

## **CASES OF FACULTY WORK IN TEACHING, SCHOLARSHIP, AND SERVICE**

**PURPOSE OF THIS WEBSITE:** This website is intended to provide cases of faculty work in teaching, the various types of scholarship, and in service. These cases are for illustrative purposes only to assist institutions in implementation of Policy 803.17 and its Guidelines. Institutional Faculty Reward System policies are expected to vary by institutional sector.

### **DEFINITIONS, EXAMPLES OF EVIDENCE, AND ILLUSTRATIVE CASES**

#### **TEACHING**

**Definition:** Scholarly teaching is teaching that focuses on student learning and is well grounded in the sources and resources appropriate to the field. The aim of scholarly teaching is to make transparent how faculty members have made learning possible (Shulman).

#### **Evidence of Scholarly Teaching:**

- Evidence that the faculty member reads the pedagogical literature, or attends instructional development sessions, in h/her own discipline and then branches out to the broader pedagogical literature.
- Evidence that the faculty member tries some of the teaching methods from the literature/instructional development sessions in h/her own classes.
- Evidence that the faculty member assesses whether or not h/she has been successful in increasing student learning by doing some formative evaluation with h/her students, adjusting h/her approach, asking a peer to come into the class to review the changes h/she has implemented.

#### **Cases of Scholarly Teaching**

**Case #1.** A mathematics faculty member read that time-on-task is a critical factor in student learning and, following formative evaluation, designed innovative web-based exercises to stimulate course-related student activity outside of class. Disciplinary colleagues at another university explored his course's website and, with the idea of possibly incorporating at least some features of the innovative course in their own courses, invited the mathematician to a seminar to explain the how and why of the innovations.

**Case #2.** A review of the pedagogical literature shows that teaching evolution effectively requires a simultaneous fostering of critical thinking, both within biology and about science in society. Evolution is the core of biology, and is central to public understanding and acceptance of basic science, but is rejected by a plurality of a public that accepts much pseudoscience. Data were gathered to determine whether student's initial acceptance of evolution affected their grades. In prior studies, initial rejection had been associated with lower grades. Several techniques were developed to reduce the conflict for such students without sacrificing the core science. Initial acceptance now has no relation to grades in the course.

#### **SCHOLARSHIP**

##### **The Scholarship of Teaching and Learning**

**Definition:** The Scholarship of Teaching and Learning is the “systematic examination of issues about student learning and instructional conditions which promote the learning (i.e., building on previous scholarship and shared concerns), which is subjected to blind review by peers who represent the judgment of the profession, and, after review, is disseminated to the professional community” (Research Universities Consortium for the Advancement of Scholarship of Teaching and Learning).

**Evidence of the Scholarship of Teaching and Learning:**

- Evidence that the faculty member’s scholarship in the schools or in the university classroom is public, peer reviewed and critiqued.
- Evidence that the faculty member’s scholarship is exchanged with other members of professional communities through postings on websites, presentations to h/her department or college, presentations at professional conferences, and/or written up and published.
- Evidence that the scholarship builds upon previous scholarship and shared concerns.
- Evidence that the scholarship contributes new questions and knowledge about teaching and learning.

**Cases of the Scholarship of Teaching and Learning (SoTL)**

**Case #1.** This project addressed the problem that college-level required courses in introductory statistical analysis are generally unsuccessful in conveying the necessary concepts for students to apply or understand statistics. The project utilized digital video case studies of former students who took Statistical Techniques and who applied statistical tools in their workplace to solve significant problems. Each video addressed how the workplace problem originated and its characteristics, how statistical analysis was used to solve the problem, what the outcome was on the organization or environment, and the impact on the graduate’s job or career. The problem definition component of the video was placed on a Web site and streamed to small groups of students outside of class, who analyzed the issue and proposed statistical methods for addressing the issue. Each group’s proposed solution was shared in class to stimulate discussion. A major component of the project was the development and application of assessment tools to determine if the digital video case studies were successful in meeting these goals. Another project element was the dissemination of the results of this SOTL research to the large community of scholars who teach such courses.

**Case #2.** Two chemistry faculty were awarded an NSF-ILI grant for the purchase of several Silicon Graphics (SGIs) in the winter of 2003 for use in undergraduate physical chemistry laboratories. These workstations allow for high-level molecular modeling simulations and the computation of various electronic and thermodynamic variables. Working with a third faculty member, whose specialty is the teaching of chemistry, the faculty determined that an evaluation of how the SGIs were incorporated into the curriculum and used by students would help improve the effectiveness of this technology as a teaching tool. The third faculty member observed the labs for two semesters, looking at types of student-student and student-faculty interactions. Students were also interviewed for 30-50 minutes each at three times during the year. Based on the results of the observations and the interviews, the computational portion of the laboratory was revised. The three faculty, with the assistance of a student, have also created a web-site for general chemistry and given papers on their project at regional and national meetings.

