

Undergraduate Research in International Settings: Synergies in Stacked High-Impact Practices

Abstract

Research suggests that engaging undergraduates in authentic research experiences is a high-impact practice that can transform the undergraduate experience and set students on a track for success in their academic trajectory and beyond. Global learning and international experiences can similarly transform undergraduate education. This article explores two high-impact international and service-learning opportunities offered to undergraduate students, their outcomes, and the powerful combination (or “stacking”) of these two practices. Examples are discussed from study abroad programs in the natural and social sciences that infuse rigorous, authentic undergraduate research experiences as well as synergies that can occur when undergraduates engage in research in an international setting. Interactions between these experiences and specific disciplines as well as commonalities among undergraduate research and international experiences may pay dividends for programs that combine such areas.

Keywords: *globalization, high-impact practices, science, service learning, social science, study abroad, undergraduate research*

Introduction: Engaging Undergraduate Students in Research and International Service Learning

Engaging undergraduate students in high-impact practices (HIPs) such as research and service learning is now a widely accepted and implemented strategy aimed at improving academic and developmental outcomes (Kuh 2008; Waiwaiole et al. 2016). We know less, however, about the potential for enhancing the positive outcomes typical of these types of HIPs by carrying them out in international settings. This article explores the potential for combining HIPs in an international setting, focusing on international research experiences in the natural and social sciences. Possible synergies are discussed and ways are suggested in which the effectiveness of these types of engagement practices can be bolstered, with special reference to cultures of research on home campuses.

To explore these ideas, two case studies are offered from study abroad programs grounded in rigorous, authentic undergraduate research experiences, discussing synergies that may occur between an international study experience and undergraduate research. These programs, which are centered on the natural and social sciences, combine HIPs in several ways. Furthermore, possible interactions between these ex-

periences and specific disciplines are explored. Engagement in undergraduate research is still overwhelmingly skewed toward the natural sciences with some studies indicating that undergraduates engage in natural sciences research three times as much as they engage in social science research (Bowman and Jennings 2005). Research experiences conducted in international settings may be a way forward to offset such imbalances, and the powerful applied context of many international research projects may help to level the playing field among disciplines (Eagan et al. 2011; Healey and Jenkins 2009).

The Challenges and Promise of Stacking High-Impact Practices

Increasing evidence from higher education research suggests that engaging undergraduates in authentic research experiences is a highly effective HIP that can transform the undergraduate experience and set students on a track for success in their academic trajectory and beyond (Kinkead 2003; Salazar 2013). However, a significant challenge is the investment in the creation, development, and consolidation of programs and opportunities for research that are framed both in sound disciplinary grounds and in training practices that are compatible with the level of maturity and experience of undergraduate students. Here these issues are explored in two ongoing international experiences led by the authors in different disciplinary realms at California State University, Monterey Bay (CSUMB).

A suite of recent studies have identified and explored transformative practices that are highly effective and powerful enablers of successful undergraduate experiences. Kuh (2008) describes high-impact educational practices as those that enable students to not only earn higher grades but also to retain, integrate, and transfer newly gained skills and competencies at comparatively high rates. High-impact practices include first-year seminars, learning communities with common courses, writing-intensive courses, internships, and capstone projects and courses. Discussed here are three more: undergraduate research, global learning, and service learning.

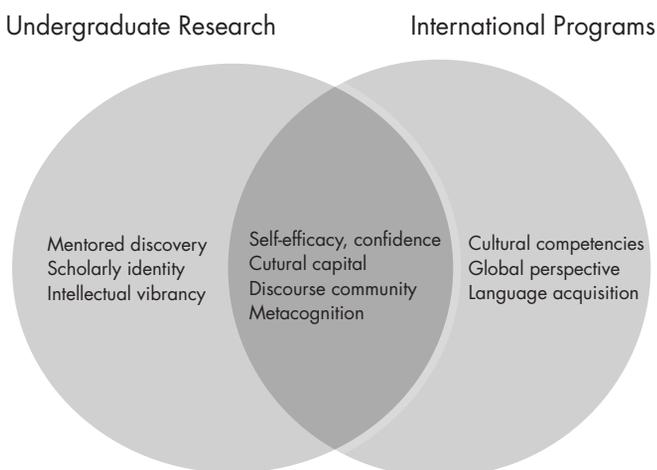
Undergraduate research is a high-impact practice that arguably presents universities with challenges as well as opportunities, as it requires campus-wide cultural and structural support. Bolstered by decades of renewed focus on active learning and “discovery guided by mentoring” (Boyer Com-

mission 1998, 15; Kinkead 2003), undergraduate research helps students create vibrant intellectual identities, boost their self-efficacy, and place their curricular studies in context. There also is mounting evidence that global learning and international experiences can similarly transform undergraduate education (Kuh 2008).

