Multi-Level Assessment of Program Outcomes: Assessing a Nontraditional Study Abroad Program in the Engineering Disciplines

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Introduction

Each year Worcester Polytechnic Institute undergraduate engineering and science students travel to Venice to study one of the many problems facing that city. Rising tides, sinking buildings, and millions of tourists cause a host of complex problems. Powerboats now inundate canals designed to handle limited human-powered boat traffic. Biological, chemical, and physical factors damage centuries-old walls, resulting in annual repairs costing many millions of euros. The impact damage caused by the relentless pounding by boat wakes is a complex problem that involves not just engineering issues, but politics, culture, and economics.

Another team of students works in the central highlands of Thailand. Students interview Thai rice farmers to collect economic and agricultural information relating to farming practices and farm life. A nutrient balance assessment and socioeconomic profile are configured for each farm, and recommendations are developed for the farmers. These results are also formally presented to Ubon Rice Research Center and the Thai Department of Agricultural Extensions by this same student team.

The United Fruit Company of Costa Rica, managers of many banana plantations in Costa Rica, uses a variety of fertilizer application techniques. At the larger plantations, the application of clear solution fertilizers using backpack applicators is the norm. United Fruit charges a team of undergraduates to investigate alternative fertilizers and application methods. The team's work includes fieldwork such as fertilizer manufacturing observation, analysis of backpack and pump spray application technologies, interviews with field supervisors, and training manual development that

accounts for safety and environmental considerations. These students combine the technical aspects of changing fertilizer solution methods and application technology with the social dimensions of safety, cost, labor reduction and environmental factors.

The London Borough of Merton faced new air quality regulation and a mandate that local authorities communicate with residents and constituencies on new regulations. Merton's town council commissioned students to develop its process of stakeholder engagement for the new 2003 regulations. Technical issues related to this project include pollutant characterization, source identification, monitoring, forecasting and health issues. Related policy issues involve local and national regulations, knowledge of the mandated consultation process, and methods of community engagement. Through surveys, interviews, and focus groups with local residents, community agencies, and businesses this student team develops an action plan for Merton.

These experiences provide meaning to students through both professional accomplishment and personal growth. Because of this, study abroad experiences have long been a large part of an undergraduate liberal arts education. Unique aspects of the examples above are that student teams are multidisciplinary, students are not taking courses but are earning academic credit through project work, and they are working on real problem-solving projects originated and coordinated by local hosts.

Despite the great value of an international experience, only recently have engineering students begun to benefit from study abroad. The change is partly driven by the increasingly global nature of engineering. Most technology-based companies are multinational and all want graduates who can work in multidisciplinary, multinational teams that cross time, disciplinary and geographical boundaries. What better way to prepare engineering students for this than a sojourn abroad?

In 2000, the Accreditation Board for Engineering and Technology (ABET) mandated a new process of engineering program accreditation. The old system of counting course credits was largely abandoned and replaced by an outcomes-based process. Schools must present evidence that graduates possess certain abilities such as communication skills and teamwork, in addition to technical discipline-specific knowledge content. One of the new outcomes is "that graduates understand the impact of engineering solutions in a global and societal context." Many engineering schools struggle with how to achieve this outcome and the problem does not have a simple solution. Although one could devise educational experiences on-campus that might provide opportunities to satisfy this outcome, study abroad offers a more effective means to achieve it. Unfortunately, traditional engineering curricula are packed with requirements; transfer credit issues exist with foreign universities; most engineering students are not multilingual; and most are a conservative group for whom travel abroad is not a part of their educational "culture." Very often an international experience can lengthen time to graduation. Cur-

rently, of the 67,300 engineering bachelor's degrees awarded in 2002, less than 4,700 had an international experience (T.M. Davis, 2002). Hence the vast majority of engineering graduates enter a global profession with little or no international experience.

Nationally, progress is being made. One result is an emergence of various study abroad models such as industrial internships, international co-ops, service-oriented models, and traditional exchange programs. A diversity of structures and sojourn lengths means a variety of student experiences and hence different student outcomes. Measuring student outcomes and understanding the learning experience is critical for making continuous improvement to programs and for satisfying accreditation agencies.

