

Assessing Engineering Students' Study Abroad Experiences

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Abstract

The University of Kentucky (UK), with an enrollment of 21,000, is a comprehensive, public land-grant university located in the Bluegrass Region of Central Kentucky. As the State's flagship university, the University of Kentucky has long been involved in study abroad and foreign exchange programs, either sending or hosting over 300 non-degree-seeking students and scholars per year.

While there is no debate among U.S. educational institutions of the benefit derived both by the student and the educational community from participation in study abroad and foreign exchange programs, virtually no effort has been made to properly assess such programs. Against the backdrop of the assessment movement among U.S. colleges and universities over the past 25 years, it is surprising that only modest attempts have been made to identify and measure intercultural competencies, that is, those skills and abilities that the student participating in an international experience should gain from the exposure.

From the authors' perspective gained from a combined 40 years of intercultural education experience, the following will be addressed:

- (1) Potential explanations for the dearth of formal assessment strategies for study abroad and foreign exchange programs.
- (2) Results of a recent survey of other universities' assessment practices.
- (3) Progress toward construction of a guide for use during structured interviews with students returning from an intercultural study experience, with a focus first on students in engineering.

The long-term objective of this initiative is to formulate an effective, efficient, sustainable, yet comprehensive, process of evaluating these programs. Recognizing that a single set of standardized criteria for assessing programs is infeasible due to differences in such matters as student expectations from participation in an international program, language of instruction, packaging of course content,

term length, and treatment of earned credit upon return to the home institution and home academic unit, the developed instrument leaves opportunity for inclusion of college- or department-specific assessment criteria. For example, in engineering majors, data can be collected that are consistent with student achievement in meeting EC2000 general criteria for program outcomes related especially to development of skills leading to: an ability to function on multi-disciplinary teams (appropriate for international internships), an ability to communicate effectively (appropriate for cultural adaptation in the student's experience abroad), and the broad education necessary to understand the impact of engineering solutions in a global and societal context (appropriate for understanding of the globalization of the engineering community).

Introduction and Background

Conventional wisdom leads educators to believe that study abroad for university students remains a valuable component of college education. Educators believe that study abroad can do many things for students, including:

- impart specific skills, such as language fluency,
- make students aware that they live in a global society, with all its positive (and sometimes negative) aspects, and
- increase student self-awareness.

In short, and on balance, study abroad offers a positive, enriching experience for our students. Only recently, however, have colleges and universities begun to question this conventional wisdom. Little has been done to actually assess the experiences of students abroad. As reflected in an Internet search on study abroad assessment, the word “assessment” usually involves colleges and universities attempting to figure out if the programs run abroad are reliable, cost-effective, safely-run, and provide student “satisfaction,” however that may be defined. Little has been done to assess the actual value of the experience on the individual students involved in study abroad.

Calls for better assessment have also appeared in such publications as the Chronicle of Higher Education,¹ a major US weekly newspaper for higher education professionals. As the assistant vice president of the Institute for the International Education of Students, a consortium of US schools providing study abroad programs in over a dozen countries, Joan Gillespie asks: “What do we really know about the worth of these [study abroad] programs.” Gillespie asserts that “formal assessment of study abroad programs lags behind the assessment of other kinds of programs on college campuses.” Gillespie notes that her organization has developed a “Model Assessment Practice, a comprehensive process of evaluating student environment, resources for academic and student support, and student learning.” While the first two areas do receive attention from most universities, including the University of Kentucky, it is the assessment of student learning that remains lacking.

A similar cry has come from the Section on US Students Abroad (SECUSSA) of the major US international education association: NAFSA: Association of International Education Administrators.² In conjunction with the Institute of International Education (IIE), a major international education organization administering the student Fulbright program, among others, SECUSSA/IIE have recently done an electronic sampling on “Outcomes Assessment and Study Abroad Programs.” By polling 120 leading US study abroad institutions, SECUSSA/IIE concluded that while 95% of the slightly more than 50% of respondents assessed student satisfaction, much

fewer measure language proficiency (probably the most assessed skill for study abroad students), while very few measure “career-related outcomes” or “intercultural proficiency.” The SECUSSA/IIE team concludes that “it is clear that the majority of the profession is far from engaging in serious outcomes research, beyond the question of student satisfaction.”

