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Currents Turns Five

Josna Rege

The essays and teaching reports in this double issue explore interdisciplinarity, faculty learning, visual representation, group work, metacognition, and the learning styles of particular groups of students. Most of them are themselves products of collaboration across disciplines.

A lot of lip service is given to interdisciplinarity, but there is much less education on how to implement it in one's teaching or even what it is. And since most higher-education institutions are still organized on a disciplinary basis, faculty and administrators do not necessarily know how to evaluate interdisciplinary teaching and scholarship and frequently undervalue them. Furthermore, interdisciplinarity is understood very differently within and across different disciplines. An interdisciplinary journal like *Currents in Teaching and Learning* must continually wrestle with these problems, and our lead essay in this issue tackles them head-on.

In "Disciplinary Expertise: Bridging Two (or More) Cultures in Undergraduate Projects," co-authors Gwen Ottinger (interdisciplinary arts and sciences, environmental justice), Richard Worthington (politics), Warren Gold (environmental science, restoration ecology), Kern Ewing (restoration ecology), James Fridley (environmental and forest sciences), and Rodney Pond (ecological restoration) take on a problem that is at the heart of interdisciplinary teaching: lack of experience on the part of faculty whose expertise is rooted in particular disciplines. The essay presents a variety of strategies to address this problem, derived from teaching with interdisciplinary community-based research (CBR). It also reflects on the institutional structures that create and perpetuate the problem and concludes by recommending changes in these structures that could foster not only interdisciplinary CBR, but interdisciplinarity in general.

Our second essay, "Building a Faculty Learning Community at a Research University," was co-written by a team of FLC members across the disciplines, Stacey Brydges, Lakshmi Chilukuri, Geoffrey Cook, Maureen Feeley, Matthew Herbst, Ella Tour, and Lelli Van Den Einde and focuses on the subject of student learning in large classes. All the co-authors are based in the same large research university and belong to a category of teaching faculty whose advancement and tenure is based primarily on teaching and undergraduate education. The interdisciplinary perspectives shared in this year-long FLC reduced the relative isolation of the participants, who were

each engaged in different discipline-based education research (DBER) projects. The FLC yielded the important insight that the institutional positions and expectations of teachers affect the teaching environment and consequently, student learning. Another insight was an increased recognition of “the collaborative potential of teaching assistants (TAs) in improving teaching and learning.”

In “Disciplinary Expertise,” two of the strategies recommended by Ottinger et al. to deal with the difficulties faced by instructors with disciplinary training when teaching interdisciplinary courses were “drawing on the expertise of community partners” and “using students’ diverse backgrounds as additional sources of expertise.” Namita Manohar, Dana Berkowitz, JeffriAnne Wilder, and Justine Tinkler, co-authors of the third essay in this issue, “Photovoice: A Critical Pedagogical Assignment in the Sociology Classroom,” mobilize both these strategies in order to bring an interdisciplinary approach into their discipline. Photovoice was first developed as a participatory research methodology in the field of public health, bringing community members into a problem-solving process in which they critically analyzed their own experience to generate structural solutions. The authors of “Photovoice,” sociology professors from public universities in four different states, have adapted this methodology into an active-learning project in which students analyze photographs they have taken themselves, critically examining their own lived experience to develop an understanding of how structural inequalities shape their lives.

David Faflik’s teaching report, “Light Writing: Verbal, Visual, and Virtual Images in the STEM Classroom,” also employs visual images innovatively, in teaching writing to STEM (science, technology, engineering, and mathematics) students. Faflik uses the pedagogy of Visual Thinking Strategies (VTS) to stimulate “interdisciplinary cognition.” In his class, critical “reading” of Web-delivered visual images enables

students “to convert their facility with online visuals into an enhanced verbal dexterity.” He argues that “the visual today functions as an instructive bridge” between media, between disciplines, and between classical and contemporary “methods of making meaning.”

In “Millennial Students: A Course Design Logic Model Utilizing Group Work Skill Development,” co-authors Scott Anstadt, Jeremy White, and Lesley Medley, also gear their teaching practices to contemporary students’ learning styles. All three are social workers who are active in the community as well as being teacher-scholars. They have developed a course in group skills with team-based assignments integrating seven learning styles which they have derived from the seven characteristic traits of Millennial students identified by Howe and Straus (2000) in *Millennials Rising: The Next Great Generation*. Their logic model will help teachers across the disciplines design their own courses using assignments that are attentive to the needs of this generation.

Diane Ruggiero’s “Hybrid Spanish: Succeeding in First-Year College Foreign Language Class through Metacognitive Awareness” breaks with the widely accepted practice of language immersion—speaking only the target language in class—by including an introductory unit conducted in English in which students reflect on the process, their personal experience, and the cultural implications of language learning. Ruggiero’s focus here, as in the first two teaching reports, is to import a self-reflexive practice that has been shown to enhance student learning in other disciplines—and, indeed, outside the classroom—into her own discipline, creating a “hybrid” course in two senses of the word—hybrid in that it is conducted in two languages, and hybrid in that it employs in an introductory language class teaching practices that, while unorthodox in that disciplinary context, have proven to be effective across the curriculum.

In this issue we introduce a new, occasional category, *Currents-to-go*, designed to provide higher-

education teachers across the disciplines with handy guides to topics of current interest. Each guide will be numbered (*collect the set!*), and will include a brief introduction to and overview of an issue or problem, a list of teaching strategies or classroom practices designed to address it, and references for further reading. In *Currents-to-go* #1, “ADHD in the Classroom.” Dev Kumar Bose presents a set of recommendations for classroom practices designed particularly for adult learners with ADHD. Since they incorporate Universal Design for Learning (UDL), these practices should meet the needs of a wide range of students.

The National (US) Center on Universal Design for Learning is highlighted in this issue’s edition of Current Clips & Links, as is another project designed to acknowledge the experiences and values of all students: the Race Equality Toolkit produced by Universities Scotland. The rest of the section features three blogs whose purview is as wide-ranging as our own.

As Book Review Editor Sean Goodlett notes, both the books reviewed in this issue require readers to re-evaluate their pedagogical perspectives and assumptions. Benjamin Lieberman discusses *Cheating Lessons* by James M. Lang, and Kisha Tracy considers *What the Best Teachers Do*, by Ken Bain.

We bid farewell to Matthew Johnsen as Book Review Co-Editor (though, thankfully, he remains on the Advisory Board). Thanks to Matt for his important role in establishing the Reviews section, and to Sean Goodlett for having undertaken to go it alone for a time. We also thank Holly Ketterer who leaves the Advisory Board having made her mark during her short but productive time with us, and founding board member Bonnie Orcutt, whom we hope to welcome back in the future. Our grateful good wishes go with the buoyant Stephanie Spino, our editorial assistant for Volume 5, who came to us in her last two semesters of graduate coursework, dove in at the deep end and helped keep us afloat during a difficult year.

As always we extend our thanks to *Currents*’ stalwart team of referees, who work throughout the year, even in the intersessions and summers, to move submissions through the review process. For this double-issue they include: P. Sven Arvidson, Andrea Bilics, J. Harrison Carpenter, Judith Jeon-Chapman, Michelle Corbin, Tom Deans, Sue Fan Foo, Maria Fung, Sean C. Goodlett, Ruth Haber, Tona Hangen, Matthew Johnsen, Vrinda Kalia, Joyce Mandell, Fran Manocchio, Bonnie Orcutt, Matthew Ortoleva, Ana Perez-Manrique, Jessica Skolnikoff, and Champika Soysa.

Currents in Teaching and Learning was launched five years ago as a non-specialist, jargon-free, peer-reviewed electronic journal that fosters exchanges among reflective teacher-scholars across the disciplines. With the completion of Volume Five I will be stepping down as founding editor. However, I will continue to serve on the Advisory Board, most of whose members have been with *Currents* since its inception and whose wisdom and wit have given the journal a solid foundation that I hope will sustain it for years to come. It has been an honor to work with this talented team. My deepest thanks to all the current and former members: Daron Barnard, Sue Fan Foo, Maria Fung, Sean Goodlett, Ruth Haber, Matthew Johnsen, Holly Ketterer, Pearl Mosher-Ashley, Jeffry Nichols, Bonnie Orcutt, Beth Russell, Dan Shartin, Karen Woods Weierman, Catherine Wilcox-Titus, Karl Wurst, and Janice Yee.

The Academic Affairs Division of Worcester State University, particularly former Associate Vice-President of Academic Affairs Julie Wolman and current Associate VPAA Patricia Marshall, and Andrea Bilics, Director of WSU’s Center for Teaching and Learning, have my gratitude and respect for their sponsorship, their consistent support, and the full editorial freedom they have given to the journal. I am happy to be passing the baton to my colleague, Dr. Ana Perez-Manrique, and have the greatest confidence in her leadership as *Currents* comes of age. ■■

Interdisciplinary Community-Based Research with Disciplinary Expertise: Bridging Two (or More) Cultures in Undergraduate Projects

Gwen Ottinger, Richard Worthington, Warren Gold, Kern Ewing, James Fridley, and Rodney Pond

Abstract

Increasingly popular on college campuses, community-based research (CBR) projects offer exciting opportunities for students to integrate ideas and methods from multiple disciplines. However, their interdisciplinarity stretches the expertise of disciplinarily trained faculty. In this paper, we present strategies for instructors teaching with interdisciplinary CBR to mobilize relevant but unfamiliar disciplines, including collaborating with colleagues with complementary expertise, drawing on the expertise of community partners, using students' diverse backgrounds as additional sources of expertise, and transforming the bounded nature of our own knowledge into an opportunity for learning. Experience with these strategies calls attention to a thicket of unresolved institutional problems in the configuration of disciplinary and interdisciplinary activities in the academy. The paper concludes with recommendations for institutional changes that could help foster interdisciplinary CBR.

Keywords

community-based research, interdisciplinarity, disciplinarity, university structure, two cultures

Introduction

Eager to lure talented young people, colleges and universities are increasingly promising prospective students the opportunity to learn through “real-world” projects. Engaged with complicated social and environmental issues, such projects offer students concrete ways to make a difference in the world. They also demand that students integrate disparate fields of knowledge. A project focused on improving environmental quality in an urban setting,

Gwen Ottinger is an assistant professor in the School of Interdisciplinary Arts and Sciences at the University of Washington-Bothell and co-editor of *Technoscience and Environmental Justice: Expert Cultures in a Grassroots Movement* (MIT Press, 2011). Her courses on environmental justice have involved students in a variety of service learning and undergraduate research projects.

Rick Worthington is a professor of politics at Pomona College. He and his students have completed numerous community-driven research projects, and his co-edited volume *Citizen Participation in Global Environmental Governance* (Earthscan, 2011, with M.Rask/M. Lammi) analyzes the first global citizen consultation in history.

Warren Gold is an associate professor of environmental science and co-director of the University of Washington Restoration Ecology Network. He has been involved in community-based ecological restoration with students for 15 years, and in 2004 received, with

Kern Ewing, the John Rieger Award from the Society for Ecological Restoration.

Kern Ewing, a professor at the School of Environmental and Forest Sciences in the College of the Environment, University of Washington, has published work on coastal marshes and on restoration practices. He teaches restoration ecology courses, has been the faculty manager of the Union Bay Natural Area since 1990, and is co-director of the UW Restoration Ecology Network.

James Fridley is a professor at the School of Environmental and Forest Sciences in the College of the Environment, University of Washington.

Rodney Pond was a co-instructor with the UW Restoration Ecology Network capstone course for six years. He currently teaches Sustainable Horticulture for Edmonds Community College at the Monroe Correctional Complex.

for example, might draw on the disciplines of chemistry, epidemiology, and sociology to characterize city-dwellers' exposures to chemical pollution; public policy, education, and the performing arts might additionally be mobilized in the course of developing strategies for taking action on pollution issues.

While community-based projects offer exciting integrative opportunities for students, their inherent interdisciplinarity stretches the boundaries of both student backgrounds and faculty expertise. The instructors who sponsor these interdisciplinary CBR experiences typically claim mastery of just one discipline, yet acknowledge that CBR projects cannot be tailored to fit neatly within its confines. The challenges faced by discipline-oriented faculty in leading interdisciplinary CBR are intensified when the disciplinary boundaries crossed by projects resemble yawning chasms rather than privet hedges—when, for example, projects reach not only across science disciplines but into the social sciences, arts, and humanities as well, and when they combine scientific or social scientific inquiry with engineering problem-solving.

How can interdisciplinary CBR—and integrative student learning—take place under the guidance of instructors with deep knowledge of disciplinarily bounded domains? Here we present a variety of strategies for mobilizing unfamiliar disciplines to supplement our own expertise as faculty. In addition to collaborating with colleagues with complementary expertise, a strategy that, we argue, is significantly limited by a variety of resource constraints, we discuss our experiences drawing on the expertise of community partners, using students' diverse backgrounds as additional sources of expertise, and transforming the bounded nature of our own knowledge into an opportunity for learning.

In discussing these strategies and the experiences that have prompted us to use them, we call attention to a thicket of unresolved institutional problems in the configuration of disciplinary and interdisciplin-

ary activities in the academy that CBR practitioners must navigate. In our conclusions, we draw on our experiences to make recommendations for institutional changes that could help foster interdisciplinary CBR. Although our recommendations draw on strategies that individual faculty have adopted in undergraduate courses, we argue that they could strengthen both teaching and research by helping to establish more constructive relations between disciplinary and interdisciplinary modes of thinking in the academy.

Disciplinarity and Interdisciplinarity in the Academy

Interdisciplinary initiatives, in both teaching and research, have largely been layered over traditional disciplines, which have organized colleges and universities for over a hundred years. Our interdisciplinary efforts are thus shaped by the history of disciplines, their continued importance as an organizing feature of higher education, and persistent tensions between disciplinarity and interdisciplinarity in scholarly work.

The Emergence of Disciplines

Disciplines as we now know them were institutionalized in the late 19th century. Until then, the curriculum of American colleges and universities, modeled on the European university, still drew largely on classical Greco-Roman disciplines such as arithmetic, astronomy, dialectics, and rhetoric. Largely ignoring the array of specialized scientific pursuits spawned by the radical empiricism of the Scientific Revolution in the 16th and 17th centuries, the basic organizational framework of curriculum and inquiry of early American institutions of higher learning changed little even as these specialized pursuits began to evolve into familiar fields of study, like chemistry and anatomy (Ben-David, 1972).

Wholesale change in the structure of colleges and universities came only in response to industrialization—and then only grudgingly. As manufacturing grew throughout the 19th century, academic institutions retained their traditional role as the agents of

cultural refinement and training for an elite stratum of doctors, lawyers, clergymen, and educators. Industry was left to advance on the innovations of self-educated tinkers and the refined sensibilities of the “great men” who owned and managed firms. By the latter part of the 19th century, however, the emerging industrial economy had reached the limits of the progress that could be made within this framework. The manufacturing industry’s interests in further development created the need and opportunity for scientifically-grounded approaches both to technological innovation and to the challenges of managing firms and society at large (Noble, 1977).

In this context, the advent of the research university was a watershed event. First appearing in the United States with the founding of a graduate program at Johns Hopkins University in 1876, the research university replaced the traditional model of a faculty comprised of a member in each of the specialties with a structure in which both new and old disciplines had their own departments (Carroll, 1986). This departmental structure promoted the establishment and growth of disciplines in three ways. First, it could accommodate the growing legions of specialists that the new, research-oriented areas of inquiry produced; furthermore, it prompted collaboration within these organizational units to professionalize the disciplines. Finally, the more complex and differentiated organizational structure, including the increased number of units or departments within it, reinforced the faculty members’ sense of allegiance to their own disciplines, and encouraged competition for resources and prestige with others.

The research university, thus organized, structured the intellectual work of scholars in (at least) two important ways. First, in order to feed their appetite for research funds and to secure employment for their graduates, disciplines cultivated alliances outside the university with private industry and government. In the

period from 1880 through 1920, for example, geologists helped the federal government map the resources of an enormous continent (Sloan, 1980), and the disciplines of chemistry and electrical engineering positioned themselves to provide graduates and ideas to the most dynamic sectors of industry (Noble, 1977). The research university’s interest in allying the new disciplines with the ethos and practical agendas of industrial growth had an additional consequence: it tilted the disciplines toward social conservatism. Although many early social scientists were drawn to their fields by an interest in social reform, universities were quick to discipline those who openly supported trade unions or advocated economic reforms; threatened with dismissal, faculty members frequently yielded (Furner, 1975).

The structures and trends established with the development of the research university persist today and continue to shape institutions of higher education. The disciplinary boundaries institutionalized by the research university are actively policed by faculty in the professionalized disciplines, who set standards for who counts as an authority, judge research quality through peer review, develop graduate training programs that perpetuate disciplinary modes of thinking, and reinforce distinctions between members and non-members of the discipline through new faculty hires and other personnel decisions. This boundary maintenance work reflects, and reinforces, intellectual differences between disciplines, which are distinguished from one another not only by subject of study but by the ways they make new knowledge, including their methods of asking questions and/or modes of presenting results.

The work of the university, as a result, is carried out largely along disciplinary lines. The university’s products and services—that is, its curricular programs and its research, including the journals and book series that are the venues for publication—are predominantly disciplinary. Financial flows are also channeled through disciplinary structures: tuition and state subsidies that

support curriculum are typically allocated to disciplinary departments; much research funding comes from agencies such as the National Science Foundation whose programs are organized principally by discipline; and private philanthropy tends to flow to individual departments and schools. Partly because funds are controlled by disciplinary units, decisions about faculty recruitment and retention are also determined by disciplines.

The Rise of Interdisciplinarity

As early as the 1960s and 1970s, interdisciplinary initiatives began to emerge at U.S. institutions of higher learning. Colleges and universities' growing interest in interdisciplinarity responded in large part to the limitations of the disciplines in fully addressing complex problems. The disciplinary structure of science and engineering, long oriented to specific industrial innovations, struggled with a new brand of problem that required expertise from multiple technical fields (Carroll, 1986; Croissant & Doerr-Smith, 2008). At the same time, social movements for gender equality, civil rights, environmental quality, and international peace attracted—and demanded—attention from scholars across the academy, especially in the social sciences and humanities (Brint, 2005; Greenwood, 2004). The movement of cutting-edge research problems to the edges, and spaces between, the traditional disciplines was intensified by the massive knowledge growth that these fields had already produced. Several decades of investment in research on the disciplines' core questions made those questions relatively less compelling than the relatively unstudied interdisciplinary problems. The production of disciplinary scholars, which in the mid-20th century tended to occur at a rate faster than the production of jobs that could accommodate them, also contributed to the rise of interdisciplinarity. The interdisciplinary field of Science and Technology Studies (STS), for example, has historically been populated with scientists and engineers who grew interested in the social issues

connected with their disciplinary areas and with the oversupply of scholars produced by the social science and humanities disciplines (Worthington, 1987).

These factors combined to yield an array of new fields of study—including (besides STS) gender studies, critical theory, environmental studies, and applied life sciences, to name a few—each with affiliated research journals, conferences, and, on many campuses, academic programs. Interest in interdisciplinarity has prompted new institutional initiatives by colleges and universities. And funding agencies like the NIH and NSF now make awards to support the establishment of interdisciplinary research centers and interdisciplinary graduate training (Brint, 2005; Jacobs & Frickel, 2009; Rhoten, O'Connor, & Hackett, 2009).

Persistent Tensions between Disciplinarity and Interdisciplinarity

With few exceptions (see Macilwain, 2007), however, interdisciplinary initiatives have not represented a wholesale reorganization of the university. Rather, they have been overlaid on existing disciplinary structures: as Brint (2005) notes, “the preferred organizational forms are the ‘interdisciplinary centre’ and the ‘interdisciplinary conference,’ rather than the traditional academic department and disciplinary association” (37). Interdisciplinary undergraduate and graduate programs are frequently staffed by faculty with appointments in disciplinary departments. Disciplines are even integral to the interdisciplinary initiatives of funding agencies; for example, students in the NSF's Integrative Graduate Education Research and Training (IGERT) program pursue PhDs in a traditional major while receiving additional training in thematically related, but usually traditional, disciplines (Rhoten et al., 2009).

Universities and their students may benefit from the persistence of traditional disciplines alongside interdisciplinary initiatives. The deep knowledge foundations of the disciplines allow interdisciplinary efforts to be built on solid contributions from a vari-

ety of fields. Some social scientists dispute the notion that disciplines are too static to accommodate new kinds of research questions and remain skeptical that interdisciplinary approaches stand to create knowledge superior to that produced by disciplines (Jacobs & Frickel, 2009). Indeed, an experiment comparing the performance of IGERT graduate students and graduate students without interdisciplinary training showed that advanced graduate students from disciplinary backgrounds actually performed better in an interdisciplinary environmental problem-solving exercise than their peers with explicit interdisciplinary training (Hackett & Rhoten, 2009; Rhoten et al., 2009).

Yet simply superimposing interdisciplinary initiatives on discipline-oriented institutions also creates problems for interdisciplinarity. Funding continues to flow through disciplinary departments, whose continued control of resources tends to mean that courses in the discipline are prioritized over interdisciplinary ones. Hiring and promotion decisions, too, tend to favor disciplinary scholars: even departments interested in promoting interdisciplinary scholarship struggle to evaluate its quality fairly (Jacobs & Frickel, 2009; Lamont, Mallard, & Guestzkow, 2006).

These dynamics present multiple challenges for interdisciplinary community-based research projects. Most faculty—including most of the faculty involved in CBR—continue to come from traditional disciplines even as the projects they supervise range widely across disciplinary boundaries, and the persistence of disciplinary departments as the university's primary administrative units means that collaboration with colleagues from other disciplines, especially in teaching, can be seen as appropriating resources from other departments. Finally, departmental prioritization of disciplinary research and teaching can make it difficult for faculty involvement with CBR projects, especially interdisciplinary ones, to be recognized in hiring, tenure, and promotion decisions.

Interdisciplinary CBR Projects

The trends described above shape the contexts in which the authors have involved students in interdisciplinary community-based research projects. Each of us has started from a disciplinary (or quasi-disciplinary) background; all of us work in institutions where interdisciplinary programs coexist uneasily with a predominantly disciplinary structure. Yet our CBR projects have carried us, instructors and students alike, into domains that required expertise not just from neighboring disciplines but from areas of knowledge far removed from our own specialties.

For instance, at Whitworth University, theatre students collaborated with the Center for Justice, a non-profit law firm, to address issues of police accountability in the community. Using theatre activities as research methodologies, they investigated the questions 1) what should be the nature of the relationship between a police force and its citizenry, and 2) what do we do when that relationship is somehow threatened or harmed? Led by theatre instructor Brooke Kiener, the project required students with no formal background in political science, criminology, or law to learn about police training models, restraint device technology, non-lethal defensive stun guns (or “Tasers”), and “excited delirium.”

In the Public Policy Analysis (PPA) program at Pomona College, all students complete an internship oriented to solving a problem on behalf of an advocacy group, government agency, school district, or private company, and many subsequently base their senior thesis on their internship work. The internships and resulting theses, many of which political scientist Richard Worthington has supervised as chair of the program, involve domains of knowledge beyond even those included in the already interdisciplinary, but social science-based, PPA program. Internships conducted in partnership with the Center for Community Action and Environmental Justice, for example, drew on epi-

demology, atmospheric chemistry, and urban planning as well as sociology and politics. Worthington has also been a faculty advisor for the construction of an organic farm and rammed-earth dome on campus, a student-initiated project undertaken with significant involvement from the community, which required knowledge of architecture, geography, agro-ecology, and structural engineering—fields not only beyond his expertise but not represented by Pomona College faculty.

In a course on environmental justice at the University of Virginia, engineering students took up projects that required both social scientific and technical analysis, ranging from quantitative data interpretation, to internet software development, to background research on industrial processes. Course instructor Gwen Ottinger's expertise lies in anthropology and the interdisciplinary field of STS, but not in any of the technical disciplines—including statistics, chemical engineering, atmospheric chemistry—that were relevant to the projects. Students themselves, in their second year of the engineering curriculum, had limited specialized knowledge or experience.

Finally, the University of Washington's Restoration Ecology Network (UW-REN) offers an undergraduate certificate program in restoration ecology that includes a year-long capstone experience. This program attracts students from more than 15 academic departments across the three-campus UW system. The restoration of degraded ecosystems itself is a highly multidisciplinary endeavor, requiring knowledge from a variety of technical fields such as chemistry, biology, geology, and engineering. In their capstone courses, students, who can be majoring in any discipline, work in teams to restore damaged landscapes for community partners. They are supervised by a multidisciplinary team of course instructors: co-authors Warren Gold and Kern Ewing, both plant ecologists; Jim Fridley, whose expertise is in engineering and project management; and Rodney Pond, a restoration ecology Ph.D.

student with a background in environmental engineering and environmental education. In UW-REN capstone projects, students apply cutting-edge knowledge of these aspects of ecosystem restoration to problems identified by community partners. But they must also grapple with the problem of stewardship—how to ensure that the restored ecosystem will be maintained (particularly important in early decades) for long-term success. Restoration projects thus end up not only requiring knowledge of the sciences and, often, of engineering, but also demand that students build an understanding of cultural traditions, community organizing techniques, and environmental education and communication practices—among other topics far outside the realm of the natural sciences.

The co-authors' experience in the UW-REN program highlight the ways that the persistent institutional tensions between disciplines and interdisciplinarity create challenges for CBR. Hiring decisions, for example, have affected the diversity of faculty expertise available for the capstone program to draw on. When the UW College of Forest Resources was selecting a new faculty member in restoration ecology—an individual who might have contributed to the program—faculty members disagreed over the most important qualifications for the position. In the end, being a plant ecologist (like others in the traditional forest ecosystem program) was held out as the gold standard for the position, and publications in disciplinary journals like *Ecology* were considered to be of more importance than those in *Restoration Ecology*, the primary journal for the interdisciplinary profession. The level of support and resources made available to the capstone program are also affected by the layering of interdisciplinary programs onto disciplinary departments: traditional foresters in the forestry school that houses the capstone program on one of the campuses view ecological restoration as redundant and interdisciplinary elements—including managing volunteers, the politics of

restoration, community stewardship building, and the need for ritual and pageantry in work parties and celebrations—as lacking academic rigor. As a consequence of these misconceptions, the need to divert resources to teach restoration courses and do outreach is routinely questioned.

Strategies for Pursuing Interdisciplinary Projects with Disciplinary Expertise

The systemic challenges posed by the institutional configurations of colleges and universities are intensified by a notable characteristic shared by the CBR projects in which we have been involved: the projects cross the boundaries between kinds of discipline, between social sciences, natural sciences, engineering, humanities, and the arts. Our individual areas of specialization—even the specialties represented on UW-REN’s multidisciplinary team of instructors—largely do not.¹ To bring the disciplines that we do not represent into our students’ projects, we have employed four major strategies: (1) involving colleagues with complementary expertise, (2) drawing on the specialized knowledge of community partners, (3) using students’ own backgrounds to bring in relevant fields, and (4) transforming the limitations of our collective disciplinary knowledge into opportunities for student learning and leadership.

Involving Colleagues with Complementary Expertise

The wide range of fields involved in our interdisciplinary CBR projects are, in many cases, represented by other faculty members at our respective institutions. Involving colleagues whose areas of interest and specialization complement our own is an obvious and effective

way to make up for the limits of our own disciplinary knowledge. As part of a senior thesis project on day labor movements, for example, one of Worthington’s students wished to study an informal effort to organize day laborers congregating near a Home Depot in Rancho Cucamonga. Worthington had no familiarity with the group and could not help the student connect with their efforts. But a sociologist at Pitzer College, in whose course the student had first learned of the informal organizing effort, was in contact with the group. The colleague, José Calderón, was able to take that student and a couple of others to the site; introduce them to a new cast of people, including day laborers and a union organizer; and help them start working together. In that case, Calderón’s familiarity with the case as part of his sociological research enabled a CBR project that Worthington could not have facilitated alone.

In the UW-REN capstone program, collaboration with colleagues from complementary disciplines was institutionalized when Jim Fridley joined the instructional team in 2006, seven years after the project’s inception. A forest engineer with expertise in project management, Fridley added to the team’s existing strengths in botany and plant ecology. Fridley joined the team out of personal interest in the CBR approach of the course, taking on instructional responsibilities beyond those required by his academic appointment. His instruction in project design and management has greatly enhanced student learning and project success.