At Worcester Polytechnic Institute (WPI) a Global Perspective Program (GPP) has evolved that provides an international experience for most graduates. Currently more than half of WPI students travel internationally to do academic work. WPI sends more engineering students abroad than any other U.S. university, and we are ranked second in the nation for doctoral universities for the percent of its total student body that studies abroad (T.M. Davis, 2002). A unique program aspect is that students simultaneously satisfy WPI's general education and engineering academic requirements while abroad. The GPP grew from the basic project-based educational structure implemented over 30 years ago. In this paper, we describe the structure and operation, but will emphasize the multilevel assessment process used to understand student learning and improve the program. Although our specifics are related to a technical education, our assessment design and implementation may be useful to a much wider audience.

Program Philosophy and Pedagogy

WPI's Global Perspective Program was designed upon established learning principles that support learning by doing, challenging students with open-ended ambiguous problems, overcoming segmented thinking by working outside of the major discipline, and exposing learners to cultural, social, and intellectual diversity. It has its roots in a university-wide curriculum reform that began in 1970.

In 1970, a new curriculum replaced a traditional, course-based technical curriculum with a project-based program emphasizing teamwork, communication, and the integration of technical and societal concerns. WPI worked to structure a curriculum that graduates socially conscious, globally literate engineers. Architects of the curriculum accomplished this by breaking the barriers of traditional course boundaries and rigid curriculum requirements and by placing students in contexts that provide learning opportunities consistent with our mission. WPI desires student-learning outcomes that are not limited to basic comprehension or simple application, but demonstrate analysis, synthesis, and evaluation (Woods, 1994). Among the program degree requirements are three substantive projects: one in the humanities and arts, one in the

student's major area of study, and one that explores the interrelationship between society and technology. This technology/society project is interdisciplinary; small teams of students work with faculty advisors on problems proposed by public and private agencies and organizations. Student teams research, solve, and report on a problem examining how science or technology interacts with cultures, societal structures, and values. Project objectives include enabling students to understand, as citizens and as professionals, how their careers will affect the larger society of which they are a part. Projects typically encompass two to four of the following attributes:

- Examine impact of social issues on technological systems
- Examine impact of technology on social structures
- Cultivate questioning of social values and structures
- Raise value questions about social/technological interactions
- Develop skills of analysis in the societal, humanistic and technological disciplines
- Recommend policy changes in social/technological interactions
- Convey technical content to a novice or non-technical audience

Projects are broad and integrative, and are equivalent in credit to three courses (nine credit hours). All students must complete this project whether they participate in the GPP or not. Project topics, student team members and faculty advisors come from any and all disciplines with no matching of discipline expertise to topic.

As the program evolved we realized, anecdotally and through program assessment, that off-campus projects produced superior results. Student interest in international projects grew as did accreditation agency pressures to demonstrate global perspective outcomes. We believe that these outcomes are best achieved in an off-campus setting rather than just in the classroom or through information technology. Off-campus opportunities allow students to move from self-knowledge to understanding complex relationships, multiple perspectives and cross-cultural issues (P.W. Davis & Mello, 2003).

The GPP instructional design is based upon situated learning theory that includes authentic activities, contexts, and assessments. It provides collaborative knowledge construction and opportunities for explicit articulation of knowledge during the learning process (Herrington & Oliver, 2000; Brown & Palinscar, 1989; Brown, et al, 1989). Authentic learning environments seek to place students in situations that mimic the way knowledge will be used in professional practice. Learners have access to both WPI and host-country experts, and in some sense are

engaged through a process of initiation much like the apprentice-learning model (Dewey, 1974). Collaborative activities provide multiple roles, and multiple opportunities to engage material (Lave & Wenger, 1991; Rogoff & Lave, 1984; Bruer, 1993). For students to become full members of a community of practice, it is essential that they have opportunities for legitimate participation in the practices of that community. Our off-campus experience is designed to start that process.

