By Way of Introduction, Three Student Comments Reflecting the Observed Range:

Being a top research university, UCD paved the way for student research opportunities, mainly in the form of independent study that have helped enrich my learning experience from the classroom to the real world. I was easily able to do research with a professor in my major field just by asking her. Being able to conduct my own research in her lab has helped me learn more about research and how it is conducted. Also, my research professor has become a valuable mentor who has helped me with academic and personal matters whenever I needed it. I don't think I would ever get such an experience not going to a research university.

I didn't even know that UCDavis is a research university. Staff or professors never mentioned anything.

As an undergrad, I haven't really gotten anything positive out of the fact that it's a research university. Plus, its research is mostly in things unrelated to my major (CSE). The problem with being a research university isn't the class size, but rather the unenthusiastic attitude towards teaching that many profs have. Plus, many simply don't seem to understand how to best help students comprehend material. Although I have had positive experiences with some profs, many are mediocre to poor. This really hinders my college experience.
The Boyer Commission’s critical assessment of the undergraduate experience at a major research university speaks of potential unrealized, of students short-changed by a system that disproportionately rewards faculty research accomplishments at the expense of undergraduate education. Clearly, the Commission presumes that undergraduates are not typically an integral part of the research university community and will not become active partners without institutional transformation. What academic community does the Boyer Commission envision? At its core, the Commission would propose a short bill of four rights specifically for students attending research universities:

1. Expectation of and opportunity for work with talented senior researchers to help and guide the student's efforts.
2. Access to first-class facilities in which to pursue research—laboratories, libraries, studios, computer systems, and concert halls.
3. Many options among fields of study and directions to move within those fields, including areas and choices not found in other kinds of institutions.
4. Opportunities to interact with people of backgrounds, cultures, and experiences different from the student's own and with pursuers of knowledge at every level of accomplishment, from freshmen students to senior research faculty.

Consistent with the Boyer Commission’s vision of a research university that is committed to the undergraduate educational experience is the assertion of the University of California Davis in its Philosophy of Purpose that:

- A core purpose is teaching students as a partnership between faculty mentors and young scholars and that
- UC Davis’s history of focused attention on undergraduate education includes manifold opportunities for personal development through programs for academic enrichment, including undergraduate research, work-learn experiences, and extracurricular student life.

To what extent is UC Davis performing according to this philosophy and deserving of recognition as an exemplar of an outstanding research university for undergraduates and to what extent do undergraduates believe that they are receiving short shrift?

Student Affairs Research and Information took the opportunity provided by its 2001 undergraduate survey to ask a simple, neutral question “How has attending a major research university impacted your undergraduate experience?” and in response received 1,251 statements. This report shares what the students had to say.

The basic finding is that the majority of responses were positive (57%), a small
proportion were neutral (17%), and about one-in-four were negative (26%). Within this broader distinction the proportion of positive remarks differed by division or college of major, by attribute category, and by student class level. Because it is a complex picture, results will be reported by a handful of categorical types (e.g., Effects on Respondents’ Skills or Knowledge, Anticipated or Future Effects) and within these types by class level and division or college of major.

The results were reasonably clear.

- Students recognize that research university faculty can be especially enthusiastic, knowledgeable and effective instructors but they also say that instruction often suffers because of the emphasis placed on research, because of lack of personal contact with students, and because of large classes. **Majority -**

- Research universities like Davis provide unique opportunities to participate in research and to acquire practical skills through on-campus employment and internships, but these opportunities can be hard to find and are less common in some majors. **Majority +**

- Students at Davis understand that they are learning knowledge and skills for graduate and professional school and for their career. They also believe that the cachet of having attended a major research university will be to their advantage. However, some see a more theoretical perspective as an impediment to the acquisition of practical skills. **Majority +**

- Davis students recognize and appreciate that they are learning to reason logically, to apply scientific thinking and research methods, and become more confident, independent thinkers. A small number however believe that the intellectual expectations are limited to rote memorization in large classes that are the trade-off for institutional commitment to research. **Majority +**

- The few respondents who mentioned the quality of facilities at Davis were largely positive in their comments. **Majority +**

Overall, the comments of Davis students would suggest that UC Davis is consistent with the Boyer Commission’s Bill of Rights and the UC Davis commitment. But the students recognize that there are benefits and trade-offs. The results presented illustrate this and go further. They help to identify which rights and philosophical tenets are most critical to students feeling that they are experiencing a clear advantage from attending a research university. In particular, the comments offered by Davis undergraduates show that it is hands-on experience and engagement in research activities that make the difference.