The success of undergraduate research programs relies on widespread campus cooperation. As noted in the recommendations of Larson (2012) from the Council on Undergraduate Research, undergraduate research requires the creation of synergies with existing high-impact practices and multiple campus constituents as well as the generation of funding sources for existing and emerging undergraduate research programs. It also requires faculty commitment to the effort as a customary part of their workloads; more important, it requires that undergraduate research be built organically and explicitly into the curriculum (Rowlett et al. 2012).

Another HIP that has received increased attention over the last few decades is global learning. Many colleges and universities now emphasize courses and programs that help students explore cultures, life experiences, and worldviews different from their own. These studies—which may address U.S. diversity, world cultures, or both—often explore “difficult differences” such as racial, ethnic, and gender inequality or continuing struggles around the globe for human rights, freedom, and power. Frequently, experiential learning in the community and/or study abroad augment intercultural studies. Exposure to diverse cultural and/or geographic environments can bolster cultural competencies and an appreciation for and sensitivity to issues pertaining to diversity and sustainability; it can also pay dividends in terms of intellectual development (McKeown 2009; O’Rear et al. 2012).

Figure 1. Venn Diagram Illustrating Characteristics of Undergraduate Research and International Programs, Including Overlapping/Synergistic Aspects



Because many undergraduate curricula have vigorously embraced HIPs, it is not uncommon for students to engage in two or even three high-impact practices during the course of their undergraduate experience. Undergraduates now often experience layering (or “stacking”) of multiple HIPs across different years/stages of their college tenure; less often, these HIPs are stacked simultaneously. Although the positive effects of individual HIPs are increasingly well documented and understood, tremendous gaps in knowledge about the effects of multiple HIPs when stacked still persist. Of particular interest is how multiple HIPs interact—are they related in a linear manner, interchangeable in time and sequence, or do synergies occur when certain HIPs are combined? In the case of undergraduate research and international experiences, there are clear areas of overlap that may enhance the student experience (see Figure 1). To illuminate these issues, two programs featuring stacked HIPs are discussed below.

Experiences in the Natural Sciences: An International Field Ecology Course in the Neotropics

Undergraduate research experiences in the natural sciences are an increasingly common element of active-learning, student-centered curricula. Arguably the most familiar type of undergraduate research experience, natural science research programs often provide opportunities for students to gain experience in fieldwork and theoretical analyses of concrete scientific challenges. Field ecology offers the added promise of placing research firmly into the context of local communities; in the best scenarios, challenges tackled are relevant and important to local stakeholders, and elements of participatory research can be included. In all cases, strong connections to local communities and an understanding of cultural and socioeconomic issues as well as the natural world are all essential aspects of the planning and implementing stages.

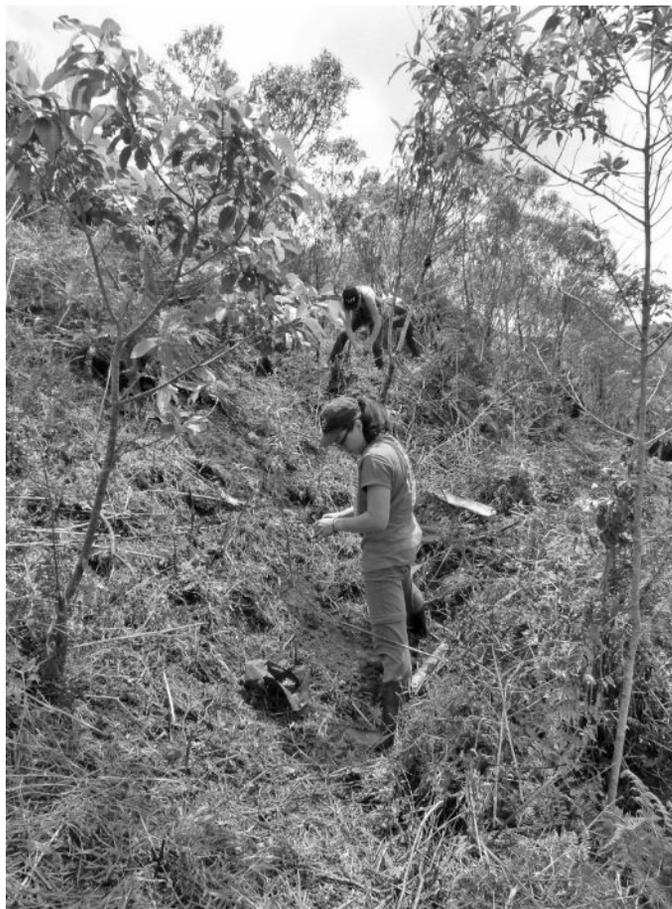
A field-research program deliberately incorporates undergraduate research and elements of other high-impact practices into a study abroad experience. The program originated and operated for more than a decade at the University of Washington’s Tacoma campus; it was eventually combined with a similar existing course at CSUMB. The program incorporates a combination of guided group research projects and independent research projects conducted by undergraduates mentored by faculty. These authentic research experiences have been primarily conducted in the small agrarian village of Mastatal on the Pacific slope of Costa Rica. The town has a church, a soccer field, a cantina, a community center, and a library. Most of its approximately 100 residents engage in some kind of subsistence agriculture. Mastatal abuts La Cangureja National Park, which was converted from a reserve to a national park in 2002. The region, part of “El Paseo de Las Lapas” (the Path of the Scarlet Macaws), is a component of a larger wildlife greenbelt extending the length of Costa Rica

