Weaving Together Undergraduate Research, Mentoring of Junior Faculty, and Assessment: The Case of an Interdisciplinary Program

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Abstract Scholars in teaching and learning value student research and program assessment as strategies to promote excellence in undergraduate education. Yet, in practice, each can be complex and difficult to sustain. This case study demonstrates how undergraduate research, mentoring of junior faculty, and assessment can be integrated in ways that enrich the educational experiences of students and the professional development of faculty and improve research on teaching and learning. The authors describe a lively undergraduate research project that became tied to the mentoring of assistant professors and then to program assessment. We conclude with recommendations for implementing such a project in other academic settings.

Key words undergraduate research · program assessment · faculty mentoring

In this article we describe how an undergraduate research project created faculty development opportunities that, in turn, accelerated meaningful program assessment. The undergraduate research project began when two undergraduate students raised thorny questions about their small group experiences. They reported frequent participation in groups across courses, a process which they described as varied and uneven. After further investigation, a senior faculty member (co-author Gillespie) and three junior faculty

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members from various disciplines (co-author Thomas was one) became involved in an undergraduate small group research project which then eventually became linked to program assessment. As a mentor to junior faculty, Gillespie first designed the undergraduate research project and then involved junior faculty to engage them in scholarship about teaching and learning. The connection among undergraduate research, mentoring, and program assessment occurred serendipitously; but when we discovered the creative synergy produced by weaving them together, we became intentional in our efforts, building these activities purposefully into the interdisciplinary program in which we teach.

The shift in the mid-1990s from teaching to learning (Barr and Tagg 1995) generated new interest throughout higher education in the undergraduate experience and student learning, including an emphasis on assessment and providing opportunities for under-graduates to do research. The new emphasis on learning has had multiple advantages, including increased student retention (Astin 1993); but it has increased faculty workloads significantly, especially for junior faculty who feel the strain of increased demands to produce research (Wilson 2001). As we will illustrate, integrating undergraduate research, assessment, and mentoring of junior faculty leads to concrete benefits by enhancing student success, faculty experience in research and publication with undergraduate students, and the effectiveness of classroom teaching and learning.

The undergraduate research project described in this article took place in Interdisciplinary Arts and Sciences at the University of Washington Bothell, an upper-division program on this branch campus that serves place and time bound students seeking to complete a Bachelor's degree. In 2005-2006, the program had about 500 students, approximately a third of the total number of students on the campus, and 24 full-time faculty members. The program is organized around interdisciplinary concentrations with multiple course cross-listings. Many of the courses are problem-based and emphasize critical thinking, writing and speaking, and collaboration. The campus mission emphasizes faculty–student relations as paramount for the institution, and program faculty members also are committed to and rewarded for research and service.

Background: Values and Challenges

Before turning to the project itself, we describe the value and challenge of each of the activities we combined: undergraduate research, mentoring, and program assessment.

Undergraduate Research

As a collaboration between faculty and students, undergraduate research combines teaching and original scholarship (Dotterer 2002). It may take many forms, including creative activity, empirical inquiry, and other forms of scholarship across the arts, humanities, sciences, and social sciences. Although undergraduate research is certainly not new, an increased focus over the last decade is part of a larger call for improved undergraduate education (Boyer Commission on Educating Undergraduates in the Research University 1998; Kauffman and Stocks 2004; National Science Foundation 1996). Consistent with the promotion of active learning, student-centered learning, and collaborative learning, scholars of teaching and learning advocate undergraduate research as a way to promote communication, critical thinking, and problem solving skills (Kinkead 2003).

Participation in undergraduate research may improve student retention rates. In an experimental study of the Undergraduate Opportunity Research Project at the University of Michigan, researchers found that the students who were selected by lottery to participate in

undergraduate research were more likely to complete a college degree and to attend graduate and professional schools (Hathaway et al. 2002). These students also reported higher levels of faculty-student interaction and higher levels of student involvement and commitment than students not selected to participate in undergraduate research.

