

Undergraduate Research Program



Research **Works** for Students: Faculty and Alumni Viewpoints

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Undergraduate Research – UD Definition

- Collaboration between student and faculty
 - Student's and mentor's project(s) closely connected:
 - NOT INDEPENDENT STUDY

- Student must progress in ability to
 - develop hypothesis; design and carry out investigation
 - analyze results; contextualize their work within the scholarly literature
 - present work orally and in writing
 - NOT A TECHNICIAN

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UD Faculty Survey—1999

- Survey of 155 science and engineering faculty
 - ~ 90% *participate regularly in Undergraduate Research*
- Examined:
 - **Motivation** of faculty to participate in UR
 - **Accommodations** faculty make to facilitate UR
 - **Faculty perceptions of student learning** through UR (compared to alumni perceptions)

Results: Faculty Motivation

1. Desire to **influence careers** of talented young students
 - 75% said “important” or “very important”
 - Another 20% said “moderately important”
2. Students’ contribution to **faculty members’ research**
 - 50% said “important” or “very important”
 - 78% said students influenced their own thinking about research
3. Students’ contribution to faculty members’ **quality of life**
 - 41% said “important” or “very important”
4. Undergrads’ contribution to **graduate students’ education**
 - 39% said “important” or “very important”
 - 73% believed grad students benefited

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Results: Faculty Accommodations

- 46% made special accommodations for their undergraduate researchers
 - These faculty took more undergrads (avg. 7.95 over 5 years compared to avg. 6.77 for those who made no adjustments)
 - 91% of these faculty had graduate students helping

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Faculty Accommodation Methods

- **Appropriate Projects**
 - smaller, short-term, with achievable objectives, detailed timetables
 - Safe bets OR high-risk explorations
- **Work arrangements**
 - Desk, “lab philosophy” articulated, research group meetings
 - Funds set aside for summer stipends
 - Lab team’s time organized around student schedules

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Results: Student skills gained

- Highest-rated abilities (by 77-80% of faculty respondents):
 - Develop intellectual curiosity
 - Think logically about complex materials
 - Understand scientific findings
- Also highly rated (by 63-69% of faculty respondents):
 - Synthesize/use information from diverse sources
 - Solve problems independently
 - Approach problems creatively
 - Maintain openness to new ideas
 - Work as part of a team

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Alumni Survey

Survey of UD alumni, classes of 1982-1997

- 986 respondents from 75 different majors:
 - 59% science or engineering
 - 41% arts, humanities or social sciences
- Three respondent groups related to Undergraduate Research:
 - 418 undergraduate researchers served by the URP
 - 213 had conducted UR but not used URP services
 - 355 had not engaged in undergraduate research

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Comparison of Faculty and Alumni Perceptions

<u>Skill</u>	<u>Faculty</u>	<u>Alumni</u>
Develop intellectual curiosity	80%	77%
Think logically about complex materials	77	77
Understand scientific findings	77	71
Synthesize/use info from diverse sources	69	70
Solve problems independently	66	76
Approach problems creatively	65	63
Maintain openness to new ideas	63	63
Work as part of a team	63	56

Results: Interesting Correlations

- Faculty perceptions generally agreed with alumni perceptions.
- Faculty who made **accommodations** for undergraduates perceived much larger gains in the **higher** order skills.
- Faculty who supervised undergraduates for **two or more years** rated gains significantly **higher** in 9 of 11 skills.
- **NO** correlation between **number of hours** per week faculty spent supervising students and skill gains perceived.
- Faculty for whom **quality of life** was a strong motivator perceived **higher** educational gains for their students.

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A Conclusion

- Undergraduate research can be thought of as a faculty development program from which undergraduate and graduate students benefit.

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Implications for University Planning

Since both length of students' research commitment and accommodations made by faculty correlated strongly with student gains:

- Facilitate *undergraduates' long-term involvement*, sophomore through senior year, using summer scholarships and setting standard expectations
- Use a clear *benchmark, such as university-wide senior thesis program*, for the institution's definition of UR
 - Do not confuse independent study with UR
 - Do not confuse technical help with UR

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PUBLICATIONS (*contact jbennett@udel.edu*)

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- Bauer, K.W. and Bennett, J.S. 2003. Alumni perceptions used to assess the undergraduate research experience. *Journal of Higher Education*, 74(2):210-230.
- Bauer, K.W. and Bennett, J.S. Forthcoming 2007. Evaluation of the Undergraduate Research Program at The University of Delaware: A Multifaceted Design. *To Think and Act Like a Scientist: Undergraduate Research Experiences and Their Effects*. Taraban & Blanton, eds. NY: Teachers College Press.