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**METHODOLOGY**

As part of a web-based survey, a random cross section of undergraduate students at UC Davis was asked to respond to the following statement and question: “UC Davis is a top 25 research university. How has attending a major research university affected your undergraduate education?” Respondents were permitted to make more than one comment, and many did so. From a sample pool of 3,802 students who received the form that included this question, 2,046
responded to the survey (54%) and 1,251 of those offered a written response to this item (33% overall and 61% of responders).

Responses were separated by type into one of six categories and were identified as having a positive, negative, or neutral connotation. The six categories of responses were:

1. **Effect on Quality of Instruction**
   For Example: “Professors who are passionate about the serious research they are doing and able to incorporate it into the lecture material”

2. **Effect on Academic Climate**
   For Example: “Learning about programs and findings offered, attending events and seminars, and having the opportunity to be a part of research programs if so desired - I like the diversity and opportunities made available for students”

3. **Anticipated Effects**
   For Example: “The main reason that I have the privilege to attend U. Texas, Austin next year in an attempt to earn a PhD in the EEB program is because I was encouraged by faculty and staff to participate in undergraduate research”

4. **Effect on Skills or Knowledge**
   For Example: “I have learned a GREAT deal about how to research, what type of questions to ask and answer, and how to clearly present my findings”

5. **Effect on Facilities**
   For Example: “It has been a wonderful experience having access to the five libraries on campus, especially Shields. It has given me the opportunity to collect information and data in the form of research papers and essays”

6. **General, Unspecified Comments**
   For Example: “My experience has been absolutely exceptional. I am intrigued by research done by the university and this has only had a positive impact on me”

Reporting categories were formed in consultation with analysts in Student Affairs Research and Information. Responses were further sorted into sub-clusters. A comprehensive listing of categories and sub-clusters follows. Reported with each cluster is the percentage of participants making a comment of that type.

**Effect on Quality of Instruction (1-in-4 of all comments)**

**Positive clusters (42% of comments in this category)**
- Instructors are enthusiastic and/or have increased subject involvement (6% of responding students)
- Instructors are knowledgeable and/or effective (5% of responding students)
- Other general compliments lectures (4% of responding students)
- Instruction includes more personal attention from instructors (1% of responding students)
Negative clusters (58% of comments in this category)
Instruction methods suffer because instructors focus on research (16% of responding students)
Instructors lack personal contact with students, classes too large (6% of responding students)

Effect on Academic Climate (1-in-5 of all comments)
Positive clusters (64% of comments in this category)
Many or unique opportunities for research, student work, and internships (17% of responding students)
Many opportunities to explore new subjects, new majors, and wide variety of classes offered (1% of responding students)
Negative clusters (25% of comments in this category)
Effects are limited because not enough opportunities to research or hard to find (4% of responding students)
Have not derived positive effects because of my major or the University has neglected my major (3% of responding students)
Neutral cluster (11% of comments in this category)
Courses are challenging/difficult, very competitive peer atmosphere – not stated as good or bad (3% of responding students)

Anticipated Effects (1-in-7 of all comments)
Positive clusters (81% of comments in this category)
I learn hands-on practical skills, skills for working world, or am exposed to work environments (7% of responding students)
No effect yet but general future undergrad effects anticipated (stated or implied) (6% of responding students)
Preparation for graduate school (3% of responding students)
Benefits from the image that other people will associate with my education in the future (1% of responding students)
Negative clusters (19% of comments in this category)
I do not learn practical skills or skills needed for working world, only theories (4% of responding students)

Effect on Skills or Knowledge (1-in-9 of all comments)
Positive clusters (88% of comments in this category)
I learn scientific thinking and research methods (5% of responding students)
I learn independent thinking or am becoming more confident in my study abilities (4% of responding students)
I learn cutting-edge information (4% of responding students)
Negative clusters (12% of comments in this category)
I do not learn to think, only to memorize (1% of responding students)
I do not learn the research skills needed (1% of responding students)

Effect on Facilities
Positive clusters (80% of comments in this category)
Facilities, materials, resources (other than instructors or projects) are high quality (3% of responding students)

**Negative clusters (20% of comments in this category)**
Facilities at UC Davis are not sufficient for effective research (1% of responding students)

**General, Unspecified Comments**

**Positive clusters (35% of comments in this category)**
Other unspecified positive effects (12% of responding students)

**Negative clusters (3% of comments in this category)**
Other unspecified negative effects (1% of responding students)

**Neutral cluster (62% of comments in this category)**
No effect/very limited effect/not sure (18% of responding students)
Unrelated Comments (3% of responding students)

Responses pertained most often to Effect on Quality of Instruction, Effect on Academic Climate, and Anticipated Effects. Comments about Effect on Quality of Instruction were both positive and negative, but more often negative – reflecting faculty priorities and reward structures that minimized teaching and large class sizes. Respondents commenting on Academic Climate Effects most often noted it a positive influence. Anticipated Effects were predominantly positive as were Effect on Skills or Knowledge.