The opportune addition of Fridley to UW-REN’s team, however, underscores the problems with relying on the involvement of other faculty members as a strategy for complementing disciplinary expertise. Colleagues in other disciplines—in the case of UW-REN, in engineering, humanities, and social science—are assigned to teaching loads only within their academic departments and receive scholarly recognition for work primarily within their academic discipline. To become involved beyond an occasional guest lecture in

¹ Ottinger and Ewing are partial exceptions. Ottinger has a bachelor’s degree in aerospace engineering; Ewing earned a BS in Civil Engineering and an MA in sociology. Although these educational experiences have offered background useful to interdisciplinary CBR, they do not compare to the kind of specialization developed in the co-authors’ respective PhD programs.

an interdisciplinary CBR project that originates in a different discipline or unit, as Fridley did, means taking on teaching responsibilities *on top of* already full academic loads. Moreover, these responsibilities are unlikely to be acknowledged or rewarded in tenure and promotion decisions, except in the relatively unusual cases where faculty reside within interdisciplinary units (as capstone co-instructor Warren Gold does). The degree of collaboration represented by Fridley's participation in the UW-REN instructional team is thus rather unusual and cannot be seen as a viable approach for providing expertise to students across the wide range of disciplines they may encounter in interdisciplinary CBR projects.

Drawing on the Expertise of Community Partners

Community-based research projects are often conceived as mechanisms through which students and faculty can share the knowledge and skills gained in academia with communities. However, community partners may include agencies and non-profits whose professional staff has expertise in areas relevant to research projects. Even community members themselves, although usually presumed to be non-experts, are likely to have specialized knowledge to contribute. In addition to having intimate knowledge of local environmental conditions and behavioral patterns that can contribute to problem-solving (see, e.g., Corburn, 2005), community members, in many cases, have developed expertise in the intricacies of the public issues of most concern to them (cf. Epstein, 1995).

The expertise of community partners has been an important supplement to our own disciplinary expertise in many of our interdisciplinary CBR projects. For example, UW-REN has had an ongoing project at Yesler Creek for the City of Seattle. The creek lies in a steep ravine with slopes covered in invasive Himalayan blackberry bushes below a decadent native tree canopy. Like other projects in public parks and green spaces, the city wants to maximize the ecological potential of

the site—in particular, by protecting the native ecosystem from being choked out by the invasive blackberry plants—but must balance ecological concerns with aesthetics, public safety, and the city's ability to maintain the site. Experts from the city and a non-profit lend their expertise on the ecology of the specific site and the issues surrounding public use and upkeep. City staff have also been critical in working with student project teams to help them understand how local citizens perceive and use the site, as well as to educate them about the citizens' and government's perspectives on appropriate ecological goals for the site. EarthCorps, a nonprofit that does contractual restoration work for the city, provides mentoring to project teams in erosion control techniques and invasive control. Finally, the volunteer Forest Steward for the Yesler Creek green space, teaches students how to recruit and manage volunteers from the community.

Similarly, the theater project at Whitworth was successful in large part because of the expertise that the community partner brought to the table. The Center for Justice provided countless legal documents, audio and video recordings, manuals, articles, and summaries, giving students access to years of research that the law firm had been accumulating as they prepared to take a particular case to court. For students facing the daunting interdisciplinary task of disentangling the issues involved in the case, the community partner's accumulated knowledge provided an entry point: it gave students topics to focus on; pointed them to useful books, journals, and websites; and identified leaders in the field and potential interview subjects.

While the expertise of community partners can be invaluable to interdisciplinary CBR projects, instructors nonetheless need to work to contextualize and evaluate their contributions. In ecosystem restoration projects where community partners offer their own knowledge, UW-REN instructors take responsibility for looking carefully at that knowledge and the way it informs

restoration plans to ensure that scientific rigor is maintained in the planning process. In the Whitworth theater project, Kiener and her students had to grapple with the Center for Justice's explicit advocacy position on the issue in order to avoid unreflectively adopting the biases of the community partner. In their effort to unpack the assumptions underlying conflicting positions on police accountability, students interviewed police officers, journalists, and a public defender rather than relying solely on the community partner.

Using Students' Backgrounds as Sources of Expertise

Students come to CBR projects with knowledge and skills gained from their other coursework, as well as from their diverse life experiences. Their areas of expertise can also serve as an important resource in projects that require knowledge of fields far beyond the instructors' own specialties—although, once again, instructors must continue to play a role in ensuring the overall rigor of the results.

On UW-REN's interdisciplinary project teams, senior-level students often employ expertise from prior coursework in their own discipline in their projects. For example, one team was charged with creating a narrow wetland buffer in a housing development. The precise location of the buffer was important in order to prevent conflict with utilities, the city, and the local homeowner's association. Drawing on professional expertise in civil and environmental engineering, one student was able to assess locations of utility corridors and rights of way and produce professional-quality site drawings that clearly delineated their project boundaries in a way that avoided potential conflicts.

At Pomona College, administrators decided to move the students' organic farm seven years after it had been established, abandoning both the rich soil that had built up over time and the rammed earth dome constructed in an associated CBR project. Helping to prevent the move soon became the focus of a new project in one of Worthington's classes. As part of that

project, one student, an environmental analysis major with a chemistry focus, took a short course on Global Information Systems and Global Positioning Systems (GIS/GPS), and trained other students in its use. That knowledge enabled students to document the exact location of hundreds of trees that would be disrupted by the administration's plan. A number of students had also taken advanced courses in conservation biology and pounced on the administration's proposal to move oak trees as part of their plan. Although moving established trees is not an uncommon practice, students presented the research literature to show that it was not a good practice. By mobilizing these areas of expertise, students demonstrated to the college administration that they knew more about important aspects of the land and land uses at issue than did Campus Planning and Maintenance, the traditional repository of expertise on the physical campus. Their ability to credibly contest elements of the administration's proposal and to ground their own proposal in solid research played a significant role in convincing the college's president and trustees to change their minds about moving the farm.

Students' different educational backgrounds often contribute in fortuitous ways to interdisciplinary CBR projects by expanding the base of disciplinary knowledge available to their teams. In contrast, the projects in Ottinger's environmental justice classes at UVA were expressly designed to take advantage of students' engineering backgrounds. Although linked to a social scientific analysis—specifically, of how science and technology function as part of grassroots environmental activism—each of the projects centered on a technical task. One team, for example, was asked to take an overwhelming amount of data from an air monitor and make it into something that a community group could use in their campaign against the neighboring refinery. The projects counted on students to apply the quantitative and computer skills that they had learned

in the first two years of their curriculum to the projects. Students in the team analyzing monitoring data drew on one team member's experience with the database program Microsoft Access to put the data into a usable format and create novel analyses, including graphics that showed the effect that wind direction (toward or away from the refinery) made on community air quality.

The UVA projects underscore the pitfalls of relying on students' backgrounds as a supplement to instructors' expertise in interdisciplinary CBR projects. While a few project teams were very successful because of knowledge or skills that particular students brought to the class, the relevant expertise turned out not to be a product of prior coursework taken by all engineering students. The aforementioned student learned Access as part of a summer internship; another student, whose web programming skills were essential to his group's project, had developed his skills as a hobby. Further, it could not be assumed that students would be able or willing to apply skills learned in other courses: told that their project would involve basic programming, which they had learned in a prior course, one group of students balked, informing the instructor that they had all gotten "C"s in the course. In the end, the contributions of students' expertise were no less circumstantial or fortuitous than in the other projects described here, where other instructors did not count on students' backgrounds as a source of knowledge or skill.

While students' backgrounds can be an important source of expertise, instructors cannot rely on them to bring knowledge from disciplines that complement the instructors' own background. The expertise available among students can vary a great deal from one term to another, depending on the group of students enrolled. In addition, just as instructors must contextualize and evaluate the expertise of community partners, they must also ensure the rigor of interdisciplinary CBR projects by having students convince them of the quality of their knowledge and their ability to apply it appropriately.

Transforming Disciplinary Limitations into an Opportunity for Learning

Our final strategy for mobilizing the disparate domains of knowledge relevant to the projects that we, as individuals with command of a limited range of disciplines, supervise, has been to use the limitations of our knowledge—and our students' knowledge—as an opportunity for students to practice learning independently and to exercise leadership by developing solutions in areas outside of those represented by their instructors.

Students in the Whitworth theatre project, confronted with the issue of police accountability, began their investigation of the topic with a discussion about how much they actually knew about it. Although not herself an expert on criminology or the legal system, Kiener began by asking them to explore their relationship to the issues, including their lack of knowledge about it. They were asked to bring to the first class session a journal entry that discussed their preconceived notions about the police and to identify where those ideas came from, whether they came from personal experience, television and the movies, or even rumors. Discussion of their experiences became a launching pad for studying the topic and engaging in conversations with other citizens. The students' ultimate theater production, moreover, drew on these generally uninformed starting places to create a powerful opening scene that laid bare their initial understandings and biases, including their lack of awareness of and even their apathy toward the issues.

Students in the UVA environmental justice projects were also initially overwhelmed by the specialized knowledge of industrial processes, monitoring techniques, statistical methods, and programming languages, among others, that appeared to be required by their projects. Through class discussions, their disorientation and frustration became ways for them to understand the environmental justice problems that they were studying. Access to information and ability

to interpret quantitative data are core problems for poor and minority communities who are trying to improve their environmental conditions; by experiencing first hand the difficulty of overcoming these problems, even as well-educated, affluent individuals with access to the resources of a major research university, students began to appreciate the ways that community groups are disadvantaged by, for example, decision-making processes that rely heavily on scientific knowledge or public discussions that pit community members against experts from industrial facilities.

Promoting Interdisciplinary CBR in Disciplined Institutions

The inevitable challenges of creating effective interdisciplinary community-based research projects in the context of institutions that are still heavily discipline-oriented multiply when the disciplines involved range far beyond instructors' areas of expertise. To meet the challenges of working across the boundaries between engineering and the social sciences, between social sciences and the arts, between natural sciences and policy and planning disciplines—to name a few—we have employed four major strategies. We have enlisted the help of colleagues from complementary disciplines; we have relied on the expertise of community partners; we have encouraged students to bring knowledge from other experiences, including other coursework, to bear on interdisciplinary CBR projects; and we have transformed our own disciplinary limitations into opportunities for learning by our students.

While each of these strategies has been effective in multiple instances in our collective experience, each has several potential shortcomings and none of them fully addresses the fundamental difficulties inherent in conducting radically interdisciplinary CBR projects, projects which reflect the tendency of real problems to be technically complex, culturally shaped, and politically charged. Many projects do depend for

their success on specialized knowledge or skills outside of the domain of instructors; the projects that made those limitations into an opportunity for learning also accepted that they might not be “successful” in the sense of furthering the goals of community partners. The participation of colleagues who have the requisite expertise is severely constrained by administrative structures that often do not reward—and may even punish—creative interdisciplinary collaborations. Finally, while community partners and students inevitably have important experiences, knowledge, and skills to contribute to any project, instructors cannot count on them to contribute the expertise that is crucial to the project.

To a large extent, the inherent difficulty of interdisciplinary CBR stems from the overwhelmingly disciplinary orientation of the academy. Without abandoning traditional disciplines, colleges and universities could make it easier for instructors to lead CBR projects by recognizing and making resources available for interdisciplinary work. Institutions could, for example, make it easier for instructors to work in multidisciplinary teams by making participation in CBR projects count toward teaching loads and therefore toward tenure and promotion decisions. Creating faculty lines in interdisciplinary units would be one means for accomplishing this; for example, appointed in the Interdisciplinary Arts and Sciences (IAS) program, Warren Gold found that his involvement as a leader in UW-REN was not only recognized by his program but was a major factor in his tenure success. Additionally, making it easier to cross-list courses not only across disciplines but also across colleges would facilitate interdisciplinary CBR projects which, like those described here, reach across boundaries between social and natural sciences or between humanities and professional schools. And since it is unlikely that all of the relevant fields of knowledge will be represented among faculty specialties at any but the largest research universities, institutions could also acknowledge the

inherent challenges of CBR projects by making available resources to retain outside experts or pay community partners with specialized knowledge to help students build knowledge or skills not offered by instructors. Pomona College, in fact, adopted such an approach to the rammed-earth dome project: because technical expertise was indispensable to building a safe structure that would be approved by city authorities, they hired an architect and a structural engineer who, together, came up with a design that met the seismic standards required by the city.

Beyond enabling instructors to provide relevant expertise, our experience also points to students themselves as potential sources of expertise. Especially in the context of community-based research, an approach that imagines student experience and engagement, not the absorption of knowledge, as the source of learning, colleges and universities could also support interdisciplinary CBR efforts by taking measures that encourage students to develop relevant knowledge that complements that of instructors. Devoting more curricular time by allotting additional credit hours to courses featuring community-based projects or distributing CBR experiences over multi-term course sequences would represent an important step. But it seems unlikely that just creating more space in the curriculum would be sufficient to help most students acquire expertise not represented in the CBR-based course; curricular structures would have to be developed to encourage them to look beyond the fields already presented to them. For example, a three-unit interdisciplinary CBR course could be turned into a five-unit course, with the expectation that, once students have identified the knowledge or skills necessary to their projects, they will work with a faculty member, community partner, or other knowledgeable person to develop an independent study in one of the relevant areas. Such an approach might be complemented by formal training for students in *how* to learn on their own: how to get, evaluate, and synthesize material in a new field with

limited expert guidance. Alternatively, a multi-term sequence might include the requirement that students take an applicable course outside their program or discipline in their second term on an interdisciplinary CBR project.

The issues raised here reflect the more general structural issues that plague interdisciplinary initiatives at discipline-based colleges and universities. Addressing the larger issues—developing fair ways to evaluate interdisciplinary work, for example—will thus benefit not only research collaboration across disciplines but interdisciplinary CBR programs as well. Nonetheless, our experiences with CBR as part of interdisciplinary teaching add to the conversation about disciplinarity and interdisciplinarity in the academy. They demonstrate additional consequences that stem from the persistence of disciplinary thinking in the context of interdisciplinary initiatives. As discussed above, not only do scholars with interdisciplinary commitments struggle to get tenure when evaluated by discipline-oriented peers, scholars committed to community-based research as a strategy for student learning struggle to mobilize the expertise required to make CBR projects effective. Students themselves may be constrained by discipline-focused curricula that offer them little space to pursue other fields of study relevant to CBR projects and that ultimately limit their learning from the projects. As a result, while our recommendations address the tensions between disciplinarity and interdisciplinarity through CBR specifically, they stand to help facilitate colleges' and universities' more general interdisciplinary aspirations by making it easier for faculty and students alike to engage in interdisciplinary problem-solving. Fostering interdisciplinary CBR also resonates with academic institutions' aims to be relevant to surrounding communities and other constituents, by enabling faculty and students to make effective contributions to real problems. ■■

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Building a Faculty Learning Community at a Research University

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Abstract

Transformation of the undergraduate learning experience through evidence-based, student-centered teaching practices remains a consistent challenge for faculty and departments at large research universities with competing priorities. This paper presents a self-study of the first formalized Faculty Learning Community (FLC) at the University of California, San Diego, which united a cross-disciplinary faculty who specialize in education (at the rank of Lecturer with (Potential) Security of Employment, as part of the LSOE series) to focus on issues of student learning in large university classes. Participants in this year-long faculty development initiative gained: (1) knowledge of the norms and expectations for conducting educational research in the classroom; (2) increased awareness of curricular and pedagogical interventions to enhance student learning in large classes and greater confidence in implementing them; and (3) heightened regard for the collaborative potential of teaching assistants (TAs) in improving teaching and learning. As a result, members of this new community of teacher-scholars are better poised to serve as agents of change within their own academic units and across the campus.

Keywords

faculty learning community, student learning in large classes, teaching-based faculty, pedagogies of engagement, discipline-based education research

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Introduction

One of my hopes for the future of research universities is that student learning will be at the center of faculty concern, research will inform teaching, undergraduate classrooms will be places of engaged, participatory learning, and a university education will be not just a means to an entry-level job, but an invitation to a lifetime of learning.

– Hunter Rawlings (2012), President, Association of American Universities

As engines of talent, innovation, and prosperity, U.S. research universities have contributed significantly to the nation's economic growth and goals for health, energy, environment, and security, while earning recognition as global leaders in research productivity and quality of education (NRC, 2012; Holliday, 2012). Public and private research universities (including research universities with very high research activity (RU/VH), research universities with high research activity (RU/H) and doctoral/research universities (DRU)) comprise only 6.3% of the total number of U.S. institutions of higher education. However, these institutions boast 27.9% of the total student enrollment (Carnegie Foundation, 2010 statistics), while graduating 70% of the nation's scientists, engineers, doctors, teachers and other learned professionals (NRC, 2012). Ranging in size, geography, and mission, these comprehensive institutions share several defining characteristics, including a hybrid education and research model that involves both undergraduate and graduate students.

Unfortunately, the academic culture at many research universities has suffered from disparate and competitive views of research and teaching (Anderson et al., 2011). In 1998 and 2001, the two Boyer Commission reports, *Reinventing Undergraduate Education: A Blueprint for America's Research Universities* and *Reinventing Undergraduate Education: Three Years*

After the Boyer Report, highlighted these deficiencies and discussed ten ways to improve the undergraduate experience through the restructuring of pedagogy and educational practices of the research university. A decade later, many of the same issues—making research-based learning the standard for all students, constructing an inquiry-based freshmen year, linking communication skills and coursework, expanding engagement in interdisciplinary study, educating graduate students as apprentice teachers, aligning faculty reward structures with change initiatives, and more—remain inadequately addressed, particularly at large and diverse institutions faced with persistent funding challenges.

Discipline-Based Education Research

Discipline-based education research (DBER) is an emerging field of evidence-based research that integrates best practices of teaching a particular discipline and is informed by the findings of cognitive science and psychology on how people learn (NRC, 2012). In its recent report, *Discipline-Based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering*, the National Research Council (NRC) outlined the areas in which DBER findings can contribute to the transformation of undergraduate education (NRC, 2012). For example, multiple DBER studies in several science, technology, engineering, and mathematics (STEM) disciplines have demonstrated that pedagogies that incorporate active learning, such as the use of audience response systems (clickers) increase in-class participation in large-enrollment classes. Peer Instruction, Just-in-Time Teaching, and Cooperative Problem Solving result in higher learning gains when compared to the traditional lecture-only method of instruction (Prince, 2004; Knight & Wood, 2005; Michael, 2006). Another important contribution of DBER to undergraduate education is the development of Concept Inventories: standardized tests that assess students' understanding of the key concepts in a

sub-discipline and allow comparison of the effectiveness of teaching approaches employed in that sub-discipline (D'Avanzo, 2008). Related to the latter is the identification of students' misconceptions: deep-rooted incorrect beliefs about fundamental concepts that, if not addressed, can prevent students from developing a meaningful framework of knowledge in a discipline. Two distinct, but interrelated, branches of DBER are (1) basic research into the ways students acquire knowledge or form misconceptions in specific disciplines, and (2) applied research that includes development of effective methods of teaching specific areas of knowledge and ways of assessing the effectiveness of such methods (NRC, 2012).

Despite its transformative potential, DBER has not yet resulted in broad adoption of evidence-based best practices in undergraduate education (Alberts, 2009; NRC, 2012), and a disconnect still exists between the successful strategies identified by DBER and what actually happens in many classrooms in research universities. Among the reasons for this are (1) lack of familiarity with the findings generated by DBER, (2) extreme demands on faculty time imposed by their research, mentoring, teaching, and administrative responsibilities, and (3) institutional reward systems that do not provide motivation or incentive for educational reform efforts (NRC, 2012; Walczyk, Ramsey, & Zha, 2007).

The Role of Teaching Faculty at Research Institutions

Improving the landscape of undergraduate education through the implementation of DBER findings will require buy-in and coordinated efforts by faculty, departments, and institutions (NRC, 2012; Wieman, 2009b). It will also require the development of coherent curricula that clearly identify the overarching concepts and capabilities that students need to master, as well as identifying and implementing the evidence-based methods necessary to achieve these learning outcomes

(Klymkowsky & Cooper, 2012). For example, the NRC report recommends that “[i]nstitutional leaders should include learning and evidence-based teaching strategies in the professional development of early career faculty, and then include teaching effectiveness in evaluation processes and reward systems throughout faculty members’ careers” (NRC, 2012, p. 199). The report further proposes that these efforts be supported by DBER scholars at the institution. Therefore, one of the first steps toward catalyzing change in undergraduate education is “seeding” departments with faculty who engage in DBER, and who can thus serve as change agents (Bush et al., 2011; Henderson, Beach, & Finkelstein, 2011).

One such example is the Science Faculty with Education Specialties (SFES) at the 23 campuses of California State University (CSU), the nation’s largest public university system and master’s degree-granting institution. Analysis of this SFES community identified a number of challenges (Bush et al., 2011). While virtually all SFES faculty (n=59) had extensive formal training in their scientific fields, less than a third reported having any formal post-baccalaureate training in science education or education research (Bush et al., 2011). Although the majority of the surveyed faculty reported that they were fulfilled by their teaching, 40% were seriously considering leaving their current profession, most frequently citing the perception that “science education was not supported, valued, or understood by their department and/or university.” Another major concern of SFES faculty was the lack of access to graduate students in order to support scholarly activities (a comment voiced by 78% of the SFES faculty employed in schools that offer graduate programs). An absence of clear institutional and departmental expectations for evaluation and advancement of SFES was also identified.

The 2012 NRC report recognizes similar challenges facing DBER faculty in STEM disciplines. In its

recommendations on how to promote the broad adoption of evidence-based education practices, it calls on departments, institutional leaders, and other stakeholders in undergraduate education to “clarify expectations for DBER faculty positions, emphasize high-quality DBER, provide mentoring for new DBER scholars, and support venues for DBER scholars to share their research findings in meetings and in high-quality journals” (NRC, 2012, p. 198). It also highlights the current paucity of ways in which DBER scholars from different disciplines can formally communicate and exchange ideas and findings.

In sum, DBER faculty can make a significant contribution to the reform of undergraduate education by introducing and promoting evidence-based teaching methods and curriculum. However, DBER faculty face challenges typical of those who enter a new field or new academic positions where rules and expectations are still in flux (Huber, 2001). If unaddressed, such challenges could hinder the ability of the DBER faculty to create effective institutional changes in undergraduate education.

The UC System and the LSOE Series¹

Similar to the California State University system, the University of California (UC) system has its own teaching-oriented faculty series. The appointments of Lecturer with Potential for Security of Employment (LPSOE) and Lecturer with Security of Employment (LSOE) were created for Academic Senate Faculty members whose expertise and responsibilities center on scholarship of teaching, learning, and undergraduate education and who can help meet the long-term instructional needs of the University “that cannot be best fulfilled by an appointee in the Professor (Ladder

rank) series” (UCOP, 2002). Advancement and tenure in this faculty series closely parallels the Professor series, with LPSOE, LSOE and Senior LSOE equivalent in level to assistant, associate and full professor, respectively (UCSD, 2012). Promotion is based on periodic review of the following four criteria: teaching of truly exceptional quality; university and public service; professional achievement and activity; and educational leadership beyond the campus. Examples of educational leadership include, but are not limited to, conference participation, curriculum revision, major(s) re-design, implementation of new programs or projects, procurement of grants to fund educational initiatives, journal publications, and reviews, among many others. Educational research that leads to development of new or improved teaching tools and curriculum is implicitly considered, although not specifically required. Although appointees in this series often engage in scholarly work related to teaching and learning, they are not required to conduct traditional research in their disciplinary specialties and therefore must carry a heavier teaching load than those in the ladder-rank series. Typically, faculty in the LSOE series teach six large undergraduate and/or graduate courses (24 credits) per year, in contrast to ladder-rank faculty who teach 2 to 4 courses (4 - 16 credits).

Although there has been a recent increase in LSOE series appointments across the UC System, the numbers are quite small in comparison to ladder-rank positions. Table 1 provides the total number of faculty in the LSOE series UC-wide and at each UC institution as compared to the total number of faculty in the Professor series (UCOP, 2009). In 2009, faculty in the LSOE series comprised 1.5% of the total number of Academic Senate members UC-wide. Among the UC campuses, UC San Diego had the highest (3.5) percentage of LSOE-series faculty. Current statistics are unavailable for the entire UC system, but at UC San Diego in 2012, there were 51 individuals in the LSOE

¹ In this paper, the series is referred to as LSOE series, untenured faculty in this position are referred to as LPSOE and tenured faculty as LSOE. UC San Diego is currently in the process of changing the name of this series to Assistant/Associate Teaching Professor.

series spread across a wide variety of disciplines (Table 2). Even as these positions expand, only half of all of the departments/divisions at UC San Diego (18 out of 37) have at least one faculty member in this track.

Faculty Learning Communities

The role of community in supporting student learning in higher education has a long history, dating at least to the work of John Dewey (1933), and is listed among the ten recommendations of the Boyer Commission Reports (1998, 2001). Throughout the 1990s, a large body of research reported on significant learning gains of students who participated in Student Learning Communities (SLCs), emphasizing the value of SLCs for deepening student learning and improving retention, especially among underrepresented students and those considered academically at risk. It was the success of these SLCs that provided the impetus for developing Faculty Learning Communities (FLCs).

The term “Faculty Learning Community” was first used by Milton Cox and his colleagues at Miami University, Ohio, who noted similar outcomes between their faculty development program and research reported on SLCs (Cox, 2004). They define a Faculty Learning Community as “a cross-disciplinary faculty and staff group of six to fifteen members (eight to twelve members is the recommended size) who engage in an active, collaborative, year-long program with a curriculum about enhancing teaching and learning and with frequent seminars and activities that provide learning, development, the scholarship of teaching, and community building” (Cox, 2004, p.8). Expressly, it is recommended that faculty meet biweekly for 90-minute sessions.

There are two general types of FLCs: “cohort-based” and “topic-based.” Cohort-based FLCs identify a specific group of faculty that may be isolated or marginalized among the general faculty at a university (Cox, 2004). Topic-based FLCs focus on a specific

“teaching and learning need, issue, or opportunity” identified by a campus community, such as cooperative learning, critical thinking, assessment, development/revision of curriculum, active pedagogies (i.e., cooperative or problem-based learning), research methods, scholarship of teaching, teaching with technology, or diversity/difference (Cox, 2004; Richlin & Essington, 2004).

Since Cox and his colleagues first coined the term “Faculty Learning Community,” a considerable body of literature has emerged documenting FLC development and impacts on both students and faculty. Richlin and Essington (2004) compiled the first broad-based database of FLCs throughout the United States and Canada in order to document “how and where FLCs have been created, who is in them, [and] how they operate” (pp. 25-26). They found that during the 2003-04 academic year, 132 institutions of higher education across the U.S. and Canada had a total of 308 active FLCs. Of these, 65 were cohort-based and 243 were topic-based FLCs. Among topic-based FLCs, 31.3% were focused on general or specific teaching themes, 15.6% focused on technology-related topics, and 9.9% focused on scholarship of teaching (Richlin & Essington, 2004, p. 29). Beach and Cox (2009) examined FLC impacts on student learning across six universities and found that participating faculty at all six universities reported the use of new pedagogical interventions in the classroom, as well as enhanced student learning outcomes, especially in terms of improved critical thinking skills, deep learning, and retention of information, as a consequence of FLC participation.

Developing a Faculty Learning Community at UC San Diego

In June 2011, Beth Simon (LSOE in Computer Science, FLC facilitator, and Director of the Center for Teaching Development (CTD) at UC San Diego) and co-author of this article Maureen Feeley (LPSOE

in Political Science) attended a three-day workshop on developing Faculty Learning Communities sponsored by the International Alliance of Teacher Scholars. This workshop provided instruction in and support for establishing FLCs in a wide variety of institutional contexts ranging from community colleges to research universities. The workshop influenced the decision to form a combined cohort and topic-based FLC at UC San Diego for “ untenured ” LSOE-series faculty (LPSOE s). Because faculty in the LSOE series have higher teaching loads than research faculty, with assignments that include large-enrollment classes (often 150 or more students), in addition to educational leadership responsibilities, they are perhaps in a unique position to introduce evidence-based pedagogical innovations that can affect widespread changes in classroom practices. For this reason, “ Student Learning in Large Classes ” was selected as the topical focus of the FLC. The focus was intentionally broad to enable LPSOE faculty to consider and address a range of issues, concerns, and opportunities to improve students’ learning experience in large lecture and laboratory settings.

The Center for Teaching Development (CTD) at UC San Diego issued a call for LPSOE faculty to participate in the FLC on August 1, 2011, and interested faculty were given one month to submit their application materials. The call described the general format of FLCs, as well as specific goals and expectations, including an agreement to attend the biweekly 90-minute sessions for three 10-week academic quarters, from September 2011 to June 2012. Given the participants’ substantial time commitment, and in recognition of the anticipated benefits, approval by each faculty applicant’s department chair was required.