and of a larger biological corridor that runs the length of the Mesoamerican isthmus. Conservation/restoration efforts in the region around Mastatal have lagged behind the rest of the country; clear-cut sections of forest on the slopes of the mountainous La Cangreja National Park can still be seen, along with pastures of grazing cattle; more recently, monocultures of exotic palm trees grown for palm oil have cropped up on the outskirts of the village. In the past 15 years, several learning centers on sustainability have been established in the Mastatal area, attracting short- and long-term volunteers as well as providing an appropriate setting for studying environmental sustainability and restoration.

Research Methodology and Applications. The program was designed to foster several outcomes in student learning, such as capability in applying critical thinking to environmental challenges as well as skills in field research methodology and statistical tools. Moreover, the course's metacognitive approach to increasing the transfer of knowledge (Graff 2010; Haskell 2001) sought to enhance students' environmental problem-solving through interdisciplinary methods. The ability to transfer and apply knowledge learned in one context to other situations is one attribute frequently linked to student success; it is one of the important "habits of mind" recognized for effective recruitment and retention of students, especially those in the early stages of their academic careers (Fletcher et al. 2015).

Preliminary Exercise: Carbon Footprint. In preparation for the course, students complete an exercise in which they calculate the carbon footprint associated with their travel. These calculations (performed via the online carbon calculator located at <http://www.terrapass.com/carbon-footprint-calculator/>) are used to generate estimates of the number of trees that could be planted to offset students' carbon footprints. During the course, students can elect to actually plant their estimated number of rainforest trees (see Figure 2) as well as visit a Costa Rican coffee cooperative that produces and sells coffee labeled as "carbon-neutral." Thus these experiences provide a context for a discussion about carbon offsets, local government plans involving payment-for-environmental services, and international agreements aimed at countering climate change by bolstering conservation efforts (e.g., reducing emissions from deforestation and forest degradation, or REDD). This exercise also provides an opportunity for discussing the nature of service learning, another well-established high-impact practice (Gaventa 1993; Sigmon 1995). In some cases, students have come to realize that planting trees, even ones appropriate (native) to the area, may not be serving the community well because the course timing does not align with local conditions (i.e., does not occur during rainy/planting season), which can lead to fruitful discussions of the nature of service and service learning as well as more general issues associated with conducting participatory research in local communities.

Figure 2. California State University Students Planting Trees to Offset Carbon Footprint in Copey, Costa Rica



Research: Individual Projects. Students must design, implement, and complete individual research projects during their time abroad. This requires them to delve into the literature, so that they acquire disciplinary knowledge and context for their inquiry before departure. They also gain practical skills in methodology and implementation when they undergo the arduous task of conducting research in a tropical environment. Projects have ranged from assessment of the antimicrobial properties of plants and insects to explorations of biodiversity patterns and animal behavior in the forests and rivers in and around Mastatal (see Figure 3). These projects foster creativity, the application of qualitative and quantitative analysis skills, and a nontrivial amount of resiliency. Setbacks associated with time management, stochastic events such as torrential downpours/flash floods and animal disruptions (e.g., ubiquitous spiders and snakes) of sampling efforts, and overly optimistic planning of the scope and extent of projects are common challenges experienced by students. Close mentoring by faculty can help guard against more di-

Figure 3. Students Working on Individual Research Projects in Rio Negro, Mastatal, Costa Rica



sastrous outcomes, but many of these challenges help students build confidence and self-efficacy. Students present their results to the host community and the campus community upon their return via oral or poster presentations, as well as publish them in an edited proceedings volume (e.g., Banks et al. 2016). These activities reinforce their sense of ownership and scholarly identity, which can lead to gains in self-efficacy and a deeper understanding of the entire research process.

