Faculty Expectations for a Student Work Ethic: Mountains or Molehills?

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Abstract -- This paper addresses the perceived divide in effort between faculty expectations and the student work ethic as it pertains to students in Engineering and Science Programs at the University of Detroit Mercy. While it does not offer any specific solutions to close the gap, the problem is examined from the opposing viewpoints of two faculty and two students. The results of two separate surveys completed by faculty and students are included.

Introduction

The relationship between study habits of students and academic success in Engineering and Science programs have been the subject of a number of investigations over the past several years [1-3]. These programs have always required students to put in long hours of study. An often-used rule of thumb suggests 3 hours of work per week outside the classroom for every credit hour taken. This would mean that for an 18 credit hour course load a student would typically need to spend about 54 hours of study in order to master the material, for a total commitment of 72 hours every week.

Most faculty feel that such a commitment is not forthcoming even from the dedicated students – there are far too many distractions in this day and age. As a consequence, understanding is often incomplete and sketchy. Students, on the other hand, feel overwhelmed by the academic demands placed on them. What is the reason for this great divide between expectations and performance? Is the 72-hour study week expectation justified or is it unrealistic? In this paper a team of faculty and students debate this issue from opposing viewpoints – is it a mountain or a series of molehills?

The Student Survey

In order to quantify perceptions, students and faculty were separately surveyed. The questions used in the student survey are presented in Appendix I. Undergraduate majors in the College of Engineering and Science completed this survey; in Engineering these were the four mainstream disciplines of Chemical, Civil, Electrical, and Mechanical and in Science they were Mathematics and Computer Science, Biology, and Chemistry. Almost 200 students completed the survey. We have not yet completed the analysis of our data; for instance, a breakdown by major and by year might be revealing. However, the salient features are evident in the overall results presented in Table A and are discussed below.

Of the students who returned surveys, 60.5% thought that the college workload was much heavier than in high school (item #1). The percentage of full-time students who do not work at all to support themselves was 38.1% (#2). This was a surprise to the faculty authors, who had a perception that a large majority of students had to work in order to support themselves. The faculty authors were also surprised that a significant number of students (38%) reported spending at least 2 hours per credit

hour per week studying (#4). The results of the responses to item #7 (not included in Table I) were as follows. The average distribution of effort over the five 3-week periods covering the entire semester was 12%, 16.7%, 19.1%, 20.6%, and 31.5% respectively. This does indicate a certain asymmetry of effort but not inordinately so. In item #8, a significant number of students (41.6%) have no advance strategy for making up for work missed due to illness or other conflicts. The responses to item #9 indicated that a majority (66.2%) of students are not likely to spend much time on assignments unless they have a strong interest in the subject. Related to interest, item #11 reveals that a significant number of students (42%) believe that at least 16% of the engineering courses they take are irrelevant to their major.

Table 1: Results of Student Survey

	Response (%) vs. Item # in Survey											
	1	2	3	4	5	6	8	9	10	11	12	13
A	1.6	38.1	15.5	3.6	11.7	15.2	41.6	31.3	6.9	9.6	20.3	25.3
B	2.6	6.2	25.9	11.5	7.4	30.4	16.8	34.9	25.9	21.3	54.2	55.8
C	10.5	18.0	20.7	45.8	17.0	29.8	11.6	14.9	13.8	20.2	22.4	17.4
D	24.7	13.9	14.0	25.5	18.6	23.6	13.2	17.4	30.2	13.3	2.1	1.1
E	60.5	17.5	23.8	12.5	20.2	1.0	16.8	1.5	23.3	28.7	1.0	0.5
F	NA	6.2	NA	1.0	25.0	NA	NA	NA	NA	6.9	NA	NA

The Faculty Survey

The questions used in the faculty survey are presented in Appendix II. All faculty in the College of Engineering & Science had an opportunity to respond to this survey. A total of 18 responded. An analysis of the highlights of their responses is provided below.

