

# Mentoring Undergraduate Research in a Principles of Assessment Course

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Students sometimes fear the unknown or the threatening. The word “statistics” has elicited substantial sympathetic and amygdala activation since the term was coined. Similarly, the concept of “psychometrics” may often create varying emotional reactions ranging from boredom, apathy, and indifference to fear, terror, and horror. “How do I convince students in a psychometric/measurement class that this stuff really matters?” is a question I have frequently asked myself prior to fall semester. Fortunately, I have found an approach that really seems to work...have students find out for themselves by applying the principles to help solve real-world problems and address modern-day issues through organized and carefully conducted research projects.

Experiential learning has long been a staple of education. Drawing from the works of John Dewey, Len Vygotsky, Kurt Lewin, David Kold, Jean Piaget, and others, contemporary educators have formalized and systematized a blend of experiential learning activities that have augmented student learning and addressed civic and community needs. The literature is replete with studies citing the beneficial effects of undergraduate research experiences in general science curriculum (e.g., Barrie & Seymour, 2007), education (e.g., Waite & Davis, 2006), the medical sciences (e.g., Hancox & Shaw, 2006), and in student affairs offices (e.g., Murray, Naimoli, & Kagan, 2004).

In the social sciences, Ishiyama (2002) found that those students who reported having participated in collaborative research with faculty, especially those who were so involved early in their educational experience, reported more substantial gains in their ability to think analytically, to integrate and synthesize ideas, and to learn independently. Students in psychology have ample opportunity to participate in faculty mentored research projects. Perlmann and McCann (2005) surveyed over 500 psychology departments across North America and found that of the 203 responding departments, 199 (98%) offered courses in which research activities were available for students; 160 (79%) of departments required

research-based courses. We espouse these practices in the Psychology Department at Southern Utah University and continually seek ways to involve undergraduates in research projects.

## Description of College and Department

Southern Utah University (SUU) is a Baccalaureate College located in Cedar City, Utah approximately 300 miles south of the state’s major population centers. We are a destination college, with most of our students coming from both the major population centers to our north, and from various rural areas of the State. The institution grants approximately 100 Master’s Degrees, 950 Bachelor’s Degrees, 90 Associate’s Degrees, and 15 Certificates per year. We have approximately 250 majors in the Psychology Department who are served by 7 full-time Faculty, two Lecturers, and one Department Secretary. All of our faculty embrace active and experiential learning. We are committed to undergraduate research and serve as mentors to students in various ways. This paper outlines one experiential learning approach applied to the psychometric/measurement class I offer through the department at SUU.

## The Principles of Assessment Course

In this class, students are expected to conduct some form of experiential research project addressing psychometric and measurement issues. Students select their project ideas from three outlined possibilities. First, students can choose to evaluate the reliability or validity of a psychological test, survey, or other measurement tool. A second option is for students to explore relevant social issues and opinions by taking all the steps necessary to develop, test, administer, and tabulate data from their own reliable and valid survey. Finally, students can opt to design and carry out a program evaluation for a local human service agency or university department. In any case, the principles we discuss in class are directly related to and relevant for the projects being

done. Students have the option of either working independently on their project or joining a team of no more than four students. I encourage students in work groups to share the load in all aspects of the assignment, and avoid doing only those tasks with which they have expertise and/or familiarity. Those choosing to work independently have the option of extending the course to a year-long experience worth six credits instead of the traditional 3-credit semester long class.

Throughout the first few weeks of the semester, we discuss the statistical and psychometric principles required for the kind of learning I hope to accomplish. Because taking a statistics course is a pre-requisite for the class, all students have had exposure to the principles of data organization, measures of central tendency, measures of dispersion, standard scores, non-parametric tests, parametric tests, and correlation. However, it is surprising how little most students retain. This necessitates a comprehensive review of statistics in which I incorporate homework assignments using contemporary statistical software (i.e., SPSS 13.0) to enter, code, organize, and analyze data gleaned from their own responses to an established questionnaire or test. The hands-on nature of this approach solidifies their existing familiarity and distant recall of their statistics course.

The next part of the semester comprises discussions about measurement principles such as reliability, nomological networks, validity, and standard error. Classic test theory and item response theory are also integral parts of the curriculum. I have found that students, often times, understand these complex principles if they are working with them as we talk about them. This occurrence is where the research project ties their experience back to curricular information. The projects become a vital part of the students' learning and comprehension.

## **Community Partners**

To accomplish this type of project, several different types of community partners have become instrumental players. I have been able to develop cooperative and mutually beneficial partnerships with several test publishing companies (PAR, MHS, etc.). I contact the companies a few weeks prior to the semester and inquire about any ongoing data collection projects. They usually provide me a listing of instruments for which they are collecting norming, reliability, and/or validity data. The company typically has test-retest intervals and concurrent measures projects already designed along with specific demographic criteria and desired numbers of respondents in each category. After discussing

psychometric principles of reliability, validity, standard error, and nomological networks, students in this class begin designing projects using some of these new instruments. According to PAR research and development specialists, they have 30-40 projects under contract at any given time at various stages of development (i.e., from data collection to internal reviewing, to printing). Their website <http://www3.parinc.com/careers/pdfs/INFORMATIIONFORADATACOLLECTORS.pdf> details current data collection projects.