Over the course of the academic year, FLC applicants could expect: (1) to explore the research and knowledge base on challenges to learning in large courses, and on pedagogical approaches that support increased student learning in these courses; (2)

to document a challenge associated with learning in large courses, either in their own course(s) or in other courses offered in their departments; (3) to prepare a plan to implement a practice designed to improve student learning; and (4) to implement this plan and record evidence of its effect through a range of metrics. It was explained that FLC members would be given the unique opportunity to work creatively and collaboratively in an interdisciplinary group; to support their own pedagogical efforts; and to create outlets for sharing the collective knowledge generated by the FLC. Members were also invited to engage in and contribute to assessment activities related to the work of the FLC (e.g., individual assessments, group assessments, final FLC surveys). The call ultimately resulted in the establishment of UC San Diego’s first FLC during the Fall 2011 quarter, with a total of seven LPSOE faculty participants from diverse disciplines (Brydges, chemistry; Chilukuri, biology; Cook, geology; Feeley, political science; Herbst, humanities; Tour, biology; Van Den Einde, structural engineering), and one LSOE faculty facilitator (Simon, computer science).

Although the designated topic of the FLC was “ Student Learning in Large Classes,” reasons that FLC applicants gave for wanting to join the group revealed a more diverse range of motivations, with some common themes. All LPSOE members of the group ($n=7$) indicated that they sought a forum to discuss literature on education research and to share teaching methods. Six out of seven LPSOE members stated that they wanted to join a community of individuals interested in improving higher education at a large research institution. In the words of Herbst: “ I joined the FLC because I wanted to be part of a faculty community that was dedicated to pedagogy and to improving undergraduate instruction at UC San Diego.” Five out of seven LPSOE s were motivated by the opportunity to obtain support and feedback in developing education research projects. Among other frequently mentioned motivat-

ing factors (each noted by three LPSOE's) were finding a forum to discuss (1) concerns about the requirements for promotion and tenure in the LSOE series, and (2) specific strategies for improving learning in large classes, including methods that encourage students to take responsibility for their learning, while developing metacognitive skills.

During Fall Quarter 2011, the primary goals of the FLC were to establish community norms, to develop knowledge of evidence-based research on student learning, and to investigate the impact of specific pedagogical innovations in the classroom. Winter and Spring quarters of 2012 were devoted to refinement of pedagogical innovations in the classroom, implementation of research designs, data collection and analysis. Taking into consideration the research that has identified specific characteristics that contribute to FLC success, FLC members were committed to confidentiality in an effort to create a "safe" institutional space for reporting on challenges, as well as successes, in introducing new pedagogical techniques. Studies have shown that this facilitates the building of community trust and a supportive learning environment (Cox, 2004; Daly, 2011). In addition, decision-making within the FLC was highly decentralized. Each FLC member was encouraged to bring forward his or her specific teaching-related concerns and interests, to suggest research articles to build community knowledge on these issues, and to design classroom experiments that would enable them to assess impacts, given their particular interests.

Building on the work of Akerlind (2005), Daly's 2011 study of FLCs at seven higher education institutions finds that granting faculty autonomy and control over the agenda of faculty development programs is a critical factor in explaining their success. In contrast to more "top down" programs, where priorities are established by university administrators, the structure of FLCs enables faculty to develop their own cur-

riculum related to the community's topical focus (Daly, 2011, p. 4, 9; Akerlind, 2005). As Daly explains, "[r]ather than being assigned a prescribed set of readings and activities . . . faculty were able to customize their learning (Daly, 2011, p. 9). Although she reports that this was challenging for faculty at first, ultimately "[t]he autonomy granted to the faculty enhanced their sense of ownership of the faculty development process, and it enabled them to view faculty development programs as venues to advance their own professional learning goals" (Daly, 2011, p. 9). As discussed below, members of our FLC also found that the decentralized decision-making and autonomy granted by the FLC structure were important elements that contributed to its success.

Three Main Outcomes of UC San Diego's "Student Learning in Large Classes" FLC

Based on FLC reflections and discussions throughout the 2011-12 academic year, as well as FLC surveys conducted in Fall 2012, three main sets of outcomes were identified: (1) greater knowledge of the norms and expectations for conducting educational research in the classroom and guided practice in research design; (2) increased awareness of pedagogical and curricular interventions to enhance student learning in large classes, and greater confidence in implementing these; and (3) the engagement and education of undergraduate and graduate teaching assistants as partners in course innovations. The following three sections discuss each of these outcomes in turn.

Developing competencies in education research.

Participants in the FLC have diverse research and teaching backgrounds, ranging from the humanities to engineering and various scientific disciplines. While its members are disciplinary experts, few came to the group with experience in discipline-based education research (DBER). The opportunity to discuss the literature on education research, and to obtain support and feedback in developing education research projects, was

among the major factors that motivated most individuals to join this FLC. As a consequence, virtually every FLC meeting touched upon specific DBER-related activities, as is discussed below.

The need for increased literacy in the language, topics, and concepts of education research was addressed by regular discussion of assigned readings on such topics as how people learn (NRC, 1999) and active learning (Mazur, 2009), as well as education research papers of general interest brought by individual members of the FLC. As a result, FLC members have become more proficient in the conventions, concepts, and standards of research design in this field. These outcomes are in agreement with the published data on the usefulness of FLCs in fostering scholarship in teaching (Cox, 2003; Cox, 2004).

As in any new research field, mastering the existing literature is essential for understanding the approaches, methods, and standards of evidence in the field. Analyses of the education research literature contributed to all members' increased confidence in their ability to define novel and significant educational research questions and to design effective classroom experiments to investigate them. The FLC facilitator, Beth Simon, who completed training as a Science Teaching and Learning Fellow at the Carl Wieman Science Education Initiative at the University of British Columbia and who is an accomplished education researcher, was instrumental in guiding FLC members at various stages in the research process, beginning with research aims and identifying the relevant literature from other DBER disciplines. Regular presentations of individual research projects by FLC members gave each participant an opportunity to receive feedback at all stages of the research process, from generating research questions and developing research designs, to selecting samples and instruments, piloting, and collecting and analyzing data. All members of the FLC agreed that the interdisciplinary perspective brought by

group members was critical to broadening and deepening their understanding of teaching and learning challenges across the campus and that this enriched the experimental designs of individual members.

An important component of education research design is the knowledge and appropriate application of ethical practices and standards in conducting research on human subjects. Exchange of information about UC San Diego's Institutional Review Board (IRB) requirements helped members of the group navigate the often-complex application process for project approval or exemption. By the end of the year, three members of the group (Feeley, Tour, & Van Den Einde) had applied for and received exempt status for their education research projects.

At the outset of the FLC (Fall 2011), four of seven LPSOE members were engaged in education research, although all four indicated the need for support in multiple aspects of these efforts. By the end of the academic year, all seven members had their own (often multiple) education projects in such diverse areas as "students' study habits in introductory Chemistry classes," "students' misconceptions in Geosciences," "effectiveness of PI and collaborative learning in Microbiology labs," and "increasing 3D visualization skills in engineering students." Several group members reported the results of their education research projects in national research and education conferences in their respective disciplines (Chilukuri, 2011, 2012a, 2012b, 2012c; Cook, 2011 and 2012; Feeley, 2012; Feeley & Parris, 2012; Tour, 2012; Van Den Einde, 2012).

Pedagogical interventions to enhance student learning in large classes: Peer Instruction with clicker technology.

The FLC's review of the academic literature on undergraduate teaching and learning during the Fall 2011 quarter provided convincing evidence for the value of active and collaborative learning strategies, as well as frequent formative assessments with corrective feed-

back, in promoting student understanding. Specifically, research has documented statistically significant correlations between students' active engagement in course content through in-class problem-solving and discussion, and student learning outcomes (Crouch & Mazur, 2001; Ellis et al., 2004; Hake, 1998; Mazur 1997; Michael, 2006; Pollock, Hamann, & Wilson, 2011; Prince, 2004; Simon, Kohanfars, Lee, Tamayo, & Cutts, 2010). A challenge faculty often face in teaching large undergraduate courses is providing students with meaningful opportunities for discussion and active engagement in the learning process. One effective pedagogical technique to address this challenge is Peer Instruction.

Peer Instruction (PI) is an interactive pedagogical technique first developed by Harvard physicist Eric Mazur in the 1990s (Mazur, 1997). As Mazur explains, the central goals of PI are "to exploit student interaction during lectures and focus students' attention on underlying concepts" (Mazur, 1997, p.10). In this model, rather than give extended 50- to 80-minute traditional lectures, Peer Instruction pedagogy divides the class period into a series of "mini-lectures" of approximately 10 to 15 minutes each, after which a short "ConcepTest," or a brief conceptual question on the material just presented, is posed to the class. Questions are framed in either a multiple choice or true/false format, and students are allowed approximately one minute to think about the question before individually committing to an answer. If most students answer the question correctly, the instructor moves forward with the lecture. If not, students break into discussion groups of three to five students and engage in "peer instruction." Mazur refers to these as "convince-your-neighbor discussions," and the groups are allowed another one to two minutes to reach consensus. The instructor then re-asks the question, and students again record their answers. This process is repeated, sometimes with additional instructor explanation of the concept or topic or

clarification of the question, until a majority of students answer the question correctly (Mazur, 1997).

Over the past two decades, PI has been adapted and broadly applied in a diverse set of disciplines (Butchart, Handfield, & Restall, 2009) and institutions, ranging from top-tier research universities to community colleges (Lasry, Mazur, & Watkins, 2008). Research on the effectiveness of "Interactive Engagement" (employing some forms of active learning) and Peer Instruction consistently finds impressive gains in student retention, conceptual understanding, and problem solving (Hake, 1998; Wieman, 2007; Crouch & Mazur 2001). Wieman (2007), for example, finds that after fifteen minutes, students' retention of information from traditional lectures is approximately 10%, and their gain in conceptual understanding is about 25%. Through use of interactive pedagogical techniques, such as PI, Wieman finds that students' retention rises to more than 90% after two days and that their gains in conceptual learning rise to over 50% (Wieman, 2007). Hake's 1998 study comparing "traditional" lecture formats to "Interactive Engagement" formats in 62 introductory physics courses with data from 6542 students reports significantly higher gains in conceptual knowledge and problem-solving skills in Interactive Engagement (Hake, 1998). Comparing absolute learning gains between pre- and post-administration of the Force Concept Inventory (FCI) tests in two calculus-based introductory physics courses for non-majors at Harvard, Crouch and Mazur (2001) found that the introduction of PI doubled, and in some cases tripled, absolute learning gains recorded in courses previously taught using traditional lecture methods.

The impact of PI pedagogy on student learning outcomes has been well documented in the physical and natural science disciplines (see also Emenike & Holme, 2012; Brooks & Koretsky, 2011; Knight & Wood, 2005), but it has been less studied in the humanities, social science, and engineering disciplines.

Six of seven LPSOE members of the FLC had introduced some form of PI prior to joining the FLC, but a majority of these members (4 of 6) expressed a need for greater support in further developing their use of PI and in developing research designs to assess its impact on student learning. The two FLC members who did not express this need both teach primarily lab-based courses, one in geology and the other in biology. Since they felt that an adapted form of PI is organic to the lab-based environment, they chose instead to focus on different active learning projects in their classrooms, with one introducing project-based learning (Cook in geology) and the other introducing rubrics (Chilukuri in biology) as pedagogical techniques to more actively engage students in the learning process. Faculty members' ability to try the techniques that they felt were best for their purposes is consistent with Daly's 2011 finding on the value of faculty autonomy within the FLC structure. Both Cook and Chilukuri were engaged in and influenced by FLC discussions on the value of active learning in large enrollment classes, and both adapted these to their unique course/teaching needs.

One outcome of the FLC was that five of seven LPSOE members either introduced PI pedagogy with clicker technology for the first time during the 2011–2012 academic year or further developed best practices based on PI/clicker research. Specifically, Van Den Einde (structural engineering) and Herbst (humanities) introduced PI for the first time during the Fall 2011 and Winter 2012 quarters respectively, and Brydges (chemistry), Feeley (political science), Herbst (humanities), and Tour (biology) refined PI practices during the Spring 2012 quarter. This resulted in PI's being introduced into a total of nine upper- and lower-division undergraduate courses by FLC members during the 2011–2012 academic year, with enrollment across these courses totaling approximately 1850 students. Significantly, of these five LPSOE members, three are from disciplines where the impact of PI with

clickers on student learning has not been well studied (Feeley in political science, Herbst in humanities, and Van Den Einde in structural engineering). Important exceptions include the work of Butchart, Handfield, and Restall (2009) in philosophy, and Evans (2012) and Velasco and Cavdar (2011) in political science.

Our FLC meetings became an important source of support and knowledge-sharing on PI/clicker use, from modifying course grading schemes (deciding what percentage of the course grade to allocate for clicker participation), to designing effective PI questions, to trouble-shooting software bugs in the technology system, to fielding student complaints about clicker use. As discussed in the previous section, the FLC also functioned as a valuable forum for constructing and critiquing research designs to assess the effectiveness of PI/clicker use and its impacts on student learning and perceptions of learning in our classrooms.

Overall, FLC members who used clickers and PI in their classes ($n = 5$) found that the introduction and refinement of best practices using clickers greatly increased student levels of engagement and that, in cases where student learning gains were assessed, academic performance improved. Specifically, Brydges (chemistry) reports, "Student engagement in class was high. Within a short period of time, the students came to know the drill – arrive on time to class expecting to answer a few review questions (to check knowledge and understanding), and then anticipate that the lecture will be punctuated with other clicker questions that will require you to apply the concepts discussed." Herbst (humanities) reports that "students overwhelmingly supported keeping the clickers[,] . . . Since the classroom had shifted from passive to more active, they felt the greater obligation to work accordingly, which, in the long run, they recognized as beneficial to their own performance in the class and, one hopes, to learning in general."

Students' perception of the learning value of in-class clicker questions and discussion of these questions with their classmates as part of Peer Instruction was overwhelmingly positive. These perceptions were assessed via anonymous online surveys (based on Smith et al., 2009), conducted by Beth Simon and Cynthia Lee (UC San Diego Department of Computer Science and Engineering) in large-enrollment lecture classes taught by Tour (biology), and Van Den Einde (structural engineering). In Tour's class, 87% of students (n=266) agreed or strongly agreed with the statement, "Clickers helped me pay attention in this course compared to traditional lectures," and 96% either agreed or strongly agreed with the statement, "Clickers are an easy-to-use class collaborative tool." In Van Den Einde's, 84% of students in one of her courses (n=106) and 90% of students in her other course (n=144) either agreed or strongly agreed with the statement, "The immediate feedback from clickers helped me focus on weaknesses in my understanding of the course material," and 80% (n=106) and 84% (n=144) in her two classes agreed or strongly agreed with the statement, "Discussing course topics with my seatmates in class helped me better understand the course material." Feeley (political science), who also conducted anonymous end-of-term surveys, found that 88.3% of students (n = 94) found PI/clicker use beneficial to their learning and participation in the course, and 89.4% recommended that PI/clickers be used in future classes.

In addition to the reported benefits for student learning, FLC faculty also indicated that they found teaching with PI and clickers helped them become more effective teachers and that they enjoyed using them. First and foremost, clicker technology and the classroom response system provided immediate feedback on how well students understood concepts in lecture or in the assigned reading. This information was invaluable for pacing the introduction of course materials. Second, although attendance was not kept in our

classes, it was clear from comparing courses using PI and clickers with those that did not, that PI/clicker students attended class meetings in higher numbers. The student data collected via clickers was also valuable for assessing the quality of PI questions, as well as for analysis of student learning gains. Finally, despite large class sizes, we found that through the use of Peer Instruction with clickers, students were kept engaged, classes remained interactive and participatory and, indeed, it was more "fun" and productive than the alternative "sage on the stage" model.

Teaching Assistants: An integral component of innovations in undergraduate education.

UC San Diego is representative of most research universities, where graduate and undergraduate students serve as important partners in instructional delivery and, thus, in innovations in undergraduate education (Boyer, 1998; Boyer, 2002). Indeed, all 7 members of the FLC group regularly work with a number (4-15+ *per* academic quarter) of undergraduate and graduate (MS, PhD) level Teaching Assistants (TAs) and Readers/Graders in a wide array of lower- and upper-division lecture and laboratory courses. Six out of seven FLC faculty reported that TAs played an integral role in their efforts to transform student learning in large classes through the introduction of interactive pedagogies and new curricula.

While TAs' roles in and contributions to change initiatives varied according to course and instructor, their formal responsibilities were generally expanded relative to conventional courses, as noted of TAs in earlier studies by Seymour (2005). For example, in the lower-division general education college history/writing courses led by Herbst, TAs were encouraged to develop discussion lesson plans that connected to the PI-focused questions from the lecture, and to help with classroom clicker logistics, particularly those related to academic integrity. In structural design and engineering courses, TAs assisted Van Den Einde by identifying

reading assignments, generating reading and PI clicker questions, and monitoring clicker use in the lecture setting. Tour also engaged her TAs in the development of PI clicker and exam questions for an upper-division lecture course in biology, noting a significant shift in the clarity, content, and level of questions as the quarter progressed. The TAs in Tour's class helped to promote student discussions during in-class exercises related to data analysis and experimental design and facilitated sections (of up to 30 students) focused on discussion of scientific papers. In a sequence of lower-division chemistry courses for STEM majors, Brydges required that TAs circulate during peer discussion periods of the lectures, to ask probing questions and to gain insights into student thinking. Additionally, TAs were instrumental in the implementation of a writing/video project, providing feedback on project materials, leading a literature search in sections (i.e. tutorials/recitations), addressing student inquiries, grading, and more. In upper-division political science courses, TAs worked closely with Feeley in the instructional scaffolding of research projects, helping to refine grading rubrics, mentoring students during each stage of the inquiry process, and participating in "grade norming" sessions to ensure consistency. The interpretation and implementation of grading rubrics was also a key responsibility of TAs in an upper-division laboratory on microbiology overseen by Chilukuri. Overall, all FLC faculty reported that involvement of TAs, whether as troubleshooters, consultants, or collaborators, enhanced rather than diminished these initiatives.

But what are the benefits to teaching assistants? Irrespective of course format, studies have shown that graduate students' teaching experiences improve their methodological research skills, in addition to their abilities to communicate their research, and concepts in general, to diverse audiences (Feldon et al., 2011). In innovative courses, TAs have described three major gains: deepened disciplinary knowledge and under-

standing; greater proficiency in teaching; and increased enjoyment of the teaching and learning process. TAs have also cited gains in confidence and acquisition of organizational, communication, and team-work skills, all of which are transferable to a broad range of careers (Seymour, 2005). Although FLC faculty did not explicitly measure TA benefits, Brydges, Tour, and Van Den Einde did note that some of their TAs expressed interest in education research as a result of the work in their courses. The preparation and ongoing support which we, as instructors, offered to the TAs affected both their development and their contributions to course innovations.

It is well recognized that training is a necessary component of all undergraduate and graduate teaching apprenticeships, although the type, timing, and duration tends to vary considerably between and within institutions. At the time of publication of the second Boyer Commission report a decade ago, approximately 70% of research universities had a mandatory TA orientation, usually organized by a centralized campus unit, with 60% offering optional academic-year programs and short courses (Boyer, 2002). The distinct and autonomous departmental cultures at UC San Diego have given rise to a similar array of educational options for teaching assistants across the disciplines. The Scripps Institution of Oceanography (SIO) and the Department of Structural Engineering require that their new TAs attend the half-day campus-wide orientation offered by the Center for Teaching Development (CTD). With Van Den Einde at the helm, the Department of Structural Engineering also hosts a mandatory one-hour training session on more specific TA responsibilities, including ABET accreditation requirements. In the Division of Biological Sciences, all TAs must participate in a half-day boot camp prior to their first teaching assignment and at least one follow-up workshop. The departments of Chemistry and Biochemistry and of Computer Science

and Engineering both require their TAs to take a 1-quarter, 2-credit course on discipline-specific teaching methods, with integrated opportunities for community-building and feedback (Brydges and Simon are the course instructors, respectively) (Brydges, 2012). A similar, but optional, course was developed and offered by Feeley in the Department of Political Science during the Fall quarters of 2011 and 2012, in addition to two workshops for first-year graduate student TAs, offered during the first weeks of Fall quarter. Perhaps the most comprehensive model for TA preparation and support has been advanced by Eleanor Roosevelt College, which has a rigorous selection process, a required 1-quarter, 4-credit graduate pedagogy seminar, and a professional staff dedicated to the training, mentoring, and supervision of graduate TAs in the multi-course writing program.

From these disparate models of TA professional development emerge the apprentice student teachers who work with faculty in both conventional and innovation courses. To provide supplemental training and guidance, FLC faculty held biweekly meetings regarding course administration, content, and pedagogical approaches, including student issues and impacts. Moving forward, the FLC members are eager: (1) to strengthen their discipline-specific TA programs, particularly in terms of pedagogical content knowledge; (2) to develop closer partnerships between their departments/divisions/colleges and the CTD; and, (3) to raise the educational standards in such a way that will bolster TAs' preparation for and engagement in undergraduate education reform, in addition to developing their personal and professional skills as effective communicators and future faculty who will teach and mentor, as well as engage in research.

Additional Outcomes

In addition to the three outcomes described above, 6 of 7 FLC members also identified the social aspects

of community building as having impacted them significantly. This is not surprising given the significantly lower number of faculty in the LSOE series relative to ladder-rank faculty campus-wide and the fact that faculty in the LSOE series frequently work in relative isolation. While building interdisciplinary collaborations and competencies in the scholarship of teaching and learning, FLC colleagues have also developed a supportive community that provides assistance on a variety of mutual challenges. These ranged from clarification of review and promotion criteria in the LSOE series to advice on balancing personal and professional lives. Cox (2004) and Daly (2011) have reported similar benefits of FLCs for early-career faculty.

In their continuing efforts to improve undergraduate education, FLC members must next consider how to expand the awareness of DBER and the use of the evidence-based teaching methodologies from individual practitioners to larger communities. In the absence of departmental mechanisms for promoting such exchanges among colleagues, FLC participants have considered formal seminar series, or informal, but regular, "brown bag lunch"-style meetings. While organizing such events may be an onerous task for a lone LSOE-series faculty in his or her department, the FLC, in partnership with the CTD, can provide the impetus and the infrastructure, respectively. Importantly, these seminars should be open to and encourage participation by the future faculty: graduate students and postdoctoral research fellows. These meetings can also provide a venue for DBER researchers and invited speakers from other universities to showcase DBER as a rigorous discipline that investigates the ways students learn and identifies the best educational practices using rigorous evidence-based methods. In doing so, we address the call issued by NRC (2012) to promote DBER as a field of inquiry and increase awareness and adoption of its findings among current and future faculty, all of which

are important steps toward a transformed undergraduate learning experience.

Conclusions

This article documents the progress of the first faculty learning community at UC San Diego, a large, research-intensive university. Participants in this faculty development initiative gained increased knowledge of and competence in conducting discipline-based education research; implemented active-learning methods in large-enrollment lecture and laboratory courses; and trained and engaged TAs in the introduction of new interactive pedagogies and student-centric curriculum. They also developed a community of practice and support among other teaching faculty (LSOE-series faculty) in diverse disciplines, who often work in relative isolation within their own academic units. Collectively, these outcomes underscore the effectiveness of FLCs and reinforce the potential for LPSOE-series faculty to serve as “agents of change” in undergraduate education. Such transformation will necessarily include broad understanding and institution-wide adoption of evidence-based teaching practices in undergraduate education, as well as the development of a coherent curriculum that identifies the overarching concepts and capabilities students need to master (NRC, 2012; Klymkowsky and Cooper, 2012). Establishment of this DBER-based FLC has brought one research university a step closer to achieving this goal. ■■

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Institution	Professor Series				LSOE Series
	Professor	Associate	Assistant	Total	Total
UC-Wide	5,651	1,740	1,698	9089	142
Berkeley	842	278	236	1356	17
Davis	915	258	267	1440	17
Irvine	568	238	224	1030	29
Los Angeles	1228	299	258	1785	8
Merced	30	15	71	116	2
Riverside	336	127	182	645	1
Santa Barbara	495	178	105	778	25
Santa Cruz	293	97	123	513	8
San Diego	679	213	192	1084	35
San Francisco	265	37	40	342	0

Table 1: Number of Professor and LSOE faculty at UC Institutions

Department/Division	LSOE Total
UC San Diego	51
Bioengineering	1
Biological Sciences Deans Office	1
Chemistry & Biochemistry	6
Computer Science & Engineering	3
Division of Biological Sciences	9
Economics	2
History	1
Mathematics	3
Mechanical & Aerospace Engineering	2
Nanoengineering	1
Physics	1
Political Science	1
Psychology	1
Scripps Institute of Oceanography	1
College General Writing Programs	3
Structural Engineering	1
Education Studies	4
Theatre	8
Visual Arts	2

Table 2: Current number LSOE faculty and their disciplines at UC San Diego

Photovoice: A Critical Pedagogical Assignment in the Sociology Classroom

Namita N. Manohar,¹ Dana Berkowitz, JeffriAnne Wilder, and Justine E. Tinkler

Abstract

This paper describes a critical pedagogical assignment that we have successfully developed and used in our undergraduate sociology classrooms in order to make sociology relatable to real-world learning and to interrogate the structural operation of axes of domination such as race, gender, and class. The assignment involves adapting photovoice from a research methodology into a semester-long final project centered on the specific sociological issue that is the topic for the course. We describe our implementation of the photovoice project that requires students to photograph and theoretically analyze the personal, institutional, and local, and also detail our continuous modifications of it to both enhance learning and respond to specificities of our universities. We conclude with an assessment of the assignment, which demonstrates its usefulness in enabling students to connect sociological theory to their own lives and to understand the structural bases of power and inequality.

Keywords

undergraduate sociology, critical pedagogy, photovoice, real-world learning, axes of domination, structural power, privilege and disadvantage

Introduction

In the new century, strategies in higher education have shifted considerably to emphasize real-world learning. Real-world learning here refers to educational experiences drawing upon cross-disciplinary knowledge to facilitate

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intellectual development that apply this knowledge to social realities outside the classroom, especially to students' lived experiences and everyday settings (AACU, 2007; Stein, 2007). More than the mere development of vocational skills, real-world learning is a critical pedagogical practice that grounds learning in local contexts by connecting the subject matter to the ongoing experiences of learners, and emphasizes the use of real data and active learning techniques, especially learning by doing (Brundiers, Wiek, & Redman, 2010; Orner, 1996; Stein, 2007). In so doing, it not only enables students to learn the subject matter in the context of their life experiences and thereby develop an "active sense of personal and social responsibility" (AACU, 2007, p.11), but more importantly, to develop a critical, theoretically informed lens on the same, that might point to the possibilities for change (Brundiers, Wiek, & Redman, 2010). Real-world learning bridges classrooms and the social settings in which they are embedded, highlighting their mutuality for effective, critical education.

The face of higher education is also changing, with minority student enrollment projected to increase substantially (see Turner, 2002). Diversity—broadly defined to include race/ethnicity, class, gender, sexuality, nationality, (dis)ability, and other forms of difference—is becoming a hallmark of the 21st-century academy and now stands at the core of many institutional missions, values, and objectives (Hurtado, 2007). On the curricular level, there is a growing emphasis on developing pedagogical tools that aid faculty in "mak[ing] the most of the diverse perspectives and student backgrounds...[in order] to foster active thinking, intellectual engagement, and democratic participation" (Gurin, Hey, Hurtado, & Gurin, 2002, p. 362).

While the discipline of sociology has for some time invoked critical pedagogies in its classrooms (see Fobes & Kaufman, 2008), its attention to integrating diversity and real-world learning is more recent. According to Spalter-Roth and Scelza (2009), the

American Sociological Association now emphasizes that undergraduate student learning outcomes should center on: (a) student demonstration of basic sociological paradigms; (b) the application of sociological concepts to a variety of contemporary issues; (c) an understanding of how an individual's experience can vary by race, class, gender, and other social statuses; and (d) the impact of social institutions upon individuals. As instructors, the challenge confronting us is to innovate curricula to facilitate these goals.

In this report, we describe a critical pedagogical assignment that we have successfully developed and used in our undergraduate sociology classrooms to enable students to apply sociological ideas to real-world settings and lived experiences and to theorize the relations of power and privilege as they relate to the structural organization of intersecting categories of difference such as race/ethnicity, class, gender, sexuality, nationality, and age, among others, in which they are positioned (Collins, 2000). This work is grounded in intersectional theorizing (see Collins, 2000; Zinn & Dill, 1996), a perspective that argues that the above differences are not merely individual identities, but what Collins (2000) calls "axes of domination." This implies that they are mutually constitutive structures, operating at all levels of social life, including in social institutions and interactions, to organize society hierarchically and distribute privilege and disadvantage systemically. Axes of domination are fundamentally hierarchies of power that generate the structural inequality which frames individuals' and groups' location, opportunities, and experiences in society. Through this assignment, students interrogate the structural operation of axes of domination and of inequality and power that frame their personal and social experiences.