Colleges and universities, as well as accrediting bodies, have recently initiated attempts to assess the quality of study abroad and its impact on students. For example, in the last couple of years the School for International Training (SIT) in Brattleboro, Vermont, which sends over a thousand students abroad each year, primarily to Third World countries, has begun addressing this gap in research regarding assessment of student experiences abroad. Through a Mellon Foundation grant, in January 2001 SIT held a conference for its academic program directors and nationally-invited guests to address the issues of assessing student experiences in study abroad. As a result of this initiative, SIT has decided to “use three instruments designed by leading interculturalists to measure its study abroad students’ growth and development in a variety of areas.”³ These three instruments include: the Cross-Cultural Adaptability Inventory (CCAI) developed by Drs. Colleen Kelley and Judith Meyers; the Intercultural Development Inventory (IDI) developed by Drs. Milton Bennett and Mitch Hammer; and the YOGA form developed by SIT language professor Dr. Alvino Fantini. The Dean of SIT Study Abroad, Michael Vande Berg, believes that with the variety of study abroad programs, and with the trend toward shorter programs, but without proper data, students, parents and faculty will view study abroad too broadly, and will “fail to appreciate that the differences in learning outcomes are considerable.”⁴

The University System of Georgia has also begun to assess systematically its students’ experiences abroad, through a pilot program spearheaded by Donald Rubin and Richard Sutton of the System’s Board of Regents.⁵ Rubin and Sutton note that “existing research literature warrants the conclusion that studying abroad can enhance many affective or attitudinal outcomes such as students’ ethno-relativism, global-mindedness, and sense of self-efficacy.” They assert, however, that “we are on less firm ground in documenting the effects of study abroad on students’ learning outcomes,” and ask: “How have a student’s knowledge, thinking skills, and processing abilities improved as a result of studying overseas?” Consequently, they have derived a Georgia assessment plan that “incorporates analyses of student transcripts as well as self-reported learning. It compares study abroad participants’ knowledge before and after the overseas experiences, and it also compares participants with non-participants. Detailed information about academic, logistical, and co-curricular aspects of programs can then be correlated with learning outcomes.”

One data-driven assessment of study abroad has been conducted by the Institute of International Education with alumni of the Global Engineering Education Exchange (Global E³) program,^{6,7} which recently concluded that while study abroad meets industry needs, few recruiters actively seek applicants with study abroad experience, and do not see value in that experience. The study seemed to indicate that the perception of student participants was that study abroad was more beneficial in providing an education in “soft” than in “hard” (technical) skills, which is consistent with the University of Kentucky experience thus far. This IIE study of the impact of study abroad on engineering careers, along with the similar approach taken at the University of Kentucky, are in sharp contrast to others’ pre-2000 laments about the difficulty in assessing study abroad programs.⁸⁻

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Development of Method of Assessment

As a result of these assertions, and the increasing emphasis on assessment by the University of Kentucky's accrediting body, the Southern Association of Colleges and Schools, a pilot project based on a student survey to ascertain general study abroad as well as specific engineering assessments was devised. The goal was to generate a set of general questions that could be asked of all University of Kentucky study abroad students, as well as a subset of questions pertaining to the student's College and major. Toward this end, the authors generated a survey with 35 general questions, followed by six engineering-specific questions, the latter with the intent to mirror the general criteria under ABET Engineering Criteria 2000 (EC 2000). The survey instrument was envisioned as a "living" document, subject to future refinement and adaptation over time, which could be used by faculty and administrators as a basis for evaluation of the efficacy of study abroad experiences of individual students and, in addition, could be used by the Assistant Director for Study Abroad and Exchange Programs as a basis for a post-experience structured interview. The survey was constructed by reviewing similar known survey instruments (not specifically used for the immediate purpose), augmented by the experience drawn from the authors' experience in designing, implementing, and operating study abroad and international exchange programs. The instrument was next circulated to approximately fifteen members of the University faculty with widely-recognized interest in, and commitment to, international academic engagements, including members of the recently-established University of Kentucky International Studies Steering Committee. Subsequently, the survey instrument was reviewed by the (then) UK Associate Provost for International Affairs (i.e., head of the Office for International Affairs). This process ensures that the survey instrument captures the most important items of interest in properly assessing the value of a student's study abroad experience to his/her academic and professional development.

No similar validation/evaluation of the engineering-specific questions was performed; however, the questions are consistent with the General Criteria for Basic Level Programs under EC 2000, whose Criterion 3(h) stipulates that:

"Engineering programs must demonstrate that their graduates have:
.....(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context."¹²

As a final step in the validation process, the survey instrument was electronically distributed to eight engineering students with past study abroad experience, to which six replies were received. Subsequently, two of the six students were interviewed, one each from Computer Science and Mechanical Engineering. Each interview lasted approximately 45 minutes. The completed surveys proved invaluable in guiding the informal exchange among the two authors and each study-abroad past participant.