**DIVISION OR COLLEGE DIFFERENCES IN OVERALL POSITIVE/NEGATIVE/NEUTRAL RATIO**

It is important to look at responses by division or college for there are important differences. For example, the largest proportion of positive comments were from students in the division of Agricultural and Environmental Sciences (73%) and the smallest proportion of positive comments were from Engineering majors (46%). It is also important to note that divisional or college differences are according to major and do not necessarily pertain to the experience a student has within the college or division of major. For example, an English major might speak positively or negatively about effects based on experiences with a division other than L&S HarCS. The pie charts that follow summarize positive, neutral and negative responses across categories for each division. This is followed by a discussion of within response category variation.

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1 Note: Pie chart percentages are of total responses from this Division/College
CAES - Exploratory

- Positive: 50%
- Neutral: 30%
- Negative: 20%

L&S - HArCS

- Positive: 48%
- Neutral: 33%
- Negative: 19%

Engineering

- Positive: 46%
- Neutral: 30%
- Negative: 24%
DIVISION OR COLLEGE DIFFERENCES
WITHIN RESPONSE CATEGORIES\textsuperscript{2}

Responses varied by academic division. Students’ perceptions of the educational and instructional benefit of attending a major research university were clearest in CAES. In instructional areas, Quality of Instruction, acquisition of Skills or Knowledge, and Academic Climate, CAES students were generally most positive and least likely to offer negative remarks.

More striking differences were found for Effect on Academic Climate, where 38\% of Agricultural Science students noted “Many or unique opportunities to do research, student work, and internship” while only 9\% of Letters and Science HArCS students did so. Second, none of the Biological Sciences students made the negative comment “Have not derived positive effects because of my major or the University has neglected my major” while 13\% of Letters and Science HArCS students did so.

Why does recognition of the benefits associated with attending a research university vary by major? The perception of the responding students is that research opportunities for students vary by major and this drives perception of benefits. Comments offered by HArCS students were illustrative: HArCS students were most likely to report that their major missed out on research benefits; HArCS students were also least likely to state that they found opportunities for research, work, or internships on campus; and were least likely to report learning hands-on practical skills, skills for working world, or being exposed to work environments. This pattern can be found in other divisions where students felt that by virtue of their major they missed out on research benefits. The lack of hands-on experience and lack of research opportunity was often associated with a perceived lack of benefit from attending a research university.

A consistent pattern was found when responses of Environmental Sciences majors, most positive, were compared to those of Engineering majors, least positive. At least twice the proportion of Environmental Science students as Engineering students reported that they found “Many or unique opportunities for research, student work, and internship” and “Learned hands-on practical skills, skills for working world, or were exposed to work environments.” But differences were not limited to this one category.

- Some 28\% of Environmental Sciences students made “General, Unspecified Positive Comments” versus 3\% of Engineering students.
- Twenty-two percent of Engineering students commented that “Instruction methods suffer because instructors focus on research,” a comment made by only 12\% of Environment Sciences students.
- Twenty-four percent of Engineering students offered the neutral response “No effect/very limited effect/not sure,” four times the percentage of Environmental Science students.

These results support the idea that the relative value of attending a research university is perceived differently by different majors and that perceived value varied with those principles

\textsuperscript{2}CAES’s Exploratory division has been disregarded for these comparisons because it is composed of freshmen who have not had significant opportunity for research or non-basic coursework.
identified by the Bower Commission’s Student Bill of Rights, especially, “Expectation of and opportunity for work with talented senior researchers to help and guide the student's efforts.” (Analysis of responses by division and college of major are available from Student Affairs Research and Information).

QUALITY OF INSTRUCTION

As noted earlier, Effects on Quality of Instruction was the area where more students made negative than positive comments (58% negative). Sixteen percent of all respondents (not just of all responses) stated that instruction suffered because instructors focused on research, the third highest respondent rate among all response clusters. The debate over faculty priorities and research university reward structures is a topic drawing strong opinions from all directions. In a recent Change magazine article, Peter Ewell illustrated the problem with the following anecdote and summary observation.

“A former provost, who really believed that universities should improve their teaching, nevertheless told me on one occasion that teaching made people dull; only research kept brain fires burning. There is no market for university teaching. Despite pious wishes and table thumping, the correlation between time in the classroom and income is negative.”

This is not an issue that will be resolved by one survey of undergraduate students, but the comments made by undergraduates can be used to better appreciate the issue. It is clear from student responses that the quality of instruction is an issue of concern to students and that they are well aware that faculty balance competing demands.