Assessments that are consistent with this instructional design are usually performance-based (Loacker, 2000; Mentkowski, 2000). Most other colleges provide these elements in senior-level courses. Providing them at lower levels of the curriculum can be problematic since the traditional assumption is that students must learn fundamentals before they can successfully attack significant open-ended problems. How can students solve difficult open-ended interdisciplinary problems before they've actually learned some of what they need to know in order to solve them? How can they do this in a foreign culture when a significant language barrier exists? The answer lies in proper preparation, project and team management, and in providing multidimensional assessments that support the academic enterprise. The assessment network functions at multiple levels, and absence of any one level seriously degrades the student learning process. Assessment is used for continuous improvement of all program aspects. To put our assessment efforts in context, we will first outline the overall system structure.

GPP Structure

In 1974, the first WPI residential project center was established in Washington, D.C.. That center has operated continuously since then, and WPI expanded the model to international sites. The project center model involves student groups completing their projects off-campus. The students are accompanied by WPI faculty advisors, and investigate problems proposed by local agencies. Since this academic exercise originated, we have sought ways to move students off-campus to complete these projects, and have expanded the program throughout the world. This program includes operations in the United Kingdom, Italy, Thailand, Costa Rica, Germany, Australia, Denmark, Switzerland, Hong Kong, and Namibia, as well as domestic sites in Boston and San Juan, P.R.. Most students who complete academic work off-campus, do so in an international setting.

The Interdisciplinary and Global Studies Division (IGSD) administers all program aspects of the GPP including student selection, advisor training, site and project development, risk management, re-entry programs, and the overall academic program. Typically, 24 students travel to a site for a 2-month period to work full-time to complete the projects. Two faculty advisors accompany each group. Every external sponsor provides a liaison responsible for overseeing the student team working with the agency.

A different WPI faculty member serves as project center director — responsible for setting up projects, handling general academic issues, and overseeing center operation. A local coordinator, who is a permanent resident at the site, assists the center director, particularly with housing and logistical concerns. Student preparation for the experience includes formal coursework taught by WPI faculty, and orientation/cultural preparation taught by WPI professional staff. The same staff handles health and travel issues, risk management, and re-entry issues. At project completion, each student team submits a substantial written report to the sponsoring agency, the faculty advisor, and WPI. Every team must give a formal presentation to its agency.

Typically students participate in this project through the GPP during their junior year. In addition to each student's normal academic background, site-specific preparation is required. This amounts to 1.5 courses worth of work (4.5 credit hours). Content includes basic skills needed for project work, cultural education, language training, and introduction to appropriate research methodologies. All of the preparation work and on-site project work satisfies WPI degree requirements in social science and engineering regardless of major. The integration of general education with technical requirements removes a large barrier to participation.

Although all students at WPI must complete this interdisciplinary project, admission to the GPP is controlled. This year more than 500 students applied for 380 positions. Assessment at the "input" occurs during the application process. Applicants must submit a resume and a personal essay. The essay is a reference letter they write for themselves addressing strengths and weaknesses in the areas of motivation, teamwork, flexibility, creativity, work ethic, and initiative—areas that correlate with high probability of success in the global program. Every applicant is interviewed. Faculty and professional staff are trained and calibrated in conducting a behavioral event interview (McClelland, 1978). Grades, application materials, writing ability, co-curricular activities, and the interview results all factor into acceptance and site placement decisions.

Team assignments occur prior to project initiation. GPP application information, student project preference forms, major discipline, gender, and learning styles factor into this decision. Required preparation classes include training in teaming and professionalism. Practice in peer and self-evaluation in team situations is included as are proper techniques for conducting meetings.