Research: Guided/Collaborative Projects. In addition to individual projects, students also work in group projects guided by close mentoring. The combination of guided and individual research projects in the same course of study pays dividends by enabling students to move/transfer skills/ownership between group and individual projects. One advantage of guided projects is that they can continue over the course of several years, with multiple cohorts of students participating. One such project conducted in Mastatal was a multiyear research program that entailed comparing arthropod biological diversity among farmland and rainforest habitats, which eventually led to a publication coauthored by several of the undergraduates (Banks et al. 2007). This led to an invitation to contribute the data collected with students to an international study of biological diversity across different landscapes, furthering the reach and impact of student research (Hudson et al. 2014). These kinds of endeavors can serve as examples to inspire future students, as they see how they might successfully contribute to scientific knowledge on a global scale.

Visits to local venues upon returning to the United States reinforce many of the lessons learned during the international experience. For instance, an afternoon at a local U.S. organ-

ic/fair trade chocolate producer provides an opportunity for students to connect what they learned (via a class visit and/or individual research projects) on a cacao plantation in Mastatal. Likewise, visits to local coffee roasters in the United States after touring coffee plantations involved in sustainable coffee production in the Tarrazú region of Costa Rica affords students a close-up view of the supply chain as a continuum, making for a more meaningful understanding of myriad social and environmental issues. These connections enable students to put their scientific inquiry in a global perspective.

Experiences in the Social Sciences: Ethnographic Field Research in Spanish Rural Communities

The Spain Summer Program at CSUMB (CSUMB Spain) shares three of the categories identified by the American Association of Colleges and Universities as high-impact practices (Kuh 2008). It fosters undergraduate research involving students in empirical observation as well as rigor in practices of qualitative research, and promotes the exploration of early and active research design, data collection and analysis, and dissemination of findings. It also helps students explore cultures and visions that are often radically different from their own views and understandings. Because of the nature of the program, the interaction and integration in the field is conducted in the midst of a well-structured opportunity to provide service to the communities where the research training experience is conducted. Although a three-layered experience (undergraduate research combined with global and service learning) or a stacked experience is complex and ambitious, the program has gradually developed the necessary structure and resources to offer students such exposure (described below).

The program takes place in the watershed of the Porma River, a geographic region of transition where the Picos de Europa meet the higher plains of central Spain. The villages are situated around the town of Boñar, where the field station is located. The once densely populated mining and agricultural communities surrounding Boñar started experiencing a chronic depopulation in the 1960s. Today, localities with previous populations of 200 to 300 are now sparsely inhabited.

Academic Rigor: Facilitating Sheltered, Directed Research. To achieve approval of the program from the division, college, and university-wide curriculum committees, the lead faculty members worked in collaboration with the Institute of Service Learning and the Center for Teaching and Learning in defining the set of outcomes, criteria, and standards for the program; in equipping students with instructional and support methods; and in identifying outcomes that should serve to measure learning outcomes (see Table 1).

The program drew from an existing set of language, service learning, and methodology courses that prepared students for such intensive experience. This type of preparation has

Table 1. Outcomes, Criteria, and Evidence Used to Evaluate the Social Science Program
Research Learning Outcomes

Outcomes	Criteria	Evidence
Discipline or Area Competency	<ul style="list-style-type: none"> Identifies and provides an overview of discipline and area of study 	In-class questionnaire, final research report
Methodology	<ul style="list-style-type: none"> Formulates a research problem or topic pertaining to a specific area of study Describes and utilizes methods pertaining to a specific area of study 	In-class research design and proposal, final research reports Research reports
Global Competence	<ul style="list-style-type: none"> Students show appreciation of other cultures and the ability to interact with people from foreign lands The student shows competence by evidencing understanding of interconnections with the location experiences and showing understanding of the importance of responsible decision making that affects the community or communities visited 	Relationships built with staff and users of services at the local chapter of the Red Cross and as evidenced in Red Cross reports and student final reports Monitored hours of involvement and nature of involvement as reported by the staff of the local chapter of the Red Cross in Spain

Service-Learning Outcomes

Outcomes	Criteria	Evidence
Communication	<ul style="list-style-type: none"> Understands and works constructively with conflict Builds bridges across differences Can communicate respectfully and effectively with diverse community members Is able to facilitate the participation of traditionally marginalized community members 	Relationships built with staff and users of services at the local chapter of the Red Cross and as evidenced in Red Cross reports and student final reports
Analysis of Social Issues	<ul style="list-style-type: none"> Analyzes problems from diverse viewpoints Is knowledgeable of how power dynamics operate within communities Gathers information relevant to historical and current social inequities Understands root causes of social problems 	Research reports, and published research reports (for example, Canett 2016)
Self-Awareness	<ul style="list-style-type: none"> Is aware of her/his own identities, stereotypes, and assumptions Is aware of the impact of systemic inequities on her/his own life and opportunities 	Reflection exercises and final experience reports
Action	<ul style="list-style-type: none"> Organizes and implements efforts that address systemic inequities Interacts responsively with community members 	Monitored hours of involvement and nature of involvement as reported by the staff of the local chapter of the Red Cross in Spain

been deemed critical in accomplishing goals in the intensive, 30-day experience. One challenge of the program was the creation of conditions where students could enter the field in a well-structured and sheltered immersion or “directed field experience” (Palerm and Olvera 2013). Although undergraduate students cannot usually be expected to conduct research with the level of autonomy of, for example, graduate students, undergraduates—with guidance from the field director—are able to apply appropriate research methodologies to a central research question.

