

APPENDIX B

FINDINGS RELATED TO UNDERGRADUATE LEARNING OUTCOMES

Outlined below are findings related to undergraduate learning outcomes based on evidence compiled during the self-study. Where possible, statistical analyses were completed and cross-tabulated for significant differences using a variety of groupings: academic unit, gender, and white/of color for alumni and student responses; academic unit, tenure status, length of service, gender, and white/of color for faculty. Unless otherwise noted in the narrative below, there were no significant differences identified through these cross-tabulations.

Learning Outcome 1.1: Advanced-level skills, positive habits of mind, and informed human sensitivities in the integrated processes of critical thinking, problem solving, writing and communication, and ethical decision making.

We have substantial evidence on which to base findings related to writing and communication, primarily because of the assessment activity of the Core Curriculum Written and Oral Communication Subcommittee, conducted during the 1997–98 academic year and analyzed during the following year (Exhibit II.2.2). Some items on the Freshman and Senior Surveys and the fall 1998 Faculty and Alumni Surveys are also relevant.

The Core assessment effort evaluated outcomes from the freshman-level composition and rhetoric classes. A pilot project during fall 1997 collected and evaluated portfolios from four sections of Composition and Rhetoric I. The full assessment was conducted in winter 1998 and collected portfolios from 26 sections of Composition and Rhetoric II, including all writing assignments (drafts, final versions, in-class writing, research notes), journal entries (if required), and class and reading notes. These portfolios covered sections taught by all instructors of Composition and Rhetoric during that term. A total of 176 portfolios were randomly selected from the collection (covering all sections) and were read by two faculty from a pool of 15 readers, using a rubric developed by the assessment committee and normed across all readers. A third

reading was taken if there were discrepancies in the evaluation of the first two readers.

The assessment results showed that most students (>70 percent) demonstrated critical reading comprehension, use of research to support their written work, and the ability to write with a clear thesis. Many of the students (>50 percent) demonstrated the ability to use critical thinking to develop and support their writing, the ability to write with a clear purpose and to effectively organize a paper, and the ability to revise their work to improve organization. However, only some students (<50 percent) showed the ability to assess a text's credibility, biases, and reasoning, or the ability to develop sentence complexity and variety. A review of syllabi from the courses showed that only a few courses emphasized attention to critical literacy or emphasized rhetorically-based sentence-level instruction.

Based on their evaluation, the Assessment Committee is finalizing recommendations for changes in the learning outcomes for the two Composition and Rhetoric Core requirements. These recommendations aim to establish holistic student learning as the central instructional goal and to incorporate more socially-based instructional values. They are also proposing that faculty more clearly articulate the relationship of the two courses (I and II) and collaborate more closely. The English Department faculty and the UCCC will review the recommendations.

Looking at the self-reported responses on the 1998 Alumni Survey, we find that 95 percent of alumni said their Santa Clara education had a major or moderate impact on their ability to recognize and use effective written communication skills. In addition, 90 percent reported a similar impact on their ability to recognize and use effective verbal communication skills, and 93.5 percent agreed or strongly agreed that their Santa Clara education enabled them to communicate more effectively.

Senior survey responses support the Alumni Survey. On average, seniors said they had “great” improvement (4.1 on a 5-point scale) in writing skills during their undergraduate education. Surprisingly, student-to-student comparisons of self-ratings of writing skills improved only slightly between the freshman and senior surveys (from 3.5 to 3.7 on a 5-point scale), ratings that fell between the “average” and “good” skill levels. Perhaps this means that they not only improved their writing skills during their time at Santa Clara but also came to better understand what truly high-quality writing is.

Regarding critical thinking, the faculty were nearly unanimous (98.2 percent) that developing the ability of our undergraduate students to think clearly was a very important goal of a Santa Clara education. The 1998 Alumni Survey indicated alumni believe their education provided that: 97.1 percent agreed or strongly agreed that they were required to think critically; 89.9 percent thought their Santa Clara education had a major or moderate impact on their ability to think objectively about their beliefs, attitudes, and values; and 89.6 percent thought that education had a major or moderate impact on their ability to analyze and draw conclusions from various types of data. That 61.5 percent of alumni in the 1998 survey strongly agreed that they were required to think critically correlates well with the 65 percent of alumni in the 1997 Crane Survey who responded with a 6 or 7 (on a 7-point scale) to the same question.

Objective studies used the California Critical Thinking Skills Test (CCTST) and the California Reasoning Appraisal (CRA) to evaluate the reasoning skills (analysis, evaluation, inference, deductive reasoning, and inductive reasoning) and the California Critical Thinking Disposition Inventory (CCTDI) to profile the critical thinking dispositions (truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness, maturity of judgment, and the overall disposition toward critical thinking) of Santa Clara students. The results show that Santa Clara students would rank in the 60th percentile of college students nationally on critical thinking skills as measured by the CCTST; they obtained similar scores on the Reasoning Appraisal, which is not yet nationally normed. More significantly, a longitudinal comparison using the CCTDI of 155 students between their freshman and senior years showed a significant gain in truth-seeking (the characteristic of courageous intellectual honesty and of objective search for knowledge and understanding) and in critical thinking self-confidence. There was also a significant positive change in the overall disposition toward critical thinking evident in longitudinal and cross-sectional analyses.