**Case #3.** Two biology colleagues teach courses that follow one another in sequence. Students do not seem to be able to apply in one course what they learned in the previous one. Looking for ways to help students hone this skill, the biologists reviewed the literature on how students learn science, especially as it relates to the application of previously learned information to new situations. They decided to introduce the use of case studies into the courses, providing students opportunities to apply previously learned knowledge to new formats. At the end of the second semester, the faculty compared grades in the two courses (DFW grades), with grades from biology courses that did not use case studies. The work led to the development of a campus-wide workshop on the effective use of case studies to improve student learning (and retention), facilitated by the two biologists. The biologists subsequently submitted a paper to the *Journal of Biology Teaching* on their work.

**Case #4.** This project examined ways in which prospective teachers learned how to do research while enrolled in a course on methods of teaching science in elementary schools. Data sources included tapes of instruction, copies of syllabi, lesson plans, students' journals, drawings, and written work, responses to questionnaires distributed in class, and taped interviews. During the first third of the course, the prospective teachers formulated and explored pedagogical inquiries in small groups in collaboration with experienced teacher researchers. After completing the group investigations, they began planning individual research projects which they undertook while interning two days a week in local schools. In both contexts, the prospective teachers formulated pedagogical inquiries that focused upon gender issues, cooperative learning, inquiry approaches to teaching, and learning styles. Excerpts from the prospective teachers' writings document the evolution of their understandings of and attitudes toward inquiry approaches to learning and teaching science. Informal questionnaires administered at various points in the course assessed their changing perceptions of the value of such inquiries. Results of this work were presented at a national conference and published in a journal on teaching and learning.

**Case #5.** There is currently a body of literature suggesting that parents are the single common denominator in all of the activities, services, and life-events experienced by children with disabilities. As a result, parents of children with disabilities are potentially the child's most knowledgeable and effective advocates. The primary responsibility for empowering parents of children with disabilities as advocates falls to professionals, by virtue of their access to information and resources. However, both families and professionals have described the process of meeting a child's needs as a highly stressful one, marked by disparity between parents and professionals throughout the collaborative process. Developing professionals who are sensitive to the needs and perspectives of parents is an important goal for special education programs. To support the transformative process from 'students' to 'professionals' who are capable of empowering families, two faculty members in special education designed a course that is co-facilitated by an intervention services specialist and several parents of children with disabilities. The purpose of their study is to determine whether students develop increased understanding and awareness of issues related to creating and maintaining effective family-professional partnerships from pre- to post-intervention when compared to a control group who did not participate in the course. Activities and interactions that prompted transformative change for these students were identified. The study resulted in the addition of a unique dimension to the body of literature defining "best practice" in the preparation of professionals who serve children with disabilities and their families and reduce the disparity that too often characterizes this relationship.

## **The Scholarship of Engagement**

**Definition:** The Scholarship of Engagement in schools is characterized by the following: 1) it is to be conducted as an academic engagement with the public schools; 2) it is to involve the responsible application of knowledge, theory and/or conceptual framework to consequential problems; 3) it should test a research question or hypothesis, 4) one must be able to use the results to improve practice and inform further questions, and 5) resulting work should be available for dissemination for peer review of results (Glassick, Huber and Maeroff).

### **Evidence of the Scholarship of Engagement:**

- Evidence that the faculty member designs and implements a research agenda in at least one area of need recognized by the public schools.
- Evidence that the faculty member applies relevant knowledge toward resolution of the identified need.
- Evidence that the faculty member assesses the impact of the engagement.
- Evidence that the faculty member disseminates for peer review the results of the outreach.

### **Cases of the Scholarship of Engagement**

**Case #1.** Faculty and students in Colleges of Arts and Sciences collaborated with faculty and students of local high schools in a structured, discipline-based Learning Community to improve the quality of teaching and learning of the discipline. Through a service-learning course, students who were mentored by college faculty worked with teachers to design and implement lessons with up-to-date content, constructivist teaching strategies, and learning outcomes appropriate to the grade level of the students. The research question was: To what extent does the placement of mentored undergraduate majors and graduate students in high school classrooms, working as partners to teachers, improve the quality of teaching and learning science and mathematics? Findings of each classroom were analyzed and applied to enhance the feasibility and quality of the learning community, and to increase the likelihood of replication and sustainability. Results of this Learning Community were shared statewide and nationally. With the leadership of College faculty, papers were co-authored by members in the learning community and published in peer-reviewed journals.

**Case #2.** Higher Education faculty contributed to the scholarship of engagement by applying their knowledge and expertise within a collaboration to improve teaching and learning in a K-12 course. The research question was: What are the results of a K-12 & higher education faculty collaborative that is designed to assess areas for improvement, develop strategies and team teach a K-12 course? A team of K-12 and higher education faculty worked together to assess and redesign a course. Strategies and course changes were based upon study of curricula, classroom observations and student data. The weakest areas of student learning as indicated by these data were the points of focus for analysis, study of related literature and development of effective classroom strategies. The experimental course was team taught collaboratively integrating content knowledge, pedagogical knowledge and teacher practice knowledge into the delivery. The team collected and analyzed data to measure increased student learning. Data were fine enough to identify which strategies worked and which need refinement. This information was used to further improve and redeliver the course. The redesigned course and the procedure for

course development and improvement were presented at regional conferences. Course and delivery format were adopted by district administrations.

