New Partnerships:
Engaging Undergraduates in Research Through Technology

Victoria Getis, The Ohio State University
Catherine M. Gynn, The Ohio State University
Susan E. Metros, The Ohio State University
How can higher education engage undergraduate students in research and creative and scholarly activities? In 1998, the Boyer Commission on Educating Undergraduates in the Research University published a report calling for a new kind of undergraduate education in which students would work with talented senior researchers, learn through inquiry, access first-class research facilities, choose fields of study, and interact with people with different backgrounds, cultures, and experiences from their own:

The research universities need to be able to give to their students a dimension of experience and capability they cannot get in any other setting, a research experience that is genuine and meaningful.¹

To meet such a challenge, many universities and colleges have established undergraduate research programs. The majority of these programs, however, are targeted to select populations of honors students and upper-level juniors and seniors, and most are targeted to the sciences. For example, the National Science Foundation (NSF) responded to the call for advancing undergraduate research by soliciting proposals and by funding a Research Experiences for Undergraduates (REU) program that supports math and science.

Efforts to support undergraduate research at The Ohio State University have been driven by the president’s leadership agenda and the university’s Academic Plan, which states that research

enhances the undergraduate experience by bringing faculty and students together to create new knowledge and develop mentor-student relationships that may influence a lifetime of learning for both.²

To address this need, Ohio State is working to expand opportunities for undergraduate research. As at many of its peer institutions, Ohio State undergraduate honors students are supported in conducting research and encouraged to document their experiences and findings in a senior thesis. In addition, the university sponsors the annual Richard J. and Martha D. Denman Undergraduate Research Forum, which provides undergraduates a competitive and professional environment for presenting research findings and facilitating exchange among their peers, faculty, and the public. The forum has grown exponentially from 60 student presentations when it was established in 1996 to 327 presentations in 2005. Finally, Ohio State recently created an office of undergraduate research with the goals of coordinating programs across the 19 colleges and other support units and guiding undergraduates in identifying and participating in research opportunities within and across disciplines.

While these efforts support undergraduate research, they do not take into account the integral role that information technologies play in effecting and advancing research efforts, streamlining inquiry processes, supporting research protocols, and disseminating and evaluating results. To bridge the gap, the Office of the CIO initiated Research on Research: Student-Faculty ePartnerships—an innovative, interdisciplinary program that facilitates paired work by faculty and undergraduates on a research project. The
deliverable is a publicly accessible, multimedia-rich, digital portfolio chronicling the research effort.

The summer program was conceived and administered by Ohio State’s instructional technology support unit, Technology Enhanced Learning and Research (TELR). This group has a rich tradition of encouraging innovation through internal grants. During its seven-year history, the unit has served as the conduit for multiple grant cycles to the campus community intended to support technology-enhanced teaching and learning. While each of these cycles produced some notable successes, several underfunded or overambitious projects withered on the vine. TELR underestimated the effect of a faculty member’s competing priorities on productivity and misjudged the high-order technology skills required to design and deliver professional-quality, digital materials for higher education. TELR surmised that in order for an incentive program to succeed, it should realistically estimate the time commitment required by both project administrators and participants, provide both content and technological expertise, and fully integrate the project into existing university priorities. The Research on Research: Student-Faculty ePartnerships program meets these criteria.

This research bulletin emphasizes the importance of supporting undergraduate education at research institutions and describes how technology can serve as a catalyst for integrating faculty research into the undergraduate learning environment. The bulletin also describes the highly successful Research on Research: Student-Faculty ePartnerships program (from both student and faculty perspectives) and offers recommendations for replicating such a program on other campuses. Findings are based on project participants’ postevaluation survey responses and testimonials collected over the two-year pilot period.

**Highlights of Research on Research**

In Research on Research, full-time undergraduate students are financially supported to collaborate with faculty members during the 10-week summer term to develop a multimedia portfolio documenting research. During the summer quarter, faculty interact with their student partners in formal and informal settings, guide the research experience, and participate in designing the research portfolio. Students work on research under their faculty partner’s guidance, attend workshops to learn multimedia skills, participate in seminars to discuss their specific research and research in general, and design and build the research portfolio. The summer program is initiated and interspersed with a series of community-building social events and culminates in a showcase event in which participants demonstrate their research and related portfolios to a campus and public audience.