There were small (4 percent) but statistically significant differences in both discipline area and class level on the overall disposition toward CT as measured on the CCTST. Freshmen were significantly lower than sophomores and seniors. The natural/physical sciences, humanities/letters/languages, and social and behavioral sciences scored higher than business administration and communication. The interaction between class level and discipline area was significant only on the CT confidence scale. Santa Clara grading patterns show that about 2

percent of the variance in students' final graduation GPA is related to their disposition toward critical thinking. Students' CT skills test scores as measured by the CCTSS and by the CRA correlate positively with their grades in English 001 and with the first course in calculus, Math 11. The CCTST scores show statistically significant differences by clusters of academic disciplines in the skill of inference, with the rank order going: sciences, engineering, social sciences, business, and then undeclared. The same disciplinary rank ordering was evident on the overall CRA mean scores.

Alumni responses related to problem solving were not so consistent. More than 71 percent of the respondents to the 1998 Alumni Survey strongly agreed (22.3 percent) or agreed (49.6 percent) that their Santa Clara education had helped them solve problems that otherwise would have defeated them. This contrasts with the 57 percent of alumni who responded to the Crane Survey with a 6 or 7 when asked whether their Santa Clara education had taught them to approach problems with clarity, order, and persistence. In addition, more than 90 percent of the Alumni Survey respondents felt that their Santa Clara education had a major (45 percent) or moderate (45.4 percent) impact on their ability to define and solve problems. Senior Survey respondents reported "great" improvement (4.5 on a 5-point scale) in their problem solving skills over the course of their education at Santa Clara.

Responses to questions about the impact of a Santa Clara education on graduates' ethical decision making also elicited differing opinions. Some 71.6 percent of the respondents to the Alumni Survey were positive that their education had enabled them to better withstand pressures toward unethical behavior (17.3 percent strongly agreed, 54.3 percent agreed), in contrast to the 48 percent of alumni on the Crane Survey who responded to the same question with a 6 or 7. Similarly, 30.8 percent of Alumni Survey respondents strongly agreed that their Santa Clara education had challenged them to develop their own ethical framework (50 percent agreed), while 47 percent of the Crane respondents scored the same item with a 6 or 7.

What to make of these numbers? The generally lower alumni ratings on the Crane Survey may reflect a different perspective on their educational experience by alumni who have been away from the University for longer than two years. On the other hand, it may be an artifact of a seven-point response scale rather than a four-point scale. In McQuarrie's analysis of the Crane data, a recoding of responses to include values between 5 and 7 as positive produced positive response

percentages more closely aligned with the positive (strongly agree or agree) responses to the 1998 survey.

Taken in the aggregate, there is self-reported evidence that Santa Clara does provide an education that enhances critical thinking, problem solving, writing and communication, and ethical thinking. There is also objective evidence supporting the same conclusion for critical thinking and writing and communication. However, the relatively low percentage of strongly positive responses to most of the relevant Alumni Survey questions indicates we may not be as successful as we could hope.

Learning Outcome 1.2: A practical, hands-on skill in problem solving with those information technologies that can facilitate human communication and improve the quality of one's work; as well as the understanding and resilience to keep pace with changes brought about by increasingly sophisticated technology, and an informed sensitivity to positive and negative impacts of these technological changes on human beings individually, socially, and culturally.

On the 1998 Faculty Survey, 95.5 percent of respondents felt it was very important (52.2 percent) or important (43.3 percent) to prepare undergraduate students to live in a world of technological change. This is consistent with the overwhelming faculty support for adding a technology requirement to the new Core Curriculum. The Alumni Survey from the same year indicated that 43.7 percent of the respondents felt their Santa Clara education had a major impact on their ability to access and use a variety of information sources (another 40.1 percent felt it had an impact).

While alumni are unlikely to have experienced an education in which information access is as technologically based as is currently the case at Santa Clara, the fact that they were being encouraged to use many different information sources previously could be viewed as an indicator that current students will have similar experiences with technical information sources. A University Core Curriculum assessment of the technology requirement is to be conducted during the 1999–00 academic year and should provide meaningful data on how well this outcome is being achieved.

Learning Outcome 2.1: A functional understanding of the methods of reasoning, theoretical frames of reference, and fundamental conceptualizations of reality that are characteristic of the natural, social, and behavioral sciences.

The 1993–95 pilot assessments in the College of Arts and Sciences looked at both natural and

social science outcomes (Exhibit II.2.4). The social science assessment sought both written and verbal evidence of students' ability to spontaneously use social science concepts outside social science classes, the ability to use social science concepts when explicitly prompted, and data gathering approaches. Results were relatively disappointing. None of the students spontaneously used social science concepts in their first writing assignment, and essays responding to the second assignment produced "brief, perfunctory writing," with only one essay mentioning social science concepts. The verbal group exercise on information gathering produced responses weighted heavily toward opinion surveys rather than experimental research. The evaluators stressed that these activities were not graded assignments and that students did not seem motivated.