Undergraduate research may also be promoted as a form of service to local communities. Vogelgesang and O'Byrne (2003), for example, have described undergraduate research projects that are designed to be useful to local community agencies serving immigrants. An important component of the project that we describe in this paper is the notion of students "giving back" to a program in which they feel invested. At the same time they challenge the program to improve its teaching and learning practices for future students.

Finally, while much of the emphasis on undergraduate research focuses on the outcomes for students, including the development of useful skills and important relationships, it may serve the interests of faculty members who desire and feel pressure to engage in research at the same time that they desire and feel pressure to remain student-focused and to engage in innovative teaching and learning practices in and beyond the classroom (Malachowski 2003). Involving undergraduate researchers in ongoing faculty research projects can be a way of bridging faculty scholarship and teaching. For example, a compelling argument has been made that undergraduate research is a way to open up cross-programmatic and interdisciplinary conversations about scholarship (Dotterer 2002). Faculty may become engaged with one another and with their students in useful dialogue about how research is done, what counts as evidence, and how conclusions are drawn across disciplines and fields of inquiry.

Yet there are considerable challenges. Undergraduate researchers, for example, typically need a great deal of faculty mentoring and oversight, and this is work that is not often recognized in formulas for establishing teaching "loads." Further, undergraduate group research projects can be complex to manage, as preparing the necessary applications to human subjects review boards and scheduling team meetings can be time consuming, especially for new faculty members. Faculty mentoring, administrative assistance, and collaboration can ameliorate these strains.

Mentoring Junior Faculty

Boice (2000), Boyle and Boice (1998), and Sorcinelli and Austin (1992) have argued that new faculty need to be acculturated to the specific context of a campus if they are to be successful teachers and scholars. Bode (1999) found that new tenure-track faculty members consistently rank mentoring and collegiality as central to their success, with collegiality rated more important than mentoring. Boice (2000) noted that separating research and teaching in the acculturation process is illogical as both require a system of reflection in order for meaningful revisions in practice to occur. Encouraging faculty members to write in a community of peers helps them become aware of reflective processes such as identifying one's audience and learning how to revise in light of peer comments, processes which also apply to improving teaching and service. Successful acculturation strategies help new faculty members become oriented to ways of working systematically throughout the academic year (Gillespie et al. 2005).

However, mentoring presents challenges. Tierney and Bensimon (1996) documented the frustration of untenured faculty members who reported difficulty in understanding an ambiguous academic culture, one that increasingly values scholarship across all dimensions of performance. Further, helping new faculty members understand an ambiguous culture is complicated by the pressures that make balancing the competing demands on their time difficult. In institutions where teaching is highly valued, just helping faculty set aside time for research on a regular basis is critical (Boice 2000). Frequently new assistant professors

are following out their dissertation research by publishing chapters from the dissertation or revising it into a book manuscript; concomitantly, they are starting new independent lines of research. In addition to these traditional research activities, they are increasingly being asked to participate in new areas of scholarship with their undergraduates and in the community. Termed "the scholarship of engagement" (Boyer 1996), these activities combine teaching, service, and research in efforts to prepare students to be more effective citizens. Gelmon and Agre-Kippenhan (2002) and Sorcinelli (1992) discussed the ways in which this movement is affecting promotion and tenure decisions. New faculty might have become familiar with such scholarship if they were part of a preparation program for new faculty during their doctoral training. If not, they can feel overwhelmed by these new emphases that seem, at first, to detract from their discipline-based research.

Program Assessment in an Interdisciplinary Context

Adding to workload pressures are increased calls for faculty involvement in program assessment. Attention to assessment in higher education has been driven in part by external pressures; Ewell (2002) argued, for example, that assessment has become "an unavoidable condition of doing business: institutions can no more abandon assessment than they can do without a development office" (p. 22). The shift toward less teacher-centered education and increased participation of students in the learning process have complicated assessment as faculty examine not just acquisition of subject matter but also abilities such as critical thinking and collaboration. Assessment is increasingly understood as an integral and valuable part of new approaches to learning in undergraduate education that focus on student learning outcomes and the processes that lead to these outcomes (Ewell 2002).