During the on-site project phase (in the host location) a variety of standard instruments monitors team progress. Team performance contracts are created by each team and signed by each team member. Periodic contract reviews provide a first assessment of individual contributions. We also use a formative peer evaluation form that measures 21 items within the dimensions: standards of integrity, respect for individuals, innovations, goal setting, leadership, and overall work effort. The advisors quali-

tatively evaluate frequent group meetings with sponsors and advisors. Advisors also provide weekly written feedback on group writing and oral presentations. An explicit grading guide is distributed early in the project so that students have a reference about how this unusual academic exercise will eventually be graded. That guide specifically delineates how team process is assessed and how it is weighted against the final product. Each team must produce a final report and present their results and analysis in a presentation at the sponsoring agency. Advisor evaluation of these major events is the primary component of the product grade (see Table 1 for the advising guidelines). Students also complete a final peer evaluation form, adopted from Kaufmann, et al. (2000) that provides individual accountability. It also allows, when combined with other evidence, awarding of individual final grades.

Table 1: Indicators of quality in the process and the product of student projects

	Assessing *Process* Quality	Assessing *Product* Quality
Assessing Student Project Work	Do ALL members of the team fully engage in the preparation activities? Do ALL members participate in weekly meetings?	Were there clearly stated, achievable goals, appropriately defined and qualified by the project team?
	Is the student-generated agenda well-organized, well-written, and professional for the weekly meetings?	Did the team strive to achieve as much balance possible between the technical and social/humanistic aspects of the project topic?
	Is each weekly presentation clear and professional?	Did the project achieve the goals?
	Is the team organized and working as a team? Do all members demonstrate the ability to perform several different roles within the team (i.e., research, writing, leadership)?	Did the team demonstrate knowledge of the relevant literature and other background sources; evaluate this material critically and apply it appropriately to the project work?
	Does the team effectively translate issues and situations into meaningful tasks that have a clear purpose?	Did the team take initiative? Did the students make the project their own, and pursue its completion independently?
	Does the team effectively use a variety of information-gathering techniques and information resources?	Did the team design and apply appropriate methodologies to achieve the goal?
	Does the team consistently and accurately determine whether information is credible and relevant to tasks?	Did each student fulfill his/her responsibilities to partners, sponsors, advisors, and other students?
	Is the team aware of feedback, attentive to advice (e.g., taking notes and minutes at meetings), and responsive to that advice by making corrections and adjustments as needed?	Did the team analyze the data or information collected in an appropriate fashion?
	Does the team show determination in the pursuit of solutions and use strategies to keep themselves on task?	Did the team effectively document and report information about the project, in written and oral form, including a professional presentation to the sponsor?
	Does the team meet deadlines and conduct work in a timely fashion?	Did the team demonstrate knowledge of the interaction between the project work and the local context?
	Is the team working to understand how their work relates to the sponsor and the local environment?	Did the finished project demonstrate appropriate findings in which the conclusions were properly derived from complete analysis of the evidence gathered?

GPP Assessment

The goal in assessing the GPP is to maximize the benefits of this experience not only for the students, but also for all involved. Developing a comprehensive assessment

plan for the entire program, given its complex nature, is indeed a challenge. Like students at other universities, many of our students find going abroad a transforming experience. However, the major evidence for this claim is primarily anecdotal and though it carries emotional force, such evidence is rarely useful in comprehensive program improvement or in probing student learning across the entire study abroad cohort.

We strive for a deeper and broader understanding of the social, professional, and cognitive growth demonstrated by students as a result of their global experience. Hence, we use a variety of research and assessment tools for program evaluation. The multilevel, multi-temporal assessment process includes a fairly well developed and comprehensive program-level assessment, a new faculty-level assessment, and frequent student-level evaluations.

Program Level Assessment

The major evaluation tool for the student work product is that all reports, written by on- and off-campus teams, and submitted for grades during a calendar year are read periodically and evaluated by a team of paid faculty reviewers. This practice was established several years ago. Although it probes only the product, we have found it quite useful in identifying characteristics of high quality projects.