The natural science assessment asked students (80 percent freshmen or sophomores) in an advanced biology class to write a funding proposal based on a scenario about Gulf War Syndrome as a graded exercise in the class. Student majors were roughly equally divided among arts and humanities, natural sciences, social sciences, and undeclared. Most students (70 percent) had completed the math/science requirement of the University Curriculum. The student proposals were read by a team of four faculty and rated on a scale of 1 to 4 using a normed rubric. The average score was 2.3, with 50 percent of natural science students, 33 percent of social science students, and 27 percent of arts and humanities students scoring a 3 or 4. The results suggest that these students recognized the complexity of scientific inquiry and the need to examine many possible causal factors. However, most of the students failed to apply a formal hypothesis-testing methodology as part of their proposal.

A University Core Curriculum assessment of the social science requirement was conducted in 1998–99, but no results are yet available. There will be an assessment of the Core natural science requirement during the 1999–00 academic year. The analysis of these two assessment efforts should provide a good overview of our success in meeting this objective. Moreover, one would expect that the addition of a laboratory science requirement in the Core beginning in fall 2000 would help provide additional practice with and understanding of scientific methodology.

Learning Outcome 2.2: A deeply humanistic involvement with American, Western, and world cultures, including those social, historical, economic, technological, political, scientific, philosophical, literary, artistic, and religious issues, concepts, belief structures, and ideals which shape our lives and communities.

Faculty survey responses show substantial support for the importance of these learning objectives to a Santa Clara education. More than 90 percent feel it is very important (49.6 percent) or important (42.9 percent) that undergraduate students develop an appreciation for international perspectives, and nearly 90 percent (52.9 percent very important, 35.4 percent important) feel the same about developing an appreciation for multicultural perspectives. Almost 80 percent of faculty think teaching the classic works of Western civilization is important, but a smaller proportion of respondents chose the very important category (30.2 percent, compared to 46.8 percent important).

When responses are broken out by academic areas, there are significant differences in results for each of these questions. In general, engineering, mathematics, and natural science faculty responded with lower ratings of importance than did arts and humanities faculty. For example, the table below shows results disaggregated for faculty opinions on the importance of teaching the classic works of Western civilization.

Teach the classic works of Western Civilization (by academic division)

	Arts & Humanities	History & Social Science	Math & Natural Science	Business	Engineering
Not Important	11.6%	14.3%	44.4%	22.2%	55.6%
Important	46.5%	54.3%	33.3%	58.3%	38.9%
Very Important	41.9%	31.4%	22.2%	19.4%	5.6%

This item is also one of the few in which there was a significant difference based on tenure status, with more than twice the percentage of non-tenured but tenure-track faculty rating teaching the classic works of Western Civilization as not important compared to tenured faculty, as shown below.

Teach the classic works of Western Civilization (by tenure status)

	Tenured	Non-Tenured but Tenure-Track	Not Tenure-Track
Not Important	18.9%	39.4%	13.2%
Important	46.5%	30.3%	68.4%
Very Important	34.6%	30.3%	18.4%

The primary student performance assessment data related to this learning outcome come from the University Core Curriculum assessment projects conducted in the 1997–98 academic year for

the first religious studies course and for the Western culture (two- or three-course) sequence. These data are supplemented by the activities conducted in both areas during the 1993–95 College of Arts and Sciences pilot assessments. In general, the data indicate that the courses are helping students become involved in significant issues of the disciplines.

The 1998 religious studies assessment (Exhibit II.2.2) was a questionnaire administered to nine sections of introductory religious studies courses during spring 1998. Evaluation of the responses indicated that students found the courses caused them to reflect on their own religious tradition or that of others. However, there was much less agreement on whether the courses caused the students to reflect on the “larger questions of life.” Students agreed that the courses were driven both by a critically reflective study of the topic and by a detailed grasp of the relevant information for the course. The 1994 study, a focus group interview with 15 seniors about their experience with all three religious studies courses, found that the students (with one exception) had been led to question religious doctrines as a result of their religious studies courses. Students also perceived connections between and among academic (religious studies, psychology, philosophy courses) and non-academic (Mission Church, Campus Ministry, Residence Life) experiences related to their religious and spiritual development. These connections came about, at least in part, through shared experiences as members of a community.

The 1998 assessment project for the Western culture sequences (Exhibit II.2.2) was a more longitudinal study, following 40 students from the beginning of the sequence through two or three courses in a particular discipline. The students were asked to maintain portfolios of their work during the sequence and also completed both a pre- and post-sequence essay. Unfortunately, only 13 students fulfilled their commitment to maintain portfolios, so the sample size is small. Three Western culture faculty each evaluated all of the portfolios and essays. All students’ work from the portfolios and in the final essay reflected an improvement in cultural literacy compared to the initial essay. Moreover, the work demonstrated an ability to sustain a critical perspective and to apply the methodologies of a particular discipline. In each case, students “either increased their knowledge of Western culture, improved their critical skills, and evidenced a better understanding of disciplinary methods, or they sustained a high level of performance from the initial essay.” The conclusion is that, at least for the students evaluated, the Western culture courses are achieving their stated learning objectives.