Table 2: Results of Faculty Survey

	Response (%) vs. Item # in Survey				
	1	2	3	4	5
A	0	35	37	0	0
B	22	59	52	64	53
C	56	6	11	12	29
D	22	0	NA	24	18

An overwhelming majority (88%) of faculty members who returned the surveys reported that they expect students to study at least 2 hours per credit hour per week for their courses (item #1). The faculty perception of the actual amount of time students study (#2) differed significantly from what was reported by the students, as well as from what faculty expect. Only 6% of the faculty said they thought students studied at least 2 hours. Over half (52%) of the faculty reported that over the years they have been teaching, they have lowered their expectations of students (#3). The faculty authors were somewhat surprised to discover that so many of their colleagues seemed satisfied with students' preparation in math and writing skills (#4, #5).

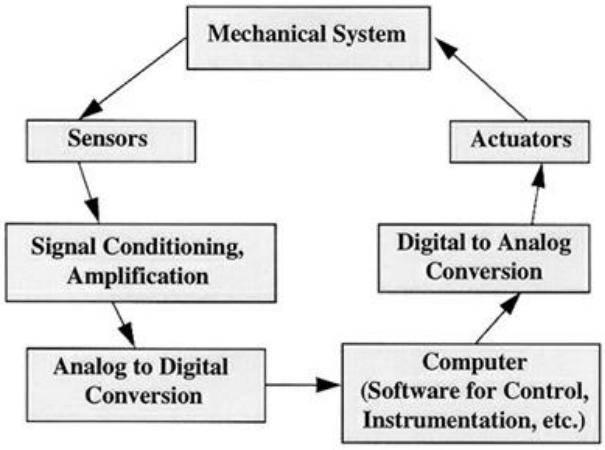

Figure 1: Sample figure added to demo SWE format

Molehills: The Faculty Viewpoint

Engineering and Science programs involve courses with material that is typically more difficult to master than in other programs. Understanding is gradual and time consuming – a graded process that requires multiple passes at the material, and frequent interaction with faculty. A minimum amount of practice including rote learning is also an important component of this process.

Into this world enters the freshman, probably subscribing to the prevalent school of thought (among students) that learning should be instantaneous, that a lecture should be self-standing in its ability to educate completely and thoroughly. Such a result is difficult to guarantee in the best possible circumstances, and particularly so when entering students lack the necessary preparation.

Sub-heading Sample

A key behavioral element on the part of the student for success, is a strategy founded on distributed effort, where the effort begins in the first week of classes. However, inevitably the first three to four weeks are squandered away. With midterm tests over the horizon, there does not seem to be a reason to study on a day-to-day basis. Yet it is this laissez faire approach to studying that essentially puts students in a hole that they spend the rest of the semester trying to climb out of. The interdependent nature of the theoretical development of most engineering courses requires a building block approach to learning. If the major concepts covered in a particular lecture are not understood well or even adequately, it is generally true that understanding of the concepts covered in the next lecture is at risk. Under these circumstances the piling up of material begins. When exams finally come around there is no alternative to "cramming" – it is the only "fix" in the short term. However, as is well known, cramming is neither conducive to learning nor to long-term retention. When the same material is tested in the finals, one is forced to repeat the process all over again, except that there is now more material to cover and less time to do it. Additionally, there is the obvious question of the effect this has on the overall intellectual development of the student.

The time and effort available for study activities is also impacted by the hours that students spend working. While the faculty authors were surprised that a significant number of students do not

have to work to support themselves, the fact remains that over 60% of them do work. In many instances this is a commitment that goes well beyond the odd campus job for pocket change. While the need to support oneself financially cannot be questioned, one wonders whether the choices made in terms of the hours of work have more to do with lifestyle than financial necessity. If the model of the 72-hour academic workweek is accepted, that by itself is more than a full-time job. So where is the time to pursue another job?

The problem is even more fundamental than a lack of time management skills – it is the inability to even realize time management as being the cause of the problem. Once this is realized, by minimizing distractions, developing a strategy for studying, and keeping one's eye on the ball, students will start to see engineering and science programs as a series of molehills instead of the mountains that they tend to make them.

Mountains: The Student Viewpoint

With eyes wide open, the freshman student stands before a doorway leading to endless possibilities. For the first time, the freshman is considered an adult, and, therefore, is conferred the immense power of decision-making. The student is following his dreams of becoming a famous scientist, doctor, or engineer and enters the school of Engineering and Science. Soon after classes begin, the freshman is challenged both mentally and morally. The dilemma of "To Study or Not To Study" plagues the young pupil's mind – most students will give in to the temptation that a party offers, and disregard the consequences that follow. Once a student falls into this trap, it is very difficult to restore good study habits. This individual then soon becomes the stereotypical college student described in the "Molehill" section of this study.

