

# Do Engineering Freshmen Find Value in Extracurricular Seminars Designed to Enhance Collegiate Success?

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## Abstract

To improve retention and student success, freshmen at the University of San Diego participate in a *preceptorial* program. Through this program students are ensured to have one regular academic class having fewer than 20 students taught by a professor having particular interest in helping first-year students succeed. All freshmen students expressing an interest in engineering enroll in a preceptorial section of ENGR 101: Introduction to Engineering. Recently, an optional *Passport to Success* program has been added as an enhancement to the preceptorial program offering informal sessions on topics ranging from test-taking strategies, to developing personal relationships, to an introduction to cultural opportunities in San Diego.

During the Fall 2004 semester three ENGR 101 sections addressed the *Passport* program in different ways. One section required students to participate in specific sessions primarily centered on academic success. A second session required students to participate, but placed no restrictions on which sessions should be attended. The third section did not incorporate the *Passport* program. At the end of the semester students were asked to assess the degree to which they feel prepared for academic success and other personal challenges during their college careers.

This paper will introduce the *Passport to Success* program and how it is implemented across the University. Details regarding adoption in ENGR 101 will be presented. The effect of the *Passport* program on engineering student perceptions of their preparation for a successful collegiate career will be discussed.

## Introduction and Background

The *preceptorial* method of teaching was introduced by Woodrow Wilson when he was the President of Princeton University in 1905<sup>1</sup>. As originally developed, preceptorial courses included a high degree of personal interaction between the instructor (or *preceptor*) and the students (*precepts*). Rather than rely on a traditional lecture, the preceptors guide the students learning of the subject matter by assigning readings and conducting less formal, more open-ended discussions or seminars. In 1973, the University of San Diego (USD) implemented a freshmen *Preceptorial Program* as one approach to improving student retention across campus. At USD, the cornerstone of the program is the grouping of 16-20 students into preceptorial sections of regular academic classes. Typically, students are placed in preceptorial sections of courses for which they have expressed an interest. These sections are restricted to freshmen and

they are taught by experienced, full-time faculty members. Besides teaching the regular course material, the faculty members also serve as the academic advisor for all of the students in the course until they declare a major (typically during the sophomore year). During the fall semester, most preceptors supplement the normal course material with information that will help the students adjust to USD including procedural issues like add/drop deadlines, as and help students become aware of campus resources available to help students with academic, or personal challenges such as the Writing Center, or Counseling Center. USD has a tradition of offering a high degree of student/faculty interaction. The Preceptorial Program provides the first opportunity for these relationships to develop.

In a separate initiative, the Office of Student Learning Initiative recently developed the *Passport to Success* program as a supplement the Preceptorial Program. The *Passport* program offers a series of one-hour seminars addressing a topic in one of three themes:

Academic Success: Seminars that offer some of the nuts-and-bolts skills needed to succeed academically such as time management and test-taking tips.

Career Planning: Sessions to help students prepare for a career including choosing a major and writing resumes.

Personal and Social Growth: Programs developed to help students mature and cope in non-academic areas ranging from dealing with incompatible roommates to getting involved in extracurricular activities.

The *Passport* sessions are not associated with particular courses and are offered outside of regularly scheduled classes, usually during the evening or other times when there are few scheduled classes. Each session is limited to approximately 40 students. At the end of the session, and after completing an evaluation form, each student receives a stamp that is glued to a “passport” that is turned in to their preceptor at the end of the semester. The *Passport* program offers 30-35 sessions during the Fall semester. *Table 1* lists the topics offered during the Fall 2004 semester. Some topics are offered more than one time.

Preceptorial instructors are invited to incorporate the *Passport* program into their courses. The extent of participation is at the discretion of each preceptor and is not required. Instructor’s also have the freedom to incorporate the sessions into the course grading, or not, as they choose. Furthermore, *Passport* sessions are open to all first-year students; not only to students whose preceptors have not formally joined the *Passport* program.

During the Fall 2004 semester USD had 70 preceptorial sections across all departments. Eighteen of the preceptorial sections elected to participate in the *Passport* program. The faculty teaching the engineering preceptorial sections undertook a one-semester-long study to determine the extent to which first-year engineering students would benefit from the *Passport* program. The remainder of the paper describes this investigation. The next section will describe some salient aspects of the first-year engineering programs at USD. Following that is a discussion of how the *Passport* program was incorporated within engineering during the semester. A discussion of a survey used to assess the value of the *Passport* program to engineering students is then presented followed by an analysis of the student responses.