The 1994 Western culture assessment involved an in-class discussion in a senior-level political science course on the topic of liberty and equality in Western culture. Evaluators were impressed by student comments but found concern in the students' general inability "to divorce [themselves] from the modern perspective" and in a lack of integration of ideas from across the spectrum of Western culture courses, particularly music and art. This is perhaps understandable, given that the requirement was (and remains, except for the performance and culture courses) for a sequence within a single discipline area. The evaluators wondered how greater integration across the Western culture sequences could be attained. The 1995 and 1996 evaluations of the Freshman Residential Community (Exhibit II.2.3) also comment on the lack of perceived integration across the various Western culture sequences. An interesting pilot project was being conducted in spring 1999 in which two sections of Art History 13 and English 13 were being linked, with students required to register for both courses and both faculty involved in presenting material. While such a pairing enhances the understanding of interdisciplinary methodologies that is one of the learning outcomes for the requirement, two courses from the same chronological period do not provide the longitudinal view considered an important part of the requirement.

Two responses from the 1998 Alumni Survey also support the idea that a Santa Clara education is achieving this learning outcome. More than 62 percent of respondents thought that their Santa Clara education had a major or moderate impact on their understanding of international issues, and 72.2 percent agreed or strongly agreed that it had enabled them to deal more knowledgeably with global issues. In response to a third question on the survey, 87.9 percent agreed or strongly agreed that their Santa Clara education had caused them to reflect on their values.

These assessments pointed to several areas of concern, however. A concern for the Core Curriculum, but not for the Santa Clara educational experience as a whole, is the degree of integration between Core requirements. The vast majority of the students in the 1998 religious studies assessment saw little connection between their religion class and the Core, or between the courses that satisfy Core requirements. This contrasts with the findings of the 1994 religious studies assessment, which found evidence of such connections, and the FRC evaluations, which reported that connections between the Western culture and religious studies courses were the most effective. The UCCC will seek ways to foster such connections.

There were also significant differences between alumni from different schools and colleges in their responses to the questions cited above. Engineering alumni responded at a much lower level about the impact of their education on their understanding of international issues. Is this a result of the Core second language requirement being waived for engineering students, due to the heavy unit requirements of engineering majors?

**Impact of Santa Clara Education on Understanding of International Issues
(by school)**

	Arts & Sciences	Business	Engineering
None	9.9%	5.5%	25.0%
Minor	22.2%	30.1%	43.8%
Moderate	38.6%	45.2%	25.0%
Major	29.2%	19.2%	6.3%

Both business and engineering alumni were less likely to strongly agree that their academic experience had caused them to reflect on their values although the sum of strongly agree and agree is similar to that of arts and sciences graduates. Note, as well, that business alumni were more than twice as likely to disagree or strongly disagree with this statement than were graduates in other disciplines.

I had academic experiences that caused me to reflect on my values (by school)

	Arts & Sciences	Business	Engineering
Strongly Disagree	1.2%	1.4%	1.1%
Disagree	8.2%	17.8%	6.1%
Agree	43.3%	50.7%	75.8%
Strongly Agree	47.4%	30.1%	18.2%

Learning Outcome 2.3: A clear sense of how to connect and how to integrate the learning in the major with learning through the University Core Curriculum and with knowledge in related disciplines.

One of the findings of the assessment of the first Core religious studies requirement, cited in the previous section, was that students did not see much connection between their religious studies class and the Core, or between Core subjects. This is troubling, since one of the objectives of the Core Curriculum is to have students view their Core courses as “related educational experiences that help structure the students’ whole University study.”

Responses to the 1998 Alumni Survey give a somewhat conflicting view of how successful

Santa Clara is in integrating knowledge gained across a student’s undergraduate experience. For example, nearly a third of respondents (33.1 percent) disagreed or strongly disagreed with the statement “My department or program made it clear how the courses in the major relate to the larger academic goals of the University.” Only 15.8 percent strongly agreed with the same statement. Yet 37.5 percent of alumni respondents strongly agreed with the statement “I experienced an integration of knowledge across subjects,” and only 6.5 percent disagreed or strongly disagreed.

Another form of integration is that of academic work with co-curricular activities and a student’s personal interests. Faculty strongly believe that Santa Clara provides an opportunity for students to do so, with only 3.9 percent disagreeing with the statement “Students here are given opportunities to integrate the various dimensions of their life into a coherent and purposeful whole.”