Results of Pilot Testing of Survey Instrument

Because the primary focus of this work was to develop a usable survey tool to permit better assessment of the value of study abroad opportunities for university students, and because the sample size was small, one must use caution in drawing conclusions about the actual value of the travel experience to the students. On the basis of the limited data collected during the final stage of

instrument validation/evaluation (Exhibit 1), perhaps a few guarded comments may be made, however.

First, of the six students, five noted that their study abroad experience increased their interest in pursuing an engineering career in a multi-national corporation. The one graduating chemical engineer, who had been abroad twice, on an Engineering program and a non-Engineering program, went to work for a multi-national oil corporation, in the expressed hope that she might eventually work in the corporation's operations in Africa. It will remain to be seen if the others follow up on their intent to be international engineers.

Second, four of the six reported that their experience abroad had a beneficial effect on their engineering skills, in terms of applying these skills with confidence to real-work problems in a broader global context.

Third, all six students agreed that the study abroad experience had been an important part of their overall University of Kentucky experience. It gave them valuable insight into other cultures, and also into themselves, making them more self-reliant and independent.

It is interesting to note that of the "general" items (numbering 35), eighteen (51.4%) yielded five or six replies of "Strongly Agree" or "Agree," while of the six "engineering-specific" questions, only one item (16.7%)--"I have a deepened interest in pursuing an engineering career in a multi-national organization by virtue of my experience abroad."-- received a solid response of "Strongly Agree" or "Agree." While the results of the application of the survey to this limited population certainly is not statistically significant, one might conjecture that one or both of the following is at play: (1) either the students surveyed think that the experience abroad was more important to their overall personal and social development than to their growth in their academic discipline and/or (2) the students have experienced the same difficulty as engineering educators in finding ways to assess and demonstrate their ability to contribute toward meeting Criterion 3(h). The latter provides solace to the engineering-educator author, whose vexation over the matter continues five years into the application of the outcomes-centered accreditation criteria.

Summary

Recognizing the need for a tool for assessing the value of study abroad experiences for University of Kentucky students, with an initial focus on engineering students, the authors have developed and tested a simple survey instrument. Administered electronically and followed up with a structured interview, the approach shows promise as a method of data collection and quasi-analysis, with the results shared back to college and departmental personnel for their consideration in advising and mentoring those students who embark on an international study opportunity. The methodology described works to ensure collaboration between the University's Office of International Affairs and individual academic units and provides a template for evaluation of study-abroad programs in multiple academic disciplines. While outside the scope of the reported work, opportunity exists to use such an assessment tool in validation studies using any number of qualitative approaches (e.g., case studies, phenomenology, ethnography, grounded theory, biography, naturalistic inquiry).

The survey instrument is available for application by other interested parties by contacting the lead author at dbettez@uky.edu. The authors' only request is that institutions that use or adapt this approach share the results of their assessment efforts.

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EXHIBIT 1: STUDY ABROAD SURVEY RESULTS

Reflecting back on your recent University of Kentucky study abroad experience(s), please respond to the following items:

Personal Information

Gender: Male **5** Female **1** (2x abroad)
 Age when studied abroad: **19, 20** (3x), **21** (3x)
 School-year status when studied abroad: **sophomore** (3x), **junior** (3x), **senior** (1x)
 Major(s): **mechanical, chemical, electrical, civil** (2 students), **computer science**
 Minor(s), if applicable: **Japanese studies** (3 students), **Math** (2 students), **psychology, German**
 Number of study abroad experiences: **1** and **2**
 Period(s) studied abroad: year **1** semester **4** summer **2**
 Country(ies) where you studied abroad: **Japan (2), Germany, Australia (2), Greece, England**
 Been abroad previous to University of Kentucky experience, for whatever reason(s)? **2 yes, 4 no**
 How many times? **2** (2 students)
 How long? **10 days, 14 days, 14 days, 1 month**
 For what purpose? **vacation**
 Languages spoken before going abroad: **Spanish (2), Japanese (3)**
 Proficiency: **beginning in Spanish (2), beginning in Japanese (3)**
 Languages spoken after going abroad: **Spanish (2), Japanese (2), German (1)**
 Proficiency: **beginning in Spanish (2), excellent in Japanese (2), intermediate in German**