During the first iteration of the program in 2012, it became clear that the time allotted for the course precluded students from fully developing their own research question and approaches. In subsequent years, the program director created a student handbook that provided a menu-driven selection of specific research questions and protocols to follow.

During the first week, students map the communities assigned, identifying main physical elements, resources, and spaces. During the second and third weeks, students explore other methods and techniques of methods of data collection and analysis, usually practicing first among themselves and then applying the technique or method in the community. (see Figure 4) The last week of the program is devoted to coding, conducting preliminary analyses of the information, and preparing preliminary reports to members of the communities. Upon return to the United States, students present their findings to other students and faculty members on campus. Students are expected to submit their reports to a student online journal for peer review and publication (Gutiérrez and Figueroa 2016).

Through such a sheltered and structured context, program participants have carried out different activities in collabora-

Figure 4. Students Practicing the Development of Genealogical Charts in Preparation for a Community Exercise with Local Families in Boñar, Leon, Spain.



tion with the local chapter of the Red Cross. Around Boñar, Red Cross activities center on assisting older adults and providing instruction on public health and safety for children. Three days a week, students typically spend two or three hours per day collaborating with Red Cross volunteers and professionals. Such teamwork enables students to become acquainted with and earn the trust of families and individuals in the community, providing a quality and level of interaction that would have been difficult to attain in different circumstances. Because there is substantial overlap between the ethical considerations of ethnographic field research and service learning, these two activities can easily be structured together in a relatively short field-based experience.

Assessment

To assess the effectiveness of these practices, the programs adopt different strategies that are defined by a clear identification of the programmatic, pedagogical, curricular, and training goals of the experience. From the program perspec-

tive, each of the experiences aspires to be sustainable and fiscally responsible. For both programs, for example, the program leaders determine a baseline budget that gives priority to the safety of the group and factors in the basic needs and logistics necessary to run the program. Similarly, the programs are scrutinized each year for compliance with risk management parameters and other university policies. Part of the programmatic outcomes include the maintenance and strengthening of local ties and objectives that are defined and revised with local constituencies. For example, the Red Cross staff and the program director for the Spain program hold planning meetings each year to define the objectives for the summer session, thereby ensuring that the Red Cross's perspective is included. For the Costa Rica course, the program director similarly consults with faculty and in-country partners about objectives/goals during the year leading up to the program.

Pedagogically, the parameters in the Spain program are mostly defined in terms of the level of student participation in the definition of their own research agendas and the need for a clear frame or structure of activities that enable the student to reach programmatic objectives in a very short period of time. In curricular terms, the specific learning outcomes identified for the course define the objectives. The course has both disciplinary outcomes as well as outcomes specific to service learning. Disciplinary outcomes are related to the students learning methods and techniques of data collection and analysis; they systematically accumulate empirical evidence and materials that they begin to analyze during the last week of the experience. A more reflexive approach is required for those students who choose to transform their summer experience into senior capstone (graduating) projects.

The participation record of the social science program is encouraging despite the modest number of participants and the relatively small enrollment at the CSU Monterey Bay campus. Since it was first created in 2012, the Spain summer program has provided direct instruction to 49 students and indirect benefits to 256 students (via the research methods course used as training/preparation). The graduation rate of comparable institutions in size and degree of selectiveness is 77 percent, whereas the graduation rate of students participating in the Spain program is an impressive 98 percent.

The Costa Rica Field Studies course has served 91 students since its inception at UW Tacoma a dozen years ago (including 25 first- or second-year students participating in a shorter course and students enrolled in the 2016 course through CSU Monterey Bay). Although student outcomes were not quantified for the program until the most recent course, students were asked to provide reflections upon completion of the course. Anecdotal positives (including several students who changed majors to environmental science as a result of the course or who subsequently pursued graduate studies in

the life sciences) were common. One female lower-division participant—one of several who became involved in student leadership on campus the following year—held a typical view:

- “This trip was one of the most memorable, amazing adventures I have ever been on. Living in a sustainable environment has been a mind changing experience.”

A student from the 2016 CSU course enthused:

- “I believe this entire experience in its entirety was valuable and rewarding. Everything that was done, from the academic material to the exposure to the real culture of Costa Rica was put together harmoniously and gave me an entire experience that has changed my perspective on research and the world.”