Students also seem to take advantage of those opportunities. Nearly three-quarters of the alumni respondents (74.5 percent) strongly agreed or agreed that their department or program helped them to integrate coursework with activities outside the classroom. Almost the same proportion (69.3 percent) strongly agreed or agreed that their department or program helped them connect what they learned in the major with issues that were personally important. However, there were significant differences in the responses to that item from different academic groupings, as the table below shows. Nearly two-thirds of engineering alumni (63.7 percent) and more than one-third of business alumni (34.2 percent) disagreed or strongly disagreed with this statement. Arts and sciences alumni were twice as likely to strongly agree with the statement as their business school colleagues and ten times more likely to strongly agree than engineering alumni.

My department or program helped me connect what I learned in the major with issues that are personally important (by school)

	Arts & Sciences	Business	Engineering
Strongly Disagree	2.4%	2.7%	6.1%
Disagree	20.0%	31.5%	57.6%
Agree	44.1%	49.3%	33.3%
Strongly Agree	33.5%	16.4%	3.0%

Learning Outcome 3.1: A personal intellectual and affective connection to at least one academic

major which includes not just the study of that major but active participation, at a level appropriate to an undergraduate, in the scholarly, professional, intellectual, artistic life of that field or discipline.

Santa Clara students have many opportunities to become more fully involved with the professional and intellectual life of their major discipline. All but three departments have student chapters of professional societies or student clubs to serve as a focus of both social and discipline-related activities (speakers, field trips, peer advising and tutoring, etc.). There are also campus chapters of 20 honor societies, mostly discipline-focused but some also campus-wide (Alpha Sigma Nu, Phi Beta Kappa) or school-wide (Beta Gamma Sigma, Tau Beta Pi). In addition, the School of Business sponsors a half-day Undergraduate Convocation annually, with executive speakers from local industry.

Seventeen of the 28 academic departments have requirements for a senior thesis, project, or presentation, and eight departments require students to complete capstone courses. These activities help to integrate the knowledge gained in the major and also give students an opportunity to explore the practical and intellectual aspects of the discipline.

The 1998 Research Committee survey of undergraduate research activities (Exhibit III.1.6) also points out opportunities for students to participate in the scholarly activities of their chosen major. Seven departments in the College of Arts and Sciences host undergraduate research conferences each year, and the History Department publishes a journal of undergraduate research. The School of Engineering conducts a Senior Design Conference annually, in which student teams present the results of their yearlong design projects. Eight departments present student research awards each year, and the survey indicates that, in a typical year, 50 to 75 undergraduates are involved in faculty research activities as research assistants, perhaps ten students are listed as co-authors on faculty publications, and another 20 students publish or present their own papers.

While those participation numbers seem small, responses on the 1998 Alumni Survey showed that nearly 70 percent of alumni strongly agreed (27.6 percent) or agreed (42.2 percent) that their department provided opportunities for them to do research in their field or to create new pieces of work. On the 1998 Senior Survey, 22 percent of respondents reported that they were frequently provided the opportunity to work on a research project (another 36.2 percent reported occasionally), and 4 percent reported they were frequently provided the opportunity to publish

(25.1 percent occasionally). This contrasts with the 21.9 percent of responses to the 1998 Faculty Survey indicating that the statement “My scholarship involves collaboration with students” was very descriptive of their experience. This item also demonstrated significant differences by school and by length of employment, with the newest faculty (service less than seven years) and mathematics/natural sciences and engineering faculty much more likely to consider the statement very descriptive, and business faculty much more likely to consider the statement not descriptive. It is not clear whether the engineering faculty response includes collaboration with graduate students.

My scholarship involves collaboration with students (by academic division)

	Arts & Humanities	History & Social Science	Math & Natural Science	Business	Engineering
Not Descriptive	44.2%	42.9%	33.3%	69.8%	9.5%
Somewhat Descriptive	41.9%	34.3%	22.2%	25.6%	33.3%
Very Descriptive	14.0%	22.9%	44.4%	4.7%	57.1%

My scholarship involves collaboration with students (by length of service)

	1–6 Years	7–12 Years	>12 Years
Not Descriptive	43.5%	51.0%	40.7%
Somewhat Descriptive	21.0%	37.3%	42.3%
Very Descriptive	35.5%	11.8%	17.1%

Learning Outcome 3.2: An in-depth understanding of the fundamental questions, concepts, theories, methods, evidence, and standards of inquiry and practice in at least one academic major.

Readers are referred to the individual self-studies of the College of Arts and Sciences and the Schools of Business and Engineering for more specific information about success in achieving this learning objective for particular disciplines.

Survey responses provide some global reactions to the major experience of Santa Clara students. As one would hope, seniors reported “great” (4.6 on a 5-point scale) improvement in knowledge of a particular field, and 79.7 percent of alumni respondents strongly agreed or agreed that their Santa Clara education had enabled them to obtain the knowledge and understanding needed to advance in their chosen field. Alumni also felt their discipline-specific knowledge was

well-integrated, with 86.4 percent strongly agreeing or agreeing that their department or program had helped them to integrate information learned from different courses in the major.

