Understanding Our Students

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Introduction

> If we understand students' critical need to find a niche socially and to experience early academic success and if we are aware of the difficulty the college environment can pose for freshmen, especially women, minority, and adult students, we are better able to become sensitive to student needs and concerned for the conditions necessary for their academic success. Faculty who understand what freshmen are going through are, in short, in the best position to put those events in a larger context and to help students focus on the academic aspects of their freshman experience. [1, p 45]

In their book, *Teaching College Freshmen,* Bette Erickson and Diane Strommer speak of changes in the culture of high school students from those of decades past [1]. Our national culture expects college study of a greater proportion of students now, and some national leaders speak of a college education as essential for the economic survival of tomorrow's workforce. Does the "new" student culture support or inhibit success in college? Can we, the faculty, recognize this culture and adjust our teaching and our courses to maximize student achievement?

For faculty to teach effectively, we need not only to know what we're teaching, but also to understand those who need to learn from us. By gaining some insight into the strengths, weaknesses and preferences of our students, we can best choose methods for presenting information, developing understanding and abilities, and for changing the student culture where necessary to optimize learning. In this paper, we will examine a snapshot of students entering Trinity University in the Fall of 1998—a snapshot provided by the Cooperative Institutional Research Program (CIRP) survey completed by the entering class during orientation of their first year at Trinity. This snapshot provides some surprising views of the culture of today's entering students, and of those intending to pursue an engineering degree at Trinity.

The CIRP Survey

The Cooperative Institutional Research Program (CIRP) was established in 1966 at the American Council on Education to study the American higher education system. One of the projects of the CIRP is an annual nationwide freshman survey, conducted by the Higher Education Research Institute at the University of California, Los Angeles. The survey gathers information from new college students about their academic and family backgrounds, interests, college and career goals, and attitudes. Institutions participating in the freshman survey receive summary data on

their own new students as well as comparative information for the nation and from groups of similar schools. These data can provide valuable understandings of the abilities, aspirations, and expectations of current students. Additionally, schools participating on a regular basis can monitor changes in their students over time and can compare such changes to trends at other institutions.

At Trinity University, we administer the CIRP freshman survey to our incoming classes approximately every other year. Our first year students are assigned to advising groups of about 15 students each, with a faculty advisor and a student mentor. The survey is one of the scheduled activities for the advising groups during orientation. The questionnaires are distributed by the mentor or advisor and take approximately 30 to 45 minutes to complete. This method of administration has resulted in high response rates. In the fall of 1998, 622 of our 644 new first year students (96.6%) completed the survey; thus the information reported here is not from a sample of the population, but is from (almost) the entire population.

The CIRP staff annually produces a book of the national norms [2]. Additionally, they periodically produce studies of long-term trends [3]. Many of the survey responses show marked changes since 1966 when the survey was first administered. Our current students are not the same as those students we taught in the past. How they have changed, and how (or whether) we as teachers should change in response to student changes, are issues that we must address if we are to best accomplish our teaching goals.

Self-Rated Student Abilities

Effective learning experiences will take into account both students' abilities and students' perceptions of their abilities. Table 1 shows CIRP results (five of nineteen are discussed) for Trinity University entering students and for students indicating engineering as a probable major.

The high school grades described in Table 1 are encouraging. Around 70% of the entering class indicated average grades of A- or above in high school (622 responses). The much smaller group (57) considering engineering is just below (66.1%) that mark for the entire class. This in itself was a mild surprise—in the past, those considering engineering at Trinity University were markedly above the entering class average in measures of academic ability. We may need to take a fresh look at recruiting, perhaps become more involved in the recruitment and admissions process, if we want to change this trend.

When Trinity University students rate their academic abilities in the CIRP, we see a picture of some confidence, perhaps too much. The engineering students rate themselves higher than the aggregate, and the engineering females all rate themselves highly. Even if the GPA figures don't indicate the superiority of the entering engineers, they still feel they are an intellectual elite among their peers.

Writing is a very important ability for students at Trinity. Our general education encourages the development of writing skills and makes writing a significant part of the entire curriculum. Historically in the CIRP survey nationally, females are more confident of their writing abilities than are males. For the aggregate of the entering students, this is true (61.1% for females, 52.8%