The assignment involves adapting photovoice from a research methodology into a semester-long final project centered on the specific sociological issue that is the topic of the course. We suggest that this photovoice

assignment offers valuable contributions to teaching and learning. First, its action-oriented nature—taking photographs, observing, analyzing—facilitates critical thinking (see Fobes & Kaufman, 2008) by requiring students to be attentive to and to question the social organization of society. Coupled with the requirement to analyze images using a theoretical framework, it enables them to uncover the macro-micro processes that shape social phenomena and, in so doing, challenges students' taken-for-granted assumptions about sociological realities, replacing them with a more critical, theoretically informed perspective that is attentive to power and privilege (Braa & Callero, 2006; Zenkov & Harmon, 2009). Second, the emphasis on uncovering the structural operation of axes of domination is useful in moving students beyond individual or cultural analyses of inequality to interrogate the structural bases of their own privilege and disadvantage (Leonardo, 2005). Third, it enables us to integrate technology into our college classrooms. A recent study shows that 75 percent of Millennials identify their generation as distinct because of the role of technology in their everyday lives (Goffe & Sosin, 2012; Keeter & Taylor, 2009). As students, they anticipate that technology will play a significant role in their college classrooms (Pearson, 2010). They expect that their instructors will use visual media and online course management tools and will require them to use electronic devices, like smartphones and laptops, and the latest virtual resources, like social networking sites and blogs, in their coursework. The assignment meets these expectations by facilitating the use of digital photography to enhance the learning experience. Finally, it enables students to take learning outside the classroom, reflecting both real-world learning via civic engagement—i.e., using our local communities as sites of academic learning and exploration—that is an important mission at each of our institutions and the growing trend to make the discipline of sociology more public (Burawoy, 2005).

Photovoice: The Research Methodology

Originally developed by public health scholars Wang and Burris (1994; 1997), photovoice is a participatory-action research methodology used to engage community members in defining and assessing community needs and in campaigning for policy change (Castleden, Garvin, & Huu-ay-aht First Nation, 2008). Influenced by the traditions of education for critical consciousness, feminist theory, and documentary photography, photovoice uses “the immediacy of the visual image to furnish evidence and to promote an effective, participatory means of sharing expertise and knowledge” (Wang & Burris, 1997, p. 369).

Methodologically, photovoice involves participants—i.e. community members—photographing what they identify to be “salient community concerns” (Hergenrather, Rhodes, & Bardhoshi, 2009, p. 687), and then analyzing these photographs—i.e., “examining their historical-social situation” (Castleden, Garvin, & Huu-ay-aht First Nation, 2008, p. 1396)—in community-based group discussions. With the assistance of researchers, who facilitate this process by training participants in camera use and research ethics and conducting post-analysis interviews and discussions, participants use their photographs to collaboratively generate critical knowledge about their lived experience. In turn, they experience collective power to identify institutional solutions and the stakeholders to whom these should be addressed (Hall, Kline, & Glanz, 2011; Wang & Burris, 1997; Wilkin & Liamputtong, 2010).

Photovoice has emerged as an empowering tool, primarily used with marginalized populations and race/ethnic-gender-class minorities, to enable them to assess their health, development, and social outcomes and create change for themselves and their communities (Webb, 2004). Examples of these include its use with rural African-American survivors of breast cancer to assess their quality of life in their own social context

(Lopez, Eng, Randall-David, & Robinson, 2005); with homeless youth to engage them in health promotion activities and planning (Dixon & Hadjialexiou, 2005); with Latino adolescents to learn about their immigration experiences (Streng et al., 2004), and with a First Nation community in Western Canada to assess their environment and health risks (Castleden, Garvin, & Huu-ay-aht First Nation, 2008). See also Hall, Klein, & Glanz, 2011; and Kramer et al., 2010, among others. For these groups, historically objectified in the research process (see Castleden, Garvin, & Huu-ay-aht First Nation, 2008), photovoice empowers them by privileging their voices, indigenous knowledge, and interpretations of their realities (Lopez, Eng, Randall-David, & Robinson, 2005; Wang, 1999). Further, its collaborative nature balances power between participants and researchers (see Castleden, Garvin, & Huu-ay-aht First Nation, 2008), to engender collective community ownership in affecting change that is culturally appropriate. Photovoice also empowers by engendering participants' self-determination to define their concerns and priorities and openly discuss their experiences in "ways they would not have normally thought appropriate to bring up with others" (Wilkin & Liamputtong, 2010, p. 233) and, by fostering their trust and ownership in the research, builds community capacity (Castleden, Garvin, & Huu-ay-aht First Nation, 2008; Hergenrather, Rhodes, & Bardhoshi, 2009).

Recently, there have been a few attempts to apply this research methodology to enhance classroom learning. Zenkov and Harmon (2009), for instance, effectively used it to teach writing to urban youth in inner-city schools, while Carnahan (2006), describes its efficacy in improving engagement with autistic children. Much of this work is centered on disadvantaged learners in the K-12 setting—a dynamic that raises two very interesting questions about its viability within college classrooms. First, we wondered whether a photovoice pedagogical assignment would allow us to both

teach in the context of diversity (i.e., the diverse student demographics, learning styles and college readiness evident in our classrooms) and teach about how "diversity" is structurally organized. Second, we also wondered whether it could be an effective method to foster student engagement with sociological ideas. Our experiences indicate that it is indeed a useful pedagogical tool for college students to better understand sociological theories, and the extent to which structural difference, power, and privilege shape their everyday life worlds.

Photovoice in the Sociology Classroom: The Pedagogical Assignment

The photovoice sociology assignment is centered on three key premises: 1) the combination of visual and written representation as a powerful means for students to "communicate their life experiences and perceptions" (Wilkin & Liamputtong, 2010, p. 233); 2) the emphasis on lived experience to uncover students' view of the world and their knowledge of it; and 3) the focus on the local setting within which they live (Castleden, Garvin, & Huu-ay-aht First Nation, 2008; Hergenrather, Rhodes, & Bardhoshi, 2009). To this effect, drawing on the original methodology, we have designed a semester-long photovoice project that requires students to photograph personally relevant objects or place-based activities around a specific sociological topic, such as gender, race/ethnicity, or work, and then provide a written reflection, analyzing their photos within learned theoretical paradigms. We name our assignment, "Understanding Gender Through Photovoice." The name derives from the Sociology of Gender course, the first course in which it was implemented. It can, however, be modified to fit the specific course topic.

We have successfully implemented the photovoice final project in three upper- and lower-level sociology courses (Sociology of Gender, Racial & Cultural Minorities, Sociology of Work¹), a total of nineteen times at three public universities. The first is

an urban institution in the northeast, well known for its comparatively affordable tuition, with a racially and economically diverse student body, including a significant international student population. The other two are predominantly white institutions (PWI). One is a large, land-grant university in the south, with mostly in-state or neighboring-state students. The other is an urban, mid-size state school in the southeast, with a predominantly city-based student population.² Class sizes vary from approximately 100 students in lower-division to 25-30 students in upper-division courses.

The Semester-Long Photovoice Project

The project, which was first developed by the second author for a Sociology of Gender course, proceeds in two stages. The first stage involves photography. Students are asked to take ten photographs documenting the salience of gender in their everyday lives at the micro and macro levels. Five of these photographs are personal (micro) illustrations of how they personally experience and/or perform gender. The other five photographs are of institutional (macro) representations of gender—i.e., how gender both is experienced through and structures social institutions—that are meaningful to them (Martin, 2004). It should be noted here that while practitioners of photovoice are often concerned that its use might reproduce class stratification especially around access to resources such as cameras (Wang & Burris, 1997), this has never become a significant issue in our experience largely due to the widespread use of mobile phones with photographic capabilities among our students and their ready usage of this in their social lives. Nonetheless, some of the authors have collaborated with colleagues in their departments to create a stock of cameras and video equipment to support student research projects.

This photography is bounded by two *caveats*. First, students are required to *take* the photographs themselves rather than downloading pictures or images from the internet. This facilitates their active learning

and engagement by encouraging them to be observant of their social worlds in order to identify moments that are illustrative of the key questions underlying the project, rather than simply demonstrating their “googling” skills. Second, the photographs can depict real or symbolic experiences: they do not *have* to be *physically* present in every photograph, but must be able to theorize how certain symbols are representative of their personal gendered experiences and/or a gendered institution. In this way, we encourage students to be cognizant of the way inanimate cultural artifacts are ubiquitous to the experience of the social world, integral to the marking of bodies, identities, spaces, institutions, and differences.

The second stage entails contextualizing these photographs through theoretical storytelling. Students are asked to create montages of their photographs by cutting and pasting and/or scanning photographs onto a power-point slide or construction paper. There should be ten papers or slides in total.³ Adjacent to each photograph should be a theoretically informed description of the relevance of the photograph and how and what it depicts about the personal or institutional dimensions of gender. Each of these theoretical descriptions should be written from a sociological perspective, i.e., employing the sociological vocabulary learned in the course, and should be approximately one paragraph in length. Each must reference a different theoretical concept or framework, requiring students to demonstrate their ability to apply the breadth of sociological ideas learned through the course, rather than letting them repeat their favorite ones. Students are reminded that there is no single right or wrong analysis *per se*, but rather, that multiple meanings can be accorded to a single image, framed by their social location within intersecting axes of domination. Accordingly, their theoretical storytelling is evaluated by whether they cogently represent personal and institutional dimensions of gender using theoretical frameworks, and not by whether we, as instructors, agree with their interpretations. It has been

our practice to evaluate the assignment for a total of 50 points, with greater weight being given to the written than to the visual component.⁴

In our experience, while the successful completion of the semester-long assignment appears deceptively easy on paper, as our students acknowledge, it requires significant collaboration between students and instructors, just as its use as a research methodology requires collaboration between researcher and participant. Student/instructor collaboration involves several tasks. First, similar to the formal training of community members in the methodology that is often a mandatory step in participatory-action research projects (see Hergenrather, Rhodes, & Bardhoshi, 2009; Wang & Burris, 1997), instructors provide multiple, comprehensive introductions to and overviews of the project. This includes explaining the meaning of the photovoice methodology, as described earlier, and a verbal outlining of its adaptation for the classroom, with a focus on the project's pedagogical objectives. We highlight the goals of applying and connecting abstract theoretical concepts to their life worlds, and of challenging their taken-for-granted assumptions about identities, experiences, social institutions, and realities. We push our students to recognize the social world as historicized, marked by social fixity and social contingency, and, in so doing, to recognize the potential for change at multiple interconnected levels: micro, meso, and macro. In our experience, outlining these objectives in the introduction has proved to be especially effective in assisting students to visualize what they call a "framework" within which they need to work. One student elucidates:

You know when you emphasized that you are evaluating how we apply the concepts to our lives, it got me thinking about what I do and see every day and how that relates to what we discuss in class...like patriarchy you know...like I know... my husband and I do different things, but now

I'm thinking why. And that helps in thinking about the photos you know...

In this introduction we also spend considerable time briefing students about the ethics of doing a photovoice project, particularly around issues of consent. We explain that photography can be personally intrusive and so must be undertaken with sensitivity. We emphasize that students whose photographs include third parties and/or are observations of non-public spaces must get permission from the human subjects in the first case, or owners of those spaces in the second, based on an understanding that the pictures will appear in a final project report and an academic presentation (Castleden, Garvin, & Huu-ay-aht First Nation, 2008; Wang & Burris, 1997). Further, we assure them of confidentiality on our parts—that we will be the only evaluators of their final projects, which will be retained for as long as is specified by our universities and then destroyed according to our universities' policies.

Second, student/instructor collaboration also involves us providing reminders throughout the semester of the methodology and of the directions for successful completion of the project. In these discussions we pay particular attention to defining terminology for students. Thus through the use of illustrations and an interactive, Socratic method we help students understand what is meant by real and symbolic, personal and institutional, with reference to the topic of the class. In the gender class for instance, we ask them what the personal dimension of gender means to them. Most begin by self-identifying with the normative gender categories. Then, to illustrate their identities, they point to the ways they "do gender" through external markers like dress and hair and discuss how it is inscribed on all our bodies in our movements, behavior, and mannerisms (West & Zimmerman, 1987). We then point to how this might be depicted through photographs, explaining that a "real photograph" could be of them posing in a way they consider to be masculine, such

as being dressed in masculine attire, while a “symbolic photograph” could be of high heels, an object symbolic of gender identity.

Similarly, we collaboratively list social institutions within which they interact daily, such as marriage, family, sports, media, and religion, and identify photographic examples of their gendered character. For example, we discuss how a picture of their priest could demonstrate the structural patriarchy within their religious community or a photograph of their mother doing household labor might be useful to illustrate the second-shift (Johnson, 1997). An especially beneficial method has been for us, as instructors, to use our lives to illustrate the goals of the assignment. Thus, one author discusses how through her dress she marks her gendered ethnicity on her body, thereby doing gender in a culturally appropriate way, and how a photograph of a red sari symbolizes certain ideas of womanhood in the gendered institution of marriage in her culture. We have noticed students responding very favorably to this kind of illustration because it provides them with concrete examples they can relate to and demonstrates that the project is “doable” and not merely abstract.

The third level of collaboration between instructors and students is in the analytic effort. In our experience, students find the photography stage of the project to be relatively easy, but encounter stumbling blocks in the theoretical storytelling stage. As many have noted, this *process* is disconcerting, not the least because theorizing about their own lives constitutes unfamiliar and perhaps even uncomfortable territory. One student explained that this part of the project was “more difficult than I thought before I started doing it, because I am not used to thinking about why I do certain things, or why and how certain things are the way they are—they just are! I mean, I’ve never really thought about it....” It is also the stage in the project where student frustration with and resistance to the demand for critical thinking and interrogating axes of

domination manifests itself, with some students refusing to analyze their photographs beyond the mundane and popular explanations (Fobes & Kaufman, 2008). For example, students are tempted to respond with statements like, “I do it because I’m a girl and it’s what girls in my culture do” or “I don’t know why. It’s just an Asian thing!” We therefore realized rather quickly that we need to collaborate with students in the elicitation process to help them “move past the obvious themes of their images and engage in richer inference-making processes” (Zenkov & Harmon, 2009, p. 578). In this way, we can perhaps manage their emotions and convert their frustration into a pedagogical resource.

To do this, we draw upon the technique of collaborative meaning making between community members and researchers that was developed in the original participatory research methodology. Adopting the photo assignment discussion questions designed by Wang (1999), we ask students to analyze critically, asking, “What do you see here?” “What is really happening here?” “How does this relate to your lives?” To these, we add the following that are explicitly tailored to facilitate a theoretical, sociological analysis:

- » What does this photograph depict about your gender/ racial/ethnic identities, bodies, and experiences beyond a mere description of the photograph?
- » How does the photograph illustrate gender or race/ethnicity as a social and situated accomplishment that is constantly created and re-created out of human interaction? (West & Zimmerman, 1987)
- » How does the photograph illustrate the institutional arrangements that underlie gender-race-ethnic relations?
- » How does this photograph illustrate the extent to which you are situated within axes of domination to experience race/ethnicity, gender, sexuality, nationality, age, and embodiment simultaneously?

- » How does the photograph depict social location producing personal and social, individual and institutional privilege and disadvantage?
- » How does the photograph represent resistance, challenge, and/or conformity to the normative gender/racial/ethnic order?

Through these questions we encourage students to apply theoretical ideas learned in class to an analysis of their photographs. In so doing, their storytelling is attentive to the socially constructed, diverse organization of their social and personal worlds, where power, privilege, and inequality are structurally emergent (Collins, 2000). It is important to note that the above questions have to be operationalized more colloquially for students to understand the analysis expected of them. Thus, for instance, in her gender course, the first author facilitated a student's analysis of how a photograph of dressing style and make-up is representative of her femininity, as she claims by asking the student to think and correspondingly write about how or what about her femininity is symbolized by her dress. The student's reply that it "enables her to embody emphasized femininity" is countered by the instructor's questions about what emphasized femininity entails, given her social location; why she chooses to embody it; and what the implications of this embodiment are. Emphasized femininity refers to an ideal of femininity organized around compliance with gender inequality and "accommodating the interests and desires of men" (Connell, 1987, p. 183). In time, the student attempts storytelling, connecting her gendered performance of dressing up with make-up to her efforts at conforming to the idealized beauty standard for women in western contexts. She argues that this enables her to court attention from men in a socially appropriate way, thereby demonstrating the social construction of feminine embodiment and heteronormativity. Examples of students' theoretical storytelling from the Sociology of Gender course have been provided below. In Figure 1

[on the following page], MW analyzes her personal representation of gender, while in Figure 2 [on the following page], JC provides an analysis of the institution of entertainment/media in the form of the gaming industry.

Modifications to the Photovoice Project: Adding Verbal Presentations

Since the project's implementation in 2007, its fundamental parameters as outlined above have been largely maintained across different courses, its focus changing from gender to race and other topics to reflect the subjects and goals of the individual courses. We have also made several modifications to the assignment that illustrate photovoice's versatility as a methodology (see Wilkin & Liamputtong, 2010). The second version of the project includes a critical methodological change. Inspired by the community forums and photovoice exhibits of the original methodology, by which community members present their assignments to a larger audience (Hergenrather et al, 2009; Wilkin & Liamputtong, 2010), we modified the photovoice final project to include presentations to be made by students in the final weeks of the semester. For this, students present four photographs, two personal and two institutional, from their final project, displaying the images and their theoretically informed analysis. Further, we encourage students to ask questions about each other's analysis at these presentations and to think about structurally emergent similarities and differences in both their experiences and their interpretations of institutional arrangements. For instance, multiple students with a similar photograph, like one of their father, mother, and siblings might analyze it differently: one might write about the patriarchal ideologies that undergird her father-breadwinner, mother-homemaker family, and the other might write about the normative, heterosexual family as a white, middle-class construct that marginalizes other family forms (Collins, 2000).

Figure 1: Photovoice Project – Sociology of Gender, Personal

Photograph by MW: Representation of her gender
 [Note: Theoretical story-telling has been reproduced verbatim from students' assignments with their permission]

This is a picture of me after preparing for an outing with my friends. The feathers in my hair, makeup, leopard print top and large jewelry are all examples of displaying emphasized femininity as an essential part of my gender. By performing femininity appropriately I am able to access privileges (which can include free drinks, better service at the bar). In addition to this, embodying femininity appropriately, I am able to attract male gaze which can be essential to accessing the privilege previously mentioned. Conforming to the expected ideals of beauty and attractiveness can also risk reinforcing the controlling images of women of color as “Jezebels” even if it is only a display and not directly related to promiscuity. That being said, my choices to either display emphasized femininity or not is something I do based on how risky it is to conform and whether that controlling image may compromise my safety. If I am dressed this way, I make arrangements for transportation and never go out alone.

Figure 2: Photovoice Project – Sociology of Gender, Institutional

Photograph by JC: Representation of Gaming Industry

The gaming industry is a gendered institution for the reason that it makes use of controlling images of masculinity and femininity in the construction of gender roles in the games. The representation of masculinity in games often includes male characters as being fearless, capable, muscular and with super human strength while the representation of femininity is of the idealized beauty which includes women being elegantly beautiful, tall and slim. The gaming industry also uses controlling images as a strategic plan to market their product to men for profit by commodifying images of masculinity based on violence and constructing women as sexual objects upon whom men can gaze.

This modification has several aims. One is for students to share their projects with each other. This affords them an understanding and awareness of the complexities of the social world in that their identities, social experiences, and institutional interactions are fundamentally organized by axes of domination that position them subordinately and superordinately within society. A second is for students in the classroom to recognize how their lives are relational to each other's, in that their experience of inequality and privilege is structural, emergent from their social locations. It also carries the added benefits of developing students' verbal communication skills.

The presentation requirement is, however, not without its challenges. It carries the risk of forcing students' lived experiences into the realm of public scrutiny, where despite a semester's investment in learning and practicing inclusivity of opinions and lives, students might fear criticism and ridicule. This is particularly so for those who transgress normative standards, who do not share the instructors' progressive social and political orientations, and who do not want to overtly and publicly engage with their marginalized identities. For one author, this was evidenced by the reluctance of a self-identified gay student to participate in the class presentations of the photovoice gender project due to concerns about how she might be perceived by her colleagues, despite the fact that she had hinted at her sexual orientation in her many comments on the readings over the semester. It has thus been our practice to allow some flexibility around presentations, to be negotiated on an individual basis. One emergent strategy involves individual presentations in the instructor's office—preferred by this gay student—enabling students to complete the project while avoiding public scrutiny and lessening the fear of ridicule. On the whole, however, student feedback includes largely positive reviews of the presentation component. A number note that their learning is enhanced both by having to put together a

presentation and by observing their classmates' presentations. Especially illustrative of this is the small, but growing, number of our students who have presented their photovoice projects at undergraduate research competitions at our universities and at undergraduate sessions at national sociological conferences.

Modifications to the Photovoice Project: Adding Mid-Semester Outline Requirement

Another modification to the photovoice project includes the methodological addition of an outline, or detailed plan for the assignment, due at the mid-point in the semester. This version was devised by the first and third authors, who work at public colleges with a large proportion of non-traditional learners, first-generation college attendees, and/or non-native English speakers. Such students come from a wide range of backgrounds, have widely varying levels of preparation to do college work, feel only a limited engagement with the campus, and may find it difficult to consult with instructors outside of class due to the demands of full-time work and/or families on their time. For these instructors, outlining is a strategy by which to address these issues while facilitating students' successful completion of the project.

This outlining takes two alternative forms. One is in the form of a "mock assignment" where students are required to submit a mini-photovoice project of four photographs—two personal and two institutional—connected to the topic at hand (gender or race)—and their corresponding theoretical analysis. The other we call a "workshop or class quiz" where all students are required to bring an example of one photograph and theoretical analysis to class and, in the ensuing class period, exchange their papers with at least three classmates and provide grades to each other, enabling them to discuss examples of their work, troubleshoot the mechanics of undertaking the project, all while receiving feedback from us. In our experience, outlining in either way has been highly successful, demonstrated by

the improved quality of students' final projects especially in the analytic component. Students report that it "forces them to start the project in a timely manner" and "to practice theoretical storytelling." For instructors, outlines enable us to give personal feedback to each individual student, while identifying common areas of weakness and of strength in all the analyses so that we can also give pointers for improvement to the class as a whole. This is especially useful in ensuring that while the standards for the assignment remain stable across our different courses and universities, feedback is tailored to the dynamics of the particular class of students we are currently teaching.

Modifications to the Photovoice Project: Adding Locality and Observation

The final modification we have made to the project is in the content of the assignment to explicitly integrate locality. This modification is fairly recent (over the past three semesters) and has only been implemented in small sections of one course, Sociology of Work. In this modification, students are challenged to sociologically examine a job or a type of work that is personally relevant to them, either a job performed by them and/or by close family/friends or one with which they engage daily in their neighborhoods or in the city. First, they are required to develop a broad thesis question around which they focus their photovoice projects. Next, students take ten photographs of the job/type of work, depicting it in either real or symbolic ways and documenting both institutional arrangements of the workplace and personal engagements within it. To do this, students are also required to do participant observation, with prior permission, of the job and/or workplace they are researching, which should then inform their photography and analysis. In this iteration, the project also becomes more explicitly research-oriented. The theoretical storytelling, outlining, and presentation components of the project remain relatively unchanged, with the minor exceptions that a more detailed analysis

of two to three paragraphs and a presentation of their entire project, rather than of selected photographs from it, are now required.

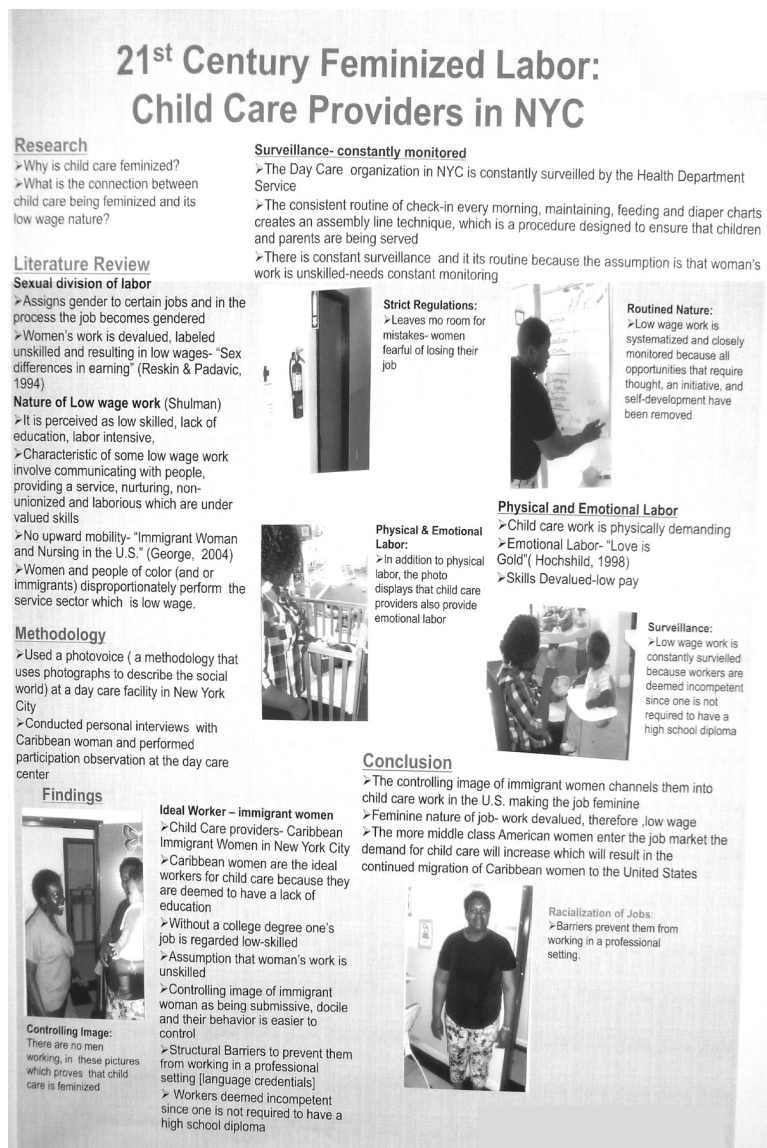
To emphasize the locality component, student analysis is facilitated along the following lines:

- » How does the photograph demonstrate the salience of locality—i.e., neighborhoods—and social location in access to and experiences with work?
- » How does the photograph depict the organization and structure of the job/work to the extent that these are both produced by and reproduce larger socio-political and economic processes like globalization, immigration, the New American economy, and individual agency?
- » How does the photograph depict how the job/work is a site for the production and reproduction of axes of domination, power, and privilege?
- » How does the photograph illustrate the nature of the job namely: workplace routines, job profiles, worker interactions, mobility, as experienced by different categories of workers?

In so doing, students are prompted to think about why particular work arrangements are in place. Whom do they benefit? What impact do they have? And how these are shaped by the local context? For instance, in her project examining the interplay of race and low wages in day-care work in the city, a student photographed a staff of predominantly Caribbean immigrant women. The first author facilitated her analysis by asking her to think about these questions: "why Caribbean women? How and why do you think they found that job in the city? Is there a connection between the workers and the nature of the job?" This in turn enabled her to theorize the connections between feminized migration and the emergence of ethnic job niches in the city. [See Figure 3 below.]

The sociology of "work" photovoice projects are typically focused on, but not limited to examining gen-

Figure 3: Photovoice Project – Sociology of Work



Photographs by YM: This poster only includes her key findings and was presented at a regional sociology conference in February 2011.

dered and low-wage work in ethnic economies in the city, such as restaurants and nail salons, unionized blue collar jobs in industries such as local utilities

and transportation [See Figure 4 below], and service work in the New American economy. The particular

predominance of blue-collar, service and/or low-wage work in these projects is emblematic of the city's bifurcated labor market (see Sassen, 2001) and the rapid expansion of this sector and of the working-class, immigrant, and racial/ethnic minority status of the students at this university, which channels them into these (part-time) jobs especially while they are studying. As they worked on their photovoice projects, students reported a growing cognizance of the interplay of social and geographic location with work and of work's not just being an activity performed for compensation, but a social structure with its own logic, norms, and hierarchies that has differential consequences in terms of pay, mobility, interactions, and treatment for workers differently located within it (Sweet & Meiksins, 2008).⁵

Assessment

In order to assess learning outcomes, we asked 174 students to complete a post-assignment questionnaire in which they reported how the project altered their understanding of gender and society.⁶ We assessed student learning in four sociology of gender classes, two at universities in the south/southeast and two in the northeast. We found that 93% of students answered the question. We coded their answers into four categories: 1) I learned how gender applies to my life (e.g., "gave me insight into how my own identity is gendered"), 2)

I learned how gender is often invisible, but everywhere (e.g., "It opened my eyes to everything around me that was already there"), 3) I learned about the ways that we perform our gender (e.g., "It made me see that gender is a learning process, not just a sex"), and 4) other (e.g.,

Figure 4: Photovoice Project – Sociology of Work

The Gendered Nature of Electrical Work

Research Problem

- What is Gendered Work?
- How the workplace encourages sexual division of labor?
- The need to constantly reaffirm masculinity in order to continue male dominance in the workplace?