Papers from senior capstone experiences in several different disciplines (anthropology, two economics courses that serve as general business capstones, and a broadly interdisciplinary capstone relating political science and religious studies) were selected for critical reading by a faculty member from the related discipline. Readers were asked to rate, on a four-point scale, the extent to which the papers displayed an understanding of the fundamental concepts and methods of the discipline, demonstrated an ability to apply both to the topic of the paper, and demonstrated creativity within the discipline (Exhibit II.2.17).

In three of the four cases, readers' evaluations were good but not exceptional, with 25 percent of the papers receiving the top score, and 55 percent receiving the second score. None received the lowest score. Not surprisingly, evaluations were highest for the anthropology papers (92 percent of the papers were awarded one of the top two scores), where both the students and the topics being covered were from a single discipline. The reviewers, however, were often disappointed in the quality of research that supported the arguments made and in the level of critical thinking demonstrated.

The fourth set of papers, from the broadly interdisciplinary course, received markedly lower scores, only 27 percent of the papers receiving one of the top two scores. The reviewer was disappointed in the students' lack of ability to support the claims made in their papers with factual evidence, and in their ability to follow the methodologies of either political science or religion. This may be a result of the varied backgrounds of the students in the course, or it may indicate a lack of familiarity with those methodologies.

In evaluations of capstone experiences in a different school, judges for the School of Engineering's senior design conference (Exhibit II.2.15) were generally positive about the engineering skills shown by students in completing their yearlong design and implementation projects. More than 60 percent of the judges gave students in their session top marks in such categories as knowledge of math, science and engineering concepts; ability to design a product to meet defined needs; ability to solve engineering problems; and ability to use engineering tools. Here, as in the case of the anthropology papers mentioned above, students were working within

their academic disciplines, and we should expect a greater grasp of concepts and methods.

These impressions are somewhat supported by pass rate data for those engineering students (primarily civil engineers, with a few mechanical engineers) who took the general section of the Engineer In Training exam, the first step towards professional registration. Data from the 1996–98 tests show that pass rates for Santa Clara students were 70 percent, 82 percent, and 78 percent, compared to statewide rates of 63 percent, 70 percent, and 55 percent (Exhibit II.2.14).

A secondary indicator of success on this and related learning outcomes might be a comparison of how graduating Santa Clara seniors do on standardized professional and graduate school admissions tests, such as the LSAT, MCAT, and GRE. These data, while difficult to acquire since not all students have their scores sent back to their undergraduate institutions, can be usefully reviewed for trends and for comparison to national benchmarks. The health professions advisor reviewed MCAT scores for the past four years and learned that Santa Clara students tend to do better than the national average, for example, on that measure. Tables showing this are included in the College of Arts and Sciences self-study report (Exhibit I.4.6).

Learning Outcome 4.1: A reflective understanding of what it means for someone with a Santa Clara undergraduate education and the specific major he or she has selected to be a person of competence, conscience, and compassion; and the knowledge, skills, sensitivities, and inclination to strive individually and collaboratively to bring about the common good.

The section immediately preceding provides some evidence of the competence of Santa Clara graduates in their major field. In this section we will concentrate on conscience and compassion, and the ability and inclination of Santa Clara graduates to work for the common good.

The readings of capstone papers were generally supportive of the conclusion that students were somewhat sensitive to issues of conscience and compassion. Combining the scores (on a 4-point scale) for the papers from economics and anthropology, 20 percent received a 4 and 49 percent received a 3. However, these percentages were significantly reduced by the scores for one of the economics sections, where the reviewer felt the paper topics were not well-suited to allowing the students to demonstrate either characteristic (64 percent of the papers in this section received a 2 for conscience, and 88 percent received a score of 2 for compassion).

The scores for the political science and religious studies papers were more troubling, with none of the papers earning a top score for conscience although half received a score of 3. The

reviewer felt these papers reflected “a maturing personal sense of commitment to the world’s betterment.” Many of the papers displayed “no personal opening to moral obligation or to a global sensitivity, and this in a course on the third world!” Only 12 percent of the papers earned a top score for compassion, and the reviewer felt that the authors’ personal experiences with community service and study abroad were important factors in their sense of compassion. Another 26 percent earned a score of 3.

There are inconsistencies between responses to the 1998 Faculty Survey, the 1998 Alumni Survey, and the 1997 Crane Alumni Survey for items that are related to this learning outcome. Faculty responses were generally quite supportive of the importance of these objectives. Alumni responses were less consistent. There are also significant differences for several of the items on the fall 1998 Alumni Survey based on academic division and gender.

Faculty were nearly unanimous (43.4 percent strongly agreeing and 51.6 percent agreeing) that a college education should help students learn how to make a difference to society. Only 72.5 percent of the responses to the 1998 Alumni Survey strongly agreed (17.3 percent) or agreed that their Santa Clara education had enabled them to make a difference to society. However, 51.1 percent felt that education had made a major difference in their ability to contribute to a better society, and another 41 percent believed their education had made a minor difference. Students also believed that their personal actions could have an effect, with only 18.4 percent of respondents strongly agreeing or agreeing that “realistically an individual can do little to bring about changes in our society.”