Table 1: Entering Student Self-ratings and Selected Activities

	Entire Class			Engineering		
	All	Male	Female	All	Male	Female
	622	291	331	57	47	10
Average High School Grade						
A or A+	38.5	30.4	45.7	35.7	32.6	50
A-	32.5	31.8	33.0	30.4	32.6	20
B+	16.8	21.1	13.0	17.9	19.6	10
B	9.1	11.4	7.1	14.3	13.0	20
<B	3.1	5.3	1.2	1.7	2.2	0
Self Rating: Above Average or Highest 10% in the Following Categories:						
Academic Ability	87.0	85.3	88.6	93.0	91.5	100
Athletic Ability	44.5	61.4	29.6	61.5	66.0	40
Mathematics Ability	55.8	60.7	51.5	89.5	89.4	90
Public Speaking	41.6	44.4	39.2	29.9	34.1	10
Writing Ability	57.2	52.8	61.1	61.4	65.9	40
Activities Engaged in During the Past Year: (1) Percent responding "frequently." Others here combine "frequently" with "occasionally."						
participated in demonstrations	31.7	33.2	30.3	40.3	46.9	10
performed volunteer work	90.7	86.7	94.1	93.0	95.7	80
asked teacher for advice (1)	31.9	26.8	36.3	38.6	36.2	50
discussed politics (1)	28.5	30.8	26.5	24.6	29.8	0
voted in student elections (1)	33.5	30.7	36.0	29.8	36.2	0
read newspaper editorial page	66.3	61.0	71.0	59.6	61.7	50
checked a book/journal from school library	20.8	16.8	24.3	24.6	25.5	20
used internet for research /homework	86.7	87.1	86.4	87.8	87.3	90
played computer games	77.6	87.1	69.2	93.0	93.6	90
HS required community service	27.9	32.0	24.3	35.1	38.3	20

for males), but the for the entering engineers, the reverse is true (40% for females and 65.9% for males). We need to be sure to get enough samples of individual writing in our introductory engineering courses to determine if further action is needed to ensure that our engineering students are good in written communications.

Mathematics is another ability where self-expressed gender differences are traditionally seen, and again, this is supported by the aggregate of Trinity students (60.7% of the males and 51.5% of the females rate themselves above average in mathematics), but not in the engineering subgroup. For this class, at any rate, we might consider that the males and females considering engineering are about the same in perceived ability in mathematics.

The Engineering Science program at Trinity requires student presentations in semester design projects and many traditional engineering courses. In the entering class, 41.6% of students rate themselves above average in public speaking, whereas only 29.9% of the prospective engineers do. This is the most marked difference between the entering aggregate and the engineering students seen in this survey. Clearly, we need to bolster the confidence and the ability of our engineering students in public speaking.

In the past decade, the level of interest in, and the quality of Trinity athletics has improved greatly for both men's and women's sports. Over 65% of the engineers (vs. 45% of the aggregate) show potential for interest in athletics with males showing the highest interest. In engineering, we now see a growing number of both male and female students playing varsity sports. We see them as better organized than the typical student, but are concerned at the number of classes they miss due to travel. We try to make participation in athletics by engineering students part of the culture in the Department. We frequently point out the accomplishments of our athletically inclined students, and we offer them our support and help outside of class.

Activities Engaged in the Last Year of High School

The culture that the students bring with them from high school includes a lifestyle that involves them in many activities, perhaps in ways not conducive to the best college learning experience. Students may not seek help outside of class, even if such help is abundantly available, because they aren't used to seeking that help in high school. Only 31.9% of the aggregate asked teachers for advice outside of class 'frequently,' while engineering students made more use of their teachers. We make a significant effort to ensure that help outside of class is also a part of our engineering culture at Trinity. Faculty are available and want students to seek help.

Trinity University wants to prepare students for "…understanding their responsibilities in a changing world."[4, p9] The CIRP survey indicates that there is some interest in politics, despite national trends indicating a decline over time. About 30% of the aggregate participated in demonstrations, with the engineering females having the lowest rate (10%). About the same (30%) percentages frequently discussed politics, except for the engineering females (none reported frequent political discussion). The same relationships appeared in frequent voting in student elections. About 66% of the aggregate (males 61%, females 71%) read the editorial page of the newspaper (either frequently or occasionally), while the engineering female students did so at a lower rate (males 61.7%, 50% females). We have speakers and discussions for the entire

engineering student body several times a semester with current events as one of the topics. We try to keep our students interested in a broader picture of their responsibilities than is stereotypic of engineering.

Volunteerism is perhaps a greater part of the student culture than in the past. About 28% of the entering students indicated that their high school required some form of community service, and about 90% indicted that they did perform volunteer work. The engineering students, through an umbrella student organization (Trinity Engineers) encourages participation in on- and off-campus volunteer activities such as mentoring, tutoring and work for organizations such as habitat for Humanity.

We would hope that our students make good use of our libraries—use extending beyond specific research assignments. However, only 20.8% of the aggregate reported frequent checking out of books or journals from the high school library (the CIRP doesn't address the use of other libraries), while 86.7% used the internet either frequently or occasionally for research and homework. Faculty expectations are likely very different from student expectations here. We need to make our expectations clear (e.g. as to when text references are preferable to those found on the Internet). Part of Trinity University's first year experience includes two courses that have improvement of bibliographic skills as important goals.