Literature Review

- Reskin, Barbara & Irene Padavic "Gendered Work": Women and men at Work
- They call the process of gender differentiation **gendering** and speak of activities that organizations or cultures have attached to one or the other sex as **gendered**.
- Williams, Christine "Gendered Jobs, Gendered Workers": Still a Man's World
- Gendered organizations
- The workplace is not-gendered neutral; it is a central site for the creation and reproduction of gender differences and gender inequality.
- Workers are not passive players in this social reproduction of gender in organizations
- According to this perspective, cultural beliefs about masculinity and femininity are built into the very structure of the work world.
- Lorber, Judith "Night to his Day": The Social Construction of Gender
- Gendered Division of Labor: The assignment of productive and domestic work to members of a different gender status
- The work assigned to those of different gender statuses strengthens the society's evaluation of those statuses
- Connell, R. W. "Hegemonic Masculinity & Emphasized Femininity"
- One form is defined around compliance with this subordination and is oriented to accommodating the interests and desires of men. I will call this 'emphasized femininity'.
- What most women support is not necessarily what they are.

Research Questions

- How does gender organize the job?
- How do workers perform gender on the job?
- How do male workers keep women out by reinforcing masculinity in the workplace?


Methods

- Semi-Structured
- One (1) semi ethnographic: during one semester of observation at various job sites collected field notes through informal conversations during (September – November 2009)
- Photovoice

Results


- Evidence of how workers perform gender on the job and engage in gender practices to prove their masculinity and keep women out by policing in order to maintain the masculine nature of the workplace.
- The assumption that the employees will be male workers, dictates the design of the personal protection equipment (P.P.E.). (Exhibit A)
- Girl Watching to create solidarity among male co-workers and Emphasizing Femininity to fit in. Doing gender to retain privilege by reinforcing masculinity while subtly indicating to the women that she's excluded from the hegemonic masculine nature of the workplace but welcomed only by being treated as an object of desire.
- The woman accepting and reinforcing the behavior as a means to fit in.

Image *Exhibit A: Personal Protection Equipment (P.P.E)



Overalls: Women workers must remove overalls on bathroom breaks.
Harness: Equipment could cause discomfort because it drapes over the shoulder and fastens at the chest area.


Image **Exhibit B: Relief Bags used for Bathroom Break



Keeping Them Out

Restroom Breaks:
"Workers are issued relief bags when a bathroom break is required. However, women have to find a bathroom because use of the relief bags" do not provide privacy. We must stop all work in progress, pack down the work site, including protective barrier*** and put away all work tools and equipment just to take her to the restroom. Sometimes we take our time and pack down real slow which causes her great discomfort. Eventually she leaves and finds work in another department because the hassle to use the bathroom several times within an 8 hour shift can become overwhelming if she has to go to the bathroom several times in a work shift" -- Tony, 34 – Electrical Worker, (Campbell: Fieldnotes)


Image ***Exhibit C: Protective Barrier (Part of the Set Up)



Performing Gender on the Job

Retaining Privilege
"One of the girls who use to work here use to dress in high heels and short skirts and wear a lot of make-up so people would not mistaken her for a man. She also got breast implants and she let me touch them. All the guys wanted to touch them but she would tell them no and curse them out. Sometimes the guys would bet me that she wouldn't let me touch them again. I would wait until she was around all the guys and ask her to let me touch them and she would say sure" -- Mae, 41 – Electrical Worker, (Campbell: Fieldnotes)

Image ****Exhibit D Heavy Equipment



Conclusion

- Gender organizes electrical work by assuming the electrical worker is a man. This assumption is demonstrated and reinforced by the design of work gear and use of heavy equipment to perform duties. These are clues which support the idea of gendered work. (Exhibit D)
- Gendered organization of electrical work shapes worker's behaviors on the job, and worker's gendered behavior reinforces the gender structure and the sexual division of labor.
- In a male dominated workplace men do gender to reaffirm masculinity, exercising power to keep women out, therefore reinforcing that electrical work is male dominated.

of students learned more about how gender applies to their lives, 20% reported learning about the way that the effects of gender on society are obscured, 15% mentioned learning about the way that we perform our gender, and 8% named another way that the project helped them understand gender. The exercise appears to be most useful for providing students with the opportunity to connect sociological theory to their own lives. In particular, students noted that the exercise helped them identify ways in which we "do gender," ways in which gender is institutionalized and obscured in everyday life, and ways in which race, gender, and class intersect. We interpret these results to mean that the assignment accomplishes the learning goals of applying sociological ideas to real-world settings and lived experiences and of interrogating and theorizing the structural operation of the axes of domination and of inequality, power, and privilege.

As a practical matter, we also asked students to report the easiest and most difficult aspects of the assignment. Indicating that the project was feasible for the vast majority of students, nearly 80% of students reported that taking the photographs was the easiest and most fun, while only 12% reported it to be the most difficult part of the project. Aside from a handful of students who ran into logistical/technical problems, the majority of the students (nearly 80%)

Photographs by TC: This poster only includes her key findings and was presented at a regional sociology conference in February 2010.

"how stratified our society is," "about the way that race and gender intersect," "I did not learn anything from the project"). Since the question was open-ended, the coding scheme allowed many students' responses to be coded into more than one category. Student responses generally reflected what they took to be the most important or most salient aspect of what they learned, not the only thing they learned. Our analysis shows that 60%

reported that the most difficult aspect of the assignment was applying the sociological theory to their lives. This points to the effort involved in becoming critical thinkers and suggests the potential of the assignment in aiding this effort.

The efficacy of this assignment suggests that it might be replicated in other disciplinary contexts. Its underlying methodological precepts, namely applying classroom learning to real-world situations, reflection and analysis, group work, use of media and technology, are relatively easily translatable across disciplines. For instance, instructors of English might use it to have students photograph their lived experiences around a particular topic through which they can develop narratives to practice plot development and writing skills. Those in psychology classrooms might use it to document, perhaps symbolically, the social causes and effects of disorders or psychological phenomenon like altruism or groupthink. Anthropologists might use it to encourage students to visualize cultural processes and criminologists to encourage them to think about theorizing policing, surveillance, and the prison industrial complex. Furthermore, the intersectional theorizing that frames the assignment draws on interdisciplinary perspectives that make the assignment applicable to interdisciplinary classrooms, such as in African American studies, women's studies, and Chicano/Latino studies.

This paper has described a semester-long photovoice project which we have implemented in our undergraduate sociology courses to facilitate real-world sociological learning and to interrogate the structural operation of axes of domination and inequality that frame personal and social experiences. Our simulation and assessment indicates that the project is an effective pedagogical assignment in developing a critical consciousness and stimulating students' sociological imagination. It enables them to apply sociological training to understanding the social world, to interrogate the structural nature of difference that organizes social life,

and to recognize that seemingly individualized personal experiences are in fact public issues, relationally experienced within a web of privilege and disadvantage. By emphasizing the personal, institutional, and local, the project encourages students to render the invisible and normalized as visible and constructed, thereby engendering a spark of interest in the possibility of personal and social change. ■■

Endnotes

- 1 These course titles are the ones most commonly used in the discipline and across universities, although there are institutional variations in their nomenclature. The curricular focus, however, remains relatively similar. Furthermore, these courses also attract majors from a variety of disciplines, including but not limited to sociology, women's studies, business, and anthropology, and meets general education requirements.
- 2 With reference to the urban universities, the one in the Southeast is located in a city with a history of strained white-African-American race relations that still persist. The other is in a northeastern immigrant gateway city, defined by a racially/ethnically and economically diverse population, spatially organized into fairly segregated neighborhoods. In these universities, then, given our students' daily struggles with race/ethnic/class inequality, our goal of interrogating the structural operation of axes of domination through the project becomes especially relevant.
- 3 Final projects are submitted in hard copy with either black-and-white or color photographs, supplemented with typed text.
- 4 For instance, we offer students a total of ten points for taking ten photographs. In the absence of the later modifications, the descriptions are then worth a total of 40 points.

5 It should be noted that the successful implementation of this modified photovoice final project is aided not only by our students' connectivity to their localities, but also an emphasis on facilitating place-based learning and student research intensive courses at our institutions, which make issues of access, permissions, and communities' willingness to assist students in projects relatively easier to navigate.

6 This assessment is drawn only from the Sociology of Gender courses largely because the assignment has most often been implemented in them across our universities, affording us sufficient data for this article. Its implementation in courses on Race and Cultural Minorities and Sociology of Work is fairly recent, limiting the availability of statistical assessment data. Nonetheless, in the latter, informal qualitative feedback has been generated, referenced in the body of the article.

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Light Writing: Verbal, Visual, and Virtual Images in the STEM Classroom

David Faflik

Abstract

This essay elaborates the instructional value of visual images for STEM students in the writing classroom, across the curriculum. On the one hand, the emerging pedagogy of Visual Thinking Strategies (VTS) shows that conventional aesthetic visual forms (paintings, drawings, prints, still photographs) not only encourage object analysis among undergraduates as an interpretive occasion for “reading”; they excite an interdisciplinary cognition made manifest in formal acts of writing. On the other hand, the comparatively unconventional Web delivery of digital images allows students to convert their facility with online visuals into an enhanced verbal dexterity. The much-discussed Second Life software, especially, affords developing writers a multi-dimensional route from image apprehension to critical articulation. As images evolve, the visual today accordingly functions as an instructive bridge: conceptually, between seeing and saying; intellectually, between the sciences and humanities; and temporally, between the classical practices of rhetoricians in the past and our current image-centered methods of making meaning.

Keywords

writing, image, photography, visual studies, Virtual Thinking Strategies (VTS), Second Life, STEM

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Introduction

... the problem of the twenty-first century is the problem of the image.

—W. J. T. Mitchell, *Picture Theory*

... images can be understood as natural or analytical signs with universal capacities to communicate.

—Martin Jay, “Cultural Relativism and the Visual Turn”

That ours is an image-oriented society—that we increasingly comprehend the world with our eyes, through imaged representations—has become a commonplace in both scholarly and popular discussions of the contemporary postmodern condition. Image has become so central to the very concept of

culture that the burgeoning academic field of “visual studies” risks redundancy with its interdisciplinary predecessor, cultural studies, as a site of inquiry into how meaning emerges within any given human context. Such is the centrality of the image today that Margaret Dikovitskaya even writes of visual studies’ having “subsume[d] everything related to the cultural and the visual” (2005, p. 2).

One question raised by the image’s twenty-first century ascendancy is how the acknowledged relation between the verbal and visual translates into the writing classroom. Some commentators suggest that the image has of late suffered comparative neglect in the natural and applied sciences (Elkins, 2008, p. 5; Latour, 1990, pp. 21-22). Yet rhetoricians from the previous century, most notably Walker Gibson, were prepared as early as the 1950s to have students “compose” experience (as the subtitle of Gibson’s path-breaking textbook has it) by conducting integrative exercises that paired *Seeing and Writing* (1959). Since then we have seen seeing itself transformed inside what Kathryn Grushka names “our ocular-centric culture” (Grushka, 2010, p. 13), and so there has been a concomitant shift in our basic understanding of what and where it signifies to write. The current digital age is, among other things, an era of “visual complexity,” given the way the variable data we confront on page, console, monitor, and screen demand what Manuel Lima calls “information visualization.” From Lima’s perspective, precisely because we know what we see, and because the nature of seeing—and knowing—has changed so swiftly in a period of interlocking information networks and infrastructures, we need a new visual means of making sense of our surroundings (2011, p. 13; Grushka, 2010, pp. 13-14). What we require, as Kathy Yancey explains in her 2004 Conference on College Composition and Communication (CCC) Chair’s address, are updated ways of “interfacing” with our world. Writing’s role in this “interfacing” is central, Yancey, among others,

believes (Dyehouse et al., 2009; George, 2002; Hill, 2004). Yet the rapidly evolving places, spaces, and occasions of writing per se have in turn forever altered an act that once simply meant putting “words on paper.” It’s fair to say that we’re at a crossroads in the “doing” and teaching of writing. In consequence, and as recent commentators have suggested, the kinds of literacies we need moving forward must at once accommodate the cognate oral, print, and digital discourses that increasingly construct our collective visual framework for communication. Indeed, “envisionments” is Donald Leu’s sight-sensitive term for the “new literacy potentials” he anticipates for a next generation of students, instructors, and general practitioners of writing, writ large (2004).

At a glance, the visual turn would seem to carry special significance for students of science, technology, engineering, and math, or STEM, as innovations in their different fields redefine the kinds of composing that practitioners are called on to perform. Collaboration and improvisation across vast scales of space and time are today just a few of the skill sets and “strategies” (each with telling visual consequences) on which science-minded writers of what Sidney Dobrin (2011) calls “Postcomposition” must depend (Zappen, 2005, pp. 319, 323-24; Dobrin, 2011). Of course the visual’s impact on STEM writing is in some respects nothing new. Even before Walker Gibson was preparing students from the Eisenhower era to witness for themselves the myriad means by which language determines so much of what (and how) they see, contemporary instructors of technical communication were already making use of the visual in the form of the proverbial charts and graphs that epitomize the precision and concision prized by scientific and professional communities (Flesch, 1948, p. 180; Fahnestock, 2003, pp. 40-42). “In fact,” as Diana George explains, “for a number of compositionists over the years, the technical writing course was exactly [for this reason] where the

visual belonged” (George, 2002, p. 14). In retrospect the restriction of images to the natural and applied sciences, in particular, was perhaps more a matter of stereotype than close study because it was generally assumed that students who elected to work in these latter disciplines would favor objective, numeric quantification over the subjective modes of critical thought and expression that are too easily associated with the arts and humanities. But now, at a time when science itself is recognized as a rhetoric in its own right (Fahnestock, 2005, pp. 277-78) and such phenomena as hypertext, online multimedia, and digital variability and interactivity ensure that our modern, heterogeneous means of seeing yield ever more varied means of knowing (Mitchell, 1994, p. 2; Hocks, 2003, p. 629; Sorapure, 2003), STEM’s very image-indebtedness makes it well-poised to literally visualize for the twenty-first century the diverse acts of saying, naming, describing, and inscribing that we used to know as “writing.”

In what follows, I recount my own STEM-inspired attempts to incorporate the dynamic promise of visual representation into the traditionally text-based composition curriculum. My “image” laboratory was a land-grant university in the Upper Plains of the United States, where I previously taught at least one writing course each semester to student sections limited exclusively to engineering majors. Most of these were in their second or third year of study and came to class from a wide range of engineering specializations, with many working toward careers in the electrical, mechanical, agricultural, or construction areas of the profession. Equally wide-ranging was their writing competency; although all were required to complete the school’s mandatory entry-level composition course before they could enroll in the second-phase offering (ENGL 277: Technical Writing) that I taught, both courses constituting a combined requirement for the Bachelor of Science degree in Engineering. Over the span of twelve semester weeks, “technical” writing as it

was taught in my classroom unfolded in three course units. Unit I, “Writing for the Workplace,” comprised the core of the course. This seven-week introductory section condensed professional writing to its familiar norms: students learned to research and compose such standard workplace documents as résumés and cover letters, recommendation memos, and analytical proposals. As experts in their respective fields, they themselves supplied the content of whatever texts they wrote; classroom discussions, exercises, and revision workshops, meanwhile, concentrated on more general rhetorical strategies of argument and organization. Unit II took writing in a different direction for a transitional two weeks. Here the class considered hands-on “The Work of Writing” at the technological edge of new channels of communication. Together, students and instructor charted an evolutionary path from email to instant messaging (IM) to texting (SMS), before we undertook a brief examination of collaborative composition with blogs and wikis. Unit III concluded the course with three weeks of “Light Writing,” wherein our classroom understanding of composition took a decidedly visual turn until the end of the term. Note that all of the images featured in this essay appear courtesy of Stephen Foster Briggs, grandson of the late photographer-engineer of the same name.

Writing with Light

“Light Writing” sees composition turn with images away from narrow conceptions of the textual. “Light writing” is in actuality photography. Suitably for student scientists, the photographic process itself emerged simultaneously, in 1839, from two separate research laboratories. One was in England, where William Henry Fox Talbot developed what he believed to be a new means of fixing visual images on the ground glass plate of a centuries-old instrument, the camera obscura. The other site of modern photography’s origins was France, where the team of Joseph Niépce and Louis

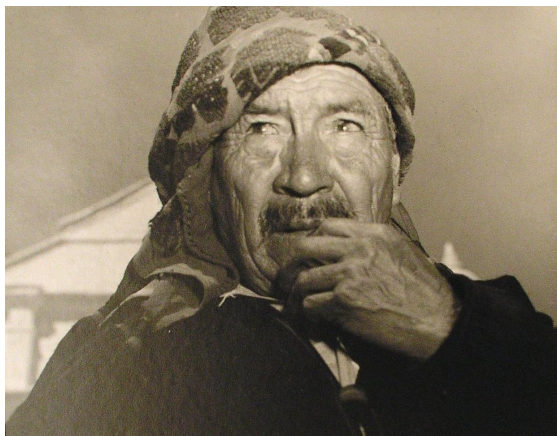
Daguerre achieved an almost identical revolution in representation. Photography's renown spread quickly throughout Great Britain and the Continent and from there to the United States. Some referred to the unprecedented image process as Daguerreotype; the term Talbotype enjoyed lesser vogue. The question of a fitting descriptive label continued for the next several decades, until the Philadelphia daguerreotypist James E. McClees insisted in a pamphlet from 1855 on a return in the nomenclature to "photography." The term had been in limited circulation since photography's birth, but, as cultural critic Alan Trachtenberg relates, McClees staked his claim (a proselytizing campaign, in effect) to a name that carried the weight of "etymological correctness," since the new process indeed was "*a way of writing with light*" (1989, p. 3, my emphasis). "Lexically," Trachtenberg continues, "photography means a kind of pictographic *writing, communication through images*" (p. 4, my emphasis). As such it sets the verbal, the visual, and the mechanical (the process then and now being dependent on the moving parts of machines and on the men and women who make and manipulate them) upon a single continuum. The "argument" of ENGL 277 was that this same continuum is co-extensive with the composition curriculum. "Light Writing," in other words, must be understood in rhetorical terms as "a way of writing with light."

"Light Writing" duly became in my classroom less an occasion for making pictures than an opportunity to sustain a meaningful engagement with images. A composition that is based on comprehension of images charges engineering students to do what they do well—exercise their "objective" powers of observation to "read," interpret, decipher. They concentrated in this case on a selected set of photographic images, looking for whatever data (regarding the photographs' who, what, when, where, why, etc.) they contained. "Light Writing" additionally asked students to do what they may do less well or feel uncomfortable doing: take

the "subjective" next step away from objective analysis to consider, in writing, what most likely were for them photography's less familiar aesthetic properties, as well as its rich semiotic/socio-historical suggestiveness. Visual form, artistic figure, and resonant cultural signifiers may reside in the scientific mind some fair distance from the comparative comfort zone of empirical fact. Not so for visionary information architects like Manuel Lima, for whom the "visualization" of "patterns or structures in data" (and all things digital, really) is as much an "aesthetically interesting" technique for organizing "nonutilitarian activity" as it is the governing principle of "utilitarian design" (2011, p. 13). Prompted by this same counterintuitive spirit, my students' inductive passage from observation of plain old facts to studied reflection on figurative representation proved less vexing than it otherwise might have been, because the captive audience of my classroom more often than not regarded the visual images on offer as genuinely captivating.

This brand of writing depended in part on the provenance of the photographs by which I invited students through "light" to write. I taught image awareness using a cache of twenty-five photos from the archival collection of Stephen Foster Briggs, the celebrated founder-engineer of the Milwaukee-based Briggs & Stratton engine company. Briggs is remembered today largely for his pioneering early mass-manufacture of the gasoline ignition engine—then and now a central component of the automotive industry, and still the motive force of many a lawnmower. This is the Briggs whom not a few engineers on my campus emulated, as this is the same Briggs who received his engineering degree from that very university in 1907. Less well known, even at his own alma mater, is Briggs the photographer. Retiring in 1946 from the company that he co-founded, Briggs relocated to Naples, Florida, where the sometime industrialist turned itinerant photographer. He circumnavigated the globe packing high-

grade camera equipment, looking to capture through still and moving images the flora, fauna, peoples, places, and faces that greeted him on his travels. Much of what he witnessed he saw through the lens of his 35 mm camera, which he fitted with a searching 26-inch telephoto attachment that permitted him an illusory sense of intimacy in photographs usually taken at a distance ranging from 150 to 500 feet (Figures 1 & 2).



Figures 1 & 2: The privileges of perspective – close portrait photographs by Stephen Foster Briggs, ca. 1950. Courtesy of the South Dakota Art Museum.

Briggs said this technique allowed him to make “natural and interesting pictures” (“Camera Notes,” 1952, p. X12). The National Audubon Society was less measured in its assessment. In addition to being a devoted Audubon member, Briggs was a photographic enthusiast for the waterfowl of the southern United States. As a reporter for the *New York Mirror* related in 1952, during a summer exhibit of Briggs’ work at Grand Central Terminal’s Kodak Information Center, the nation’s premier avian organization, praised the former Briggs & Stratton man as “one of the finest bird photographers in the country” (Reidy, 1952). An amateur filmmaker as well, Briggs utilized a 16 mm movie camera with a specially-built twin lens. His results with this device were no less compelling. The Walt Disney Corporation, for one, was impressed enough to borrow his rare footage of birds (his famous pink flamingos among them) for use in its films. Cinematic success never unsettled Briggs’s disarmingly modest method, however. Despite “personif[ying],” for an effusive columnist from the *New York Times*, amateur film’s best rendition of “a Walter Mitty dream come true,” Briggs continued to advocate a simple aesthetic, counseling image collectors everywhere in his own words “to film a little story even on one reel, rather than just a series of distantly related shots” (Langer, 1952).

Briggs’ approach was and remains elemental, both to photos and film—an approach that I urged upon my beginning image rhetoricians. “Light Writing” for them proceeded from three leading questions that I posed to my class at the start of our visual turn in Unit Three, in conjunction with a single photographic image presented as an overhead Microsoft PowerPoint display. Our image inquiries unfolded as follows:

1. What’s going on here?
2. What do you see that makes you say that?
3. What else do you see?

With this heuristic students not only approached an unfamiliar image by Briggs (whom I introduced only

after the fact) for the first time; they also internalized an interrogative method by which they learned to make the interpretive most of any visual encounter with the world around them. From simple “seeing” (“What’s going on here?”), they came to make claims on a strengthened evidentiary basis (“What do you see that makes you say that?”) before advancing further to complex decoding (“What else to you see?”). Closer close “reading” followed of such of Lima’s image attributes as color, line, shape, light, emotion, and narration (Smith, 2008, n.p.a.), all of which helped prepare students to revisit and then revise their initial visceral responses to a specific visual text. Their deliberate written response arrived in due course in the related composition assignment.

Visual Thinking Strategies (VTS)

I owed my visual heuristic not to Briggs, but to a pedagogy known to educators as Visual Thinking Strategies (VTS). VTS is the result of cognitive research conducted by psychologist Abigail Housen in the early 1980s. At that time, Housen was assembling a theory to identify discrete stages of aesthetic development; her findings led her to conclude that children could and should be taught to make meaning from visual images, much as they learn to construct meaning from the verbal images of books. In partnership with museum educator Philip Yenawine, Housen would go on to establish what one commentator calls “a systematic, inquiry-driven method using stage-appropriate art to teach visual literacy” (Smith). This “method” is VTS. Most VTS curricula consist of a mere ten lessons per year, including an on-site visit to a local museum. Yet extraordinary results have been achieved with even this brief imaged interlude. Moving across cultures, eras, and artistic genres, and mixing visual media throughout, students receive the opportunity to observe a wide variety of images, usually two or three in any given forty-five-minute session. Observation, as we

have seen, becomes an occasion for analysis, analysis for interpretation, and interpretation for expression, both oral and written. The current executive director of VTS, Oren Slozberg, summarizes its strengths, saying, “It’s a very powerful tool that can.... get people to look and think,” rather than simply “receive and spout information” (Smith). VTS co-creator Yenawine waxes still more enthusiastic. He enumerates the “liberating” educational benefits of his method as follows:

Student-centered, stage-appropriate teaching that helps foster the individuality of young people, motivates their learning, and maximizes their potential for growth; open-ended, facilitated discussion that can encourage individual expression, productive group interactions, and the development of appreciation for diversity; and art as a subject that is tailor-made to increase flexible, reflective thinking, and appreciation of multiple possibilities (1998, p. 314).

VTS obviates the potential drawback of “open-ended” class meetings with what Fran Smith calls a “rigorously structured” curriculum. Teachers follow guidelines for when to show which images, at what age levels, and in what sequence. Their discussion questions, too, are scripted, as are their appropriate cues for what to do or not do as students speak: educators are advised to focus students’ collective attention on the telling details of images, paraphrase their comments, and elevate the operative discourse by introducing new vocabulary, even as they register that they value and appreciate each individual student response. It’s this solid lesson-plan structure and tendency to empower students personally that has made VTS so popular in K-8 classrooms across the United States.

VTS enjoys favor not just in elementary and secondary schools; it has affected higher education as well. Participating VTS scholars, for example, share their classroom experience and research online through the VTS Forum, a monthly Web conference call that

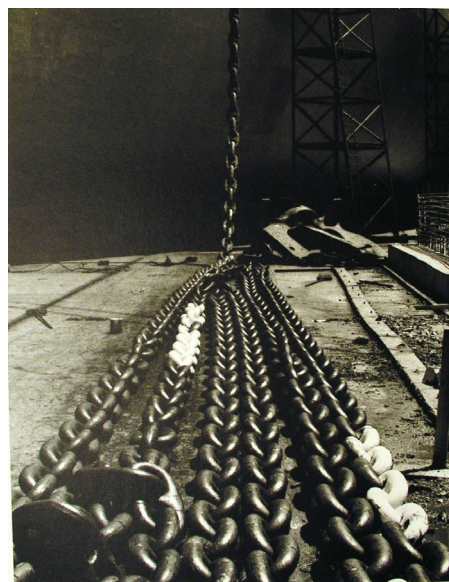
attracts increasing legions of members. (Visit the site online at <http://vtshome.org/training--2/forums/>.) Interest in VTS has also gone global, the educational department at a respected university in Bangkok, Thailand, being but one among many institutions worldwide to take steps to visualize its curriculum (Yenawine, 2010, n.p.a.). Even august Harvard has seen the light. As conducted by Alexa Miller, Curator of Education at the Davis Museum and Cultural Center, Wellesley College, the lead topic for a VTS Forum Session held on January 26, 2010 was the museum-based preclinical course, “Training the Eye: Improving the Art of Physical Diagnosis,” which Harvard Medical School offers to students as a visual means of developing their physical examination skills.

The imaged lessons derived from VTS by Harvard’s future physicians were no less instructive for tomorrow’s engineers in the American Midwest. Visual studies for both student groups came to constitute a cognitive chain, leading intuitively, and felicitously, through a series of connected segments of comprehension: looking closely engenders scientific observation; observation, as before, yields analytical insights that serve as a preliminary stage to Yenawine’s “saying”; through finding the words to express those insights, utterance ultimately takes written form as composition. When image analysis, furthermore, eventuated in the kinds of formal written responses expected of my students, it approximated the “inscriptions” that Bruno Latour insists hold the key to modern scientific method in general. “Inscriptions” are synonymous for Latour to what he calls “paper writing.” “Writing,” in turn, is for him identical to “visualizing,” by which latter term he would indicate both the tangible impressions of print and the “superimposable” representations that often complement scientific texts—those aforementioned graphic charts, diagrams, and tables, as well as the signifying paragraphs of explanatory prose. Equating the verbal and visual, Latour “reads” letters literally/

figuratively and figures figuratively/literally (1990, pp. 21-22). And thus he achieves the cognitive command that imagists, like visual strategists, would effect across the curriculum. This is the same expansive, *enlightened* variety of cognition to which I would photographically *expose* engineers through “Light Writing.”

Classroom Practice

Another literal visual from Briggs illustrates how photographic image can enhance the composition curriculum for scientific writers – how it invites attentive literalization, facilitates inventive figuration, and prepares students for confident exegesis in their written coursework. In an early class session from “Light Writing,” I gave a mechanical twist to the visual turn with the Briggs image below (Figure 3). Accompanying the image in question with the by-now familiar interrogative triad from VTS – What’s going on here? What



*Figure 3: The literal image **link** in visual studies’ figurative chain. Shipyard photograph by Stephen Foster Briggs, ca. 1950. Courtesy of the South Dakota Art Museum.*

do you see that makes you say that? What else do you see?—I received a range of responses from students, as they moved ever-further away from their initial interpretive best guesses and zoomed in closer to the meticulous details of Briggs’s text. “Chain” was the consensual reply to the first query, the “what” that students testified to seeing. When pressed for visual corroboration to their claim—the “what they see that makes them say that”—they invariably began a productive round of contested second guessing, in which the earlier consensus of the classroom faltered. Some saw a *trompe l’oeil*, a visual trick of the eye, achieved by photographic magnification of a regular old chain. Others saw an anomaly, a chain so large that it demands explication of both central text and context. Image narration began as students connected the dots – or linked the links – in what became a literal/figurative *chain* of associations. Prominent white markings in the photograph suggest water-level indicators, as one would expect to find on a ship’s chains. The gigantic size of individual links bespeaks a ship of extraordinary magnitude. A small paint can and brush to the mid-left of the image further supply a sense of scale, both can and brush being dwarfed by the chain that they appear to have white-washed. Indeed, the chain casts much that surrounds it into shadow, lending additional hints of proportion to what fits where inside the sized hierarchy of the photo.