More than 98 percent of the faculty felt that preparing graduates to be responsible citizens was an important goal of an undergraduate education (64.4 percent very important, 32.6 percent somewhat important). By contrast, only 26.8 percent of the alumni respondents reported that their Santa Clara education had a major impact on their appreciation of and ability to exercise their responsibilities as citizens, with another 43.2 percent reporting a moderate impact. Engineering alumni were significantly less likely to report a major impact and significantly more likely to report no impact, as shown below.

SCU education had an impact on: Appreciating and exercising my responsibilities as a citizen (by school)

	Arts & Sciences	Business	Engineering
None	4.7%	2.7%	12.5%
Minor	19.9%	31.5%	31.3%
Moderate	42.1%	43.8%	53.1%
Major	33.3%	21.9%	3.1%

With respect to the importance of community service in achieving the desired outcomes, the differences were somewhat reversed. Faculty believed it was very important (31.6 percent) or somewhat important (50.2 percent) that a Santa Clara education instill a commitment to community service. In contrast, 42.7 percent of alumni strongly agreed that they had participated in community service that increased their awareness of others' needs, with another 37.3 percent agreeing. Most alumni continued this activity after graduation, with only 26.9 percent reporting that they had not performed some form of volunteer work in the past year. This result also contrasts with the Crane Survey data, in which only 31 percent responded with a 6 or 7 that they had participated in such community service. Alumni from the College of Arts and Sciences were more likely to strongly agree that they had participated in community service, engineering alumni were more likely to strongly disagree, and males were less likely to have participated in community service.

I participated in community service that increased my awareness of others' needs (by school)

	Arts & Sciences	Business	Engineering
Strongly Disagree	0.0%	4.1%	12.5%
Disagree	10.6%	21.9%	43.8%
Agree	37.6%	41.1%	25.0%
Strongly Agree	51.8%	32.9%	18.8%

I participated in community service that increased my awareness of others' needs (by gender)

	Female	Male
Strongly Disagree	1.2%	4.8%
Disagree	12.1%	26.7%
Agree	37.6%	37.1%
Strongly Agree	49.1%	31.4%

Similarly, the vast majority of faculty felt that developing a commitment to fashioning a more humane and just world was an important goal of a Santa Clara education (58 percent very

important, 32.6 percent important), and most (57 percent) alumni responding to the Crane Survey agreed (scored 6 or 7 out of 7) that it was important for Santa Clara to emphasize social justice. However, just 36 percent reported a 6 or 7 indicating agreement that their Santa Clara experience had developed a commitment to fostering a more just society. Responses to the 1998 Alumni Survey were more in line with faculty expectations. More than three quarters of the respondents said that their Santa Clara education had heightened their interest in fostering a more just society (26.3 percent strongly agreed, 52.5 percent agreed), and 84.7 percent said their education had helped them develop a social conscience (35.9 percent strongly agreed, 48.8 percent agreed). This latter response contrasts with the 43 percent who responded with a 6 or 7 to the same question on the Crane Survey.

There were significant differences in the 1998 Alumni Survey responses regarding fostering a just society and developing a social conscience, as shown below. Male alumni were more likely to disagree with both statements about their educational experience; engineering students were much less likely to strongly agree that their interest in fostering a just society had been heightened and more likely to disagree that their education had helped develop a social conscience.

My interest in fostering a more just society was heightened (by school)

	Arts & Sciences	Business	Engineering
Strongly Disagree	1.2%	1.4%	3.1%
Disagree	12.9%	27.8%	31.3%
Agree	51.8%	51.4%	62.5%
Strongly Agree	34.1%	19.4%	3.1%

My interest in fostering a more just society was heightened (by gender)

	Female	Male
Strongly Disagree	1.2%	1.9%
Disagree	14.7%	28.0%
Agree	50.0%	57.0%
Strongly Agree	34.1%	13.1%

My SCU education helped me to develop a social conscience (by school)

	Arts & Sciences	Business	Engineering
Strongly Disagree	1.8%	2.7%	0.0%

Disagree	8.2%	15.1%	30.3%
Agree	46.2%	53.4%	54.5%
Strongly Agree	43.9%	28.8%	15.2%

My SCU education helped me to develop a social conscience (by gender)

	Female	Male
Strongly Disagree	1.2%	2.8%
Disagree	9.2%	20.6%
Agree	47.4%	51.4%
Strongly Agree	42.2%	25.2%

The data above certainly indicate that Santa Clara graduates are people with a sense of conscience and compassion. They do not indicate how much the Santa Clara experience contributed to that result. The McQuarrie analysis of Crane data (Exhibit II.2.7) indicates that there are no significant differences in mean scores of items related to conscience or compassion between freshman and senior students, although there are significant differences between current students and alumni related to conscience. Scores on conscience-related items are higher for alumni than for current students. That same analysis suggests that Santa Clara is more successful at stimulating conscience than at engendering compassion. Moreover, McQuarrie’s analysis of HERI data (Exhibit II.2.6) indicates that Santa Clara students are neither more nor less compassionate than other college students (except they are more likely to engage in volunteer work) and that “the experience of college [for all students] appears to have little impact on values associated with compassion.”