Each spring a team of 11-12 reviewers are identified and recruited. They meet for two half-day workshops for training and calibration. We developed an evaluation form for assessment of each report. Prior to each review cycle this form is reviewed, discussed, and updated as appropriate. We have spent considerable effort writing rubrics to standardize the evaluation. Each reviewer is given the same three project reports to read and evaluate using the form. We convene for a second half-day to debrief everyone's evaluation, attempt to calibrate each other against the rubrics, and minimize variance in application of the rubrics. Very often rubrics are rewritten on the basis of the discussion. Our evaluation form contains questions that cover everything from project objectives, quality of the literature review, application of appropriate methodologies, findings and analysis of data, achievement of educational goals, and quality of the writing and presentation. Recently, we added sections related to new engineering accreditation outcomes (DiBiasio, Mello & D. Woods, 2001; Besterfield-Sacre, et al, 2000) that we feel the project potentially addresses. The outcomes important for new accreditation requirements are:

- an ability to function on multi-disciplinary teams;
- a recognition of the need for, and an ability to engage in lifelong learning;
- a knowledge of contemporary issues;

- an understanding of professional and ethical responsibility;
- the broad education necessary to understand the impact of engineering solutions in a global and societal context.

Figure 1 presents example rubrics for the last outcome listed above. The evaluation contains two parts that allow a fair assessment of both on-campus and off-campus project reports.

Figure 1: Rubrics for evaluation of accreditation outcome for "Impact of Engineering Solutions in a Global and Societal Context"

Exposure to Global Issues and/or Foreign Cultures

Rating 5: excellent
The project was conducted at a foreign off-campus site and dealt, in a substantive fashion, with topics that were clearly global in nature or international in scope. If conducted on campus, the project focused on and effectively analyzed topics that were clearly identified as global or international.

Rating 3: acceptable
The project was conducted at a foreign off-campus site or dealt, in a substantive fashion, with topics that were clearly global in nature or international in scope.

Rating 1: poor
The project was conducted on campus and contained only oblique indications that the students were aware that some of the problems being addressed were global or international in character.

Impact of Engineering Solutions on Society

Rating 5: excellent
The project is focused heavily, if not entirely, on such an impact and evaluates it effectively using the most appropriate methodologies. (Implies a rating of 4 or higher on methodology and overall quality.)

Rating 3: acceptable
Evaluation of such an impact is a significant component of the project and was conducted using sensible methods (if not state of the art). (Implies a rating of 3 or higher on methodology and overall quality.)

Rating 1: poor
Evaluation of such an impact is a relatively peripheral or incidental component of the project and appropriate methodologies either were not employed or shed little light on this issue.

Each reviewer is randomly assigned 15-20 reports to read and evaluate. Data from each form is entered into a database for analysis. Most student reports approach 100 pages in length. The evaluation form has 35 questions and sub-questions, including comment entries. Hence, the reviewer's task is not a small one!

Within the IGSD there is an Assessment Coordinator who analyzes the results and writes a report to the WPI community. Separate reports are prepared for each academic department summarizing results for their own students. The full IGSD staff works collaboratively on continuous improvement issues as informed by assessment measures such as the one described. These may involve changes in the student preparation, advisor training, sponsor consultation, resource allocation, or any other issues identified as problematic from the review process. Below we describe some examples of program review results and how they are used.

The most striking result has been the persistent significant quality gap between on-campus and off-campus (GPP) projects. This gap emerged with GPP expansion and has grown each year since 1997. Our results show that projects conducted by student teams at off-campus sites consistently outrank those done on campus in nearly every aspect, as illustrated in Table 2. Note that although GPP participants are selected through an involved application process, we have not been able to demonstrate significant GPA differences between them and on-campus students. Our sense is that issues such as learning preferences, motivation, willingness to take intellectual risks, teaming skills and other attributes separate the GPP cohort from their peers who stay on campus. Future research will probe this issue.

In the following tables average scores are shown for the rated item for on-campus projects compared to off-campus projects. The on-campus cohort was 244 students representing 119 teams, and the off-campus cohort was 242 students representing 77 teams.

