

# Satisfaction – A Starting Point to Identify Needs and Areas for Improvement

Sandra L. Dika<sup>1</sup>, Noel Artiles-León<sup>2</sup>, and Mario Rivera-Borrero<sup>3</sup>  
 College of Engineering, University of Puerto Rico-Mayagüez  
 Mayagüez, PR 00681

**Abstract** - While surveys of student satisfaction alone do not constitute a comprehensive assessment approach, they can play an important role in identifying potential needs and areas for improvement. As part of the efforts for an institutional accreditation self-study, students at a large public institution in Puerto Rico were surveyed annually for two years on their satisfaction with academic experiences. The survey, administered in Spanish, included items on programs and academic resources at the department level, academic resources at the institutional level, and the knowledge and skills of departmental faculty. This paper summarizes the results for students in the College of Engineering. Trends in student opinion across the two years and areas of low satisfaction are identified, along with follow-up analyses of enrollment and scheduling data. The paper provides a case study of how student satisfaction data can be used as a springboard for a larger assessment project.

*Index Terms* – assessment, continuous improvement, student satisfaction

## INTRODUCTION

While student satisfaction surveys cannot be considered direct measures of student learning, they serve as formal needs assessments to “strategically and systematically target areas in need of immediate improvement” [1]. Student satisfaction data ensure that decisions to change or modify programs are based on reliable and valid information about students’ concerns, rather than anecdotal evidence or perceptions of faculty and administration. The continued administration of student satisfaction surveys provides a means of benchmarking over time [2]. Further, research by Pike and others indicates that there is a relationship between student satisfaction and performance [3]–[9].

As part of the efforts for an institutional accreditation self-study, students at a large public institution in Puerto Rico completed surveys on their satisfaction with academic experiences. The survey, administered in Spanish, included items on programs and academic resources at the department level, academic resources at the institutional level, and the knowledge and skills of departmental faculty. This paper

summarizes the results for students in the College of Engineering to identify needs from areas of low student satisfaction. Further, findings of follow up analyses using enrollment and scheduling data are presented to investigate areas of low student satisfaction and suggest actions for improvement. The paper provides a case study to demonstrate how surveys of student satisfaction can serve as academic needs assessments.

## METHODOLOGY

### *Sample*

A stratified, representative sample of engineering students was selected for each survey administration in 2004 and 2005. The surveys were administered to classrooms of students to ensure representation from every department and program. The total number of classrooms to be included in the sample was determined, and then numbers of classes from each department were selected based on proportional representation of enrollment within the institution. The total participants for 2004 and 2005 were N=447 and N=283 respectively.

Several steps were taken to ensure that the sample classrooms would accurately represent the student population. First, the proportions of total enrollment for each academic department were determined. Next, the undergraduate and graduate schedules for every academic department were obtained and the proportional number of third and fourth year classes – or fourth and fifth year classes in the case of engineering - randomly selected. Third, fourth, and fifth year classes were selected to ensure that respondents would have an adequate level of exposure to the courses and faculty of the department.

The demographic characteristics of the engineering samples did not vary greatly in the two survey administrations. Table I shows the major demographic characteristics of each sample.

<sup>1</sup> Sandra L. Dika, Assistant Research Professor, System for the Evaluation of Education (SEED), UPR-Mayagüez, sandra.dika@gmail.com

<sup>2</sup> Noel Artiles-León, Professor, Industrial Engineering, UPR-Mayagüez, nartiles@uprm.edu

<sup>3</sup> Mario Rivera-Borrero, Associate Professor, General Engineering and Faculty Coordinator, System for the Evaluation of Education (SEED), UPR-Mayagüez, marivera@uprm.edu

TABLE I  
DEMOGRAPHIC CHARACTERISTICS

Demographic variable	2004 (N=447)	2005 (N=283)
Gender	62% male; 38% female	62% male; 38% female
Time at Institution	27% ≤3 years; 73% >3 years	29% ≤3 years; 71% >3 years
Academic Load	94% regular undergraduate; 4% regular graduate	84% regular undergraduate; 11% regular graduate
Work Status	20% part-time; 2% full-time	20% part-time; 6% full-time