**Application and Selection**

Research on Research has a paired application process and an interdisciplinary selection committee. Using an online application process, students and faculty members form partnerships and apply to the program together. The partnerships can include
multiple faculty members and can be interdisciplinary. The selection process includes the following criteria:

- Is the partnership logical—do the applicants have an ongoing relationship and share a vision of the importance of the research to be undertaken?
- Will the project help the student in his or her educational goals?
- Will the project produce multimedia portfolios that will be useful to the faculty member and the university?
- Is the student willing to learn technology? (The review team considers technology skill, although it is not used as a selection criterion.)

As a central unit, the CIO’s office is committed to meting out its grant monies across the university and to promoting interdisciplinary research. Therefore, the program targets 10 project teams from across the university. In the first two years of the program, 24 departments have been represented by either faculty or student participation. Project proposals have ranged from studying economic market bubbles to developing distribution plans for e-groceries and from researching the molecular mechanisms of diabetes to chronicling the lives of Japanese-Americans held in internment camps during World War II.

**Program Components**

Research on Research is a 10-week summer program that has four central components:

- a workshop to build multimedia skills;
- a seminar to build a community of scholars;
- research time; and
- production of a multimedia portfolio.

Students commit 30 hours per week to these activities, which take place concurrently.

**A Workshop to Build Multimedia Skills**

The goal of the workshop is to hone the students’ multimedia skills. Program assistants begin with a student technology skills assessment to gauge abilities. Over the first half of the summer, the students learn basic HTML coding and how to use software packages including Macromedia Dreamweaver and Flash, Adobe Photoshop, and Apple iMovie. They also are introduced to video and audio production concepts and how to design online content to comply with design standards of the Americans with Disabilities Act. During the workshops, staff emphasize project management skills, including planning and time management. As the students develop their multimedia portfolio designs, the staff members touch base with the faculty partners, ensuring that students and faculty have realistic goals and expectations. By the end of the fourth week of the program, faculty, students, and staff have agreed on a site plan for each portfolio.
The workshop is less structured during the final five weeks as the students work more independently to develop their projects. Program assistants are available four hours a day in open workshop to provide more advanced training in specific areas, depending on student needs. They may receive more advanced training in specific areas, depending on their needs. For example, one 2005 student worked one-on-one with a staff member to gain Macromedia Flash expertise to produce multiple animations for his site.

The workshop is held in the Office of the CIO and University Libraries Digital Union, an advanced technology laboratory designed to support the academic community’s multimedia production needs and foster cutting-edge research collaborations. In addition, students are each lent an Apple PowerBook laptop computer that they can use throughout the program period to work on their projects outside the Digital Union’s operating hours.

A Seminar to Build a Community of Scholars

The second component of the program is a weekly seminar in which students gain an understanding of the academy and of research in general. Each seminar starts with a general discussion based on print articles and online resources about topics related to research in an academic setting. Since the program participants come from many different departments and disciplines, topics are necessarily general. Students contribute based on their developing understandings of their own fields. By the end of the program, students have substantial information about the academy, financing graduate school, and the possibilities for a university career. The second part of each seminar consists of interaction with a faculty member partner. He or she might lead a tour of a research space or studio, discuss current research, or participate with other faculty and guests in roundtable discussions on such topics as the relationship between faculty research and undergraduate teaching. The 2004 seminar took a tour of the animal research labs supporting the work of a diabetes researcher. To the students’ surprise, they learned that the university has more mice than undergraduates!

Research Time

The students commit to a 30-hour work week at the outset of the program and they allot whatever time is remaining after the workshops and seminars to individual research. They may do this in a variety of ways. In the first two years of the program, faculty-student pairs demonstrated three different ways of working with each other. The majority of students (65 percent) took part in research driven by the faculty member’s question. For example, history major Lara Ford, intrigued by geology, explored the process of fossilization with Loren Babcock, geological sciences professor (see Figure 1).
Twenty percent of the students concentrated on their own research question, with guidance provided by their faculty member partner. In 2005, visual communication design major Anthony Paul prepared for his senior project on campus signage by partnering with Jack Nasar, city and regional planning professor, who guided him through the literature on “wayfinding” and the psychology of navigating space (see Figure 2).