Pressed for “what else they see,” students came to acknowledge that they indeed saw much more than they at first realized. Their seeing engendered saying, as the VTS paradigm would predict, and led them to provide additional details to their developing storyline: they made analytical decisions regarding time, place, geographical scale, human agency, etc., and so contributed to a nuanced reading of the “text” at hand. A *literal* chain now revealed a *figurative* associated series, as one-dimensional observations of “what” transformed into subtle cogitations on the “how” and “why” of artistic composition, perspective, and photographic

method. Outside the frame of the image, moreover, lies the additional weight of mercantile and naval history, drawing students deeper inside the Briggs archive for images that help resolve what more and more seemed a visual, factual, and rhetorical riddle. The answer to what W. J. T. Mitchell would call this image “problem” began to appear when and where seeing and saying progressed a step along the cognitive chain to produce writing (1994, p. 2). Refining still further their evolving aesthetic sense and discursive sensibility, students learned to differentiate between the related concepts of “image,” “object,” “medium,” and “picture” *en route* to asserting, in writing, the meanings they had inferred from careful analysis of a selected set of Briggs’s back catalog of visual texts (Mitchell, 2005, pp. xiii–xiv).

The capstone assignment for “Light Writing” asked students to compose collaboratively, in accordance with one of the first and foremost of the new literacy paradigms. Arranging the class into five teams (the same that were used throughout the semester for peer review draft workshops), I assigned each group a total of five Briggs images. Broadly speaking, teams together were to “read” these assigned texts as a basis for considering, in writing, both the scientific/mechanical side of their photographs and their aesthetic content and form. More specifically, they were to write their own accompanying text for the images, as if they were creating, arranging, and staging a miniature exhibit for Briggs’s “light” work. I asked students to consider their “compositions” a rhetorically guided walking tour of a conceptual museum space, stressing that there could be no right or wrong answer in their response. Teams were to “frame” their proto-essays with a one- to two-page introductory statement (single-spaced) that at once provided a contextual overview to their exhibit, included a summary scientific statement on the photographic process, and, above all, identified a clear, overarching argument that tied their five assigned “texts” together. Individual readings of images—which

had to elaborate and sustain the project's larger argument—were to run to a length of one page (again single-spaced) each. On the whole, a successful response needed to be historically and technologically accurate, employ analytical rigor and appropriate terminology, demonstrate consistency and creativity, and articulate a coherent larger claim, rather than simply convey an unshaped mass of arbitrary information.

Second Life

From a visual studies standpoint, there is nothing striking about “reading” what Robert Aguirre names the “exhibitionary surfaces” of a museum gallery (2010, p. 131). Yet “Light Writing” was unique in that it called upon students to make the verbal *virtual* as well as visual. Students in my course mounted their individual exhibits within the virtual world of Second Life, an online communications medium (and new media message) which, similar to photography itself, bridges the apparent gap between science and art. Engineered in 1999 by San Francisco's Linden Lab, Second Life is the brainchild of Philip Rosedale, a former chief technology officer at Real Networks. At the start of the 1990s, Rosedale was already interested in what a Linden Lab colleague calls “the Internet's next evolutionary stage” (Au, 2008, p. 13). That interest grew when Rosedale read of an imagined 3-D Internet experience, or “metaverse,” in Neil Stephenson's cyberpunk novel *Snow Crash* upon its release in 1992. By decade's end, online virtual three-dimensionality was no longer an imaginary fabrication, and several Web platforms rapidly established shared electronic environments whose “residents” might seek and find, as functionally anonymous “avatars,” opportunities for social engagement, diverting entertainment, and, on occasion, edifying instruction. Second Life ranks as the most high-profile of these platforms. And so it made for a natural fit at my former university, whose administrators wish to deploy Second Life as a testing ground for various active-learning

experiments involving wireless “cloud” technology and distance education.

Institutions on both sides of the Atlantic have pursued similar “virtual” paths. Duke University's School of Nursing permits its students, regardless of their geographic location, to attend lectures and discussions in Second Life “classrooms” that attempt to replicate the face-to-face exchange of conventional teaching. Stanford University's Humanities Lab implements Second Life as well, as it did in a recent “mixed reality” gallery that it launched in league with San Francisco's Museum of Modern Art. But it is perhaps in England where Second Life enjoys its greatest educational influence. As of 2008, an estimated three-quarters of universities in the UK were using Second Life actively, or else preparing to do so (Warburton, 2009, p. 414). The *British Journal of Educational Technology* since then has devoted an entire issue to Second Life, marking the occasion with an inventory of Second Life's winning attributes for the virtual classroom. One contributing writer's list includes the comparative easy access to the platform, in addition to its encouragement of interactivity, creativity, and socialization (Warburton, p. 421). Others concur. Four co-authors praise the “totally immersive experience” afforded by Second Life (Edirisingha, Nie, Pluciennik, & Young, 2009, p. 473). Another contributor asserts “that Second Life is low cost and high value for learning” (Salmon, 2009, p. 527). And a final writer even begins to suggest the rhetorical ramifications of Second Life when he credits multi-user virtual environments, or MUVES, generally with enlisting participants into the educated deployment of a “virtual vernacular.” The “anthropological engagement” afforded by even casual use of Second Life is, for this commentator, the primary virtue of virtuality, “a vital step on the road to understanding how learning takes place (or might take place) in new worlds” (Bell, 2009, pp. 515, 520).

Students need not master the verbal and visual dimensions of the virtual in order to achieve fluency in Second Life. Indeed, the platform's manifold outlets for "creative expression," to borrow David Bell's apt phrase, make a working variety of virtuosity an attainable goal for even the least *expressive* of users (p. 520). If Second Life is not the only MUVE in use today, it alone grants "residents" the intellectual property rights to any content that they contribute to the virtual cause, and any infrastructural modifications that they might make inside the medium. "Light Writing" was a direct beneficiary of this open-sourcing arrangement. As is the case at many schools, my previous university has situated its Second Life activities within a virtual campus community that comes complete with buildings, classrooms, and game rooms, each and all accessible to student avatars who elect to populate the online site occupied by the school's registered domain. Courtesy of the prescient Brazilian architect who designed it, the school's Second Life grounds are additionally equipped with a virtual museum, where the exhibit space itself is user-controlled. This control is qualified to the extent that a special "authorial" feature protects the gallery from untoward tinkering by student-users; the final "editorial" rights to the look and feel and shape of the space instead belong to a single lead technician from the Office of Instructional Design. But if students cannot claim unfettered access to the museum, they can and do resort to Instructional Design as an enabling conduit for Bell's "creative expression." They relayed their written content as electronic text to me, the middle man in the composition chain. I, in turn, forwarded their content to our Design contact; she matched written texts to the visual texts that they complement. In our case, said "texts" were the Briggs images that I'd assigned my students to study and had arranged beforehand on the designated space that each team received on the gallery's walls. This arrangement complicated the collaborative nature of the assignment, for sure, but

it also ensured some level of stability within a foreign virtual space, the shifting contours of which otherwise might undermine the reliable signifying strength of our literal/figurative rhetoric. What resulted was a rich panoply of texts—verbal, visual, virtual—that mutually reinforced within a multi-dimensional setting what one set of media educators (Jenkins, Clinton, Purushotma, Robinson, & Weigel, 2007) have named a "transmedia" exercise in communication and "navigation" through image (Figures 4 & 5).

Students' written responses to the assignment again ranged widely, as one would want from maturing scientist-empiricists as they learn to pair the relative certainty of "object" analysis with the murkier interpretation attendant on "reading" equivocal texts.



Figures 4 & 5: Expressive virtual rhetoric, inside the instructional museum space of Second Life.

Some of my writers adopted a story-board approach, conceiving of Briggs' images as sequenced slides in a cinematic show. One such group decided, in their own words, to "challenge" readers/viewers "to pull" the hidden "narrative" from Briggs' oeuvre. They were sure that therein lay a *developing* "story" combining what they described as "the technical details of the photographs and the photographic techniques used" with "the evidence within the images." Other groups situated themselves behind the camera's eye, to examine the permutations and implications of point of view. A particularly sophisticated reading in this vein (titled "Bird's-Eye View") regarded Briggs' work overall as a reflexive meditation on perspective. Team members in effect maintained that it was Briggs' "vision" to conflate the act of observation with whatever he observed. They imagined Briggs at work as the embodiment of one of his own signature bird images, "[h]is head cocked to one side, his beady eyes behind the lens of a camera, analyzing every detail, like so many birds we see today." Still other students drew a direct line from the visual to the material-historical in their discussions, foregoing more audacious leaps toward symbolic meanings that they continued to consider at best an ambiguous offshoot of "art." For instance, a group that was randomly assigned the shipyard image mentioned earlier matter-of-factly reported on a "photo of a chain that goes to an ocean-sailing vessel, which was used primarily to move shipping crates in the early to mid-nineteen hundreds." For these newly self-conscious visualists, "a closer look ... at the scaffolding in the background going up to the deck of the ship" was as close as they came to *seeing* how such exercises might lead naturally to a more penetrating mode of thinking/writing. But no matter how groups responded, the pop-up dialog boxes that contained their written text—and that appeared on the Second Life screen at the instigating touch of ambling avatars who interfaced with a given image—they at once came to understand and underwrite W. J. T.

Mitchell's pertinent assertion "that the interaction of pictures and texts is constitutive of representation as such" (1994, p. 5).

Conclusion

In visuals, there resides a rhetoric that translates into most any classroom. My own experience demonstrates as much, and more. In teaching image-driven college writing to the technically minded, I've found that visuals constitute not only a useful rhetoric, but a resonant one as well.

This in part explains the visual's viral pedagogical spread, inasmuch as image can now be said to occupy a pivotal position in the post-secondary teaching of writing. A survey of the image-oriented writing textbooks that are now available reveals more than a visual fad in writing instruction. There's no denying the popular cultural appeal of such *au courant* lesson plans as "Figuring the Body," "Engendering Difference," "Constructing Race," and "Reading Icons," to cite but some of the chapter titles from the most recent edition of a visual reader named *Seeing and Writing* (McQuade & McQuade, 2010). But as Lester Faigley says, in introducing his own textbook, *Picturing Texts* (2004), today's students are conditioned from an early age to move seamlessly between the verbal and visual. It's our job as instructors to make that back-and-forth movement a critical, which is to say thoughtful, "habit of mind," to borrow Faigley's formulation (p. 17). Cynthia Selfe to that end invites students in her writing classes to compose "visual essays" in which authors reflect "on the range of literacies (both on and off computers) they have developed over their lifetimes and their feelings toward literacy" (2004, p. 75). Underscoring her approach is the recognition that what makes the new media new—and thus what makes visual literacy imperative for its image-saturated, college-age users—is their "heavy dependence on visual communication" (p. 68). Underlining my own

approach to image instruction is the related recognition that image's wide interdisciplinary reach recommends a visually cognizant pedagogy not just for any and all students, but for students writing in and across STEM as well. ■■

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Millennial Students: A Course Design Logic Model Utilizing Group Work Skill Development

Scott P. Anstadt, Jeremy L. White, and Lesley L. Medley

Abstract

This is a descriptive study of an undergraduate practice skills course in groups development and facilitation in the discipline of social work. It illustrates a logic model basis of course design with an emphasis on the extant knowledge of the learning styles of students served. The seven characteristic traits of today's Millennial Generation identified by Howe and Strauss (2000) are described in a contextual learning styles framework. The course design integrated these learning styles of the Millennial Generation into assignments applying group development skills, group facilitation skills, and the use of the classroom as a community consisting of several smaller teams working together in an interactive learning process. Instructors defined their overall teaching role as that of principal consultants, mentors, and coaches, matching teaching techniques, strategies, and specific tools to achieve the overall objective of engaging students fully in the learning process.

Keywords

course design methods, learning characteristics, learning process, Millennial Generation, teaching techniques, group work

Introduction

This descriptive study of an Introduction to Group Skills course offered in the discipline of social work illustrates teaching methods that maximize learning potential for Millennial Generation students. We include a brief description of the learning characteristics of this generation and define how an awareness of them necessitates a changing and evolving style of teaching on the part of instructors. In Table 1 we have provided a logic model, or visual match-up between the characteristics of the Millennials and the teaching strategies that, according to literature-based research (cited below), will fit their learning needs and should be considered in plans to engage them in learning. A logic model is a planning tool to clarify and display graphically what a project intends to do and what it hopes to accomplish (National Network of Libraries of Medicine, 2012). It has been our experience that an experiential atmosphere and a systematic process where the students are learning by listening,

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observing, demonstrating and teaching to each other, is far more effective than a conventional style of teaching. Table 1 strategically outlines the logic model of our course design as it fits within relevance of the case study.

Literature Review

Millennial Characteristics

In their seminal work *Millennials Rising: The Next Generation*, Howe and Strauss (2000) describe the characteristics of the Millennial Generation. Born after 1982, these students are more affluent, better educated and more ethnically diverse than previous generations. Seven traits common to Millennials were identified by Howe and Strauss: members of this generation are considered to be special, sheltered, confident, team-oriented, achieving, pressured, and conventional. These traits and their role in student learning will be discussed later.

Following Howe and Strauss' (2000) original work on the Millennials, a number of recent studies have validated and expanded upon the characteristics and concept of the Millennial Generation as a distinct population of learners with educational expectations and classroom needs that differ from those of previous generations. Both Nikirk (2012) and Considine, Horton, and Moorman (2009) contend that the Millennial Generation's lifetime experience interacting with information communication technology requires teaching strategies that address the needs for media literacy of those born into the digital age. These students learn best from a technology which uses interactive responses to visual and spatial cues and requests from the software program (Bowen et al., 2011; Roehling, Kooi, Dykema, Quisenberry, & Vandlen, 2011). Butler and Gheorghiu (2010) concluded that Millennials maintain a positive attitude toward learning when properly engaged in the pursuit of work skills knowledge.

Although much has been written about the importance of recognizing the characteristics of and learning styles of the Millennial Generation in order to provide effective education to these students (Aggerholm, 2006; Garsombke, Hanks, Prince, & Zaino, 2006; Howe & Strauss, 2000; Minifie, Middlebrook, & Otto, 2011; Nellen, Manly, & Thomas, 2009; Oblinger, 2003; Simons, 2010), the educational literature does not address the application of this information to the design of a course on group facilitation for Millennials.

A review of the literature finds that less than a handful of current studies (Gutman & Shennar-Golan, 2012; Macgowan & Vakharia, 2012; Macgowan, 2012) have attempted to address methodological issues in teaching group work, and none of these studies mention teaching methods that specifically incorporate the characteristics and learning styles of the Millennial Generation into the course design of group work.

Learning Styles of the Millennial Generation

The Millennial Generation is best engaged in learning by working in teams, being involved in real-world problem-solving issues, working on projects that have a purpose and civic nature, incorporating technology, and being in an active learning environment (Nellen, Manly, & Thomas, 2009; Garsombke, Hanks, Prince, & Zaino, 2006). To better reach these students, research has shown, teachers may find that instead of the traditional lecture-style classes that are proving to be ineffective, teachers should create learning environments in which they are facilitators while students are active participants (Minifie, Middlebrook, & Otto, 2011). According to Oblinger (2003), Millennials respond best to collaborative learning and group activity. The literature shows that students of this generation need structured assignments to give them the confidence to proceed through step-by-step learning activities. The steps have to be meaningful and understandable to them (Simons, 2010). They also tend to believe that

“doing” is more important than “knowing” and that the process and the activity of arriving at a correct answer are more valuable than simply being given the correct answer (Aggerholm, 2006).

Bowen et al. (2011) identified a shift in the Millennials’ preferred learning experiences that is categorized as “active and integrative learning” (p. 26). Learning and teaching in this context acknowledge the voices of the Millennial Generation and, as a newly emerging paradigm, are more learner-centered and collaborative. Building upon the Millennial Generation’s variety-seeking and collaborative traits, Roehling, Kooi, Dykema, Quisenberry, and Vandlen (2011) found that class discussions, if conducted correctly, can be an effective learning activity for actively engaging students in coursework. Butler and Lidia (2010) utilized Kolb and Kolb’s experiential learning theory (ELT) to address the learning styles of Millennial Generation students. These researchers concluded that the ELT framework, which is process-oriented rather than results-oriented and features experiential learning, reflection, observation, and action (all characteristics of the Millennial Generation’s learning style), is effective in evaluating the skills of Millennial students.

Because Millennial students appear to work well through action and collaboration, group work has become a part of the teaching style in many disciplines. This has been illustrated in studies across such diverse disciplines and educational levels as secondary-school computer science (Panselinas & Komis, 2009) and mathematics courses (Staples, 2008), undergraduate business management programs (Dunne & Rollins, 2000) general education programs (Ferrante, Green, & Forster, 2006; Kember & Leung, 2005), and postgraduate professional development programs (McCormack & Pamphilon, 2004). In each of these examples, the development of interactive group-work skills became an integral part of the teaching methodologies incorporated into the course design. A summary of the

literature inspires Table 1 (see p. 68), which shows the current best practices for course design and execution based upon the characteristics and learning styles of Millennial students.

The reader is directed to look at each row from left to right to see how the characteristics of the Millennial Generation inspire motivational styles of classroom instruction. The table illustrates how the Millennial Generation is highly inspired to learn but must do so in a clearly defined and structured context which encourages and facilitates practical input, critical dialogue, and instruction of students by students. In this process, the students become co-creators of the course design by giving evaluations and feedback about what they have experienced within the classroom environment both as individuals and as members of small groups or teams.

Macgowan and Vakharia (2012) utilized a microskills teaching approach that measured students’ perceptions of the importance of using the Standards for Social Work Practice with Groups (AASWG, 2006) and their confidence in using it. This study included a newly developed and empirically tested inventory that has been specifically designed to measure performance on the Standards (Macgowan, 2012). Results of their study, which include quantitative and qualitative reports gathered through student feedback, indicate that role-plays, which are participative and interactive and provide multiple perspectives—leader, member, observer—had the most impact on learning. During the development of the role-plays, the students worked in groups, with the teacher taking on the role of consultant, as the students constructed role-plays that would enable them to practice different skills that they would need to use professionally as facilitators of therapy groups. The students reported that developing and leading the role-plays contributed the most to their learning, followed by observing and participating in the role-plays, and that writing a paper was the factor that contributed the least to learning.

Millennial Characteristics	Millennial learning style	Course design to fit the learning style	Teaching strategies	Particular tools to convey the information
Enterprising: Each feels a sense of purpose, are unique and should be recognized as such	Learn from self-discovery, awareness of their own personal values	Short lectures, experiential learning situations, provide structure, provide them the opportunity to design their own course, interdependence	Coaching, provide quick feedback, praise and recognition Encourage students to teach each other in an organized fashion.	Internet communication, email, research from database, team work, interacting with people in the field
Sheltered: Are more dependent than previous generations and thrive on structure and a secured environment	Clearer framework with a step-by-step process based upon clear directions and expectations	Clearly defined assignments, organization and flow, provide a roadmap of main points	Evidence based, finite, definite, detail-oriented, presenting assignments with consistent guidelines, application of social justice	Well written syllabus, exercises with distinctly defined assignments
Confident: Consider themselves leaders and exhibit “high levels of trust and optimism”	Model for each student to provide interactive sharing for each other	Incorporate building in choices with in well-defined assignments	Recognize leadership roles, development of multi-tasking skills, enhancement of oral skills, recognition of change in student behavior	Brainstorming to elicit student input in problem solving using student thought conceptual frameworks
Team-oriented: “strong team instincts and tight peer bonding”	Teamwork geared toward learning from fellow peers	Develop assignments that are team oriented with clearly defined individual and team outputs, community based assignments	Facilitate class discussion using small team critical thinking exercises, open-ended questions and seek support for the answers that they provide	Internet communication among team members
Achieving: Goal and achievement oriented	Task oriented, dependent on clearly defined parameters and then show flexibility in their learning	Experiential group exercises, critical thinking exercises	Going over assignments in class and allowing for course discussion	Very precise grading rubrics, clearly defined assignments Student feedback and evaluation of the process of learning elicited several times during the semester.
Pressured: Pressure to excel	Motivated in incremental successes leading to a larger whole	The ultimate professional competencies are clearly linked to course objectives and assignments	Expectations are well defined and connected to professional experience and application	Guest speakers and mentors in the field
Conventional: Civically involved – social norms important	Respect for social values, regard for ecology, moral and socially conscience framework	Develop strategy for discovering potential groups in the community	Bridging the gap between community experience to community theory	Social service settings, community resources and net working with professionals in the field

Table 1. Logic Model Linking Millennial Characteristics and Learning Styles to Course Delivery Considerations

(Inspired by: Howe & Strauss, 2000; Nellen, Manly, & Thomas, 2009; Tucker, 2006; Garsombke, Hanks, Prince, & Zaino, 2006)

On a slightly different note, Gutman and Shennar-Golan (2012) have developed a model that is used to teach group work within a learning environment that “awakens” the curiosity of the students and encourages students to continue to study and use group work methods in their professional lives as social workers. Similar to the findings of Macgowan and Vakharia (2012), these authors note that the leadership role as a group facilitator is the “high point” in the student’s learning about group work. The teaching structure in this model creates a multiplicity of roles for both students and teachers and also influences their perceptions of how learning occurs in the classroom. Millennial students require a shift in the traditional role of the teacher. In order to teach Millennial students effectively, the instructor first acts as a model for the students by facilitating the group work. After the teacher’s demonstration of how to do it, the students begin to facilitate groups themselves and, in doing so, proceed to teach each other group work, leadership, and facilitation skills. In developing this model of group work, the authors state that, “the challenge for us as educators remains to create the optimal learning environment and the setting for such learning” (p. 141). The success of the model suggests that student participation in the design of curriculum and in the training of teaching assistants might have significant benefits for colleges and universities.

Although current research on group work (Gutman & Shennar-Golan, 2012; Macgowan & Vakharia, 2012; Macgowan, 2012) indicates that both students and faculty are in great need of new and effective learning, teaching, and assessment strategies, none of these studies specifically mentions the learning styles of the Millennial Generation when considering modifications to the design of courses on group work.

Method

Course Example: Group Facilitation Course in Social Work

To illustrate how knowledge of the Millennials’ learning styles, as established above, could be used in course design, we present the case of a sociology course taught at a state university in the southeastern United States. The course will be described, along with the rationale for the particular design elements and procedures used.

The methodology utilized in designing the group work course for this case study shares similar “strategic areas” in methodology with research recently published by Macgowan and Vakharia (2012, p. 582). Similar to this case study, these instructors included role-plays that were participative and interactive, with students working in groups and consulting with the instructor to build their skills. The course design included a multiplicity of roles that provided students with the multiple perspectives of group leader, group member, and group observer. Research and preparation for the role-plays enabled the students to apply theory to their developing skills.

Knowledge was assessed with the writing assignment and skill development and demonstration through role-plays. In their 2012 study, Macgowan and Vakharia confirm the benefits of ongoing in-class practice and peer feedback in teaching group skills. Inspired by their findings, our design of a group work course emphasized student peer feedback using focused small group interaction. In our course, students were exposed to a diversity of instructional methods and assignments, with students learning by listening, observing, demonstrating, and teaching each other. The assessment of learning was provided by weekly quizzes based on text, a written assignment, and in-class role-plays.

Course description. The course is entitled Practice II-Groups and uses as its primary text Zastrow’s (2012), *Social Work with Groups* (8th ed). The course aims to provide students with knowledge and skills to work

with groups in a variety of social service settings within the community. It covers the importance of developing an appropriate relationship with clients who engage in group work through the collection and assessment of information that will allow the student to identify strengths, issues, needs, resources, and assets of the clients in their environments. The course will educate the students about the structure and function of groups in society, their use in formal and informal helping networks, and their applications in social service organizations as well as the appropriate group interventions. Topics will consist of the basic formats and process of group stages of development and application of group process to specific groups.

The educational competencies covered as part of the Council on Social Work Education course accreditation requirements (Holloway, Black, Hoffman, & Pierce, n.d.) include:

- » Demonstration of professional conduct while facilitating groups,
- » Application of ethical principles to guide facilitation practice,
- » Application of critical thought process,
- » Engagement in research-informed group practice,
- » Application of knowledge of human behavior in a social environment, and
- » Engagement, assessment, intervention, and evaluation of groups and their benefit to clients within a community context.

Course objectives as published in the syllabus include:

- » Demonstrated application of group knowledge and skills through interventions in groups of various contexts,
- » Use of theoretical frameworks supported by empirical evidence to demonstrate flexibility in the group facilitation skills,
- » Use of communication skills differentially with group members to attain effective dialogue and interaction among group members,

- » Use of theories and evidence-based knowledge to focus interactions that specifically contribute to change behaviors which translates to social environment, and
- » Development of awareness of the student's own personal values regarding group ethical dilemmas and the ways in which they might affect facilitation of groups.

Mastery of both competencies and course objectives requires students to do much personal reflection on how they interact with group members and how the group may be facilitated to function as a whole unit. The students are to learn these skills as they may be applied to various types of groups, including those based in office as well as community settings. They also must learn how to conduct groups whose purpose is to inspire their members to change their behavior because of their self-observation and reflection on what they have observed and groups which are more task-oriented, producing a product from collective efforts. Students are exposed to types of groups used in a wide variety of settings, allowing for specific self-observation within those particular contexts. In order to understand the effect of facilitation within the group, the students experience themselves as group members. Therefore, the construct of group facilitation is seen from the perspectives of both the giver and the receiver.

Given the characteristics of the Millennial Generation, the course was designed to be largely experiential, yet highly structured. All assignments were completed in small teams of students. This means that a most important consideration for the team was to figure out what method of communication could ensure maximum participation of their fellow team members in completing the assignments. It was emphasized that each individual person has the responsibility to make himself or herself a working member of his or her team and that if this did not happen to the satisfaction of the

team, the individual in question would have to answer both to the team and to the instructor.

Course assignments. The following assignments illustrate the course design approach:

- » Each team facilitated two group exercises (serving as “lead” group) illustrating group facilitation skills in various contexts previously studied in the text.
- » Each team participated in every facilitated exercise after seeing it demonstrated by the lead group of the week. We have termed this the “breakout effect” in the group facilitation process.
- » Each team wrote a group summary paper in which they applied the theoretical material from text and lectures to their own reflective group development. This paper was aided by written weekly reflections regarding participation in these group exercises.
- » Each student took three essay exams during the semester. Each person was given different questions from a pool of exam questions. Initial student answers were posted on the learning management system’s discussion boards so that other team members could read and comment on them in a threaded conversation a few days later. The students’ comments on each other’s exams and discussion board postings assisted in clarifying and adding to their answers to the exam questions. In this way, they acted as consultants for each other before they submitted the final versions of their essays to their instructor.

The above becomes an interactive process of learning for the students. This is illustrated in Figure 1 (see p. 72).

The reader can see that group theory, coming from the text and short lectures, was then applied to group exercises derived in part from the text and largely through the creative machinations of the lead group of

the week. The ‘lead group’ facilitator (micro) coordinated the lead group’s (mezzo) exercise in front of the rest of the class (macro). In this way, theoretical material was put into practical use in an experiential way meaningful to the group members and observable to the larger class community. Skills to be derived from the exercises included how to begin a group session, assess roles and group dynamics, facilitate member communication patterns, resolve potential conflicts, master problem-solving skills, develop group leadership skills, recognize specialties in working with diverse groups and populations, elicit member self-help, provide educational modules, and end group sessions. Exercise formats included: step-by-step instruction, role-plays, development of individualized goals, and use of surveys and other instruments to glean feedback from group members. Before proceeding to the next step, the rest of the class gave valuable feedback through observations, challenging questions, and evaluation of how well the exercise was executed to meet its stated purpose and expected results. The lead group’s facilitator was given feedback on the leadership skills he or she had demonstrated. This type of peer feedback fits in with a model of shared critical thought process. Students have the opportunity to discuss the nuances of the lead group’s demonstration of the group technique. This discussion, plus their own experience in their own breakout groups, makes the learning process very real and tangible to them.