*Instrumentation*

The initial 2004 instrument (32 total items) included questions to determine student satisfaction with programs and academic resources at the department level, academic resources at the institutional level, and the knowledge and skills of departmental faculty, as well as demographic items (gender, number of years, academic load, work status, and participation in student leadership activities). The 2005 instrument included 41 total items. Of the nine additional items on the 2005 instrument, six were new items including one demographic item on GPA, one item on faculty knowledge of technical aspects, two items on general satisfaction with resources (departmental and institutional), and two items on general satisfaction with departmental faculty (quality and quantity). The other 3 items were created by splitting questions on the 2004 survey that had referred to both quality and quantity in the same item.

Both instruments were developed as part of the institutional accreditation process to provide evidence related to self-study questions. First, Likert-type survey items were developed to match the self-study questions from each task force. Then, the items were reviewed and revised by the respective task force coordinators. The team as a whole approved the final survey instrument. Both instruments were administered in Spanish. The items, translated to English for this paper, are shown in the tables in the results section. Items appearing only on the 2005 administration are marked with an asterisk (\*).

*Procedures*

For both administrations of the survey, professors of the selected classrooms were sent envelopes containing a letter from the university's chancellor, along with a sufficient number of surveys for the entire class. The letter specified a window for administration of the surveys, along with a return envelope to return the completed surveys. In general, no difficulties with administration were reported; however, some professors chose not to administer the surveys for unstated reasons.

*Data Analysis*

Percents of students answering strongly agree and agree to each item were combined to determine percent of students expressing satisfaction with the item. The weighted average agreement level for the two administrations was calculated. Next, letter grades were assigned to satisfaction levels using the familiar scale to assign grades for academic performance:

A=90-100%; B=80-89%; C=70-79%; D=60-69%; and F=below 60%. The weighted averages and associated letter grades by item are shown in Tables II, III, IV and V. The intent of examining the two survey administrations was not to test for any differences, thus, no statistical tests were computed. Rather, the two data points are used to observe trends in student opinion and identify areas of low satisfaction.

**FINDINGS**

The results are presented in tabular format below by the four survey sections: satisfaction with programs and resources at the department level; satisfaction with resources at the institutional level; familiarity of departmental faculty with policies and procedures; and quality of departmental faculty.

*Satisfaction with Departmental Programs and Resources*

The 16 items related to departmental programs and resources are shown in Table II, organized within each letter grade category in descending order of agreement (average percent of students answering agree and strongly agree).

TABLE II  
SATISFACTION WITH DEPARTMENTAL PROGRAMS AND RESOURCES

Letter Grade	Percent	Items
B	88.01%	Student learning expectations are clearly indicated on course syllabi.
	84.98%	Academic programs effectively develop professional skills and competencies.
	81.52%	Academic programs are designed to promote an integrated student learning experience.
C	79.26%	Academic programs promote integration of learning across courses and activities.
	78.32%	Academic program expectations are clearly communicated.
	70.30%	Classroom equipment (e.g., audiovisual, laboratory) is adequate.
D	64.91%	Course offerings are of adequate quality.
	61.56%	Teaching resources (i.e., professors, laboratory instructors, teaching assistants) are adequate in quantity.
	61.41%	Departmental computer center resources are of adequate quality.
F	58.66%	In general, I am satisfied with the academic programs and resources in my department.*
	58.19%	Academic program facilities are adequate.
	58.12%	Departmental computer center resources are of adequate quantity.
	54.22%	Course offerings are of adequate quantity.
	48.69%	Course offerings allow students to complete the degree within the established timeframe.
	37.53%	I can easily enroll in the courses that I need.
33.90%	The availability of courses and sections satisfies student need.	