How Students Spent their Time in the Last Year

Perhaps the most revealing information to be derived from the CIRP survey is found in the fourteen questions that ask how much time per week students spent last year on various activities. The results for all 1998 entering Trinity students and the engineering subgroup are provided in Table 2 for seven of the questions.

The most striking results come in the self-estimated time spent on academic schoolwork (studying or doing homework). Almost 50% (45.4% of the aggregate) spent 5 hours or less per week, while only about 30% spent 11 hours or more). In the engineering subgroup, the overall rate was about the same, but the males were more likely to be in the low-time-spent group (48.9%) than the engineering females (30%). Faculty may expect students to spend three hours studying outside of class for each hour in class, for a total of about 45 hours per week. One important task for us is to try to make study a much more important part of student life than it is when the students arrive on campus.

Why is the time spent studying so low? High school students have many activities vying for their time. Socializing with friends seems to play a more important role in high schools than does studying. More than half the aggregate spent 11 hours or more per week socializing versus about 30% studying for the same time range. Exercising or playing sports takes comparable time to studying (40% spent 11 or more hours per week exercising, females lower at about 30%).

High school students hold regular, albeit part-time, jobs to a much greater degree now than in the past [1, p14]. About 25% of the aggregate, and 20% of the engineers, worked 11 hours or more per week.

Table 2: Hours per Week in the Last Year Spent on Selected Activities

	Entire Class			Engineering		
	All	Male	Female	All	Male	Female
	622	291	331	57	47	10
Studying or Doing Homework						
none to 5	45.4	56.1	35.7	45.6	48.9	30
6 to 10	24.7	19.4	29.5	29.8	27.7	40
11 to 20	24.8	20.9	28.2	19.3	21.3	10
over 20	5.1	3.6	6.5	5.3	2.1	20
Socializing with Friends						
none to 5	17.4	16.9	18.0	17.5	14.9	30
6 to 10	25.5	18.7	31.7	26.3	23.4	40
11 to 20	35.4	33.8	36.9	26.3	27.7	20
over 20	21.6	30.6	13.4	29.8	34.0	10
Exercise or Sports						
none to 5	42.6	32.1	52.0	31.6	31.9	30
6 to 10	16.8	15.9	17.5	19.3	14.9	40
11 to 20	26.3	28.9	24.0	33.3	34.0	30
over 20	14.4	23.1	6.5	15.8	19.1	0
Working for Pay						
none to 5	65.0	63.1	66.7	66.7	68.1	60
6 to 10	8.7	7.9	9.4	12.3	12.8	10
11 to 20	15.4	13.4	17.3	8.8	6.4	20
over 20	10.8	15.5	6.5	12.3	12.8	10
Volunteer Work						
none to 5	90.7	91.6	89.9	93.0	91.5	100
6 to 10	5.0	4.7	5.2	5.3	6.4	0
11 to 20	3.4	2.9	3.9	1.8	2.1	0
over 20	0.9	0.7	1.0	0.0	0.0	0
Watching TV						
none to 5	69.0	62.0	75.1	75.4	74.5	80
6 to 10	18.8	22.1	15.9	15.8	17.0	10
11 to 20	9.1	11.2	7.1	7.0	6.4	10
over 20	3.2	4.7	1.9	1.8	2.1	0
Reading for Pleasure						
none to 5	88.9	87.3	90.3	87.7	89.4	80
6 to 10	6.5	6.9	6.2	5.3	2.1	20
11 to 20	3.9	4.7	3.2	5.3	6.4	0
over 20	0.7	1.1	0.3	1.8	2.1	0

While volunteer work may have become part of the culture, for most (about 90%), less than five hours per week is spent on such activities.

Television seems less of a factor than socializing, and perhaps that's good! Of the aggregate, 12.3% spent 11 hours or more watching television (8.8% for the engineers, with only a small differentiation between the male and female engineering students). Television watching outweighs reading for pleasure as a pastime—but reading is a pastime that might help with college studies more than television should. Around 90% spent fewer than five hours per week reading for pleasure. With reading such a vital part of academics, we need to find ways to make reading more central to, and a pleasurable part of, our students' activities.

Conclusions

Our responsibility as faculty is to understand our students, to do our best to change their academic habits where necessary, and to utilize their best abilities to help them learn. One way to get a glimpse of the incoming student body, including those interested in engineering, is to make use of the CIRP survey. The survey provides some useful and occasionally startling insights into the culture and mores of new students—insights we need to have and use. We can see how students are used to spending their time, where their confidence and lack of confidence lies, and how they are used to performing their academic tasks. Engineering programs should consider using the CIRP survey as one means of meeting these responsibilities to our students.

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