For the 2016 course, 100 percent of respondents to a post-course survey stated that they felt they had gained a great deal of knowledge and skills in both statistical approaches to research as well as designing and carrying out research projects. In general, reflections for both lower- and upper-division students illustrate an enhanced awareness of both personal and academic growth; this meta-cognitive perspective is encouraged during regular class check-in discussions throughout the course. As the course has transitioned to CSU Monterey Bay and serves students across the California State University system, more holistic comprehensive assessment strategies—including an ethnographic study of village residents focused on how this course and others have affected the village over time—are underway.

Creating a Culture of Research: Coordinating Undergraduate Research at the University Level

The bedrock of a good undergraduate research program is a strong campus research culture. Creating a culture of undergraduate research at the university level naturally presents serious challenges as well as opportunities. It requires, for example, the creation of structures that include assessment practices and the development of sound and sustainable mechanisms to finance the activities. The payoff of creating such a culture is that, as such structures are created and consolidated, more students will be compelled to engage in such activities. For faculty members, the expectation that they will be able to include undergraduate students in their research endeavors would ideally be accompanied by administrative structures and incentives that would reaffirm the campus commitment to such activities—and necessarily include clear, supportive language in tenure and promotion criteria. Having centralized resources devoted to undergraduate research is also critical. For example, faculty members who hesitate to ask a group of undergraduate students to code materials, sort collections, or process/analyze data in a given

project may be more amenable to training those students if they know that the students will be supported and recognized by a campus-wide office of undergraduate research.

Established in 2009, the CSUMB Undergraduate Research Opportunities Center (UROC, <https://csumb.edu/uroc>) brought together faculty members and administrators who recognized the potential of a transformative program for undergraduates that would also engage faculty inside and outside of the classroom. Understanding the importance of creating a culture of research across programs and majors, they also recognized the place of that culture in feeding expectations and heightening the level and quality of participation. UROC serves CSUMB students across academic units through summer and academic-year placements in mentored research experiences on campus or at regional, national, and international partner institutions. UROC also offers seminars and workshops that address issues critical to student success, such as finding research opportunities, developing writing skills, developing a scholarly identity, networking, increasing cultural capital, navigating the “hidden curriculum” of academia, and preparing for and applying to graduate programs. Undergraduate research is often heralded as one of the most powerful high-impact practices because it can easily engage faculty members and students from across disciplines and also generate palpable benefits (Malachowski et al. 2015). Furthermore, encouraging undergraduate participation in research naturally raises the profile of research on campus, which pays tremendous dividends in the classroom, as faculty can draw on their own or shared experiences with research to illustrate key concepts in the curriculum (Prince et al. 2007). This cycle is augmented when international perspectives are layered on these research experiences; this stacking of high-impact practices heightens both experiences, providing inspiration and context for both formal (curricular) and informal learning.

Each campus should build on its own strengths and trajectories, but a larger conversation involving key players across programs and areas will be required. In the cases described in this article, a campus-wide office of undergraduate research propels undergraduate research, building on a solidly established culture of service learning and banking on multiple programs and faculty-led research programs that have involved undergraduate research since the university’s inception in 1994. Upcoming challenges include the systematic generation of funding opportunities for existing and emerging programs and a more deliberate inclusion of curricular activities that foster, structure, and reward undergraduate research as an integral part of the faculty workload. Fundamentally, the common denominator of all of these practices is that they take students away from situations in which they are invisible and anonymous, placing them instead in circumstances where direct and meaningful interactions with peers, instructors, and matters of substance are the norm (Kuh et al. 2007). A remaining challenge is how a university

or a university system with tens to hundreds of thousands of students can support and sustain such opportunities for all students. Scaling up will require a comprehensive and synergistic approach that mimics some of the elements of the programs described here, resulting in the gradual embedding of high-impact practices into the fabric of the academic community. Overall, institutional support for concerted, cooperative efforts can multiply via the creation of campus cultures of HIPs such as undergraduate research, service learning, global citizenship, internships, and capstone experiences.

The Future of International Undergraduate Research

Although the importance of research experiences for undergraduate students is a well-established principle for most universities in the United States (Taraban and Blanton 2008), infusing these experiences with a global perspective has a high potential to yield extraordinary outcomes for academic communities. The experiences described here support what other authors have amply documented: an international experience adds—stacks up—high-quality outcomes in professionalization and readiness for graduate school for undergraduate participants. Furthermore, the scholarly vibrancy of such experiences bolsters standards of attainment that affect all other students pursuing similar paths. Finally, research experiences in international social science (or natural science integrated in a meaningful way with social science issues, as Viseu [2015] notes) may be a way to increase interest and participation of students outside of more traditional lab/field offerings in the natural sciences.