The three highest rated items ("B") evidence high satisfaction with program outcomes and learning experiences. In contrast, the seven lowest rated items ("F") reflect dissatisfaction with course availability, computer center resources, and facilities. General satisfaction level (59% agreement) seems to be most influenced by dissatisfaction with resources, and not the comparatively high level of

satisfaction with programs. The particularly low rating (34%) for availability of courses to satisfy student need highlights the necessity to look more closely at course scheduling across departments, particularly in fourth and fifth year when students are completing key program requirements in the field of engineering study, to determine whether student responses reflect actual scheduling conflicts.

*Satisfaction with Institutional Resources*

Six items were included to assess satisfaction with academic resources provided at the institutional level, and they are organized in descending order of agreement in Table III.

TABLE III  
SATISFACTION WITH INSTITUTIONAL RESOURCES

Letter Grade	Percent	Items
B	81.89%	Campus internet services/resources are easily accessible to students.
	84.42%	Library resources are easily accessible to students.
C	78.28%	The library contains the resources necessary for my program of study.
	72.44%	In general, I am satisfied with the academic programs and resources outside my department.*
D	62.04%	The Campus Computer Center resources are of adequate quality.
F	57.33%	The Campus Computer Center resources are of adequate quantity.

Engineering students expressed moderate satisfaction with the ease of access to library resources and Internet resources. About 78% of students indicated that the library contains requisite engineering resource materials and references. A little over half (57%) of participating students indicated satisfaction with the quantity of resources in the computer center. Coupled with the response to the questions about available computer resources in the department, this suggests that students do not perceive sufficient availability of computers within or outside their departments. It is difficult to determine the validity of this conclusion without looking at actual numbers of computers available per student and levels of student use of campus computing facilities.

*Faculty Familiarity with Policies and Procedures*

Students rated faculty familiarity with institutional policies and procedures on seven items, shown in Table IV in descending order of agreement. Students expressed positive perceptions, particularly for faculty familiarity with policies related to academic honesty and privacy of student information. Only one item was rated relatively lower – faculty knowledge about dealing with student complaints.

TABLE IV  
PERCEPTIONS OF FACULTY FAMILIARITY WITH POLICIES AND PROCEDURES

Letter Grade	Percent	Items
A	92.28%	Institutional norms regarding academic honesty (e.g., copying, plagiarism).
B	87.31%	Institutional policy regarding privacy of student information.
	84.66%	Institutional mission and objectives.
	83.76%	Faculty duties and responsibilities.
	83.12%	Procedures of student evaluation.
F	80.90%	Procedures of student discipline.
	64.46%	Procedures to attend student complaints.

*Faculty Quality*

The final section of the survey included five items on faculty quality, shown below in Table V in descending order of agreement as rated by engineering students.

TABLE V  
PERCEPTIONS OF FACULTY QUALITY

Letter Grade	Percent	Items
B	86.91%	Qualified.
	86.57%	Knowledge of technical aspects of the profession.*
C	76.30%	Teaching excellence.
	75.97%	In general, I am satisfied with the quality of the faculty in my department.*
F	71.38%	In general, I am satisfied with the quality of the faculty on the campus.*

Average agreement for these statements was 71% or higher, showing positive perceptions of the quality of faculty across the college and the campus. An examination of the regular, course-based faculty evaluations would provide additional information about student perceptions of the quality of teaching in the college.

**DISCUSSION**

The results of these surveys, based on representative samples of junior and senior engineering students, reveal that the majority of students express satisfaction with their academic experiences in engineering. The areas of strength suggested by student opinions include program design and outcomes, accessible Internet and library resources, and a qualified, technically proficient faculty with reasonable knowledge of institutional policies and procedures related to student learning. Of the nine statements receiving an average rating equivalent to “F”, eight were related to academic resources. Further, the four lowest rated statements, all below 50% agreement, addressed the availability of courses.

This finding prompted us to look at the 3rd, 4th and 5th year course offerings, by department, over the past two academic years (2003-04 and 2004-05) and ask three questions: For all required courses in the semester they are required - are all courses offered as listed in the catalog? Is there more than one course section for each required course? Are there any scheduling conflicts within sections of required courses that prevent students from taking all required courses?