### ***Passport to Success Programs Offered Fall 2005***

Academic Advising Challenges	Barriers to Safe Partying
Cheating Yourself	Battle of the Bunk Beds
Creating Your Vision and Values	Buff and Beautiful
Effective Study Methods	Clues to Losing the Blues
Effective Test Taking (Essay/Long Answer)	Faith Matters
Effective Test Taking (Multiple Choice/Short Answer)	Friends, Foes & Lovers
Faculty 411	Getting Involved
Managing Finances	Home for the Holidays
Playing the Majors Game	Let's Talk
Real World Resumes	Need to Know Health Issues
Should I Stay or Go	Scared Speechless
Surviving Your First Year at USD	Student Development Transcript
Time Management	Studying at a Catholic University
	Sun & Surf: Things to Do in San Diego
	Take Action
	USD Road Rules
	Who Owns the House

***Table 1*** Listing of Passport to Success programs offered during Fall 2005. Topics in the left column were identified as “Approved Professional Development” topics for one section of Engr 101.

## **First-Year Engineering at USD**

The engineering programs at USD have some factors that make them unique. First, in keeping with the liberal arts tradition at the university, all three degrees offered (Electrical, Industrial & Systems, and Mechanical) require approximately 150 semester-hours leading to dual B.S. and B.A. degrees. Because of the extensive degree requirements, the engineering faculty needs to track closely the courses students take to make certain that all of the courses will apply to the engineering degree.

The second unusual consideration is that students enrolling at USD are admitted *to the University* and not *to a major*. This makes it possible for some of the first-year students to take engineering with very little understanding of the engineering field. Many of these students decide to “try” engineering to see how they like it, intending to declare another major on campus if they don’t like engineering. As a result, our students are less likely to understand the opportunities that engineering offers than are students at some schools. Consequently, we have an obligation to ensure that all prospective engineering majors understand the opportunities offered by the field of engineering as well as each of the specific majors.

To accomplish both of these goals, we require that students take two courses during their first year in the program: *Engr 101- Introduction to Engineering* during the Fall semester, and *Engr 102 – Introduction to Engineering Design Practice* during the Spring. In their current forms, *Engr 101* provides an overview of engineering including a broad introduction to each of the disciplines offered at USD while *Engr 102* presents students with an opportunity to participate in a semester-long design activity.

Recognizing some of the special considerations facing prospective engineering majors, all sections of *Engr 101* are treated as preceptorial sections. For administrative reasons, internal or external transfer students needing to take *Engr 101* are enrolled in a shadow section offered at the same time as the preceptorial section. This means that these transfer students take their first engineering course alongside true freshmen. Besides helping to forge a group identity, this allows an engineering faculty member to serve as an *ad hoc* advisor even for students who may have another advisor on campus. During Fall 2004 there were three sections of *Engr101*. The authors were each the preceptor for one section and each are faculty members of a different one of the three engineering disciplines offered at USD. Some salient characteristics of the sections are presented in *Table 2*.

Section - Name	Enrollment (Total/Men/Women)	Participate in Passport?	Passport sessions accepted
1 - NoPassport	18/12/6	No	--
2 - AnyPassport	15/14/1	Yes	Any
3 - ProfPassport	17/15/2	Yes	Only Professional Development

*Table 2 Summary of the sections of Engr 101 offered during Fall 2004.*

To ensure that all students have the opportunity to learn about each of the majors from faculty who know the subjects, the three sections were offered concurrently and each section had significant instruction from each of the three preceptorial instructors. The classes met twice each week for 2-hours each session. Five of these sessions spread throughout the semester were devoted to general engineering topics (*What is Engineering?*), or to preceptorial topics (*Effective Study Methods*). These topics were presented to each section by the preceptor formally assigned to the section. Seven or eight classes were then devoted to each USD engineering discipline. The discipline-specific sessions rotated between instructors. Although this rotation may have weakened some of the bonds between students and faculty that lie at the foundation of the Preceptorial Program, each rotation was taught by a preceptor. Because of this rotation many students are comfortable seeking input from any of the engineering preceptors. Consequently, in some respects, engineering students have three advisors and mentors rather than one.