There are also important ethical implications in the creation of interactions with local communities and institutions abroad. Faculty leaders of these international instructional experiences must ensure that measures are in effect that adhere to high standards of human-subject protections. These standards should be at least at the level of those that apply to research sponsored by institutions of higher education and research in the United States and, of course, must comply with all existing safeguards and policies in the host countries.

In closing, synergies between the high-impact practices of global learning and undergraduate research may be driven by some clear commonalities in the two as students experience them. In particular, as McKeown (2009) points out, international experiences require students to be willing to adjust their attitudes and biases as they encounter new experiences and evidence. This is strikingly similar to what we ask of undergraduates conducting research; in inquiry-based exercises such as ecological field research, success often requires students to deal with uncertainty. In the social sciences, students are similarly exposed to revisiting their cultural parameters and assumptions—a fundamental prerequisite for social inquiry. In both disciplinary areas, stacking these

high-impact practices helps link the curriculum and experiential learning by asking students to compare and update what they have learned in the classroom with newly obtained knowledge from the field. As a result, students engaging in multiple high-impact practices can experience synergistic outcomes, as each endeavor informs and facilitates success in the other. This deliberate, intentional stacking of undergraduate research and global learning can be a model for effective combinations of other high-impact practices. 

References

- Banks, John E., Diana Lieberman, Milton Lieberman, and Mariby Cruz (Eds). 2016. *Expedition Report: CSU-LSAMP Costa Rica Summer Expedition 2016*. Seaside, CA: California State University Monterey Bay.
- Banks, John E., Patti Sandvik, and Levi Keesecker. 2007. "Beetle (Coleoptera) and Spider (Araneae) Diversity in a Mosaic of Farmland, Edge, and Tropical Forest Habitats in Western Costa Rica." *The Pan-Pacific Entomologist* 82: 152–160. doi: 10.3956/0031-0603-83.2.152.
- Bowman, Kirk, and Ashley Jennings. 2005. "Pura Vida: Using Study Abroad to Engage Undergraduate Students in Comparative Politics Research." *Political Science and Politics* 38: 77–81.
- Boyer Commission on Educating Undergraduates in the Research University. 1998. *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. Stony Brook, NY: State University of New York at Stony Brook for the Carnegie Endowment for the Advancement of Teaching.
- Canett, Luis. 2016. "Añoranza, entre la tristeza y la alegría del recuerdo de los mineros." *Culture, Society & Praxis* 9(2): 1–4. Accessed November 29, 2016. <http://culturesocietypraxis.org/index.php/csp/issue/view/18/showToc>
- Eagan, Kevin, Jessica Sharkness, Sylvia Hurtado, Cynthia M. Mosqueda, and Mitchell J. Chang. 2011. "Engaging Undergraduates in Science Research: Not Just About Faculty Willingness." *Research in Higher Education* 52: 151–177. doi: 10.1007/s11162-010-9189-9.
- Fletcher, Jennifer, Adela Najarro, and Hetty Yelland (Eds). 2015. *Fostering Habits of Mind in Today's Students: A New Approach to Developmental Education*. Sterling, VA: Stylus Publishing.
- Gaventa, John. 1993. "The Powerful, the Powerless, and the Experts." In *Voices of Change: Participatory Research in the United States and Canada*, ed. Peter Park, Mary Brydon-Miller, Budd Hall, and Ted Jackson, 21–40. Westport, CT: Bergin and Harvey; Toronto: OISE Press.
- Graff, Nelson. 2010. "Teaching Rhetorical Analysis to Promote Transfer of Learning: This Strategy Has the Potential to Help Students Develop the Rhetorical Awareness and Meta-knowledge About Writing that Can Help them Transfer Their Learning About Writing to New Contexts and Tasks." *Journal of Adolescent & Adult Literacy* 53: 376–385.
- Gutiérrez, Juan J., and Michell Figueroa. 2016. "Oral Histories, an Ocean Away." *Culture, Society & Praxis* 9(2): 1–4. Accessed November 29, 2016. <http://culturesocietypraxis.org/index.php/csp/issue/view/18/showToc>
- Haskell, Robert E. 2001. *Transfer of Learning: Cognition, Instruction, and Reasoning*. San Diego, CA: Academic Press.
- Healey, Mick, and Alan Jenkins. 2009. *Developing Undergraduate Research and Inquiry*. Heslington, UK: The Higher Education Academy.

Hudson, Lawrence N., Tim Newbold, Sara Contu, Samantha L.L. Hill, Igor Lysenko, Adriana De Palma, Helen R. P. Phillips, et al. 2014. "The PREDICTS Database: A Global Database of How Local Terrestrial Biodiversity Responds to Human Impacts." *Ecology and Evolution* 4: 4701–4735. doi: 10.1002/ece3.1303.