I encourage students to select projects that are related to a principle or topic in psychology that is of particular interest to them, and then go and do some reading on that topic. I instruct them to identify concepts or constructs related to those the new instrument is addressing, and then to attend to types of measurement issues they may encounter (e.g., how do you objectively measure self esteem with a paper and pencil test). As they develop expertise in the subject matter, often times, the students will come up with additional ideas for criterion or concurrent measures. I have found the publishing companies, after consulting with the authors of the instruments, to be very receptive to these new ideas.

Once students have committed to a project, the company provides all of the testing materials necessary (e.g., stimulus cards, test protocols, administration instructions, and scoring procedures) and technical support (e.g., manuals and computer programs) to complete the project. When test instruments are under very early development the company will use their experimental scoring programs and then e-mail the results back to students in a spreadsheet that is amenable to various types of statistical analysis. Very often, there is compensation for the numbers of completed and usable protocols the students collect. I put this compensation into a fund to purchase additional testing materials that we use in class demonstrations or in future research projects.

In addition to corporate partners, I have found that local community partners are also generally willing and eager to have students evaluate their programs. Students in this course have conducted a comprehensive assessment of a local truancy support center and participated in a county-wide health services needs assessment. Closer to home, students in this course have also assessed university programs. One student conducted a detailed assessment of the admissions criteria our university uses in relation to retention issues. At the conclusion of the study, the student and I made recommendations to the administration that influenced policy changes to the admissions process. Currently, a student is evaluating the impact of a newly organized women's center on

campus in meeting the needs of the campus community and plans are in place to assess the Career Services Center on campus. Directors and managers of these programs are always appreciative our students' work as well as the data and final report that the project produces.

## Conclusion

These types of projects are a lot of extra work for the students and for the faculty mentors. What makes the whole research project idea work, in my opinion, are three crucial factors. First, students must have the resources available to help them accomplish the task. This requirement means that as a faculty mentor, I am available to my students far more hours per week than the number of office hours required by university policy. It means that I choose to be responsive to student needs when planning my lectures and that I take time to review the issues and concerns students are having with their projects during class and in small, informal, and spontaneous research groups; many times in the student computer lab, in the hall, during a ball game, over coffee, or after an unrelated class. I also have financial resources available through course fees and through the above mentioned compensations from testing companies to purchase research and presentation materials. Our university provides students access to SPSS funded through general student fees and I have arranged reserved time during our class for computer demonstration, orientation, and ongoing instruction.

The second factor crucial to my implementing experiential research as a component of the assessment class is having a culture in which this type of activity is recognized and valued outside of the classroom. To be the most effective, such a culture should be an institutional endeavor and supported by the university in all ways. Our university is beginning to recognize and reward those who pursue these types of pedagogical activities. Recently the university commissioned a budgeted committee supporting undergraduate research endeavors. Faculty mentors are honored and rewarded accordingly (see Lynn White's chapter in this volume). However, nurturing and fostering this type of culture within the department or program can be possible even without formal recognition from the university as a whole. In our department, we have

recognized for years that mentoring undergraduate research is within our primary purview. Each faculty member is active in mentoring undergraduate student research. Directing and mentoring these types of projects is supported in our departmental constitution and is rewarded through course reductions and Leave Rank and Tenure considerations. This level of support allows me to devote a great deal of time and energies to mentoring student projects without sacrificing potential for tenure and advancement.

A final requirement for successfully mentoring and fostering undergraduate research projects in the assessment class is having a meaningful forum for disseminating the results. We have found several local, regional, and national venues friendly toward and supportive of undergraduate research. In our department, we have an annual scholarship day toward the end of Spring semester. Students submit proposals that are reviewed by faculty. Students whose projects are accepted present either posters or oral presentations that are judged. Cash awards are made possible due to a generous contribution by a former faculty member. The University has more recently began to sponsor an annual, peer reviewed Student Faculty Scholarship Day with very similar parameters. Finally, professional organizations such as Rocky Mountain Psychological Association have been friendly toward undergraduate student research projects. Giving students a peer-reviewed forum where they can disseminate the result of their studies is the final piece in giving the project and their learning experience meaning and purpose. To date, my students have presented 28 papers at professional meetings in local, state, regional, and national forums detailing their scholarly work.

This brief discussion outlines my efforts in one class. As can be seen in this volume, there are myriad ways to initiate and foster a culture for undergraduate research in today's institutions of higher education. Developing and implementing undergraduate research projects in various classes helps to address the Boyer Commission's first and most important recommendation for improving American undergraduate education; "Make research-based learning the standard" (The Boyer Commission, 1998, p. 23).

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