Although quite a few students of the above type are prevalent in college classrooms everywhere, many others are lumped into this category unfairly. In fact, what may appear to be a "laissez faire approach to studying" may actually represent the student's best attempt at adjusting to the colossal change from the high school to the college environment. The "lack of time management skills" may be caused from a stress overload of great expectations and juggling the different demands of a full-time college career. And the "cramming" syndrome may be the result of long days/nights spent working on a job in order to afford a college education.

As the results of the student survey show, many students feel that the academic workload in college is much more than in high school (item #1). There are many explanations for this. The obvious reason is the possibility that a student has adopted this "laissez faire approach to studying" throughout his/her entire school career; if he/she did not study in high school, and passed, this attitude may transfer to college. A related possibility is that the high school did not challenge the student to his/her fullest ability. In higher education then, he/she feels overwhelmed with the amount of work required and confused about how to deal with it. The final possibility is simply that high schools are very restrictive in the academic choices that students are required to make; most of the time high schools offer little flexibility in either the selection of classes or class time. This regimented schedule acts as a safety net, but lessens the need for the students to make any important decisions; perhaps it is not the best preparation for college. As opposed to high school, college is relatively unstructured as far as providing guidelines for students on time management; this is essentially considered to be the students' responsibility. For most students this is a difficult adjustment.

Other students are more quickly introduced to the real world. The numbers cited below are from the U.S. Census Bureau [4]. While 53% of students in the USA were claiming to be financially independent in 1994, the corresponding figures for 1975 were just 33%. Today, three out of four full-

time students hold a job while going to school. The question of why so many students feel the need to work arises immediately in one's mind. Are students more materialistic than in years past, or is there some other explanation for this trend? The answer may be found in simple economics. While the cost of higher education has risen dramatically, public and private aid has declined over the past 20 years. In 1975 the average annual cost was $4,587 per head for a public institution and $10,086 for a private institution. By 1994 these costs had risen to $6,053 and $16,470 respectively. These statistics pertaining to rising costs are just one side of the coin. Revenue support from public sources has fallen dramatically over the 20-year span. Governmental appropriations dropped from $8,176 in1975 to $7,386 in 1994 for public schools and from $7,279 to $6,659 for private institutions. The combination of these factors has forced the college student to offset costs by working at a job, while continuing to maintain a full academic load. With the financial burdens discussed above, students do in fact learn a form of time management under stress, which enables them to balance the rival demands of work and study. It just happens to be a balance that exacts an academic price.

In addition to monetary concerns, today's students are also faced with the demands of a more broad-based hiring ethic on the part of industry. They now seek a more well rounded individual instead of one with just a good GPA. It is a belief held within Eaton Corporation, where one of the two student authors co-ops, that three major qualifications desired in a future employee is mature judgement, interpersonal skills, and self-motivation. All of these can only be obtained through experiences outside the walls of the classroom. With this in mind, some students attempt to have an all-round college experience; i.e. they participate in a diverse range of activities such as professional and social clubs, a job, etc. As a consequence, a student's time is distributed between the various demands from the two aspects of his/her college career – academic and extra-curricular.

Yes, all things considered, it is a mountain.

Summary

Mastering the material of Engineering and Science courses is often a slow drawn-out process of, to use a baseball analogy, grinding out one single at a time. On the other hand, most students study in spurts just before exams, depending on a "test strategy" and the hope of hitting a home run for success. Under these circumstances learning is incomplete and, in many circumstances, happens after graduation due to the requirements of a specific job. While on-the-job learning has its importance, it is not as comprehensive in its scope as academic learning; it should be a supplement to, not a substitute for the latter.

Some interesting questions come to mind. Can Engineering and Science Programs be restructured to provide an incentive that encourages distributed learning? Why is it that understanding and learning the lecture material is not considered the best strategy for doing well in homework, quizzes, tests, etc.? How should a program be restructured such that the gaining of knowledge rather than the procurement of good grades is seen as synonymous with the Degree sought; that the one automatically leads to the other? And, finally, how can the system support the concept of full-time study that requires a commitment of 72 hours per week?

Where does the solution lie? Does it lie in a better system or in a better student? Does it lie in a combination of both?

References

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