Students making “Instruction Suffers” comments were often very specific, listing cases of professors who abandoned the class halfway through the quarter to a TA, litanies on instructors who were brilliant in their subject matter but could not explain it to others, et cetera. Also, a number of respondents mentioned the high rate of use of TAs in general, and more specifically, frequent language barriers with TAs in the classroom as a consequence.

A number of students who commented that instruction suffered at a research university also made statements displaying an awareness that there were positive effects directly related to the professors’ research expertise, and from learning from instructors at the top of their fields. In addition, some of the students who remarked that instruction suffered at a research university also made positive comments about learning to think and act independently, about the wealth of opportunities for research, and about the quality of their preparation for graduate or professional school. UC Davis students clearly perceive competing demands and priorities and realize that this is a complex issue.

INDEPENDENT THINKING

Among students addressing independent thinking, responses varied widely in both content and tone. Comments ranged from complaints of having to teach everything to oneself, to those

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complimenting the school for a structure that teaches students to learn independently. Four percent of all respondents made positive comments about learning to think independently and becoming more confident in study skills. This was not a large number, but something very interesting may be learned from this group. These respondents were nearly twice as likely to make complimentary remarks toward instructors and four times as likely to state that they were learning to think scientifically and use proper research methods. It is tempting to suggest a causal relationship but the data are not adequate to support that determination. Either students with preexisting ability to learn independently made positive comments about the University’s academic atmosphere and the fact that it facilitated progress in independent learning, or students with no preexisting ability who had an exceptionally good educational experience were inspired to develop those intellectual skills.

GRADUATE SCHOOL PREPARATION

Within higher education, it is widely held that research universities provide superior preparation for undergraduates planning to attend graduate or professional school. Central to this competitive advantage is the opportunity to participate in undergraduate research. In our survey, respondents who mentioned that UC Davis provided solid graduate school preparation were also more than two times as likely to state that UCD provided many or unique opportunities to do research, work as a student, and to intern. On the flip side, of all respondents who stated that the University provided many or unique opportunities for research/student work/internships, the percentage that also listed graduate school preparation was not much higher than that for the entire respondent group. Do students who aspire to graduate school make a greater effort to seek out opportunities for research/student work/internships? According to these data, this seems more likely than does the idea that students who have had exposure to many or unique research/student work/internship opportunities are more likely to make early decisions to attend graduate school. That is further supported by other UCD survey research that reported that 86% of incoming freshmen intended to pursue degrees beyond the bachelors (2001 CIRP).

OPPORTUNITIES FOR RESEARCH, STUDENT WORK, AND INTERNSHIP

The cluster “Many or unique opportunities for research, student work, and internships” encompassed 17% of all respondents. That this was the second most popular response type among the entire survey group is encouraging, as opportunities for research and applied engagement in the academy are central features of a research university experience. Another response cluster offers suggestions for how UCD might increase its research opportunity ratings by undergraduates. That cluster is “Effects are limited because not enough opportunities to research or hard to find.” This negative comment was made by 4% of respondents and many of the students making this response type cited tales of searching campus-wide for research opportunities without finding one. If students that have the initiative to search for research opportunities do not find them, how many other students with interest but less drive did not encounter research opportunities? This number should be of high interest to the University, because it is this number in addition to the students in the “Effects are limited because not enough opportunities” category who would engage in research if the opportunity presented itself, gaining the independent thinking skills, the scientific reasoning skills, the complimentary effects to their lectures, and all of the other positive effects which appear scattered throughout the
positive response types of this survey. One respondent summed it up well: “Research opportunities are not available to all, and are certainly poorly promoted.”

CHANGES FROM FRESHMAN TO SENIOR YEAR

Among trends apparent in comments made by students at different points in time in their undergraduate careers are the following:

- From freshman to senior year, “Quality of Instruction” was increasingly reported to be negatively affected by UCD’s research university status. The majority of freshmen comments about the quality of instruction at UC Davis noted a positive impact from attending a research university but comments by all other classes were both more likely to be negative and more frequently made.

- Recognition of the positive contribution attending a research university made to the quality of the academic climate developed in students from freshman to senior year from 50% of responses by freshmen to 75% of responses by seniors. This increase in proportion making positive comments is important but, perhaps more interesting, is the nature of change in the proportion making neutral comments. As freshmen, about 1-in-4 of the comments were neutral but by senior year, only 1-in-20 were neutral.

- There was a decline in the proportion of students from freshman to senior year who expected to experience a positive impact at a future date; still, 3-in-4 seniors continue to anticipate future benefits.

- There was little change from freshman to senior year in the proportion of positive and negative student comments about the acquisition of research skills or knowledge – about 9-in-10 positive – but there was a remarkable increase in the number of comments from freshman to senior year. Seniors were much more likely to comment on the effect that attending a research university has had on their ability to reason independently and think scientifically.

A transcription of student comments by academic division is available upon request through SARI.