

Inquiry-based Teaching and Undergraduate Research-Exposure Courses at Carolina: An Overview

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Introduction

There needs to be a symbiotic relationship between all the participants in university learning that will provide a new kind of undergraduate experience available only at research institutions. Moreover, productive research faculties might find new stimulation and new creativity in contact with bright, imaginative, and eager baccalaureate students, and graduate students would benefit from integrating their research and teaching experiences.

- Boyer Commission. Reinventing Undergraduate Education: A Blueprint for America's Research Universities, 1998.

This proposed undergraduate learning experience now exists throughout the curriculum at Carolina, and undergraduates in significant numbers pursue scholarship and research in courses in all disciplines. In fact, undergraduates choose to come to UNC seeking opportunities to join with faculty, postdoctoral fellows and graduate students in the vibrant research community that exists on our campus. Inquiry, whether through research, scholarship or creative performance, is at the heart of our research university, and inquiry-based teaching methods offers us a way to bring inquiry into the classroom.

What is inquiry-based teaching?

Inquiry-based teaching methods focus on helping students to make a transition from “novice-like” approaches to learning (memorizing conclusions reached by others, practicing solutions to “the questions that might be on the exam”) to “expert-like” approaches (a procedural understanding of how current conclusions were reached, the limitations of those conclusions, and the opportunities for further exploration and deeper understanding).

Inquiry-based approaches are not new, but they are currently receiving much attention for two reasons. First, inquiry-based approaches are well-aligned with the natural abilities of faculty at a research university (and therefore, they are enjoyable to implement). Second, cognitive psychologists have studied ways that people learn, including undergraduates in conventional lecture courses. They have reached the somewhat alarming conclusion that conventional courses in some disciplines actually make students more novice-like in their approach to understanding than they were before the courses began. This result occurs because traditional lecture only or teacher-driven discussion fosters a passive approach to learning where students look to the faculty (the expert) for all of the right answers.

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Research-Exposure Courses and Graduate Research Consultants

Faculty in all disciplines at Carolina have been experimenting with inquiry-based approaches for many years, particularly during the past ten years with the assistance of the Graduate Research Consultant (GRC) Program. To date (Fall 2012), instructors participating in the GRC Program have taught over 700 undergraduate courses involving more than 21,000 students in ways that include student inquiry as a way for students to interact in an active way with course material through questions and authentic exploration. Based on our ongoing program assessment, faculty and students have found these courses to be highly satisfactory. The courses provide a way for students to meet the multidisciplinary requirement of the Carolina Research Scholars Program, which promotes a framework to help guide students' deeper involvement with Carolina's research community.

The Office for Undergraduate Research (OUR) developed the Graduate Research Consultant Program in Fall 2003 to increase course-based opportunities for undergraduates to learn methods of the disciplines and to experience research. The OUR staff encourages and supports instructors who want to transform course projects or assignments into research projects. By research projects, we mean opportunities in which students use the methods of the discipline to pose questions, apply those methods in investigation, and communicate formally their findings to others. So that faculty can develop, guide, and evaluate the research component, we compensate advanced graduate students as research consultants to work with the instructor and the students for 30 hours during the concentrated period of the course when the students are planning, carrying out and communicating their research.

Examples of Research-Exposure Courses

During Fall 2010, the OUR funded Graduate Research Consultants (GRCs) to support 73 research-exposure courses for undergraduates. Here is very brief summary of the research experience in a cross-section of those courses:

- In an issue-based and methods-focused **Anthropology** First Year Seminar, students,

with GRC assistance, researched a public archaeology site using primary documents and artifacts and considered methods for presenting their findings to a public audience;

- The GRC in a **History** seminar worked with students to design a *doable* research project, suggest resources including primary sources, and overseeing the research methods the students used;
- In a **Geology** First Year Seminar, students planned their research projects, did field-based data collection and analysis with GRC support, and presented their findings at a department poster session;
- In a **Geography** course, students with GRC support, investigated and documented a topic related to a local-global community connection, using mapping, interviews, archival research and observation in a mixed method approach with findings presented in a class mini-conference.
- In an advanced **Psychology** course, small groups of students developed an empirically informed questionnaire that assessed a variety of theoretical constructs related to the students' theoretical question of interest and, with the guidance from the GRC, did a statistical analysis of their own data, all culminating in a 3-hour research symposium.
- In a **Philosophy** course, the GRC assisted students in the formulation of their research topics, in locating and assessing available sources on the topic, and in structuring the thesis and arguments of the research paper, and students were encouraged to submit their final papers to undergraduate philosophy journals and to present at regularly scheduled conferences.

The GRC blog (<http://grc.web.unc.edu/>) is a valuable source of information about course design and student experience from both the faculty and the graduate student perspective. To explore course examples in depth from the humanities, social sciences and natural sciences, please see the four comprehensive research-exposure course design examples on the OUR website: http://www.unc.edu/depts/our/faculty/grc_program/faculty_grc_course_ex.html.

Undergraduate Comments on Research-Exposure Courses

We have continued to assess the Graduate Research Consultant Program since the program started in 2003, through interviews, participatory seminars and surveys. Following is a series of undergraduates' survey comments from the 2009-10 academic year that capture the program goals for the research-exposure courses and the benefits of the Graduate Research Consultants:

- *This course was the first one I have had at this University that provided me with so much exposure to various techniques that are used on a daily basis in research. It provides invaluable experience, especially for those students who have never had prior [research experience].*
- *The research component of this course contributed significantly to my ability to gather and synthesize information. I also believe that engaging primary documents and learning to incorporate them into my writing as evidence is an invaluable skill.*
- *The GRC showed me great databases where I could find valuable resources. She also showed me how to find resources in the citations of other published works that I would not have thought about doing. The skills I gained I will use on other projects.*
- *[The GRC] helped me to interpret my statistics and figure out what model of statistics would be best given my research design; I can't imagine not having had her help in this process.*
- *I learned what kinds of research materials to use other than sources found on the internet, such as rare books collections, print documents, etc.*

For More Information

If you decide to explore further, we, in the Office for Undergraduate Research, would be happy to discuss approaches you are considering and put you in contact with a colleague in your discipline who could offer additional advice. If you are interested developing a research-exposure course and applying for Graduate Research Consultant funding, the application deadlines are listed on the OUR website.

Additional Resources

If you are interested in learning more about developing and teaching inquiry-based courses or about collaborating with a Graduate Research Consultant to support the research component of your course, please see the following resources on the OUR website [our.unc.edu]:

For Faculty: The Graduate Research Consultant Program: <http://our.unc.edu/faculty/grc/>

Five Steps to Using Inquiry-Based Approaches in Teaching by Patricia J. Pukkila. American Society for Cell Biology Newsletter 31 (10): 27-28 (2008). http://our.unc.edu/files/2013/02/pjp_inquiry_ascb.pdf

The Graduate Research Consultant Program-Embedding Undergraduate Research Across the Curriculum by Patricia J. Pukkila, Martha S. Arnold, Aijun Anna Li, and Donna M. Bickford. Council on Undergraduate Research Quarterly 33: 28-33 (2013). <http://our.unc.edu/files/2013/06/The-Graduate-Research-Consultant-Program-Embedding-Undergraduate-Research-Across-the-Curriculum.pdf>