When defined as "action research," assessment can involve multiple stakeholders, all of whom facilitate systemic change (Walvoord 2004). These multiple stakeholders include faculty, staff, and students, who, as capable social actors, identify strengths as well as name and solve problems in the department or program (Balcazar et al. 2004). Further, each group of stakeholders brings a particular understanding and various strengths to the action research process. For example, students bring knowledge (e.g., of the "hidden curriculum") and skills (e.g., building rapport with other students in interviews) that are unique and valuable research contributions.

Program assessment may also be valued for the opportunities afforded students to participate more fully in their educational experience (Falchikov 2005; Palomba and Banta 1999). Learning may be enhanced for students who contribute as collaborators in program assessment. While student roles in program assessment are not well described in the literature, research on student self- and peer-assessment in the classroom indicates improved cognitive and meta-cognitive competencies and the development of a variety of skills including problem solving, reflection, transfer of knowledge, critical thinking, listening, and communication (Falchikov 2005). These competencies and skills may be developed as students become partners in assessment beyond the classroom as well.

Yet developing a set of authentic program assessment practices that help to improve the undergraduate educational experience is challenging. Reductionist or mechanistic approaches become transparently inadequate. Ewell (2002) suggested that conceptual and organizational transformations are needed to move towards a view of assessment in which everyone assumes active and collective responsibility for fostering student learning and decision-making based on assessment information is widely shared.

In moving to a model of assessment that includes distributed decision-making and collective responsibility, the investment and involvement of faculty members are obviously

critical. Yet the literature indicates that overcoming faculty resistance is not easy (Yogan and Mercer-Taylor 2000). Debates arise around whether educational processes and outcomes can be specified and measured at all. For example, some educational critics have characterized the rhetoric surrounding assessment, with its emphasis on reductionist methods, as positivist and mechanistic. Legitimate and deeply-felt faculty concerns about assessment range from philosophical to methodological to political (Ewell 2002). Finding appropriate measures is also a challenge. Finally, there could be potential drawbacks in including students in program assessment. Without clear expectations, adequate training in research ethics and skills, and support for faculty mentors, student participation in assessment may contribute to problematic program dynamics and/or faculty workload inequities. In sum, authentic program assessment involving multiple stakeholders and multiple measures is difficult to plan and implement effectively.

The Case

The case that follows details the process of integrating program assessment, mentoring of junior faculty, and undergraduate research; it addresses many of the obstacles and challenges we have described. It was not implemented "as a project" in the IAS program but rather evolved out of the practices of several administrators, faculty members, and students. We recount the history of how the three different threads came to be woven together. We then follow with recommendations for those who might wish to implement such a project at their institutions.

The Undergraduate Research Project: Origins and Their Implications

In 2003 in a 400-level Interactive Learning: Theory and Practice course (taught by co-author Gillespie, an Educational Psychologist), two students began to raise troubling questions about the frequent use of small groups in classes across the program. As they learned about the theories that justify group work, they discussed the student lore about small groups, suggesting that many students were not aware of the benefits so clearly delineated in the theories. They reported that their peers seemed at best ambivalent and at worst unhappy about the frequency with which they were "in groups." Following the lead of the students, we defined small group activities as times set aside by the instructor during which students (between three and ten) work together (without the continuous presence of the instructor) on a common project or problem. The lore about small groups included extremes: horror stories and love fests. Because of these two students' interest in doing research and the instructor's own curiosity about how students described their small group experiences across classes, Gillespie invited the two students to join her in investigating the meanings of small group work for students who had been frequent participants. They eagerly agreed and enrolled in her undergraduate section of a graduate level qualitative research course the following quarter. The class provided background and experience in qualitative research, with an emphasis on how to conduct interviews and focus groups.

As Associate Director of the program, Gillespie could supervise this undergraduate project as part of her administrative duties because it related directly to program concerns. The supervision of the project (e.g., shepherding it through Human Subjects Review/IRB approval, helping students win grant monies for undergraduate research) and of the students' work (e.g., scheduling meetings, following on-line discussions, making articles available to the group on e-reserve) did take time and effort; but student enthusiasm about

the project, including conducting interviews and coding transcripts, and their willingness to work beyond required course assignments were so inspiring that she invited four more students to join the team the following year. They, too, took the qualitative research class. By the end of spring 2005, seven students had completed 17 in-depth interviews with a variety of students, all of whom had been in at least two groups that had lasted for more than one class period.

