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Engaging Students with Global Challenges across the Curriculum

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By: Kristin Wobbe and Richard Vaz

Colleges and universities are seeking more effective ways to help students prepare for lives of global citizenship and impact. The most pressing problems facing the world—related to energy and the environment, food and water, public health, peace and security—are global in nature, and will require global solutions. At the same time, students increasingly recognize that their lives and careers will play out on a global stage, necessitating cross-cultural competencies and other skills for global engagement and understanding.

Approaches to helping students develop global awareness and skills vary widely, and can involve required courses, seminars, international experiences, and more. However, students are unlikely to develop global awareness and skills unless they can see how global issues relate to their future lives and careers, and unless they have opportunities to grapple with global problems. Global learning should be intentional: connected to student learning both in the major and in general education, and clearly situated at the center of the curriculum rather than at its periphery.

The WPI Plan: Developing a Global Mindset

Worcester Polytechnic Institute's (WPI's) focus is on engineering and science, with an emphasis on experiential learning: across the curriculum, students at WPI tackle authentic problems that are embedded in real-world settings. WPI's approach to undergraduate education focuses on the application of knowledge as well as the development of transferrable skills and abilities through a series of project experiences across all four years, both in the major and in general education.

The Great Problems Seminars (GPS): Capitalizing on the desire of first-year students to make a difference in the world, each of these optional six-credit courses has at its core one of the world's big problems, such as public health, water, food security, energy, or education. These courses are team-taught by two faculty members selected from different disciplines: for example, a course on energy might involve a mechanical engineer and a philosopher. In the first half of each course, students and faculty use a variety of sources to explore the depth, breadth, and complexity of the chosen problem, and to examine how different individuals might experience that problem based on their location, age, socioeconomic status, and other circumstances and characteristics—all while developing teamwork, research, writing, and presentation skills. In the second half, students divide into teams; each team selects a small piece of the global problem

and devises a potential solution. Deliverables include a poster presented to the entire campus community and a written report.
The GPS projects are largely theoretical, though student teams have formed companies to raise money for wells in Togo, Africa; developed and implemented educational units for local elementary school children; worked with nongovernmental organizations (NGOs) to provide business plans for village soap-making enterprises in Kenya; and more. These early project experiences provide students with valuable contexts for their further global learning, giving them awareness of the skills and abilities they need or would like to have upon completion of their degrees. These projects also help students develop confidence in their ability to tackle complex, open-ended problems, and many students develop a strong sense of mission that informs their later work.

The Humanities and Arts Requirement: Each student at WPI is asked to choose an area of the humanities and arts on which to focus. Similar to a minor, the eighteen-credit-hour Humanities and Arts Requirement sets the expectation that each student will explore an area in depth and will produce a culminating project involving original research or creative work. After selecting a series of courses in a chosen area, each student works closely on an independent project with a faculty advisor through a research seminar or a performance practicum.
Students interested in literature might complete their requirement in London, exploring Dickens's world; students focusing on Arabic language and culture may spend time in Morocco, researching cultural questions in the medina of Rabat. On campus, students of history might investigate the evolution of scientific thought in the nineteenth century, and students interested in music might create and perform original compositions. In each case, students are asked to connect their projects with their passions and previous learning to do something new.

The Interactive Qualifying Project (IQP): The IQP is a general education requirement that challenges small teams of students to address interdisciplinary projects relating science or technology to social issues and human needs. While it is equivalent to three courses, the IQP is not organized as a course; instead, each student team tackles an authentic problem under faculty direction. Most problems are posed by nonprofits, NGOs, or government agencies, and 70 percent of students complete their projects off-campus through WPI's Global Projects Program, a network of programs in forty domestic and international locations.
Students at WPI's Cape Town, South Africa, Project Center collaborate with community members, NGOs, and local government agencies to advance efforts in informal settlements—developing water and sanitation facilities, early childhood education programming, and strategies for upgrading housing. In Costa Rica, students—many of whom first complete their Humanities and Arts Requirement by studying Spanish language and culture—work to promote sustainable aquaculture and preserve coastal habitats. Project groups in Venice focus on canal management, public art preservation, and impacts of tourism; project groups in Thailand promote sustainable agriculture in

rural areas and investigate how to better communicate environmental risks to vulnerable communities. Closer to home, students have promoted food security in Central Massachusetts by helping to create a food hub that connects local farmers with underserved urban areas.

In each case, the IQP emphasizes helping students understand that problems are situated in cultural and social contexts, and that project teams must take those contexts into account in order to develop appropriate, sustainable solutions. Faculty advisors work closely with student teams to guide their research, whether it occurs abroad or domestically. Students' research typically focuses on the perspectives of local stakeholders—ensuring that students gain greater appreciation for the viewpoints and concerns of others.

The Major Qualifying Project (MQP): Each student completes the nine-credit-hour MQP as a capstone or research project in the major. These projects, like the IQP, are not organized as courses, but around authentic problems. Projects are advised by faculty and usually tackled in teams, frequently with an external sponsor. As appropriate for each major, students delve into scientific research, write original papers, design assistive devices, or create deliverables to address the challenges identified by project sponsors. Whether designed as part of a faculty research program or in response to the needs of an external organization, the MQP, like many capstone projects, allows students to synthesize their knowledge and apply it as budding professionals.
While many MQP projects take place on campus, students have the opportunity to complete their projects at sites across the United States and abroad. Chemical engineering majors work in labs in Nancy, France, to analyze water quality; industrial engineering students work in Beijing on manufacturing challenges posed by Chinese firms. Each project is documented in a report written in professional style that the student presents to the WPI community and, if relevant, to the sponsor. Students completing their MQP learn by integration into the professional community about local and global standards for practice, behavior, and ethics as they prepare to leave college and begin their professional lives.

Challenges and Rewards

A project-based approach to global learning, whether incorporated into individual courses or designed as part of an experiential curriculum, demands significant effort from both faculty and students. Because no authentic problem is the same as any other, and because each project team has a different dynamic and skill set, there can be no cookie-cutter approach. Faculty and students alike must engage deeply with the problem and with each other.

The work, however, can be highly rewarding. The use of authentic problems to promote global learning provides significant extrinsic motivation for both faculty and students. Further, students who engage in project-based learning enjoy increased employability. A recent study commissioned by the Association of American Colleges and Universities

revealed that students and employers highly value applied learning experiences as well as "written and oral communication skills, teamwork skills, ethical decision-making, critical thinking skills, and the ability to apply knowledge in real-world settings" (Hart Research Associates 2015, 4). Alumni of WPI's project-based curriculum report that their undergraduate project work was highly effective in developing those skills and abilities, particularly for those who completed at least one project off campus (Vaz and Quinn 2014). Alumni also credit authentic project work conducted off campus for helping them develop a greater appreciation for other cultures and people, a greater sense of self-efficacy, and stronger personal character—all essential elements for those who would tackle global problems.

References

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