Kinlead, Joyce. 2003. "Learning through Inquiry: An Overview of Undergraduate Research." *New Directions for Teaching and Learning* 2003(93): 5–18. doi: 10.1002/tl.85.

Kuh, George D. 2008. *High-impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter*. Washington, DC: American Association of Colleges and Universities.

Kuh, George, Jillian Kinzie, Jennifer Buckley, Brian Bridges, and John Hyek. 2007. "Piecing Together the Student Success Puzzle: Research, Propositions, and Recommendations." *ASHE Higher Education Report* 32(5): 1–182.

Larson, Susan. 2012. *Synergizing Undergraduate Research on a Campus*. Paper presented at UW-GB customized CUR Institute. Accessed June 6, 2016. <https://www.uwgb.edu/catl/files/Workshops/cur/SynergizingURUWGB.pdf>

Malachowski, Mitchell, Jeffrey M. Osborn, Kerry K. Karukstis, Elizabeth L. Ambos, Shantay L. Kincaid, and Daniel Weiler. 2015. "Fostering Undergraduate Research Change at the System and Consortium Level: Perspectives from the Council on Undergraduate Research." *New Directions for Higher Education* 2015(169): 95–106. doi: 10.1002/he.20126.

McKeown, Joshua S. 2009. *The First Time Effect: The Impact of Study Abroad on College Student Intellectual Development*. Albany, NY: SUNY Press. doi: 10.1111/j.1467-9647.2011.00748.x.

O'Rear, Isaiah, Richard L. Sutton, and Donald L. Rubin. 2012. "The Effect of Study Abroad on College Completion in a State University System. Report from Georgia Learning Outcomes of Students Studying Abroad Research Initiative." Accessed November 29, 2016. <http://glossari.uga.edu/wp-content/uploads/downloads/2012/01/GLOSSARI-Grad-Rate-Logistic-Regressions-040111.pdf>.

Palerm, Jacinta, and Martha Otilia Olvera. 2013. *Guía y Lecturas para una Primera Práctica de Campo*. Querétaro, Mexico: Universidad Autónoma de Querétaro.

Prince, Michael, Richard Felder, and Rebecca Brent. 2007. "Does Faculty Research Improve Undergraduate Teaching? An Analysis of Existing and Potential Synergies." *Journal of Engineering Education* 96: 283–294. doi: 10.1002/j.2168-9830.2007.tb00939.x.

Rowlett, Roger S. Linda Blockus, and Susan Larson. 2012. "Characteristics of Excellence in Undergraduate Research (COEUR)." In *Characteristics of Excellence in Undergraduate Research*, ed. Nancy Hensel, 2–19. Washington, DC: Council on Undergraduate Research.

Salazar, Pamela. 2013. *High-Impact Leadership for High-Impact Schools: The Actions That Matter Most*. New York, NY: Routledge.

Sigmon, Roger L. 1995. "Sit Down. Be Quiet. Pay Attention." *NSEE Quarterly* 20: 31.

Taraban, Roman, and Richard L. Blanton. 2008. *Creating Effective Undergraduate Research Programs in Science: The Transformation from Student to Scientist*. New York, NY: Teachers College Press. doi: 10.5860/choice.46-1435.

Viseu, Ana. 2015. "Integration of Social Science into Research Is Crucial." *Nature* 17: 291. doi: 10.1038/525291a.

Waiwaiole, Evelyn N., E. Michael Bohlig, and Kristine J. Massey. 2016. "Student Success: Identifying High-Impact Practices." *New Directions for Community Colleges* 2016(175): 45–55. doi: 10.1002/cc.20211.

John E. Banks

California State University, Monterey Bay, jebanks@csumb.edu

John E. Banks is director of the Undergraduate Research Opportunities Center (UROC) at California State University, Monterey Bay. He earned an MS in applied mathematics at the University of Southern California and a PhD in zoology at the University of Washington, Seattle. His past positions include professor of environmental science at the University of Washington, Tacoma. His research blends field data and mathematical models; recent projects include fieldwork in Costa Rica (biodiversity of rainforest and subsistence farms; sustainable coffee production) and Kenya (ecological restoration and interactions of birds, arthropods, and elephants) as well as an ongoing collaboration exploring the protection of ecosystem services as an August T. Larsson Guest Researcher with the Swedish University of Agricultural Sciences in Uppsala, Sweden.

Juan José Gutiérrez is professor of anthropology in the Social Behavioral and Global Studies Division of California State University, Monterey Bay. He chairs the CSUMB Academic Committee on International Programs and serves as director of the CSUMB Global Service Learning Spain Program. He earned a PhD in cultural anthropology at University of California, Santa Barbara. His past positions include vice president of the International Oral History Association. His academic interests encompass migration, rural development, pedagogy, and higher education.

doi:10.18833/curq/37/3/8