The current approach of rotating students in *Engr101* through the discipline is partially a result of curricular changes that resulted from establishing the mechanical engineering program in Fall 2003. In previous years, some of the time currently devoted to ME was devoted to general professional topics (e.g. project management) in preparation for the design activities in *Engr 102*. The remaining time was used for more discussion of preceptorial topics- particularly study skills, communication, and teamwork.

Although these non-technical skills appear to be less important to a student's prospects for success in engineering (and to the retention of students), there is some evidence of their importance. Blumner<sup>2</sup> showed that good study habits can be correlated with higher grades. Bradley<sup>3</sup> showed that students exposed to a formal program that develops good study skills had higher GPAs and were more likely to remain in engineering than were students in a control group. Although no retention statistics were cited, Blowers<sup>4</sup> reported that students enrolled in a

one credit seminar course found topics including resumes, time management, studying, and exam strategies were highly valued by first-year engineers. In other work, 23% of the students in a study conducted by Carter<sup>5</sup> reported that they had difficulty balancing academic demands with their social life.

Given the limited time available to devote to some of these topics within *Engr 101*, the *Passport to Success* program was considered as a venue through which engineering students could acquire some of the skills that might make them more effective engineering students, and also provide them with some of the skills they might need to succeed outside of the classroom.

### **Adopting *Passport* in *Engr 101***

At first glance, the *Passport* program seems to have offer students many topics that have been identified as contributing to the success in their engineering programs. There are, however, some aspects of the program that may make it less appealing than it appears. First, although the time commitment is small (typically ~3 hours during a semester), it is not always possible for students to participate in the sessions. For example, regular classes do not meet during “dead hours” on Tuesday and Thursday so *Passport* sessions are often offered at those times. However, the freshman naval science course required for NROTC students meets during this period. Four of the 17 students in one of the sections of *Engr 101* last fall were NROTC students and were unable to attend approximately 1/3 of the *Passport* sessions offered. Similar conflicts occurred for some athletes and students in some chemistry labs.

The content of the sessions raised a second concern. *Passport* sessions are larger than the typical Preceptorial course and are not always taught by faculty. Consequently, the content may be less thorough than desired and it will certainly not be tailored to the needs of engineering students. While all students are likely to encounter similar problems in non-academic areas, some of the academic issues faced by engineers are different than those faced by students in other majors. Furthermore, because *Passport* sessions are self contained last only one hour, there are no opportunities for follow-up or measures in place to ensure that students take the sessions seriously. Similarly, the loose structure of the program could allow one student to meet the requirements by attending sessions focusing on fitness, or fun things to do in San Diego, while others are attending sessions on effective studying strategies. It seems likely that some of the students would elect to attend the sessions that might seem easy, rather than those from which they could best benefit.

On the other hand, engineering professors are unlikely to provide useful lectures on safe partying. Some of the sessions that we are least prepared to present may be of the greatest benefit to some of our students. The students may be in the best position to assess the impact of the *Passport* program, so the Fall 2004 instructors planned a strategy to help decide whether *Passport* should be incorporated into future offerings of *Engr 101*.

Because students are assigned to *Engr 101* randomly, it was decided that each section of the course would approach the *Passport* program differently. Section 1 (*NoPassport*) was taught without explicitly telling the students about the *Passport* program and had no requirement that

students attend any of its sessions. Students in Section 2 (*AnyPassport*) were introduced to the *Passport* program and told that they could attend any sessions they wished, but that they were required to attend three sessions. Students in Section 3 (*ProfPassport*) were also required to attend a minimum of three sessions, but they were required to attend at least three sessions related to “Professional Development”. These sessions were identified by having the students and the professor identify topics that would qualify. The 13 topics in the left column of *Table 1* were selected as eligible courses. Interestingly, the students and professor independently identified 11 of the topics. The professor accepted one of the two other topics identified by the students as “professional” and added one topic that the students had not identified. *ProfPassport* students were encouraged to attend other sessions according to their interests.

To make grading consistent between the three sections, *Passport* activities were not included in the grading criteria. Rather, students in Sections 2 and 3 were told that if they did not complete the required sessions their grades could be lowered 1/3 of a grade. (As it turned out, unexpected scheduling and other conflicts caused the instructors to not adjust any grades because of *Passport* participation.) During the semester the semester, *Engr 101* operated independently of the *Passport* program except that the professors in Sections 2 and 3 would occasionally remind students of their *Passport* obligations.