## REFERENCES

- [1] Noel-Levitz, Inc., "Introduction and Overview", *2005 National Student Satisfaction and Priorities Report*, 2005, 5 pp.
- [2] Harvey, L. et al, *Student Satisfaction Manual*, 1997, 364 pp.
- [3] Bean, J.P. and Bradley, R.K., "Untangling the satisfaction-performance relationship for students," *Journal of Higher Education*, 57, 4, 1986, 393-412.
- [4] Bizot, E.B. and Goldmen S.H., "Prediction of satisfactoriness and satisfaction: An 8-year follow up," *Journal of Vocational Behavior*, 43, 1, 1993, 19-29.
- [5] Liu, Richard and Liu, Rebecca, "Satisfaction and Performance: A Reciprocal Model," Paper presented at the *Annual Forum of the Association for Institutional Research*, 2004, 31pp.
- [6] Pike, G.R., "The performance-satisfaction relationship revisited: specification and testing of a theoretical model," *Paper presented at the Annual Conference of the American Educational Research Association*, 1989, 30 pp.
- [7] Pike, G.R., "The effects of background, coursework, and involvement on students' grade and satisfaction," *Research in Higher Education*, 32, 1, 1991, 15-31.
- [8] Pike, G.R. and Simpson, E.M., The relationship between academic achievement and satisfaction: Evidence of moderating effects for academic and social integration. Paper presented at the *1997 AIR Annual Forum*, 1997, 32 pp.
- [9] Umbach P.D. and Porter S.R., "How do academic departments impact student satisfaction? Understanding the contextual effects of departments." *Research in Higher Education*, 43, 2, 2002, 209-234.
- [10] Noel-Levitz, Inc., "Common Approaches to Using Strength and Challenge Data on Your Campus", *2005 National Student Satisfaction and Priorities Report*, 2005, 7 pp.

The analysis revealed that required courses have been offered as listed in the catalog for the two academic years corresponding to the student survey (2003-04 and 2004-05). Of note is the finding that across departments (except for one), many required courses are offered in both semesters, and sometimes in summer. Further, more than one section of each required course is generally offered, except for fifth year courses. The analysis of scheduling conflict involved some specific considerations. We were particularly concerned about required courses with three or fewer sections. We calculated a percentage of conflict by course as the number of other required course sections offered in an overlapping time slot, divided by the total number of sections of the course. Thus, if the required course had 3 sections, and two sections of another required course were offered at the same times, the percentage of conflict would be 2/3 or 67%. Each of the academic departments showed some conflicts, with more conflicts occurring in fourth year courses across the departments. All but one of the departments had at least one incidence of 100% conflict; one department had six incidences of 100% conflict.

This cursory look at course offerings suggests while courses are offered regularly, course scheduling conflicts may play a role in the availability of course enrollment for students, and consequently, their ability to complete the course of study within established timeframes. Evidence from the past two years suggests that patterns of conflict vary across the departments. Further information is necessary to determine the factors that influence the apparent scheduling issues, such as student withdrawal and failure rates; teacher/student ratios; number of class spaces needed versus spaces opened, and others.

## SUMMARY

As part of its institutional accreditation efforts, a large public institution in Puerto Rico conducted surveys of student satisfaction with their academic experiences. An examination of the results for the engineering college revealed that the lowest areas of satisfaction were related to course availability. This prompted an analysis of the course offerings by department at the time the surveys were administered. While multiple sections of required courses are offered nearly every semester, scheduling conflicts (sections of required courses scheduled at the same time) may restrict the availability of courses to students, particularly those who do not participate in early enrollment. Nationwide and across institution types, students indicate difficulties in registering for courses without conflicts [10]. Other factors that influence scheduling and availability, as well as interventions used by other institutions, should be examined as part of a more fully developed assessment project.

## ACKNOWLEDGMENT

The authors would like to acknowledge the UPRM MSCHE Steering Team for the development of the student academic experiences instrument, and Dr. Ramón Vásquez Espinosa for feedback on an earlier version of this paper.