

# Increasing Undergraduate Research Participation: From Classrooms to Conferences

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Within our curriculum, emphasis on student research begins during Career Planning for Psychology Majors (PSYC 100). During this course we emphasize the important role research engagement plays in the quality of their undergraduate experience, and their opportunities for employment and advanced training after they graduate. In various meetings of this class, faculty, graduate students, and undergraduates participating in research, as well as former and current undergraduates who have obtained research-related employment, are gleefully paraded before our new majors to emphasize the central role of and opportunities provided by research involvement. Research participation is emphasized for newer students outside of class as well. Because beginning students often take their cues from advanced students, meetings and events of our Psi Chi Honor Society and Undergraduate Psychology Organization are jointly held, maximizing the interaction of our most academically successful and research-oriented students with our newest students.

Several years ago we decided we needed a way to involve more undergraduates in research. This decision is consistent with arguments (e.g., Wilison & O'Regan, 2007) and findings (e.g., Ishiyama, 2002) from a wide range of disciplines that undergraduate research participation can play an important role in undergraduate education (though to be honest, we did not review this literature when making our decision; it just seemed like a good idea). However, we found ourselves at the upper limits of availability of the traditional one-on-one mentoring our 20-plus research-active faculty members could provide, even with the considerable help of our 90-plus graduate students and excellent funding from several department, college, and university sources. To compensate for this stressed availability, we decided that two important components of the learning usually accomplished during research mentoring (i.e., multivariate statistical analysis and preparation of those analyses for public presentation) could be reproduced, at least partially, within selected classes. Whereas the classroom experience would

certainly not be as complete or as rich an experience as the analysis and presentation of data from research they had collaboratively designed and collected with faculty, these types of research activity would provide important training and experience that might function as a gateway to further research participation (Landrum & Nelsen, 2002).

We decided to change our quantitative methods curriculum to better prepare students for traditional research participation and to provide for more classroom-based research. After consulting with our faculty, the sophomore-level course Research Methods and Data Analysis (PSYC 350) was overhauled in several ways. This course, required of all majors, now has a more balanced treatment of experimental and non-experimental research designs, reflecting the methodological mix of our faculty's research and better preparing student for work with archival data collected using non-experimental designs. The methodological and design topics are introduced first, and then extended with the introduction of each statistical model so students better understand the range of possible applications of the different analytic models and the value of mixing experimental and non-experimental designs within a research topic. The course introduces both factorial designs and multiple regression, which are the two most common analytic models used by our faculty and much of the discipline. Two laboratory projects are completed, one involving multiple analyses of archival non-experimental data (there are three large datasets to choose from) that is presented in poster format along with an APA-style manuscript, and a second involving experimental data collected by the students that is presented in a multimedia oral format.

Two additional courses that are offered for students who want to further their research training and expand their quantitative skills were also retooled. Many of the students taking these courses are engaged in collaborative research with faculty and graduate students and plan to produce their own independent research, whereas others have come lately to the realization of how important research is,

but have not yet found a source of collaboration. The purpose of these courses is to introduce advanced undergraduate students to research designs and data analytic techniques that are most often taught at the graduate level. We find that this expanded repertoire allows students to take a greater role in their collaborative research, promotes the development of independent research efforts, and strengthens their graduate or professional school applications. Selecting appropriate statistical models that match research hypotheses or questions, correct use of a statistical package, and clear integrative presentation of the results in manuscript, poster, oral and web-based formats are emphasized in both courses. Both courses also require a substantial research project, each of which is conveniently timed to correspond with opportunities to present their work at local, state and regional conferences.

One course, Advanced Research Methods and Analysis (PSYC 450, usually 40 students), emphasizes factorial research designs and their analysis with various ANOVA and ANCOVA models. The minimum analysis for the course project is a 3-way factorial design, preferably with a mixture of associative and causal effects, with at least two dependent or response variables. The other course, Psychological Measurement and Prediction (PSYC 451, also approximately 40 students), emphasizes multiple regression, discriminant function, cluster analysis, and factor analysis. The minimum analysis for the course project is the comparison of alternative nested and non-nested multiple regression models, comparison of multiple regression models across alternative criterion variables or across populations, or the comparison of alternative nested and non-nested linear discriminant function models for multiple groups.

The highlight of each of these courses, for the students and especially for the instructor (the first author), is the semester research project. Students may use data sets from research they are currently working on, but more often they solicit datasets from the faculty or graduate students with whom they are collaborating, or use one of several data sets that have been donated by our faculty. Using these archival data allows the students to invest their efforts in the sophisticated statistical analysis of large multivariate data sets, and the interpretative and writing challenges that follow. The project in each course is prepared either as a poster or a multimedia oral presentation, along with a complete research report. Over the last 10 years more than 400 of these research projects have been presented by the students

at state (e.g., Nebraska Psychological Society or Nebraska Psychological Association) or regional (e.g., Great Plains Student Psychology Conference, Psychological and Educational Research in Kansas, Midwest Psychological Association) research conferences, and approximately 200 more have been presented at various university functions (e.g., UNL Research Fair).

We are happy to have a corporate sponsor who shares our commitment to undergraduate research training to help defray the costs of this research and the conference presentations. Talent Plus, a locally founded and internationally based human resources consulting firm, helps in several ways. They cover the costs of poster preparation and printing for students who present their research in that format at a conference, as well as the students' conference registrations and meals. Talent Plus and the department also give each presenting researcher a "Talent Plus & UNL Psychology Undergraduate Research Participation" certificate. Over the years Talent Plus has hired almost a dozen of our students for various research and data analysis positions, which provides an additional incentive to our students to master the techniques and procedures.

Completing this type of large project and presenting it at conference, though initially scary, is clearly a huge motivator to further participate in research for the students. For example, over the last five years, at least 13 students have completed a research project working independently and presented it at a conference during the semester after they had finished both of the 400-level courses. Nine students have approached the faculty who donated the archival data the student used for their project analysis and completed a collaborative project, usually on the same research topic. Eleven students have used their project as a jumping off point for their Honors Program thesis.

In combination, early emphasis on undergraduate research participation, a research methods curriculum focused on the range of designs and statistical techniques emphasized by our faculty, and the opportunity to engage in the completion and public presentation of advanced statistical analyses has been beneficial for our students. Students who take advantage of collaborative research with our faculty are better prepared for a deeper engagement in that research. Also, many students who do not have the opportunity for collaborative research get a taste of the process, and acquire methodological and quantitative skills that could act as gateways to advanced training or employment opportunities.

## References

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