After feedback has been given, the students in the lead group break out, with each lead group team member facilitating the same exercise with one of the other teams in the class. In this way, all lead group members have an opportunity to facilitate the exercise with another team of peers. Each lead group member has the opportunity to be both a group exercise recipient and then facilitator in a team of peers, all within one class session. After the exercise is completed in this second round, the entire class collects and each class team

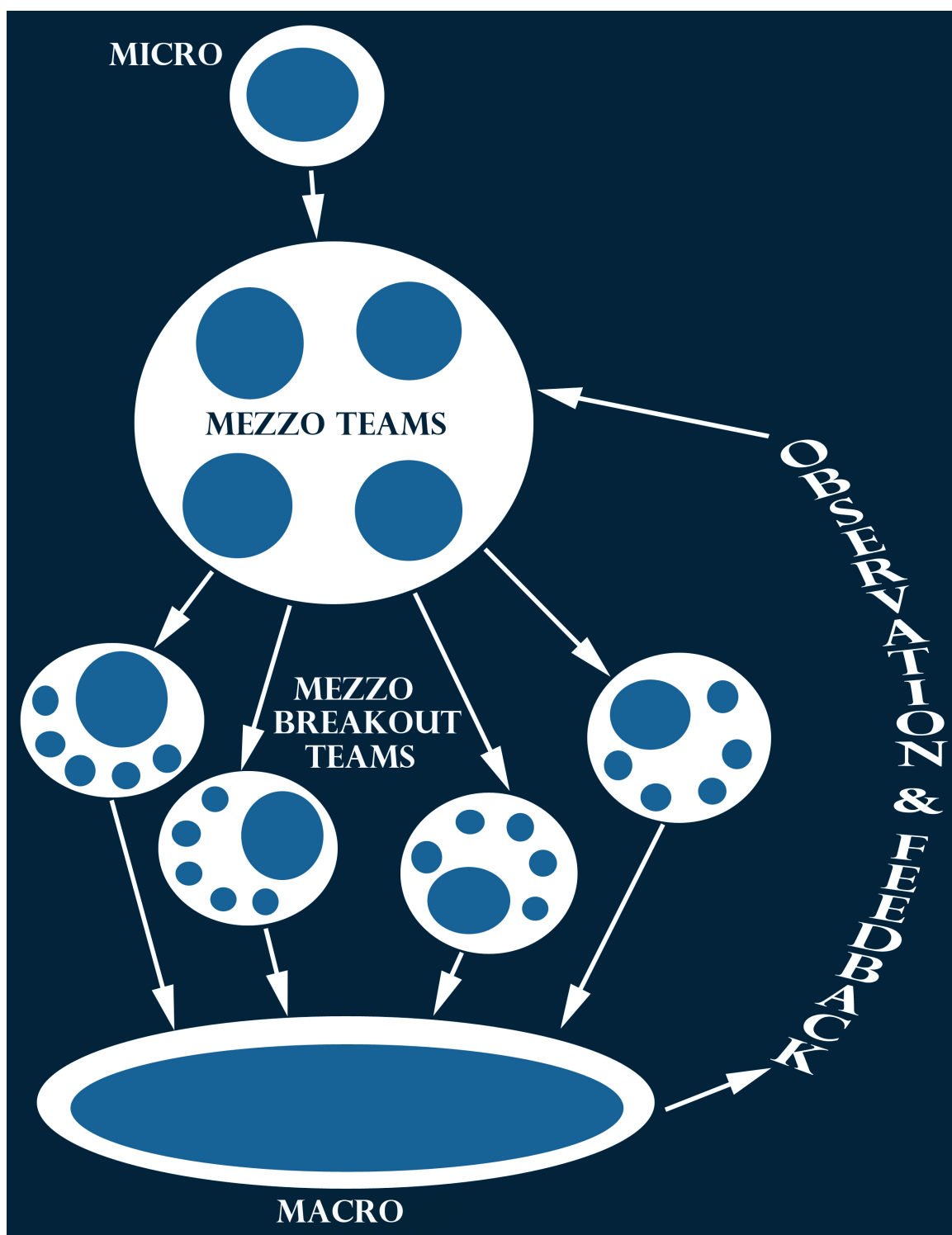


Figure 1- The Multidimensional Group Process in Group Work Course

gives focused feedback to the lead group member who facilitated the exercise for them. This brings together the experience of doing the exercise with recognition of how the facilitator conducted that effort.

After the completion of the exercise, the lead group writes a short paper on their rationale for conducting the facilitation exercise in the manner they chose, backed by theory from the text and lectures. The other teams also writes a short paper including their personal reflection on what the group exercise taught them about themselves, a short critique of the facilitation method, and an appraisal of the skills learned through the exercise which could be applied to their future as group facilitators. Working together, both the lead and breakout groups combine the text, lecture and outside research materials in a reflective group-development paper that addresses how each team changed and matured as a result of the weekly breakout-effect process described above and shown in Figure 1.

Student Evaluation of the Learning Experience.

The above assignment timetable depicts how each of the six teams assumes the role of lead group and breakout group at scheduled times during the course of the semester. Each group team was assigned to be a lead for two classes and to assume the role of breakout team for the remaining ten classes. In this manner, every week a different lead team would assume responsibility for the group exercise in that particular class. When a team was scheduled to be the lead, the assignment required that the members would collectively write a short, 4- to 6-page reflective paper, describing their experience in preparing and delivering the exercise for the week. The teams were required to take the role of the breakout participatory groups for the remaining ten weeks. They were required to write a short paper for six out of these ten remaining weeks covering their experience of being taught and participating in the group exercise facilitated by that week's lead team member. Each team wrote a total of eight short papers prior to the final capstone group development summary paper.

The reflective papers for both the lead and breakout participatory teams focused on five items assessed via Likert scale, using the following list as an outline:

1. The purpose of the exercise for the week was clearly described in terms of group development theory, as outlined in the text.
2. Steps to complete the exercise were described and demonstrated.
3. The team discussed and shared impressions after completing the exercise.
4. The exercise was an individual learning experience.
5. There was a change in group communication patterns during and after the exercise.

For each item the team papers included both a narrative description of the team's collective impressions and the results of a five-point Likert scale, with 1 representing the least and five the most. Compiled means of team responses are shown in Table 2 (see p. 74).

Table 2 shows team mean ratings of a 4 or higher on a five-point scale over the course of the semester. The team ratings served a dual purpose of bringing these key elements (outline items) of group process into a group discussion format as they wrote their papers. Part of the team discussion included reflection of how each of the team members' participation affected the other team members and the collective experience of the whole group. In addition team ratings elicited reflection by each group member in self-evaluative discussion while emphasizing group process as a combination of individual members' contributing to a whole-group, collective experience. Selected quotes from the reflective papers illustrate these points below:

Item #1. Purpose:

Describing the purpose of the exercise helped us to be aware of how it affected each of us as a whole group.

Taking the time to be clear about what we were trying to accomplish made it all make sense.

Group Role for the Week	Item #1- Purpose	Item #2- Steps Described	Item #3- Shared Impressions	Item #4- Individual Learning	Item #5- Change in Communication
Lead	Mean =4.4, SD= 1.2	Mean= 4.3, SD= 1.3	Mean= 4.0 SD= 1.25	Mean= 4.8 SD= 1.43	Mean= 4.2 SD= 1.46
Breakout Participatory	Mean= 4.2, SD= 1.45	Mean= 4.7, SD= 1.32	Mean= 4.3, SD= 1.41	Mean= 4.7, SD = 1.35	Mean= 4.6, SD= 1.4

N= 30 students; 6 teams

Means based on a 5 point Likert Scale with 1= Least and 5= Most

TABLE 2. MEAN TEAM RATINGS OF GROUP EXERCISE LEARNING EXPERIENCE

Item #2. Steps Described:

The conscious effort to describe each step allowed us to follow the exercise completely and derive the most from it. It was well worth the effort and time taken to outline the steps and to demonstrate them.

Outlining the steps in the exercise helped us to make sense of what we were doing and get the most from it.

Item #3. Shared Impressions:

A portion of the group was for sharing impressions about the exercise and how it affected us. A lot was shared and made us think of the experience from a totally different light.

We had a very lively discussion about what we got from the exercise and we each got to know each other better even if we don't all agree.

Item #4. Individual Learning:

This exercise helped us to realize how we appear to other folks in the group and help us to understand the effect we have upon each other.

We feel that the group is a laboratory for learning how to get along and share our inner selves. That helps us to feel a comfort in sharing more.

Item #5. Change in Communication:

We found that we learned more about how to listen to each other and let others know that we understand and can relate. This helps us to get to know each other on a very personal level.

We discussed not only the exercise but who participated most and who participated least and why. This will help us as a group in future exercises.

Discussion

This course provided a case illustration that demonstrates a teaching process revolving around an understanding of the learning needs and patterns of our target audience, Millennial students. Reviewing Table 1, the reader is invited to recognize our process of course design as we thought through each characteristic and then designed the course with the needs and nature of the Millennials in mind. We describe such applications in the paragraphs below. Figure 1 shows

how students experience group development from several perspectives, beginning with the individual, or micro. As facilitators of mezzo lead groups, they took on a leadership role in demonstrating group exercises, teaching these exercises in breakout smaller groups and then obtaining evaluative feedback from the entire, or macro, class community. In this manner, students experienced group process from several angles.

As instructors and course designers we envision ourselves as assuming a mentoring and coaching role, conveying very clear procedures for the construction of experiential exercises and serving as consultants within multidimensional group process while building on the theory from assigned reading. Students had ready access to consultation and guidance from the professors as they facilitated student group development.

Application of characteristics of the Millennial Generation to the groups course (Table 1):

Enterprising. The course was designed to capitalize on the Millennial students' unique characteristics. The teams developed their version of the skill-building exercises within their group, and each member of the team became a facilitator using his or her own emerging, individual style. Based upon their own experience, skills, and knowledge, the facilitators for each team designed the exercise to match their personalities.

Sheltered. Each assignment described a systematic procedure and set out very clear grading rubrics. In previous years, syllabi would provide a general description of the assignments. We discovered that being more precise and succinct enabled students to develop and use their own organizational and structural skills while still adhering to assignment guidelines.

Confident. As part of the groups course we brought the definition of leadership by conveying that there are multiple leaders in a group. We incorporated the leadership roles specifically and consciously to help build confidence. Students were given continual feedback from their small teams and from the larger class

community regarding their effectiveness in conducting group skill activity. Much opportunity was available for feedback and dialogue based on peer observations.

Team orientation. Every aspect of the course was based on teamwork and establishing bonds with peers on a multi-dimensional level. Within this groups course we maximized the experience of being a part of several groups simultaneously, as illustrated in Figure 1. A level of freedom was incorporated in the team process to generate a trial-and-error approach where students engaged in a process of problem-solving (Minifie, Middlebrook, & Otto (2011).

Goal- and achievement-oriented. If the goal of the assignment is the development of the experiential exercise, then by necessity the students have to discover how to operate as a team to carry out the exercise. This ties into the team orientation, integrating characteristics into an overall learning framework. In doing so, the students became aware of how much they needed input from each other, therefore reinforcing the group process. This was modeled in (Figure 1) for the class to give immediate feedback on their achievement in designing the exercise.

Pressure to excel. The competency skills to supply services to clients are acquired directly from the group exercises in this course. Part of the discussion in this course focuses on how to apply group techniques during work with clients.

Conventional. All the role-plays demonstrated in class were defined as real-life applications that can be found in direct service within the social service community. For example, students may conduct a role-play group in a substance abuse treatment center with a "client" group whose members are helped to define goals leading to abstinence from addictive substances.

Group Development as a Learning Process

Throughout the course, the students exhibited noticeable development as individuals and as groups. It appeared that students felt more comfortable, more

confident, and demonstrated a greater level of ease while facilitating the exercises. Group cohesion increased as they learned by experience that they could rely on each other for support and encouragement. We provided a platform for students to trust their own abilities by providing a safe atmosphere for self-exploration and discovery. An enhanced level of enthusiasm and interest in working with groups was clearly evident. This was substantiated by the relatively high ratings of the lead and breakout teams included in the team papers and reported in Table 2.

Group development occurs within the process of conflict, as conflict arises and settlements are successfully negotiated. As group conflict emerged, students used several methods to attain resolution. As a frame of reference, students would refer to the syllabus to help each other understand what their role involved. We encouraged the teams to resolve conflict internally, but on several occasions students would consult with the professor to seek guidance and support. From these consultations between the professors and the teams, the values of cooperation and communication were solidified through the emphasis on group and team facilitation. Values of cooperation, success, and confidence, and a sense of feeling special, were imparted by the professor when meeting with the group. Thus, all of the team members felt included, which enabled the professor to maintain a coaching role to help facilitate autonomy within the group. Students were able to recognize each other's unique styles of participating in their teams and to negotiate optimal ways of working as colleagues with their peers within the course.

As a form of evaluation, although anecdotal, we elicited subjective ratings, feedback, and testimonies from reflective papers to gather students' impressions of their experience during this course. Among the majority, expressions of, "this has been a great experience and we enjoyed the learning process as we were engaged and felt a sense of involvement" coincided with the

student ratings for each item covered in their reflective papers (Table 2). Furthermore, students claimed, "we were motivated, intrigued with the course content, and the structure of the course was outstanding," and "we felt supported and encouraged to openly express our opinions and observations to our colleagues."

Conclusion

This case study illustration provides a framework for potential course design in a variety of disciplines. This course represents a paradigm shift away from content-driven design toward a more consumer-driven design in which instructors engage students in an interactive laboratory of social networking. In summary, this article advocates for and encourages course planners to carefully consider and construct course curricula based upon the student consumers to whom we have an obligation and responsibility to provide the best framework for learning. ■■■

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Hybrid Spanish: Succeeding in First-Year College Foreign Language Class through Metacognitive Awareness

Diana M. Ruggiero

Abstract

Often, students entering a first-year Spanish language course lack knowledge concerning how to use metacognition to their own benefit. It is also common that they do not understand the reason why they are being taught in the way that they are (i.e., immersion in the target language). In this study, an experimental group of 49 first-year Spanish students received lessons in English at the beginning of the semester dealing with language acquisition, foreign-language teaching methodology, and metacognitive awareness. During this time the students also discussed the meaning of deep culture and related past experiences concerning their own language-learning processes.

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Keywords

SLA, metacognition, teaching strategies

Introduction

This research has its origins in an Associated Colleges of the Midwest (ACM) conference, *Understanding Student Learning*, a project of the ACM-Teagle Collegium on Student Learning.¹ There, I attended Professors Karl Wirth (Geology; Macalester College) and Fahima Aziz's (Economics; Hamline University) presentation on "Better Learning through Better Reading and Reflecting." Though the presentation was on geology and metacognition strategies, I recognized the potential value of linking the teaching of a language to metacognition. My research began and I soon realized that other Spanish teachers were using metacognition in their instruction; that was the case for David Thompson (Spanish; Luther College), who presented "Metacognitive Self-Regulation and Comprehensive Testing in Intermediate Spanish" at the same conference. His focus was on finding out whether comprehensive testing stimulated students' self-monitoring practices in Intermediate Spanish. I

¹ The ACM (associated colleagues of the Midwest) -Teagle *Collegium on Student Learning* focused on issues of cognition and learning that have particular relevance to liberal arts teaching—critical thinking and analysis, strategies for learning how to learn, and development of awareness about motivation to learn. Recent work on metacognition in learning was the focal point for the ACM project and proved to be a topic of great interest and applicability.

was more interested, however, in the way students lack self-monitoring skills to begin with and how teachers can help them acquire and put those skills to use in maximizing their language-learning abilities.

Teachers of first-year college language may assume that students know why studying the language is important. We also tend to assume that students know why “immersion,” or speaking only that language—in my case, Spanish—in class (a central component of the communicative approach), is such an important aspect of the learning process. Moreover, we tend to expect students to begin to reproduce the language before they have been provided with enough knowledge of vocabulary and grammar and enough models to be able to do so successfully. In any case, we fail to understand that students who enter language courses as adults differ in their language-acquisition skills from infants who are learning a language for the first time. This study posits that students can benefit from explicit instruction concerning how to “unlearn” the language and relearn it with the help of metacognition.

There is an extensive literature on metacognition and foreign languages. Studies such as “Raising General Awareness of Language Learning Strategies: A Little Bit Goes a Long Way,” by J. Flaitz, C. Feyten, S. Fox, and K. Mukherjee (1995); “Metacognition and Foreign Language Cultural Instruction,” by J. Ivers (2007); “What Is Metacognition? The Brain Knows,” by G. Mazzoni (2000); “Learning, Remembering, and Understanding,” by A. Brown, J. Bransford, R. Ferrera, and J. Campione (1983); “Student Responses to Learning Strategy Instruction in the Foreign Language Classroom,” by A. Chamot (1993); as well as the research of many other scholars on similar topics (see Cohen, 1990; O’Malley & Chamot, 1990; Oxford, 1990, 1993; Oxford & Crookall 1989; Rubin, 1975; Wenden & Rubin, 1987) assert that metacognition has a positive effect on learners. My research contributes to these studies in terms of its approach to and use of

metacognition: specifically in the explicit application of metacognition to current methodologies in second-language teaching. This is reflected in the title of the course, Hybrid Spanish, as explained below.

Hybrid Spanish was created, in part, to foster a positive attitude among students concerning current foreign-language teaching methodologies (i.e., the exclusive use of the target language in the classroom), so as to facilitate a better learning experience and learning outcome. Learning a language can become a punishment instead of a joy, depending on the methods used. All too often we hear students say, “I had four years of Spanish in high school but I cannot speak, write, or read the language.” Similarly, it is not uncommon for instructors to complain, “My students do not want to speak in Spanish! They reply in English!” After all, English is the language that students hear most often (even if they speak another language at home). As teachers we need to help our students appreciate the language and understand why language study is so important. We can have a greater impact on their education if we have the deep conversations that no one else will have with them: this is where metacognition can help. The study described below focused on making students aware of the strategies they need to learn the language, helping them unlearn old habits, and exploring the efficacy of introducing metacognition at the beginning of the semester. This method has been successful for my students as well as for my colleagues, according to their own self-evaluation.

By extension, the potential benefits of emphasizing the students’ own learning processes through metacognitive activities, as suggested by this study, are applicable to higher-education instruction beyond foreign-language teaching. Instructors need only think creatively about how best to incorporate metacognition within their respective discipline’s accepted teaching methodologies and tailor the metacognitive activities to the particular challenges posed by the subject matter at

hand. In this regard, this study, in its use of metacognition, may serve as a model for teaching methodologies across the curriculum.

The following section outlines how metacognition was applied within the context of this particular study. The expectation is that students who received instruction in metacognitive awareness will show a higher scoring in terms of self-perception, thus demonstrating that metacognitive awareness influences the student's self-perception in regard to learning. The null hypothesis is that metacognition does not influence self-perception in this way.

What is Hybrid Spanish?

It is important to note that Hybrid Spanish, as used in the context of this study, refers to the integration of two approaches, the communicative and metacognitive, within a Spanish language course. This differs from earlier uses of the term, which refer to the blending of online and face-to-face student-teacher interaction in the same course (see Chenoweth, Ushida, & Murday, 2006). Though unaware of them when developing this method and study, I retain the term Hybrid Spanish here, as it conveys the fusion I envision between metacognition and conventional language-teaching methods such as the communicative approach.

Metacognition is defined as "cognition about cognition," or "knowing about knowing" (Ivers, 2007, p. 152). It can take many forms and includes knowledge about when and how to use particular strategies for learning or for problem solving. On the other hand, communicative language-teaching is a methodology that emphasizes language acquisition and promotes expression, interpretation, and negotiation of meaning (Kumaravadivelu, 1993). Hybrid Spanish intends to mix both approaches to give the students a holistic experience and to provide them with an explicit platform for learning.

In a semester format, (16 weeks) students will spend two weeks at the beginning and one week at the end learning about and reflecting on how to learn a second language. Students will be able to:

- » Express their opinion on how to learn a language;
- » Explain their high school experience;
- » Share strategies with others;
- » Develop study materials;
- » Learn how to learn (again); and
- » Talk about deep cultural differences and similarities.

Though the proposed format does indeed require instructors to make certain adjustments with regard to course content, it affords an opportunity for the students to assess and strengthen their language-acquisition capabilities, make cultural connections through meaningful discussion, and thus cultivate a more meaningful relationship with the subject and the teacher. Indeed, the one element frequently missing in beginning Spanish classes is a conversation about culture. More often, we only get to consider cultural experiences in any depth at the advanced level, typically toward the end of a major. In Hybrid Spanish, not only will the professor create cultural connections with students from day one, but the students themselves will be able to talk about culture from day one as well. It is worth quoting John Ivers (2007) at length, as the following statement best captures the challenge faced by second-language instructors in engaging and making meaningful connections with students beyond the teaching of grammatical structures:

I believe that teachers who spend most of their careers in this realm may occasionally feel a sort of "depth deprivation." Teaching verb conjugation and adjective agreement is very important and necessary; however, in and of itself, this subject matter does not seem to have the exciting potential to revolutionize the world or take us to new heights of consciousness. We can (and should),

of course, inculcate the potentially enormous personal and worldwide impact of foreign language acquisition. However, especially in beginning classes, foreign language instruction often neglects great controversies, new paradigms, and interesting uncertainties that have long enriched many other disciplines. There is no doubt then that foreign language, as a legitimate and important part of the curriculum, would profit from a sort of critical orientation that has obviously benefited other subjects. (p. 153)

Addressing the above concern is at the core of Hybrid Spanish. In Hybrid Spanish students and teachers communicate on a more profound level, beyond grammatical instructions, and thus make a more meaningful connection from day one. For example, in Appendix A, you can see a sample of a metacognitive reflection activity. Students receive the form, fill it out and then get into pairs, reading their answers to each other and giving each other advice. They also comment on the standards of foreign-language learning and why it is important to incorporate them into the learning schedule. A sample lesson plan for the first two weeks is included in that appendix.

Research Questions

For the present study my research questions are: Does a beginning-level Spanish student's self-confidence in learning a second language (L2) increase due to traditional teaching and learning strategies regularly employed in the language classroom (control group)? Does a beginning-level Spanish student's self-confidence in learning L2 increase as a result of activities aimed at increasing metacognitive awareness (experimental group)? Does metacognitive awareness reinforce the connection among students and teachers?

Method

Sample

The population for this study comes from students enrolled in six sections of beginning Spanish at a small liberal arts college in the upper Midwest. The experimental group was comprised of three sections; the other three were the control (see Table 1). Students were distributed equally among the six groups, and about the same percentage in each group had no prior knowledge of Spanish. The researcher's prediction was that students in the experimental group would score themselves and their experience in the class more positively in the end-of-semester survey and that the connection between teacher and students would be more positive as well.

Materials

Students filled out different forms during the semester: one introductory demographic form and, for performance assessment, an end-of-semester survey on self-assessment of language skill (see Appendix B). Both the experimental and the control group filled out the end-of-the-semester survey. At the beginning of the semester the experimental group was given explicit activities using metacognition. During this time, the control group participated in standard review exercises. The control group was neither given metacognitive activities nor informed about metacognition by the instructor.

Procedures

The researchers for this particular study were two assistant professors of Spanish. The instructors conducted the first two weeks of classes in English. During this time, they presented the experimental group with the new Hybrid Spanish method, emphasized its benefits for language learning, and implemented lesson plans such as the one included in Appendix A. The control group engaged in similar activities but were never

explicitly made aware of the concept of metacognition, nor were they informed of the new methodology being piloted with the experimental group. The students in the experimental group brainstormed new strategies for learning the language and for sharing these strategies with others. Using what is known as the World Café practice of deep conversation (see Brown & Isaacs, 2005), the instructor divided the classroom into four stations. Each station had a “leader” and an important question, such as “What is metacognition?,” “How do we best learn a language?,” “What strategies do we need to learn the language?,” “How do we unlearn old habits?,” and “What is culture?” The control group had different questions, such as “What did you do during the break?” or “What are your favorites movies and why?” The World Café conversation was very productive in the experimental group. The four student groups rotated stations every five minutes and were encouraged to write their ideas on a poster board (provided at each station) as a brainstorming tool. When all four groups had rotated through all four stations, the professor asked the leaders to share what they discovered. Then the instructor shared with the class what the students had felt to be of great use. The homework for the following class period consisted of compiling a list of strategies learned that day from the student’s group. During the next meeting, the students shared their strategies with the class and showed examples of how to carry them out (see Appendix C for World Café activity).

To measure the impact of the metacognitive instruction on the experimental group, we compared the end-of-semester surveys on self-assessment completed by both groups (See Appendix D for a sample of the survey). Before the study took place, instructors ensured that both of the groups were the same in their knowledge of metacognition and/or foreign-language methodology using Levene’s test (commonly used in statistics to test the equality of variances for a given

variable between multiple groups). The groups were assigned randomly.

Findings

The students who received metacognitive awareness instruction at the beginning of the semester scored their course experience much higher than the ones who did not. (See Table 2 for results in the T-test on the student participants.) The value of the T test is significant at $P < 0.025$, so we can reject the null hypothesis. Besides focusing on the quantitative scorings, the study had a qualitative component: there was a question at the end of the survey that inquired about the student’s connection to the teacher. One student wrote, “I loved what we did at the beginning of the class and I felt confident in my Spanish throughout the whole semester. I finally understood why it is so important to learn the language and speak it. I loved my teacher and I loved the class.” Not only did the students exhibit a positive attitude towards the class and the material, they were also much more confident by the end of the semester. One interesting response was related to their future declaration of Spanish majors and minors: about 30% of the experimental class showed interest in one or the other as compared to only five percent in the control group.

Discussion and Implications

The confidence of the students who received metacognitive awareness instruction and the final results of the survey could be due to different factors. One possible explanation—and the hypothesis of this study—is that students received extra attention and were encouraged to take a look at the way in which they learned the language as well as why it is so important to study a second language. A second explanation could be the perceived novelty of the course among students, which was heightened by the explicit use of the title “Hybrid Spanish,” as opposed to “Spanish 101.” A third explanation could be the personality of the teacher and how

the students relate to this particular educator regardless of the methodology. One final possibility could be that motivation and self-awareness were natural characteristics of the students in the experimental class.

Other variables to consider in further research could include the number of participants, the gender and age distribution between the experimental and control groups, and the course assessment tools. The number of participants (101 total) may have limited the findings of this study. Likewise, the gender and age disparity between the two groups may have influenced the study's outcomes. As shown in Table 1, more women were in the control group than in the experimental group. At the same time, the number of students between the ages of 20 and 25 in the experimental group was slightly higher than in the control group. With regard to assessment tools, the lack of standardization across the introductory Spanish program at the participating institution may have influenced student self-evaluations. Though created in consultation between the participating instructors, the exams used during the course of the study were necessarily tailored to each respective group. It should be noted that the factors relating to the participant pool, gender and age distribution, and assessment represent circumstantial limitations inherent in the study. Ideally, this study should be replicated at a larger institution with a standardized introductory language program.

While the lack of standardization was indeed a factor in student performance in this study, the value of self-assessment cannot be overemphasized. Analyzing the self-assessments is a powerful tool since it recognizes the importance of self-reflection and attempts to measure self-confidence in students who start a language at the college level (regardless of past experiences). Increasing student self-confidence with regard to their learning abilities is, in fact, the primary purpose of integrating metacognition into existing teaching methodologies. As shown in this study, students in the

experimental group did indeed demonstrate increased self-confidence, which may in turn have contributed to their overall performance as well as their perception of the class.

It is clear that further research controlling for the abovementioned variables is necessary to determine with greater certainty the link between the proposed methodology and student performance beyond student self-confidence, motivation, and attitude toward class and teacher, which, though certainly influential, do not solely determine student performance. This does not, however, negate the greater benefit such hybrid methodologies provide students and teachers, as shown by this study, in terms of fostering a positive and therefore rewarding learning experience.

Conclusions

The explicit use of metacognition alongside the communicative approach in beginning Spanish classes fosters student self-confidence, interest in the subject matter, and positive attitudes toward the subject and teacher. The evidence is that students who were exposed to metacognition at the beginning of the semester scored the class and themselves higher in the End-of-Semester Survey on Self-assessment. They also presented more positive comments on their connection with the teacher. Thus, it may be surmised from the findings of this study that Hybrid Spanish may contribute to improved performance among students in introductory Spanish courses.

