being able to think and solve problems independently, based upon the facts before them.
- Being able to work effectively in a group for the benefit of the group.
- Being able to clearly communicate their thoughts and ideas
- Practice ethical decision making.
- Instill a work ethic so that they are valuable contributors.

If educators are successful in these goals, it would seem that graduates would indeed be productive and successful members of society.

Bibliography

1. http://www.collegepubs.com/ref/SFX000515.shtml