At the end of the semester, all students were requested to complete an anonymous survey that asked for them to assess several aspects of the course. Included was the series of eight Likert-scale questions related to their overall adjustment to USD shown in *Table 3*. These questions are identified as *Adjust 1-8* in the table for reference in the next section. Students in Sections 2 and 3 were also asked whether they would recommend the *Passport* to next year’s freshmen, and to assess the extent which the *Passport* program helped them to adjust to attending USD. These are questions *Passport 1* and *Passport 2*. They also indicated which *Passport* sessions they attended.

***Questions Asked to Assess the Impact of Passport to Success.***

- Adjust 1: I have the study skills needed to succeed in college.
- Adjust 2: I have the skills needed to make good decisions about my personal life.
- Adjust 3: I am aware of the academic resources available at USD.
- Adjust 4: I know people on campus who will help me to make good decisions about my major and career.
- Adjust 5: I know people on campus who will help me with non-academic problems I might encounter.
- Adjust 6: I have taken advantage of social opportunities at USD and in San Diego.
- Adjust 7: I have taken advantage of cultural opportunities at USD and in San Diego.
- Adjust 8: I fit into the USD community very well.
- Passport 1: Would you recommend Passport to Success to next year’s freshmen?
- Passport 2: To what extent did Passport to Success help you to adjust to your first semester at USD?

***Table 3*** Students were asked to indicate the degree to which they agreed with statement *Adjust 1-8* choosing from: 1-Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly Disagree. The response for *Passport 1* was Yes/No. *Passport 2* responses were: 1-Helped a Great Deal, 2-Helped Somewhat, 3-Had no Impact, 4-Slight Negative Impact, 5-Strong Negative Impact

## Survey Results

The first step in the analysis was to review the responses from Sections 2 and 3 to determine whether the prescribing which sessions were allowed had an impact on student perceptions. 7 of the 15 *AnyPassport* students completed the survey, 11 of the 17 *ProfPassport* students completed the survey. *Table 4* summarizes the sessions attended by the students in each section. Students in *AnyPassport* attended an average of 3.29 sessions. Students in *ProfPassport* attended an average of 2.91 sessions. When one student who attended no sessions is removed, the *ProfPassport* section attended an average of 3.2 sessions. (None of the students enrolled in the *NoPassport* section reported attending any session on their own.)

34.8% of the sessions attended by *AnyPassport* students and 84.4% of the sessions attended by *ProfPassport* students were professional development topics. A Fisher test for the difference of proportions<sup>5</sup> is significant with  $p=.00023$ . Because this is less than any typical level of significance (e.g.  $\alpha=.05$ , or  $\alpha=.01$ ), it is safe to conclude that students are less likely to select sessions leading to professional development if they have the opportunity to attend any sessions. This hold true even if *Scared Speechless* is reclassified as a professions topic. By itself, this result does not mean that these personal development sessions are less valuable than the professional topics.

Session	Engr 101 Section	
	AnyPassport	ProfPassport
<i>Professional Development Topics</i>		
Creating Your Vision and Values	0	3
Effective Study Methods	1	4
Test Taking (Essay/Long Answer)	1	3
Test Taking (Mult. Choice/Short Answer)	1	1
Managing Finances	0	1
Playing the Majors Game	0	4
Real World Resumes	3	4
Should I Stay or Go	1	2
Surviving Your First Year at USD	0	1
Time Management	1	4
<i>Personal Development Topics</i>		
Barriers to Safe Partying	1	0
Friends, Foes & Lovers	4	0
Getting Involved	1	0
Let's Talk	0	1
Scared Speechless	3	0
Student Development Transcript	4	2
Sun & Surf: Things to Do in San Diego	1	0
Take Action	0	1
USD Road Rules	1	1

**Table 4** Number of students in Engr 101 sections that attended each Passport session.

When asked whether they would recommend the *Passport* program to future students, 71.4% of the *AnyPassport* students and 45.5% of the *ProfPassport* students replied *No*. Applying Fisher's test to determine whether the difference in student perceptions was significant, the *p*-value is .37. There is insufficient evidence to indicate that student recommendations would differ. In general, most students would not recommend that *Passport* program and the nature of the topics appears to not be a significant factor.