With respect to the skills needed to cooperate with others to accomplish objectives, most of the respondents to the 1998 Alumni Survey felt that their Santa Clara experience had been helpful. More than three quarters said their education had an impact on their ability to respect others whose attitudes and opinions were different from theirs (39.2 percent major impact, 39.6 percent moderate impact), and more than 87 percent said their education had impacted their ability to work cooperatively in groups, or to work as a team member (51.8 percent major impact, 35.6 percent moderate impact). For the latter response, business school alumni were much more likely to report a major impact.

My SCU education had an impact on: Working cooperatively in groups; working as a team (by school)

	Arts & Sciences	Business	Engineering
None	1.8%	0.0%	9.4%
Minor	13.0%	5.5%	9.4%
Moderate	37.3%	21.9%	50.0%
Major	47.9%	72.6%	31.3%

The McQuarrie analysis of HERI data also indicated that Santa Clara was more successful than other universities at improving students' leadership skills and equal or slightly better at providing an understanding of the problems facing the community and nation.

Overall, this evidence seems to indicate some degree of success in achieving the desired learning objectives, although there are some inconsistencies. But how well have these educational experiences carried over into the things that alumni feel are most important to their lives at the present time? Responses to the 1998 Alumni Survey indicate that working for the common good is an important goal for many Santa Clara graduates, but not all forms of that work are equally embraced.

For example, 73.8 percent of respondents said it was an essential (21.6 percent) or very important (52.2 percent) goal for them to help others in difficulty, but only 54.7 percent responded the same way for a goal of influencing social values (19.9 percent essential, 34.8 percent very important). Slightly more than half reported that it was an important goal to promote gender equity (21.9 percent essential, 31.5 percent very important), while just less than half feel similarly about promoting racial understanding (21.9 percent essential, 28.0 percent very important). However, active involvement seems not to be a means of achieving these objectives. Only 38.3 percent (11.8 percent essential, 26.5 percent very important) say participating in a community action program is important, and only 31.2 percent (12.2 percent essential, 19.0 percent very important) claim a goal of becoming a community leader. To contrast the importance of these more altruistic goals with material goals, 57.5 percent thought being well-off financially was an important goal (18.7 percent essential, 38.8 percent very important).

There were significant differences in the responses to many of the goal questions, as the tables below indicate. In general, arts and sciences alumni were more likely to rate influencing social values and participating in a community action program as important, business and engineering

alumni were less likely to consider helping others in difficulty as important, and males were less likely to consider promoting racial understanding and gender equity to be important. Business alumni and alumni of color were more likely to consider being well-off financially as an important goal.

Importance of goal: Helping others in difficulty (by school)

	Arts & Sciences	Business	Engineering
Not Important	1.2%	2.8%	0.0%
Somewhat Important	17.2%	29.2%	48.5%
Very Important	51.5%	58.3%	48.5%
Essential	30.2%	9.7%	3.0%

Importance of goal: Helping others in difficulty (by gender)

	Female	Male
Not Important	0.6%	2.8%
Somewhat Important	17.0%	37.4%
Very Important	56.1%	45.8%
Essential	26.3%	14.0%

Importance of goal: Influencing social values (by school)

	Arts & Sciences	Business	Engineering
Not Important	4.2%	8.3%	0.0%
Somewhat Important	32.9%	45.8%	63.6%
Very Important	36.5%	37.5%	21.2%
Essential	26.3%	8.3%	15.2%

Importance of goal: Participating in a community action program (by school)

	Arts & Sciences	Business	Engineering
Not Important	6.5%	22.2%	30.3%
Somewhat Important	47.6%	50.0%	48.5%
Very Important	30.6%	22.2%	12.1%
Essential	15.3%	5.6%	9.1%

Importance of goal: Promoting racial understanding (by gender)

	Female	Male
Not Important	9.9%	20.6%
Somewhat Important	32.0%	43.0%

Very Important	32.0%	21.5%
Essential	26.2%	15.0%

Importance of goal: Promoting gender equality (by gender)

	Female	Male
Not Important	8.7%	21.5%
Somewhat Important	23.8%	47.7%
Very Important	37.8%	21.5%
Essential	29.7%	9.3%

Importance of goal: Being well-off financially (by school)

	Arts & Sciences	Business	Engineering
Not Important	12.4%	0.0%	6.1%
Somewhat Important	38.2%	22.5%	36.4%
Very Important	32.9%	50.7%	45.5%
Essential	16.5%	26.8%	12.1%

Importance of goal: Being well-off financially (by white/of color)

	White	Of Color
Not Important	7.8%	9.9%
Somewhat Important	33.7%	33.6%
Very Important	45.6%	24.7%
Essential	13.0%	32.1%

In summary, the data show that Santa Clara graduates are people of conscience and compassion, with both the skills and the incentive to contribute to the betterment of their communities and society as a whole. But while the data are positive, in general student and alumni responses are lower than those of the faculty relating to the perceived importance of these goals.