The design and findings of this study, though geared specifically toward Spanish language instruction, are indeed relevant and applicable to the instruction of subjects well beyond foreign languages. It is my hope that the hybrid teaching methodology exemplified in Hybrid Spanish will serve as a model for other courses across academic disciplines. Beyond encouraging students to look at their own learning processes and skills, such a hybrid methodology can improve

the connection between the student and the teacher, a relationship that is at the core of any positive learning experience. Unfortunately, it is often the case that this crucial connection does not develop in foreign language classrooms due to language barriers. Comparable barriers between student and teacher may exist, however, in other academic disciplines. It is here that this study hopes to make a broader contribution to teaching in higher education. Whether in foreign language or other academic courses, the teaching methodology modeled in Hybrid Spanish may well improve the learning experience for students and teachers alike. ■■■

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Table 1. Demographic Characteristics of Subjects: Control and Experimental Groups

Characteristics	Control		Experimental		Combined	
	Frequency	Percent	F	P	F	P
N	52		49		101	
Gender						
Female	33	63.5	20	40.8	53	52.5
Male	19	36.5	29	59.2	48	47.5
Age						
Under 20	51	98.1	46	93.9	97	96
Between 20 and 25	1	1.9	3	6.1	2	4
Academic Level						
Freshman	40	77	40	81.6	80	79.2
Sophomore	10	19.2	6	12.2	16	15.8
Junior	2	3.8	3	6.1	5	4.9
Senior						
Native Language						
English	52	100	49	100	101	100
Spanish						
Previous Language Study						
Yes	51	98.1	48	97.9	99	98
No	1	1.9	1	2	2	2

Table 2. The Student-t Test for the Experimental (A) and Control Group (B)

#A = 49, #B = 52, $t = 2.217$, $DF = 99$, $p \leq 0.02891$

Group	Mean	Std. Dev.	Sample size
experimental	27.96	7.62	49
Control	24.25	9.07	52

Unpaired t test results

P value and statistical significance:

The two-tailed P value equals 0.0288

By conventional criteria, this difference is considered to be statistically significant.

Confidence interval:

The mean of Group One minus Group Two equals 3.7100

95% confidence interval of this difference: From 0.3923 to 7.0277

Appendix A:
Metacognitive Reflection for Lesson Plan Week 1-2

This exercise will make you reflect **upon** the way you study Spanish and **will** improve your planning.

1. How much time a day do you spend studying Spanish?
2. What grade do you expect to receive in this class? Why?
3. How well do you usually prepare yourself for exams, quizzes?

Write the percentage of time you spend doing the following	
Listening to Spanish music	
Watching Spanish films	
Doing the homework	
Talking in Spanish	
Writing in Spanish	
Time in the community	
Other	

4. So far how did you do in Spanish? What do you think has influenced it?
5. What can the teacher do to improve the way you learn and how can you help yourself?
6. What is culture versus Culture?
7. Discuss these FL standards with your partner and then comment on how you plan to incorporate them into your learning schedule.

STANDARDS FOR FOREIGN LANGUAGE LEARNING²

COMMUNICATION

COMMUNICATE IN LANGUAGES OTHER THAN ENGLISH

Standard 1.1: Students engage in conversations, provide and obtain information, express feelings and emotions, and exchange opinions

Standard 1.2: Students understand and interpret written and spoken language on a variety of topics

Standard 1.3: Students present information, concepts, and ideas to an audience of listeners or readers on a variety of topics.

CULTURES

GAIN KNOWLEDGE AND UNDERSTANDING OF OTHER CULTURES

Standard 2.1: Students demonstrate an understanding of the relationship between the practices and perspectives of the culture studied

Standard 2.2: Students demonstrate an understanding of the relationship between the products and perspectives of the culture studied

CONNECTIONS

CONNECT WITH OTHER DISCIPLINES AND ACQUIRE INFORMATION

Standard 3.1: Students reinforce and further their knowledge of other disciplines through the foreign language

Standard 3.2: Students acquire information and recognize the distinctive viewpoints that are only available through the foreign language and its cultures

COMPARISONS

DEVELOP INSIGHT INTO THE NATURE OF LANGUAGE AND CULTURE

Standard 4.1: Students demonstrate understanding of the nature of language through comparisons of the language studied and their own

Standard 4.2: Students demonstrate understanding of the concept of culture through comparisons of the cultures studied and their own.

COMMUNITIES

PARTICIPATE IN MULTILINGUAL COMMUNITIES AT HOME & AROUND THE WORLD

Standard 5.1: Students use the language both within and beyond the school setting

Standard 5.2: Students show evidence of becoming life-long learners by using the language for personal enjoyment and enrichment.

2 American Council on the Teaching of Foreign Languages. (2012). Standards for foreign language learning. In National Standards for Foreign Language Education. Retrieved from <http://www.actfl.org/advocacy/discover-languages/advocacy/discover-languages/advocacy/discover-languages/resources-1?pageid=3392>

Metacognitive Lesson Plan

By Diana Ruggiero

1. Have the students get in pairs
2. Ask the question “why do you think it is important to learn Spanish?”
Let pairs talk for a minute then share
3. Ask: How does Spanish help in your major/area of interest? Same discussion dynamic
4. Now have students learn a list of specific vocabulary like: have them make flash cards and teach them how to quiz each other

Firefighter Vocabulary

5. air - aire
axe - hacha
to burn - quemar
department - departamento
evidence - evidencia
fire code - código de seguridad contra incendios
fire scene - área del incendio (and so on)
6. After they learn the vocabulary teach the students basic communication phrases for asking for help.
7. Select students and pretend to be a “victim” where they are the “fireman.”
(It would be funny at the beginning that they do not know how to react).
Then have the students reflect on the following:
 - a. What are some consequences of not knowing Spanish in your job? What about your specific area? Can you think of other professionals who would benefit from learning/knowing Spanish?
 - b. End the class by watching a related video

Appendix B

Introductory Demographic Form

_____Male _____Female

_____Age

Academic level:

Native language:

How many semesters or years of studying Spanish have you had previous to this course?

Appendix C

The World Café

Students divide into four stations. Each station will have an ambassador. This student will be in charge of making the conversation flow. S/he will encourage others to write on the board, paper or other materials the station has. Some sample questions are:

- » What strategies do you use to learn a language?
- » What is metacognition?
- » What does it mean to “unlearn”?
- » What do we understand by culture?

All stations will address the same question within a five-minute time frame. At the end of 5 minutes, the instructor will signal the students to rotate clockwise to the next station where they will consider a new question posed by the instructor. This setting creates a deep conversation. At the end the instructor reads all the comments on the board provided by the students.

*Appendix D***End-of-Semester Survey on Self-Assessment**

I enjoy learning Spanish (from 1, disagree strongly, to 7, agree strongly)

1 2 3 4 5 6 7

Spanish is a difficult language to learn (from 1, disagree strongly, to 7, agree strongly)

1 2 3 4 5 6 7

Please rate your writing ability (from 1, lowest, to 7, highest)

1 2 3 4 5 6 7

Please rate your speaking ability (from 1, lowest, to 7, highest)

1 2 3 4 5 6 7

I found that the first 2 weeks of the course were the most helpful in making me aware of my language abilities
(from 1, disagree strongly, to 7, agree strongly)

1 2 3 4 5 6 7

Comment on your teacher-student connection:

ADHD in the Classroom

Dev Kumar Bose

Definition

Attention-Deficit/Hyperactivity Disorder (ADHD) is described as “a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with development, has symptoms presenting in two or more settings (e.g. at home, school, or work), and negatively impacts directly on social, academic or occupational functioning” (American Psychiatric Association, 2013). Since approximately one-half of the individuals exhibiting ADHD early in life go on to have persistent time-management symptoms into adulthood (DeSimone II & Busby, 2014), research on more effective teaching strategies focuses on organizational skills (see, for example, Bose, 2011; Ratey, 2008).

ADHD affects the executive functions (activation, focus, effort, emotion, memory, and action) of a learner’s cognitive processing (Brown, 2006). Executive functioning is necessary to carry out the difficult and highly abstract tasks required in higher education. Adult learners with ADHD face certain challenges that may hinder their classroom performance; of particular concern are verbal working memory, internalized speech, self-regulation, and planning (Barkley, Murphy, & Fischer, 2010). The list of symptoms that follows is derived from the DSM-5 (American Psychiatric Association, 2013). Further information about symptoms and diagnosis is available from the Centers for Disease Control and Prevention (2014) at <http://www.cdc.gov/ncbddd/adhd/diagnosis.html>, and further information about long-term outcomes of ADHD, from the Centers for Disease Control and Prevention (2011) at <http://www.cdc.gov/ncbddd/adhd/workshops/outcomes.html>.

Symptoms

ADHD can be present along a continuum, from very minor and undiagnosed to a diagnosed condition. Higher-education teachers should consult with their institution’s disability services office, where students with documented evidence of ADHD can arrange for services such as extended test time and assisted note-taking. The focus here is on implications for learning, not on diagnosis, and is specifically for postsecondary students. Information sheets on ADHD that expand the scope of this document are available at the National Resource Center on AD/HD (2013): <http://www.help4adhd.org/en/about/wwk>. Many of the symptoms listed below can also apply to other disorders and conditions. In addition, many can be observed in most students at one time or another, but students with ADHD will exhibit more of them, and more often.

Currents-to-go is an occasional feature in *Currents in Teaching and Learning*, providing higher-education teachers across the disciplines with handy guides to topics of current interest. Each *Currents-to-go* guide will be numbered (*collect the set!*), and will include a brief introduction to and overview of the issue or problem, a list of teaching strategies or classroom practices designed to address it, and references for further reading.

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Inattention

Often:

- » 1. Fails to give close attention to details or makes careless mistakes in schoolwork
- » 2. Has difficulty sustaining attention in the classroom
- » 3. Does not seem to listen when spoken to directly
- » 4. Does not follow through on instructions and fails to finish schoolwork (not due to failure to understand instructions)
- » 5. Has difficulty organizing tasks and activities
- » 6. Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort
- » 7. Loses things necessary for tasks or activities
- » 8. Is easily distracted by extraneous stimuli
- » 9. Is forgetful in daily activities

Hyperactivity

Often:

- » 1. Fidgets with hands or feet or squirms in seat, or may have a fidget toy (such as a stress ball)
- » 2. Leaves seat in classroom situations in which remaining seated is expected
- » 3. Has difficulty engaging in independent activities quietly
- » 4. Is “on the go” or often acts as if “driven by a motor”; appears restless
- » 5. Talks excessively

Impulsivity

Often:

- » 1. Blurts out answers before questions have been completed
- » 2. Has difficulty awaiting turn
- » 3. Interrupts or intrudes on others (e.g., butts into conversations)

Recommended Classroom Practices for Adult Learners with ADHD

While the following suggestions for classroom practices will benefit most students in higher education, they will be particularly useful for adult learners with ADHD, regardless of the severity and whether or not ADHD has been diagnosed. These suggestions incorporate Universal Design for Learning (UDL). UDL does not limit curricula to specific learning disorders but addresses “the need for multiple approaches to universally meet the needs of diverse learners” (Cooper, 2008, p. 176). The Center for Applied Special Technology (2013) offers more information on UDL: <http://www.udlcenter.org/implementation/postsecondary>. Information for college students with ADHD is available from *ADDitude* (2013) at <http://www.additudemag.com/resource-center/adhd-college-success.html>.

Design documents that are visually appealing and interactive:

- » Provide assignment objectives in short sentences at the top.
- » Use text boxes and bullet points that provide essential information. Blank lines provide opportunities for students to fill in information during class.
- » Use color-enhanced documents and illustrations with hierarchical organization.
- » Use “talking” headings; for example, “lists, bullets and spaces” is more descriptive than “organization.” Refer to the *Web Style Guide Online* (Lynch & Horton, 2009) <http://webstyleguide.com/wsg3/index.html> for an exhaustive guide to web documents and other visual aids.

Use interactive teaching techniques:

- » Encourage critical analysis by surveying students' attention throughout long lectures. A simple comprehension check is not enough: prevent boredom and distraction by embedding online polls at critical points. Google Forms and SurveyMonkey offer free online surveys. There are also a number of applications that offer free mind-mapping software, such as Coggle and FreeMind.
- » Allow opportunities for evaluation by conducting investigations (e.g., case studies) and panel discussions. Combine audio-visual cues to aid in absorption of materials and reinforce deficits in executive functions. Free, open-source applications such as Moodle as well as commercial course management programs such as Wimba and Blackboard include discussion forums and wiki capabilities, all of which enhance evaluation; several applications offer argument analysis software to reinforce critical thinking.
- » Strengthen holistic thinking by having students re-create elements of existing projects into new structures. Open-source online media production tools such as Moviemasher and Jahshaka, and commercial tools with free options such as Prezi serve this purpose and are easy to learn. GanntProject is a tool for project scheduling and management; it is also free and works across platforms.
- » Understand that today's college students, including adults with ADHD, are digital learners and consequently prefer to network simultaneously with many others. Monitor groups closely and provide explicitly labeled steps, making sure to assess progress on a continuum. Feedback is essential. Encourage groups to come up with sample work problems. Move students around to different groups to have them solve these problems.

Encourage assignments addressing discipline-specific challenges.

Bose (2011) asserts that adults with ADHD benefit from work that is:

- » Interdisciplinary: addresses at least two other disciplines that relate to their field.
- » Policy-driven: addresses existing solutions in the field and the policies that drive them.
- » Active: involves a plan of explicitly labeled steps.
- » Collaborative: designs a multi-step process that requires at least three individuals to complete.



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Current Clips and Links

A list of links to interesting, non-commercial websites related to teaching and learning, compiled by Josna Rege and Stephanie Spino. *Currents* invites reader recommendations.

National Center on Universal Design for Learning/Post-Secondary Education

Universal Design for Learning (UDL) is a framework for teaching and learning that addresses the widest possible variety of learning needs, styles and preferences. This postsecondary education page has a number of resources including teacher toolkits, curriculum development, webcasts and webconferencing, UDL case stories from several California state universities, and links to examples of UDL incorporated into courses across the country, including University of Vermont, Boston College, Colorado State, and University of South Florida.

<http://www.udlcenter.org/implementation/postsecondary>



NATIONAL CENTER ON
UNIVERSAL DESIGN for LEARNING

GlobalHigherEd

GlobalHigherEd – Surveying the Construction of Global Knowledge/Spaces for the ‘Knowledge Economy’ GlobalHigherEd is a Weblog and Twitterfeed designed to highlight and then archive information about new developments, resources, analytical networks, and so

on, so as to better track what is happening with construction of new globalized knowledge/spaces. It is interested in what the implications of this complex development process are, especially for global public affairs. The GlobalHigherEd blog is edited by Kris Olds (Professor, University of Wisconsin-Madison) and Susan Robertson (Professor, University of Bristol).

<http://globalhighered.wordpress.com>



CASTING OUT NINES

Where math, technology, and education cross.

Casting Out Nines Written by mathematics professor Robert Talbert, and part of The Chronicle of Higher Education’s blog network,

Casting Out Nines is a blog on mathematics pedagogy, including the use of technology to support active learning environments in the STEM disciplines, particularly through the use of peer instruction, screencasting, classroom response systems, and the fusion of mathematics and computer programming.

<http://chronicle.com/blognetwork/castingoutnines/>

Universities Scotland



Race Equality Toolkit: Learning and Teaching A project of Universities Scotland, this resource is designed to assist teachers in higher education, particularly those less familiar with race equality issues, to embed issues of race equality and of fostering good relations as part of learning and teaching and curriculum design, thereby acknowledging the experiences and values of all students, including minority ethnic and international students. The Toolkit has four key sections, covering curriculum, learning & teaching, assessment, and institutional action.

<http://www.universities-scotland.ac.uk/raceequalitytoolkit/>

Just Visiting Written by novelist and creative writing teacher John Warner, *Just Visiting* is one of several blogs hosted by Inside Higher Education’s Blog U. In it, Warner is his own man, ranging widely, reflecting with wry humor on the latest hi-tech fads in higher education, and always arguing for attentive, face-to face interactions with students.

<http://www.insidehighered.com/blogs/just-visiting>



From the Book Review Editor

Sean C. Goodlett

In this issue of *Currents in Teaching and Learning*, our authors ask faculty to step back and reevaluate their pedagogical assumptions. Indeed, they call for the adoption of altogether different mindsets.

James M. Lang, for instance, has offered a provocative take on our approaches to academic dishonesty. In *Cheating Lessons*, reviewed here by Benjamin Lieberman, Lang argues that cheating results largely from poor assignment and syllabus design. This shift in perspective is not intended to relieve students of their responsibility for dishonesty. Instead, it is meant to aid faculty in seeing more clearly what makes cheating possible, which in turn enables its prevention.

Similarly, Ken Bain asks faculty to adopt a “beginner’s” mindset. In *What the Best College Teachers Do*, reviewed by Kisha G. Tracy, Bain posits that assuming the role of a novice opens faculty to a critical rethinking of their teaching practices. It also makes possible the adoption of a host of innovative methods and approaches, like “far transfer” (transporting skills and knowledge beyond a classroom), active learning, and differentiated instruction.

If you wish to contribute a review to *Currents*, please drop a note to the book review editor, Sean C. Goodlett, at sgoodlett@fitchburgstate.edu. ■■

Rethinking Cheating

Benjamin Lieberman

Cheating Lessons: Learning from Academic Dishonesty. By James M. Lang. Harvard University Press, 2013, 256 pp., \$26.95 ISBN 978-0-6747246-3-1.

In *Cheating Lessons*, James M. Lang has written an incisive, practical, and entertaining book about cheating that is not really about cheating. Or rather, Lang makes a strong case through analysis of teaching and cognition that cheating is mainly a side effect of flawed methods of teaching and learning. This comes as something of a relief. Instead of obsessing about cheating, instructors can focus on identifying and employing the most effective methods of teaching and thereby do away with much cheating while also raising student achievement.

Lang does not minimize the importance of cheating in a book ostensibly devoted to that subject, but he argues that we are really talking about something else: a predictable response to learning environments and methods that fail to engage students and sustain learning. Through a series of interesting historical and contemporary examples, Lang sketches out the conditions that feed cheating. These include a strong emphasis on performance, as in the Olympics (p. 21); high-stakes exams such as those faced by Chinese students (p. 23); and extrinsic motivation such as in the case of the imposition of No Child Left Behind (pp. 29-30). Low self-efficacy, or a lack of confidence in the possibility of success, further encourages cheating (pp. 34-35). From these examples, Lang discusses the practices that increase the probability of cheating: emphasizing performance over mastery (pp. 41-42), placing immense importance on a single exam (p. 43), and creating exams where the only aim is satisfying some external demand (p. 45).

Lang's prescription is both liberating and challenging. Instead of spending time and effort simply telling students not to cheat or trying to catch cheaters, he argues that instructors should set up classes and classrooms that encourage learning. Drawing on extensive literature from cognitive science, Lang outlines useful advances in our understanding of teaching and learning. The core of the book provides lessons from this new literature, as well as examples of the practices of individual professors.

In particular, Lang draws on the work of Ken Bain to suggest focusing classes "on questions or issues that you know the students already care

Benjamin Lieberman is a professor of European History at Fitchburg State University. His most recent books are *The Holocaust and Genocides in Europe* and *Remaking Identities: God, Nation, and Race in World History*.

about” or on big questions (p. 63). To show just how far this approach can go, Lang describes the work of Andy Kaufman of the University of Virginia and his students in teaching Russian literature in correctional centers (pp. 65-70). Lang insists that we should ask real or “authentic” questions as opposed to “questions to which we already have the answers” (p. 73). To build “intrinsic motivation,” effective instructors create “assessments that are grounded in the lives and unique learning experiences of their students” (p. 83).

Lang suggests that we should pursue learning for mastery, much like contestants in *The Hunger Games*. For instance, he describes a successful faculty member at Virginia Tech who teaches a class to more than 2600 students at a time. Students can choose from a menu of assessments, though in practice the course structure ensures that students cannot do well without taking more than one type of assessment. Instead of high-stakes performance, the class stresses practice to gain mastery (pp. 87-97).

Lowering the stakes by providing frequent assessments both reinforces learning and lowers the likelihood of cheating. Lang reasonably suggests, “The more pressure you put on a single exam the more likely the chance that students will respond by any means necessary to succeed on it” (p. 105). At the same time, repeated low-stakes assessments improve learning because retrieving information repeatedly builds cognitive skills. Low-stakes assessments can further help students develop a stronger sense of metacognition, which is critical if they are to determine how much they need to practice or study (pp. 129-133). To that end, Lang joins in praising the idea of flipping the classroom because students get a chance to practice and get feedback (p. 143).

The book concludes with some brief practical advice for preventing cheating, but this seems almost beside the point. Efforts to build academic integrity on campus should focus first and foremost on education.

An honor code in itself, Lang believes, is far less effective in preventing cheating than “the dialogue about academic honesty that the code inspires” (p. 172).

Lang’s instructive and entertaining book shows both the promise and the potential limits of recent trends in the scholarship of teaching and learning. Lang makes a powerful case for thinking about cheating as a symptom of something else, rather than a simple act of either dishonesty or confusion, and he helps his readers to meet multiple key goals at the same time.

However, the strategies for reducing cheating raise questions about individual motivation, high-stakes tasks, and mastery. Given that it is not enough to tell students that they should be interested in something simply because it is important, how far should instructors go in making the case for learning? Lang stresses that we should not pander, but if we constantly take this approach are we advancing our own individual class while creating the conditions for the growth of a broader collective narcissism? If we repeatedly cater to the individual student’s interests, will we create a curriculum in which we are all interested only in the things that we are already interested in?

As for reducing high-stakes assessments, what will happen to students who never confront such challenges when they inevitably find themselves in a real-life situation where the stakes are very high? Will they be able to ask others then to break the task down into small discrete activities that can be practiced before the real test?

Lang’s review of the literature on cognition and learning is extremely instructive, but can students fully attain mastery if they can choose how they are going to be assessed, or might they show evidence of mastery while failing to master some essential skill or knowledge? Lang provides examples of how the choices can be structured to force students to take multiple forms of assessment, but how authentic is assessment? Finally, Lang has comparatively little to say about the form of

cheating that may disturb some instructors the most: plagiarism. After a few brief mentions, plagiarism only resurfaces toward the book's end.

Cheating Lessons is useful, promising, and thought-provoking. Lang shows us that we have reached a moment where we can both advance certain kinds of learning and reduce the likelihood of cheating, and he provides practical advice for how to accomplish these goals. This is a very good thing, and his book deserves to be read. At the same time, it is important to note that some of our advances have potentially created new pitfalls and problems. ■■

The Beginner's Mindset

Kisha G. Tracy

What the Best College Teachers Do. By Ken Bain. Harvard University Press, 2004. 207 pp., \$29.50 (HC), ISBN 978-0-6740132-5-4.

Honing the craft of teaching requires an instructor to embrace the role of apprentice, in spite of experience or perceived expertise. In the introduction to *What the Best College Teachers Do*, author Ken Bain hopes that “readers will take away from this book the conviction that good teaching can be learned” (p. 21). Bain encourages his audience to challenge preconceived notions of what they do or ought to do inside and outside their classrooms by exploring the successful techniques of masters of the craft of college teaching. In adopting the mindset of a beginner—or a student, as it were—we can develop fresh perspectives and be open to critical reflection on our practices. *What the Best College Teachers Do* offers a framework by which readers can engage in this reflection.

Adopting a beginner's mindset can create an uncomfortable feeling of vulnerability. Disciplinary expertise is necessary in order to become a college teacher (although, curiously, pedagogical expertise is not), and this expertise implies a level of proficiency. To step back, to admit there might be room for improvement in our methods, is to tread on shaky ground indeed. It seems only fair, though, as it is exactly what we expect of our students. Bain suggests that we ask ourselves, “Am I prepared to make changes in individual class sessions or in the whole course to connect with my students?” (pp. 55-6). By being so prepared, teachers can confront difficult questions and search for answers, even if that search involves vulnerability or, perhaps more alarming, failure. Bain found that the master teachers in his study “were willing to face the failures of teaching and believed in their capacity to solve problems,” and thus, “they tried not to become defensive with their students or build a wall around themselves” (p. 145). I would add that, by accepting and learning from failure, we can retain the enthusiasm that is the hallmark of the beginner.

Perhaps the key to being open to revision and reflection is rethinking how teaching fits into our academic work. Bain argues that successful teachers perceive teaching as “an important and serious intellectual (or artistic) act, perhaps even as a kind of scholarship,” one that requires “the attention of the best minds in academia” (p. 49). Elsewhere, he remarks that “a teacher should

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think about teaching (whether in a single session or an entire course) as a serious intellectual act, a kind of scholarship, a creation” (p. 169). Perceiving teaching as scholarship is not a new concept; it has been a growing movement for over two decades. Nevertheless, college teachers often do not approach their teaching in the same way they approach their discipline-specific research. When preparing our research, we read and analyze scholarship, from which we form opinions and build theories, testing them until we are satisfied with our conclusions, only to revise these conclusions when new evidence presents itself. Teaching is, as Bain states, an “intellectual act,” deserving of this same attention and application of process.

It is interesting to note here that Bain often comments that the subjects of his study were not familiar with current pedagogical research at the time they were interviewed, and yet they bore out its significance. On the one hand, there is an irony that these “successful teachers” did not engage with the research Bain is advocating and contributing to, and yet, the fact that their practices so clearly align with the scholarship supports its validity.

Another unsettling thought develops when adopting a beginner’s mentality: what happens inside the classroom may not be the only important consideration. In fact, it may not even be the most important consideration—a view which takes the emphasis off the content we teach and know so well. Bain’s subjects agreed that “learning takes place not when students perform well on examinations but when they evaluate how they think and behave well beyond the classroom” (p. 94). The best college teachers perceived “the value of an integrated education rather than one fragmented between individual courses” (p. 46) and sought to help students “to become aware of how they think within the discipline, and to compare that thinking with the way they reach conclusions in other disciplines” (p. 87). Susan Ambrose and her co-authors (2010) in *How*

Learning Works: Seven Research-Based Principles for Smart Teaching call this “far transfer,” when students are “able to apply what they learn beyond the classroom” (p. 108). For many universities, this skill is an integral part of their liberal arts training, yet Ambrose and company conclude that students often do not exhibit such far transfer. How then do we foster this ability? Bain asserts that master teachers make this question explicit in their process. They ask themselves, “How can I lead them to compare and contrast their reasoning in this course with thinking they might do in other courses or situations?” (p. 59).

Bain examines the question of “how” by considering the practices of his subjects. In particular, he addresses the concept of content versus learning goals. His assessment is that “the best teachers plan backward; they begin with the results they hope to foster” (p. 50). In his estimation, this practice takes the emphasis off what is being taught and places it on what is being learned, a common theme throughout the book. Bain characterizes his subjects’ focus as “helping people learn to reason or create, to use new information, not on the need to tell students everything they must know and understand” (p. 51). Of course, this approach begs the question of what to do with students who do not yet have the basic skills or knowledge necessary to engage with the material. Bain is more interested in global concepts than such case-specific questions. Nonetheless, his study offers the suggestion that “students must learn the facts *while* learning to use them to make decisions about what they understand or what they should do” (p. 29). In essence, he advocates the principles of active learning, a pedagogical method with a history going back to the 1980s.

Active learning connects with another theme that appears throughout Bain’s study, the idea that students should not be viewed as a collective, but rather as individuals, with different skills, abilities, and experiences. In his words, “every student requires something special”

(p. 97). A belief in the diversity of students is why his subjects “conducted class in a multitude of ways” (p. 116), a principle underlying active learning. The common philosophy that emerged among the best college teachers was that students “develop in fits and starts and benefit from repeated challenges from a variety of levels” (p. 44). The real key to this system is “variety” and a willingness to be flexible, which returns us to the question above about being prepared to make changes in order to reach students.

In the chapter entitled, “How Do They Conduct Class?”, Bain references the “to lecture or not to lecture” debate in a refreshing, nuanced manner. In general, individuals take sides on this question. Instead, Bain acknowledges that there are numerous forms of lecturing, some quite dynamic, and that there are teachers for whom it works well, though not when it is “used as an encyclopedic coverage of some subject, or as a way to impress students with how much the teacher knows” (p. 107). He again places the focus on what is learned, rather than the method chosen, the teacher, or the teacher’s ego. Traditional lecturing may be the appropriate method to choose, for instance, when the expected goal of the lesson is to help students process by listening. However, to return to the principles of active learning and “variety,” a method that always promotes listening to the exclusion of other activities may prove counter-productive. Bain’s subjects utilized methods that promote “higher-order intellectual activity: encouraging them to compare, apply, evaluate, analyze, and synthesize, but never only to listen and remember” (p. 102). Lecture becomes “one element of a learning environment rather than the entire experience” (p. 107). The question is not whether or not to lecture, but what method is best suited to create a successful learning environment.

What the Best College Teachers Do is not a handbook of magic formulae for “good teaching,” nor does Bain intend it to be, despite the “How Do They?”

chapter titles. Indeed, Bain makes clear that there is no single formula, that too many factors are at play: these include different disciplines, types of students, strengths and weaknesses of the teacher, desired outcomes, departmental or institutional goals, and so on. Bain acknowledges and takes these factors into consideration, which increases the value of his conclusions. Although the structure of *What the Best College Teachers Do*, framed as it is around insights gleaned from examples of “the best teachers,” seems a little forced at times, there is great value in the exercise in which it asks us to participate: to take on the role of apprentice and examine our methods with the energy and mindset of a beginner. ■■

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