*Table 5* summarizes the responses to the questions as reported by the two *Passport* sections. The results show that students in both sections generally agreed in their responses to all eight *Adjustment* questions. (Recall that low values indicated a generally higher level of adjustment, or satisfaction.) *T*-tests were performed to determine whether the responses were different in the two sections and the relatively large *p*-values indicate that the differences are not significant. Similarly, the *p*-value for *Passport 2* is large suggesting so there is no reason to reject a null hypothesis that the mix of *Passport* sessions does not impact student perceptions of the utility of the sessions. On the other hand, even a 90% confidence interval for the mean response in each case includes the value 3 so it is not possible to say that *Passport* has an average positive impact on student perceptions.

Question	Mean response		<i>p</i> -value
	<i>AnyPassport</i> ( <i>N</i> =7)	<i>ProfPassport</i> ( <i>N</i> =11)	
Adjust 1	1.71	1.64	.80
Adjust 2	1.86	1.55	.24
Adjust 3	2.43	1.91	.25
Adjust 4	1.86	1.55	.50
Adjust 5	2.43	2.18	.66
Adjust 6	2.14	2.09	.88
Adjust 7	2.57	2.18	.37
Adjust 8	1.71	2.09	.34
Passport 2	3.00	2.64	.25

***Table 5 Comparison*** of mean responses to questions related to adjustment from students in the *Engr 101* sections that incorporated the *Passport* program. None of the differences in the means are statistically significant.

But these comparisons only show that the two implementations of *Passport* provide similar results. Consequently, the results of two sections were combined to compare the overall impact of sections adopting *Passport* to the section that did not include *Passport*.

*Table 6* summarizes the comparison between the mean student responses in the section that did not use the *Passport* program (where 13 of 18 students completed the survey) to the combined responses of students in both sections that included *Passport* (18 responses). Again, *t*-tests were performed and in most cases, the differences between the groups of students were not significant in all but three cases. The exceptions were the statements:



- Adjust 3: *I am aware of the academic resources available at USD.*  
 Adjust 4: *I know people on campus who will help me to make good decisions about my major and career.*  
 Adjust 5: *I know people on campus who will help me with non-academic problems I might encounter.*

Question	Mean response		p-value
	NoPassport (N=13)	Combined Passport (N=18)	
Adjust 1	1.77	1.67	0.74
Adjust 2	1.46	1.67	0.38
Adjust 3	1.46	2.11	0.01*
Adjust 4	1.23	1.67	0.06*
Adjust 5	1.62	2.28	0.11
Adjust 6	1.85	2.11	0.47
Adjust 7	2.54	2.33	0.58
Adjust 8	2.31	1.94	0.35

**Table 6 Comparison** of mean responses to questions related to adjustment from students in the Engr 101. Comparisons that are significant at the  $\alpha=.10$  level are indicated by an \*.

In all three cases, students in the section that did not use the *Passport* program were more likely to agree with the statement indicating some measure of better adjustment to USD. It is not clear why the students in the *NoPassport* section would have rated these questions higher than their peers did.

## Conclusions

The extra-curricular *Passport to Success* program was not shown to have significant positive impact on engineering student perceptions of their preparation for a successful collegiate career. Although student responses suggested that students find *Passport* sessions emphasizing academic topics might more valuable than other sessions, this result was not statistically significant and neither group of students assigned to participate in the *Passport* program overwhelmingly recommended that future students participate in the program.

It is difficult to draw strong conclusions about programs such as *Passport to Success* from a small group of students, however. It is very possible that a different selection of topics could have held greater value to engineering students, or that other USD majors find *Passport* valuable. Whatever the explanations, our investigation showed that engineering students did not respond well to a program design for all students even though the program was designed to meet the needs of incoming freshmen of all majors.

Clearly, however, the *Passport* program did provide some real value to some students. The results of the survey indicated that many students found value in parts of the program. Equally importantly, some of the engineering students explicitly told their preceptors that some of the sessions were interesting and helpful. These sessions were generally related to study and test-

taking skills. Although the preceptors covered some of the same topics as a part of the formal lectures in *Engr 101*, these students found the additional exposure through the *Passport* program to be helpful. Consequently, future instructors of *Engr 101* at USD will encourage the students to attend *Passport* sessions on their own without explicitly connecting *Passport* to the course.

#### References

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