Table 2: Average scores of on-campus project teams and off-campus teams for items directly related to dtudents' final report

Specific Report Evaluation Item	On-Campus	Off-Campus
Clearly defined objectives	3.38	4.30
Relevant literature consulted and synthesized	2.82	3.96
Appropriate methodologies employed	2.67	4.12
Appropriate and complete analysis	2.60	4.11
Supported conclusions	2.93	4.15
Writing and presentation quality	2.86	4.08

Rating scale: 1=poor, 3=acceptable, 5=excellent

Table 2 shows that GPP students could better develop project objectives, synthesize the appropriate literature, and employ proper methods than those who remained on-campus. They could also conduct the appropriate analysis, draw sound conclusions, and communicate the results better in written form than non-participants.

Table 3 breaks down the final "overall project quality" rating into the individual scale distribution. Not only are the GPP reports skewed toward the high end, the number of non-GPP reports rated below acceptable is a major concern for us. This clearly shows that many students who do not have an off-campus experience, do not meet our educational objectives or produce an IQP of acceptable quality despite receiving a passing grade.

Major reasons for this striking quality difference are that on-campus teams do not all receive the student level input, process, and product assessments described above. We have taken steps to remedy this by creating a project center within the city of Worcester and structuring it like our global centers. Initial assessments show encouraging improvements in team product quality despite small cohort sizes. For example, overall report quality for the most recent group of "Worcester" student teams (14 teams) was 3.5. Work continues on improving the overall experience for the remaining on-campus student cohort.

Table 3: Distribution for overall report quality rating comparing on-campus to off-campus cohorts

	Off-Campus				
Overall Report Quality Rating	**1**	**2**	**3**	**4**	**5**
Number of projects	1	1	10	35	30
% of total	1.3	1.3	13.2	45.5	39.5
Average Rating = 4.20					
	On-Campus				
Overall Report Quality Rating	**1**	**2**	**3**	**4**	**5**
Number of projects	16	19	42	35	7
% of total	13.4	16.0	35.3	29.4	5.9
Average Rating = 2.98					

Rating scale: 1=poor, 3=acceptable, 5=excellent

Table 4 shows the results demonstrating average ratings for outcomes required for accreditation. With one exception, the off-campus experience provides acceptable evidence that students meet these outcomes. Again, addressing the on-campus issue is problematic and ongoing.

Table 4: Average scores for on-campus and off-campus cohorts relative to selected accreditation outcomes

Desired Accreditation Outcome	On-Campus	Off-Campus
Multidisciplinary team and topic	2.91	4.14
Evidence of ability to engage in lifelong learning	2.99	4.14
Understand impact of engineering on society	2.45	3.33
Knowledge of contemporary issues	3.06	3.68
Understanding of professional and ethical responsibility	2.17	2.79

Rating scale: 1=poor, 3=acceptable, 5=excellent

Our program level assessment shows that an off-campus experience is superior to an on-campus experience in meeting one of WPI's major degree requirements. The assessment has also indicated areas we need to improve and has provided a base from which to design that improvement. The assessment is designed to avoid the pitfalls associated with over-reliance on anecdotal data and is directly related to our own educational objectives. Hence, curricular improvements designed to address program deficiencies can be made with some confidence.

Advisor Level Assessment

The roles and responsibilities of the off-campus project team advisor are unlike any other traditional teaching roles. All student work is done outside the classroom; all of it is done in teams; each team has a different, complex, open-ended project; and rarely does the advisor have deep technical expertise in the project topic. Students are also responsible to the sponsoring agency, whose goals may sometimes diverge from WPI's academic goals. In practice, the entire GPP requires faculty and staff to work in teams. The advising team's prime academic role is really that of project manager.

In addition to academic roles, advisors must also handle the myriad problems that arise during any study abroad program. This requires advisors to handle cultural orientation, culture shock, communication issues; and be an on-site counselor, disciplinarian, enforcer of university policies, mentor, team process facilitator, social event coordinator, risk manager, health and safety officer, and ultimately evaluator (a final grade is assigned). However, they do not do all this in a vacuum as we have an extensive support system for the program. All off-campus advisors apply for the position and are screened before official appointment. All are also required to attend in-depth workshops that typically focus on developing advising skills in non-academic areas (Mello, 2001). We also work to use experienced advisors as mentors for new advisors.