As part of her administrative duties, the Associate Director mentored junior faculty, one of whom expressed interest in helping to supervise the qualitative data collection and writing up the analysis (co-author Thomas, a Community Psychologist interested in the social context of learning). As a relatively new assistant professor in the program, Thomas found that becoming part of a research team with a senior faculty member was extremely helpful for other research efforts, particularly learning how to structure research experiences for the undergraduate researchers. (Based on this collaborative experience, Thomas has subsequently supervised two undergraduate researchers in a project extending her community-based research.)

After data from the qualitative phase of the project had been collected and analyzed (fall 2005), Gillespie invited two other new faculty, both mathematicians, to join the project, pointing out the advantages for practicing collaborative scholarship and highlighting the process given the feedback from Thomas. At the same time, a new group of undergraduate students volunteered to develop a follow-up survey. Having taken a statistics course, they took an independent studies course on SPSS. The analysis of that survey data has now been submitted for publication (Hillyard et al. 2007).

During the first 2 years, the undergraduate research project was not connected to assessment, in part because the program was determining the kind of assessment project it wanted to adopt. Important to the later connection between undergraduate research and assessment, however, were the program's existing goals and objectives, which faculty used to prepare their merit review and promotion and tenure materials. Those included, under teaching and learning, fostering collaboration skills and leadership development, the very issues that the undergraduate research team was investigating.

Interdisciplinary Program Assessment: The Context

Developing a process for assessment has been particularly challenging in an interdisciplinary program. Historically, assessment was linked to student portfolios; but, as the program grew, the portfolios became overwhelming to analyze in meaningful, systematic ways. The responsibility for a new approach to assessment became part of the duties of the Associate Director, who was charged during the second year of the undergraduate research project with chairing a committee to develop new recommendations and procedures. The committee analyzed syllabi, extracted learning objectives from them, and revised the questions given to students to prompt their reflection on materials in their portfolios. We wanted to align what students reflected about in their portfolios with what instructors had actually included in their syllabi—critical thinking, collaboration and leadership development, interdisciplinary research/inquiry, and writing and speaking. The committee recommended to the faculty that a fourth of them take up one of these each year respectively. The faculty adopted the committee's recommendation.

Weaving Undergraduate Research, Assessment, and Mentoring of Junior Faculty

Before becoming a formal part of the assessment process, the undergraduate research team engaged in action research when they presented findings and conclusions to program

faculty and administrators. This initial presentation generated rich discussion among faculty. When we explicitly linked the research project with program assessment, the "action" component of the research project expanded. The assessment committee studied the data collected, including publications (Gillespie et al. 2006a, b) on students' descriptions of their experiences in small groups and a working manuscript on their perceptions and attitudes toward them (Hillyard et al. 2007). The committee used these findings to create a program goal statement related to collaboration and leadership skills and to develop further a rubric that will be used to assess collaboration and leadership skills in the future. Most importantly, the IAS program faculty members are working to develop shared program understanding and commitments that can be clearly communicated in efforts to improve small group practices across the program.

Implementing the Project in Different Institutional Contexts

The project described could be implemented most easily in those institutions which value the scholarship of teaching and learning, for example, as described by Boyer (1990) in *Scholarship Reconsidered: Priories of the Professoriate*. His work spawned national efforts to make research on teaching and learning more visible and rigorous. For example, the Carnegie Academy for the Scholarship of Teaching and Learning, which has created the Gallery of Teaching and Learning, has successfully worked with various institutions to make a scholarship of teaching and learning respectable (see http://gallery.carnegiefoundation.org/). The project would also be of use to institutions already conducting assessment of student learning. Without an institutional context supportive of the scholarship of teaching and learning and participatory assessment, too many barriers would exist: lack of a senior faculty coordinator and released time for that coordinator to carry out the project, unprepared students, and junior faculty who are resistant to participating because they are not convinced that research on teaching and learning will count toward tenure and promotion.