Figure 1. Life, Death, and Fossils

Figure 2. Orientation Psychology
Fifteen percent of the students observed the faculty member’s research. For example, business marketing and logistics student partner Aubrey Young observed the survey process used by Jill Ellingson, business management and human resources professor, to determine the barriers to women’s retention in the academy (see Figure 3).

Figure 3. Sowing the Seeds of Retention

By the completion of the program, most student-faculty pairs have formed strong mentoring relationships. Some faculty members hire the eager-to-work candidate students they have trained. In some cases, students have become so interested in a discipline that another team was exploring that they switched majors, and some have become double majors. A graduating communications major, observing one of the other Research on Research teams, discovered a passion for geology, which led to a full-time job in that field.

Production of a Multimedia Portfolio

The fourth component of the program is the multimedia description of research. The students, with faculty and Research on Research staff guidance, produce digital descriptions of their work or the professor’s work, using the skills in Web production taught during the program. These multimedia portfolios are referenced in the university’s Knowledge Bank and are accessible through a dynamic Web site that describes the
program and documents the research (http://digitalunion.osu.edu/r2). Faculty may update and use the portfolios to recruit students, inform peers of research progress, and display them to granting agencies.

**Showcase**

The program culminates in a capstone experience, a showcase taking the form of an electronic poster session. The workshop prepares students to orally and visually present their work, and they are expected to be able to discuss their findings in this professionally modeled setting. The university’s president and provost have attended each poster session and introduced faculty participants, who in turn award their student partners certificates of accomplishment. Each showcase attracted more than 100 guests, including participants, faculty colleagues, student peers, and families, as well as corporate sponsors, university staff, and administrators.

**Feedback**

In two years, TELR has created a meaningful application and review process, clarified expectations, and efficiently coordinated the workshops, seminar, and showcase. Student and faculty evaluations administered at the conclusion of each program rated the program highly successful. Program feedback includes the following:

- Only one student found the software provided was insufficient for his project.
- Students felt they had access to all the equipment they needed in a congenial work space.
- Students found that the seminar topics varied in their usefulness.
- Students enjoyed interacting with the faculty in a roundtable discussion format the most.
- All students (with one exception) and faculty enjoyed the various social events that took place during the summers.
- All students and faculty felt the showcases were successful.
- Students and faculty felt that working with each other was the most important part of the program.
- One student stated that interacting with her faculty partner was “very useful and interesting, easily my favorite part of this project.”
- A faculty member valued “the opportunity to work closely with an undergrad and to provide him with some financial assistance while he advanced his skills.”
- A faculty member commented, “This was an awesome opportunity for both of us. I think I mostly loved how [my student partner] came to understand, after 10 weeks, what faculty work is really about. Through this work, he saw connections among my research, my teaching, and his experience in my classes that he
otherwise wouldn’t have understood. And of course, I have a great e-portfolio now that I would have never have had the time to work on.”

What It Means to Higher Education

Research on Research evaluation findings suggest that the program raises the visibility of undergraduate research by tying it to technology skills, student funding, and a showcase event. The Ohio State University President Karen Holbrook remarked during the 2005 showcase, “It isn’t about undergraduate research; it is about research, period.” Research on Research uses technology in innovative ways to support learning and engage the academic community. The program fosters a strong mentoring relationship between the faculty member and the student. The technology also supports instruction in a variety of topics useful in student engagement in learning: project management, planning, community building, and presentation and writing skills.

While many universities have undergraduate research programs, in most cases faculty members participate without reward. The Ohio State program gives the faculty member an item of real value and use—the multimedia e-portfolio. The student-produced portfolio is dynamic; faculty can edit it and upload new content. Faculty can use the portfolio to attract future funding, update grant sponsors on their work, and present highlights of their work to future granting agencies. Faculty can also use the portfolio as a teaching resource at both the undergraduate and graduate levels. In fact, one 2005 student has been asked to present on her research in an upper-level history class by a colleague of her faculty partner. As Michael Bugeja pointed out in a recent article, Web sites focusing on research are portable assets that can help faculty members document their contributions to the field, reach multi-disciplinary audiences, support bids for promotion and tenure, and demonstrate claims of intellectual property.