General questions	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
1. Study abroad has been an important part of my overall University experience.	5	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Study abroad should be an integral part of every student's education.	1	4	<input type="checkbox"/>	1	<input type="checkbox"/>
3. Study abroad is simply an added benefit available to under-graduate students.	2	2	1	1	<input type="checkbox"/>
4. Study abroad gave me second-language competency.	2	1	<input type="checkbox"/>	3	<input type="checkbox"/>
5. I already had second-language competency before I studied abroad.	<input type="checkbox"/>	2	1	3	<input type="checkbox"/>
6. Study abroad gave me increased insight into other cultures.	4	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I already had a strong awareness of other cultures before I studied abroad.	<input type="checkbox"/>	3	1	2	<input type="checkbox"/>
8. Study abroad gave me familiarity with international issues and affairs.	2	3	1	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
9. I already knew much about international issues and affairs before I studied abroad.	<input type="checkbox"/>	2	2	1	1
10. Study abroad was important to my personal development.	3	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Study abroad was important to my professional development and to improving life skills.	2	3	<input type="checkbox"/>	1	<input type="checkbox"/>
12. Study abroad will help me in my search for my first job after graduation.	<input type="checkbox"/>	4	2	<input type="checkbox"/>	<input type="checkbox"/>
13. Study abroad will enhance my lifelong career opportunities.	2	2	1	1	<input type="checkbox"/>
14. Study abroad increased my interest in history and geography.	<input type="checkbox"/>	5	1	<input type="checkbox"/>	<input type="checkbox"/>
15. Study abroad made me more self-reliant and independent.	3	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Study abroad helped improve my research skills.	<input type="checkbox"/>	1	5	<input type="checkbox"/>	<input type="checkbox"/>
17. Study abroad increased my self-confidence.	1	4	1	<input type="checkbox"/>	<input type="checkbox"/>
18. Study abroad helped me focus better on academics.	1	1	1	3	<input type="checkbox"/>
19. Study abroad will delay my graduation.	2	2	1	<input type="checkbox"/>	1
20. Given the same circumstances, I would study abroad again.	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Given the same circumstances, I would study abroad again on the program(s) and at the location(s) I chose.	4	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Getting credit for being abroad was very important to me.	1	2	1	1	1
23. I already had international friends on campus and/or in the community.	1	2	1	1	1
24. I have increased my contacts with internationals on campus and/or in the community as a result of my experience abroad.	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>
25. While abroad, I interacted mostly with people from the host country and lived among them.	2	<input type="checkbox"/>	1	3	<input type="checkbox"/>

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
26. While abroad, I interacted occasionally with people from the host country, but lived and studied mainly with Americans.	1	2	<input type="checkbox"/>	2	1
27. Study abroad increased my patience and flexibility when dealing with other people.	1	3	2	<input type="checkbox"/>	<input type="checkbox"/>
28. Study abroad increased my tendency to take risks.	1	4	1	<input type="checkbox"/>	<input type="checkbox"/>
29. Study abroad increased my ability to interact successfully with people from other cultures.	2	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Study abroad increased my leadership abilities.	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>
31. Study abroad made me more aware of differences in peoples and cultures.	3	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Study abroad made me more aware of how other people view me.	1	4	1	<input type="checkbox"/>	<input type="checkbox"/>
33. Study abroad made me more aware of how the international community views Americans in general.	3	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Study abroad made me more aware of other norms and taboos, forcing me to adjust my behavior appropriately.	3	2	1	<input type="checkbox"/>	<input type="checkbox"/>
35. I was properly prepared to go abroad.	3	2	1	<input type="checkbox"/>	<input type="checkbox"/>

Engineering Questions

1. My study abroad experience enhanced my perspective on the value and importance of my engineering discipline on the global engineering community.	2	1	2	1	<input type="checkbox"/>
2. The number and level of course credits earned through my study abroad experience met or exceeded my expectations when entering the program.	<input type="checkbox"/>	4	1	1	<input type="checkbox"/>
3. I have a deepened interest in pursuing an engineering career in a multi-national organization by virtue of my experience abroad.	4	1	<input type="checkbox"/>	1	<input type="checkbox"/>
4. My study abroad experience better equipped me to apply my engineering skills to solve real-work problems in a broader global societal context.	<input type="checkbox"/>	4	1	1	<input type="checkbox"/>

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
5. I returned to Kentucky with more confidence in my engineering talents and abilities than I had prior to the study abroad experience.	<input type="checkbox"/>	4	1	1	<input type="checkbox"/>
6. My experience increased my understanding of the impact of engineering solutions in a global and societal context.	1	3	2	<input type="checkbox"/>	<input type="checkbox"/>