Just as good classroom teaching evaluation is used for improving teaching and presumably improving student learning, we have seen anecdotally that good advising results in better student learning and better achievement of academic goals. So, we set out to develop and implement an advisor assessment that could be used for both reward and remediation. Our goal is really to improve the experience for everyone involved, particularly the students. However, there is little or no specific literature providing experience for evaluating a teaching experience like that of the GPP; published work on classroom teaching evaluation served as the basis (Arreola, 2000). We contracted an expert in teaching evaluation (Dr. R. Arreola of Memphis State University), formed a committee of students, staff, and faculty and developed an advisor evaluation process.

Table 5 summarizes the overall dimensions that we defined important for advisors. Within each dimension are several specific characteristics (not shown here). The table illustrates the most appropriate source for gathering assessment data on each dimension.

We chose to develop the student evaluation form first and we have pilot-tested, over the past year, an advisor evaluation form that is completed by students at the end of each sojourn. The form has 48 questions rated on a "strongly disagree" to "strongly agree" Likert-type scale. Multiple questions address each of the dimensions (except policy compliance) shown above. There is also room for open-ended questions and responses. Dr. Arreola completed the first round of the evaluation form including some recommendations for item wording. We will initiate a second pilot test during the 2004-2005 academic year. Further work on development of instruments used by faculty advising peers and the IGSD is in progress and these are included in the second two columns in Table 5. Our goal is a validated, multi-source advisor evaluation process that recognizes the seriousness of this teaching experience, evaluates multiple dimensions and is useful for remediation and reward.

Table 5: Advisor dimensions and assessment data source

	Source:		
	Students	**Co-Advisor**	**Global Studies Division**
Dimension: **Project Support and Facilitation**	***Yes***	---	---
Personal Support and Accessibility	***Yes***	***Yes***	---
Cultural Guidance and Orientation	***Yes***	Yes	Yes
Policy Compliance	---	---	Yes

External Level Assessment

Each year WPI holds an internal competition for all students completing the project described in this paper. External judges from academia, industry, and government evaluate both student reports and presentations. The top five place finishers are nearly always GPP products. External program review also occurs at the national level and the WPI's Global Perspective Program has recently won much attention. These awards include recognition from TIAA-CREF Hesburgh, NAFSA, AACU and IIE's Heiskell Award. And, some student work has been recognized by the Smithsonian (Harriss, 2002) and featured by the National Geographic Channel (Zwingle, 1999; ___, 2002). Most importantly, student results and recommendations are locally implemented by the sponsoring host agencies.

Summary

The examples presented at the beginning of this paper are from real WPI student projects and are typical of GPP experiences. Third-year engineering and science students can solve ambiguous open-ended problems in off-campus contexts, contribute to the local environment, and simultaneously satisfy general education and technical graduation requirements. This experience is not restricted to an elite group of highly-qualified students but in fact happens with a majority of our students. However, being able to provide high quality off-campus, and in most cases international, experiences for our students did not appear suddenly nor was it implemented casually. The complexity of offering experiences like these to most of our undergraduate body demands constant supervision and tweaking when appropriate. Ongoing assessment at all of the various levels of operation is a critical component of our success and the success of our students.

Our assessment process was designed to evaluate several aspects of our extensive and fairly complex GPP. Results consistently show that GPP participants satisfy our important educational objectives at higher performance levels than non-participants. Assessment results have also guided improvements and resource allocation for the on-campus experience. In the future our work will move more from the assessment level to the research level. We desire to progress beyond simply knowing that our students satisfy some educational objectives and accreditation requirements. What sort of lasting intellectual, professional, and personal growth occurs? Does the experience prepare them well for a lifetime of learning? Can this short-term sojourn develop an appropriate level of cultural awareness and world-mindedness? How do language skills, particularly the lack thereof, affect the quality of the learning experience? Do the outcomes observed transfer to new academic and other contexts post-sojourn? How is self-efficacy affected by the sojourn? These are deeper questions requiring a multifaceted research program that is currently in development.

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