If adequately supported, such a project is ideal for junior faculty members as they can devote their main research efforts to their discipline-based projects, but they have tangible evidence of scholarly engagement in service and teaching through authoring articles, giving presentations at teaching conferences, helping to organize department/program forums for dissemination of research information, and co-authoring assessment department/program documents. For a team to publish their research findings, projects need to be focused on topics of interest to a larger academic community. In determining the topic and throughout the entire project, the campus teaching and learning center can provide invaluable support and guidance.

Recommendations and Conclusion

We extracted from our experiences a set of recommendations for others interested in integrating undergraduate research, program/department assessment, and mentoring of junior faculty members:

Promoting Undergraduate Research

• Decrease strain on faculty responsible for supervising undergraduate researchers by (a) training students in team building and research and offering project-based courses, (b) building teams with at least two faculty members, and (c) becoming aware of small grants available to support undergraduate researchers and encouraging students to apply. In our projects, an undergraduate researcher has

been supported with a research scholarship awarded within the tri-campus system of which we are part. These students can then take on more of the management tasks involved in conducting the research.

- Build student capacity to participate in research by (a) developing a set of clear expectations, such as the ability to work independently and the successful completion of courses in relevant research methods and/or statistics, (b) announcing research opportunities and their benefits to undergraduate students early in their academic programs, and (c) working with advisors so that they can alert incoming students to research opportunities and the pre-requisites necessary for participating in undergraduate research. From our project, three students were admitted to graduate school, two were promoted on their jobs, and one was hired; they were told explicitly that their undergraduate research experience was part of the decision-making process. Faculty members have found that they can write more compelling letters of recommendation for students who have carried out a research project.

Mentoring Junior Faculty

- Make visible the opportunity to conduct research on student learning outcomes and identify the advantages of doing such research for promotion and tenure.
- Work in teams of junior and senior faculty to structure the undergraduate research experience. The senior faculty member needs to develop a research calendar that is sustainable and keep the project moving forward throughout the academic year. In our quarter system, we found that the first quarter could be devoted to explaining data collection techniques and having students look at the literature and journals that publish in the area; the second quarter could be devoted to data collection; and the third could be devoted to analyzing the data. The summer was the best time for writing up study findings for publication.
- Support junior faculty in navigating administrative "hurdles" such the Human Subjects/IRB processes, which can be quite daunting, particularly with a large collaborative team involving undergraduate researchers.

Collecting Valuable Assessment Data

- Frame assessment as a way to learn about the program and to showcase strengths using authentic practices. In our interdisciplinary context, for example, if we believe that interdisciplinary approaches are excellent ways to achieve desired cognitive outcomes (e.g., critical thinking and problem solving), as well as a variety of affective and developmental outcomes, assessment can help us to provide evidence for these claims and can also help us to identify and categorize other kinds of learning (e.g., collaboration skills) (Field and Stowe 2002; Klein 1999).
- Involve multiple stakeholders, including a formally-charged faculty assessment committee, in determining the types of data to be collected by the undergraduate research team.
- Think creatively about the kinds of quantitative and qualitative data to collect and analyze (e.g., student interviews, focus groups, surveys, observations in program cores, etc.). We have found that multiple methods are particularly valuable for triangulation and for establishing credibility with internal and external stakeholders. The undergraduate research project, for example, included qualitative interviews and focus groups as well as a survey. In addition, findings from the undergraduate research project were considered along with findings from student portfolios.

- Have the students and faculty present the findings to the committee or to the department/program as a whole at various points in the research process. We have found that it is also important to provide opportunities for faculty to reflect together without student researchers present.

Weaving together undergraduate research, program assessment, and mentoring junior faculty members have benefits for all stakeholders when such a project is carefully implemented and has garnered institutional support. On our campus, the project has engaged students, faculty, and administrators in important discussions about learning and teaching and led to new meaningful practices in our classrooms and program.

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