The program provides students at a large university with a personalized experience, a one-on-one relationship to a faculty member, and a real insight into the world of academia. While students self-select into the applicant pool, the review team does not target honors or special students, rewarding initiative rather than status. Student evaluations indicate that they develop greater understanding of what it is faculty do, consider attending graduate school, and even entertain the possibility of becoming a faculty member. Furthermore, they commented that Research on Research revealed to them a new facet of learning that was both exciting and authentic. For Net Generation students, this program provides problem-based, social, and interactive learning experiences. According to Diana and James Oblinger, current university students are goal oriented and active learners—they need opportunities to learn through discovery, prefer to learn by doing, and enjoy working in teams.

Finally, the institution benefits from the program and its resulting research portfolio as well, in that it provides an easy way to spotlight innovative faculty and student work across the campus. The institution’s public relations office can use this for promotional purposes and as a marketing tool. The portfolios also can serve as an advising tool for current students and as a recruitment tool for new undergraduate and graduate students and faculty.
Key Implementation Issues

The Research on Research program was designed to be replicable across campus and on other university campuses. To start, an institution interested in initiating a similar program on its campus should identify and be cultivating a commitment to undergraduate research. Over two years, the average cost to develop and implement the program was $70,000 a year. The budget for the program included the start-up costs of purchasing the Apple PowerBook laptops for student use (partially subsidized by Apple Computer, Inc.), staff salaries, software, and student stipends ($5,000 each based on the NSF REU program stipend). Beyond the budget, the program’s necessary components are access to up-to-date, multimedia production facilities, management and technology support staff dedicated to the program, and technology resources.

As universities move increasingly toward course management system solutions and as departmental staff provide more technical expertise to their faculty, interest in student technology internship programs is declining. Adding a research element transitions these once popular programs toward sophisticated academic work and allows faculty more meaningful results from their time investment.

While Research on Research is not scalable to large numbers of student-faculty partnerships in its current iteration, it is sustainable. To provide opportunities for more student-faculty partnerships, the program organizers are considering increasing the number of teams from 10 to 15 or running two sections over the summer or sections throughout the school year. During both application cycles, many more teams applied than were funded. There also is consideration being given to distributing the program to the colleges. While the university-wide, interdisciplinary aspect would diminish, students still could work within and across departmental boundaries. In addition, the organizers also are looking for development funds to provide endowed sponsorship to supplement the current funding through annual cash allotments.

Key Questions to Ask

- What is the climate for undergraduate research at my institution? Does my institution have a documented interest in this area? Does it align with our academic plan? Who are the champions?

- What technology programs or resources does my institution have that can be leveraged to support such a program?

- What is the logical home, with equipment, software, and skilled staff, to support a Research on Research: Student-Faculty ePartnerships program?

- Is there an institutional repository available to store and access these portfolios, understanding that the multimedia components can be sizable and that faculty require editing and file-uploading rights?

- How will the program be funded? Will the program provide students with academic credit or with a stipend? Will faculty receive funding?
Where to Learn More

- The Ohio State University, Research on Research: Student-Faculty ePartnerships, [http://digitalunion.osu.edu/r2](http://digitalunion.osu.edu/r2).
- For an example of an undergraduate research program, see the University of Maryland’s Gemstone ([http://www.gemstone.umd.edu/](http://www.gemstone.umd.edu/)), a four-year program for selected honors students who work in teams and present their research project at the end of their fourth year.
- The National Conference on Undergraduate Research ([http://www.ncur.org/](http://www.ncur.org/)) offers opportunities for undergraduates to present on their research.

Endnotes


About the Authors

At The Ohio State University, Victoria Getis ([getis.1@osu.edu](mailto:getis.1@osu.edu)) is Special Projects Manager, Technology Enhanced Learning and Research; Catherine M. Gynn ([gynn.1@osu.edu](mailto:gynn.1@osu.edu)) is Adjunct Associate Professor and Assistant Director, eLearning; and Susan E. Metros ([metros.1@osu.edu](mailto:metros.1@osu.edu)) is Professor of Design Technology, Deputy Chief Information Officer, and Executive Director for eLearning.