### **The Scholarship of Discovery**

**Definition:** The Scholarship of Discovery is basic research in the disciplines including the creative work of faculty in the literary, visual, and performing arts. It is the “pursuit of knowledge for its own sake, a fierce determination to give free rein to fair and honest inquiry, wherever it may lead” (Glassick, Huber and Maeroff). It contributes to the stock of human knowledge in the academic disciplines.

#### **Evidence of the Scholarship of Discovery:**

- Evidence that the faculty member’s research is innovative (as opposed to routine) as judged by peers at the institution and elsewhere.
- Evidence that the faculty member’s research represents quality, rather than mere quantity.
- Evidence of the faculty member’s publications in high quality refereed journals and the quality and quantity of citations and reprints of h/her research publications. If appropriate for the discipline, evidence of the ability to attract extramural funding.
- Evidence of invited seminars and presentations (abstracts), if travel funds are provided, are also an indication of the Scholarship of Discovery.

#### **Cases of the Scholarship of Discovery**

**Case #1.** This project was motivated by a perceived application of algebraic group theory to solving large classes of differential equations. Historically, engineers and others needing to solve differential equations in their work must rely upon approximation methods as most differential equations are considered unsolvable. Hence, the project had the potential not only to contribute to the base of knowledge in the field, but also to aid those who use mathematics in their field. The investigator undertook study to become more knowledgeable about the area of differential equations. An initial hypothesis was investigated through support from an internal research grant. It was discovered that finite algebraic groups are connected to differential equations having a very specific type of solution. The results of the work were presented at a subsequent conference and published in a refereed journal. They have since been used in proving consequential results in a new and growing field of mathematics and in the development of software used to solve differential equations.

**Case #2.** A research project dealing with the hydrology of a region was formulated when the researcher learned of the presence of springs during an agricultural workshop. None of the springs had ever been described or their waters analyzed, so the project had the potential for bringing substantial revision to the hydrology of the region. A small development grant was awarded for the purchase of analytical equipment. Students were engaged to periodically conduct carefully controlled assays of water chemistry and quality. Following two years of data gathering, a report was submitted to and was accepted by the State Geologic Survey as a water supply bulletin. The collaborative work with students was described and accepted for publication in a peer-reviewed journal on science teaching.

## **SERVICE**

**Definition:** service is outreach or engagement by higher education faculty for the purpose of contributing to the public good. Contributions to the public good may include faculty work that contributes to solutions to complex societal problems, to the quality of life of Georgia's citizens, and to the advancement of public higher education. In the case of service to the public schools, the intent should be for the improvement of teaching quality and student learning. The following activities might be included in work with the schools: involvement in Learning Communities, workshops given based on need, collaborative development of courses, unit writing for the new Georgia Performance Standards, design of field experiences to support existing courses, engagement in co-observation / vertical alignment, etc.

### **Evidence of Service:**

- Evidence that the faculty member links h/her work in some way to public contemporary issues and/or to improving the quality of life.
- Evidence that the faculty member, either through h/her scholarly work and/or service, applies h/her knowledge toward solutions to complex societal problems and human needs.
- Evidence that the faculty member contributes to the continuous improvement of public higher education.
- Evidence that the faculty member contributes in some way to the public good.

### **Cases of Service to the Schools**

**Case #1.** A professor of mathematics collaborated with high school teachers to construct effective learning modules, inclusive of a focal problem, content, design, implementation, and assessment, related to the topical expertise of the faculty. The development of each module was based on the needs specific to a grade level and classroom, including the resource base of the classroom, level of interest and competency of the teacher, and level of competency and required knowledge of the students. The professor prepared the module and guided the teacher in its implementation. In turn, the teacher and students provided feedback on the feasibility and compatibility of the module to each classroom culture.

**Case #2.** Higher Education faculty regularly engaged in group discussions via a Professional Learning Community with K-12 faculty. These groups studied student data, review literature on best practices, and shared experiences with teaching and learning. One of the main accomplishments was collaborative planning of customized professional learning for teachers. The learning community also provided a forum for ongoing discussion about classroom implementation of the professional learning.

**Case #3.** Higher education faculty and high school physics & physical science teachers met to discuss and develop seamless alignment of the curricula. Student content knowledge, study skills, and conceptual understanding were all discussed. High school and higher education faculty observed each other teaching similar or aligned topics for the purpose and applied lessons learned to the development of better aligned curriculum.

Works Cited:

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Shulman, Lee. (1998). Course anatomy: The Dissection and Analysis of Knowledge Through Teaching. In P. Hutchings (ed.), *The course portfolio: How faculty can examine their teaching to advance practice and improve student learning*. (pp.5-12). Washington, DC: American Association for Higher Education.