Assessing Undergraduate Research Outcomes

Pamela Steinke, Ph.D.
Assistant Director of Assessment,
Division of Undergraduate Academic Programs
NC State University
pamela_steinke@ncsu.edu

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Overview

- Importance of UR Assessment
- Assessment of UR at NC State
- Previous Outcome Studies
- Student Outcomes of UR
- Improving Outcome Assessment

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Importance of UR Assessment

- Relationship between UR assessment and UR research
- Continuous improvement of UR experience
- Support new and continuing initiatives in UR
- Need for research institutions to provide leadership in UR assessment

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UR Assessment at NC State

- Overview of UR experience through the Office of Undergraduate Research http://www.ncsu.edu/undergrad-research/
- Pre-Post Assessment
- Comparable Group Analyses

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Pre-Post Assessment

40 Students who did research in Spring 07 took both pretest and posttest

Pretest Stem: “So far, my coursework at NC State has:”

Posttest Stem: “My Undergraduate Research experience at NC State has:”

Rated on 5-point scale from SD to SA

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Pre-Post Results

Higher Scores for UR than Previous Coursework:

- taught me how to conduct research/creative projects
- helped me to gain more self-confidence within my academic goals
- taught me how to apply course work to real problems
- taught me how to work with obstacles and ambiguities
- improved my oral communication skills

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Comparable Group Analyses

- 6 cohorts of students (F00-F05) with OUR support
- matched on gender, cohort, college of entry and HS GPA or transfer hours.
- looked at cumulative and semester GPA in semester of research and at time of graduation, and GSS
- 321 pairs for academic indicators in research semester, 179 at graduation and 88 for GSS

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Comparable Group- Academic Indicators

All higher for UR group than comparable group:

- Cumulative GPA at graduation
- Cumulative GPA for research semester
- Semester GPA at graduation
- Semester GPA for research semester

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Comparable Group- Graduating Senior Survey

Self-report rating higher for UR group than comparable group:

- apply scientific methods
- critically analyze ideas/information
- function as part of a team (ns)
- plan/carry out projects independently
- independence and self-reliance
- potential for success

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Previous Outcome Studies

- Nagda, B.A., et al. (1998): Matched random assignment (1280 students) of applicants to University of Michigan UROP program for first and second year students and follow up comparison of registrar records.
- Bauer, K.W. & Bennett, J.S. (2003): Based on matched group survey results of 986 alumni of the University of Delaware surveyed about a variety of activities including research.

Previous Outcome Studies cont.

- Lopatto, D. (2004): Based on SURE results of 1135 undergraduates representing 41 institutions with HHMI-funded research programs asked to self report about learning gains.
- Seymour et al. (2004): Interview study involving 76 students engaged in summer UR at Grinnell, Harvey Mudd, Hope and Wellesley.
- Russell et al. (2007). Surveys of over 11,000 undergraduates and STEM and SBES graduates comparing NSF, NIH or NASA sponsored research, other sponsored research and no research.

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Cognitive Outcomes	Nagda (1998)	Bauer (2003)	Lopatto (2004)	Seymour (2004)	Russell (2007)	NCSU (in prep)
Scientific Thinking						
Critical Thinking						
Problem Solving						
Application of Knowledge						
Intellectual Curiousity						

Behavioral Outcomes	Nagda (1998)	Bauer (2003)	Lopatto (2004)	Seymour (2004)	Russell (2007)	NCSU (in prep)
Academic Indicators						
Retention						
Graduate School						
Doctoral Program						
Research Skills						
Communication Skills						

Personal/ Social Outcomes	Nagda (1998)	Bauer (2003)	Lopatto (2004)	Seymour (2004)	Russell (2007)	NCSU (in prep)
Confidence						
Independence						
Tolerance for Obstacles						
Teamwork						
Career Decidedness						

Improving UR Outcome Assessment

More Comparable Group Analyses (random or matched)

Greater Use of Institutional Data (academic and survey)

Better Use of Self-Report

More Direct Cognitive Measures (e.g. critical thinking, problem solving, epistemological beliefs)

http://www.virginiaassessment.org/rpa/2/Steinke%20Fitch.pdf

More Observational Measures (e.g., rating by faculty supervisor, skill demonstration)

More Longitudinal Analyses (over 4 years, graduate school, career)

Localizing Outcome Assessment

Assessment Efforts Must Be Localized for:

- Outcomes Specific to Institution/Program
- Population (e.g., year, gender, ethnicity)
- Components of UR Experience

Need to Identify Components of UR that Predict Outcomes

- relationships with faculty
- beginning early
- often/steady progression in skill level
- inquiry guided approach
- inclusion of senior research project
- variety of research and mentors

References

- Bauer, K.W. & Bennett, J.S. (2003). Alumni perceptions used to assess undergraduate research experience. *Journal of Higher Education, 74* (2), 210-230.
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