AC 2009-624: PROVIDING INTERNATIONAL EXPERIENCE THROUGH A RISING SOPHOMORE ABROAD PROGRAM

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Providing International Experience through a Rising Sophomore Abroad Program

Abstract

The **Rising Sophomore Abroad Program** (RSAP) was implemented at Virginia Tech's college of engineering to provide a global experience for engineering students in their first year with the intention of preparing them for an extended experience, whether it is an internship, study, or faculty lead program abroad. The program has two-parts: an instructor led course and a travel abroad experience. All students are enrolled in a special study class entitled "Global Issues in Art, Culture, and Engineering." This course facilitates the exchange of knowledge about these seemingly mutually exclusive subject areas--art and engineering. The class begins the process of seeing the intersection of art and engineering and their dual and complimentary influences on culture. The class prepares the students for their two week trip abroad which occurs just after exams end in the Spring semester. The travel itinerary provides students the opportunity to make an initial contact with an industry or university as they tour during the two week international trip portion of the course. It also brings together alumni abroad and industry stateside, with faculty and students to develop a program for global experience

There are multiple goals to the RSAP program: spark interest in future international experiences such as an internship or studying abroad for a semester; expose engineering students to different cultures and customs in the workplace, school and daily life; attract and retain women by providing interesting social, cultural and art related experiences; attract culturally disadvantaged students, raise them up and level the playing field for them; and broaden the student engineers' horizons to better prepare them for being productive employees in the global workplace.

This paper will review the steps in planning and implementing the both the class and the travel. The assessment of meeting our goals, such as providing our engineering graduates with intercultural competency, will be discussed.

The Goals of RSAP

One of 10 strategic goals of the college of engineering, and the university, is to increase global experiences for faculty and students. As Dean Richard Benson says, his goal is to "Enrich the college's strategic partnerships with universities and institutions around the world by enhancing students and faculty global awareness and cultural experiences through research, study abroad, and internship opportunities." The Rising Sophomore Abroad Program is designed to help meet that goal in the following ways:

- Spark the students' interest in global culture while early enough in their program of study to be able to fit a study or internship abroad experience into their college plans
- Expose student engineers to different cultures, making them more globally aware and broadening their horizons
- Recruit and retain women in engineering by providing culturally rich international travel opportunities

- Providing culturally disadvantaged students an opportunity to level the playing field by exposure to art, culture and travel

Excerpts from 2007 ASEE International Programs Development paper noted in the summary "The future will involve increasing the international experience numbers, developing an award for faculty involved internationally, increasing the awareness of the International Programs Office, establishing an industry advisory planning board, and continuing to develop the engineering international collaboration database that will benefit faculty and students alike."[1]

Choosing the Participants

The study abroad program was publicized in a number of venues. A representative of the college International Programs office spoke to the incoming freshmen about RSAP during Freshman Summer Orientation. During the mass meeting of all the new engineering students on the second day of classes in the Fall, RSAP was described again. RSAP had a booth at the Education Abroad Fair, handing out literature and talking to interested students. Some professors of freshman engineering classes took up the offer to have a representative talk to their classes. Interest in the program was also spread by word of mouth.

Applications were accepted online. The students were asked to write a number of essays about their interest in studying abroad and their attitudes about culture. The students were asked to provide their high school grade point average and their SAT scores. Letters of reference were asked for from their high school guidance counselor and an engineering instructor at Virginia Tech. After an initial screening for appropriateness and completeness, each candidate came in for a face to face interview. At this time they read the course expectations and requirements and it was explained to them how they would accomplish each. Costs and behavior expectations and course requirements were explained. They then took a pre-trip survey that asked them to identify several pieces of art and landmarks, plus additional questions on their travel and language background. Each student was asked a series of what was hoped to be telling behavioral and attitudinal questions. The answers were evaluated on a 1-5 scale immediately after the interview.

Once the participants were chosen, a letter from the Dean was then sent out to each student inviting them to participate in the course. The first meeting was scheduled and the issues of trying to add the students into this newly formed course began.

Demographics of Participating Students

For the RSAP 2008 Europe program there were 19 applicants. The breakdown of the group consisted of seven female and eight male engineering students and one male senior art student. Three instructors from the college of engineering accompanied them. The ethnicity of the group consisted of one American Indian, two Hispanic, two African American, and 11 Caucasians. The students came from seven different states and only two of them were from the same high school.

The RSAP Asia 2009 applicant pool consisted of 46 students. All applicants were interviewed before a selection; 13 students were chosen for the program. This process will be revised next

time because of the large amount time needed to interview so many and then keep them straight when making the selections. This will especially be important if the applicant numbers continue to increase at the current rate.

Of the 2009 applicants there were 15 female applicants and 31 male applicants. Their majors range through all 12 degree conferring engineering departments with Aerospace and Ocean Engineering having the most (10 applicants) and 13 still undecided in their discipline as entering freshman. Their SAT scores ranged from 1100 to 2200, 25 of the scores were above 1900 thus providing for a cross section of the engineering freshman class to select from. There are four who are fluent in Japanese with two having Japanese heritage and two that are taking Japanese at VT this year. The applicants came from 15 different states. Among the applicant pool, there were four groups of two who had attended the same high school.

Recruitment and retention of minorities

An important aspect of international education, especially in a technical field such as engineering, is its appeal to female students. According to the Institute of International Education's *Open Doors: Report on International Education Exchange*, in 2006/07 women accounted for 65.1 percent of U.S. study abroad participants.[2] However, in 2005 only approximately 20 percent of engineering Bachelor's degree awarded went to women.[3] There is considerable anecdotal evidence that the popularity of study abroad programs with female students may be used to increase their continued interest in engineering disciplines.

Lehigh University, for example, has a Global Citizenship Program (GCP) which consists of an approximately two-week international experience during a student's freshman year, an additional required study abroad experience, co-curricular activities, and complementary coursework. Interestingly, "although it was not an explicit goal in the original design, the GCP *appears* to help retain students, particularly female students, in engineering." It appears that this may be because, "the GCP's focus on hands-on engagement in cross-disciplinary teams, beginning in students' first year, helps students develop a sense of self and recognize, early on, the impact that their profession can have on their local and/or global communities."[4]

Another case comes from the University of Rhode Island (URI). URI offers engineering students a five year program that requires them to spend their fourth year abroad. When they graduate, the students will have earned two Bachelor's degrees--one in engineering and one in a foreign language. Approximately twenty percent of URI's engineering students have opted for this program. Female students make up one-third of the participants, despite the fact that they represent only about seventeen percent of URI engineering students overall.[5]

Finally, at Purdue University, with its strong science and engineering programs, "men outnumber women 3 to 2, but women outnumber men 3 to 2 among the education abroad contingent." Furthermore, "only one in eight mechanical engineering students at Purdue is female, but women comprise 30 percent of those taking part" in a combined study abroad/internship abroad/multinational design team program called the Global Engineering Alliance for Research and Education (GEARE). In an article in *International Educator*, GEARE's director, Eckhard

Groll, is said to speculate that this is because the female students "are drawn to the challenging program by the opportunity to experience teamwork and build leadership skills."[6]

Female students make up just 17% of the population of the college of engineering. The applicants to RSAP 2009 were more than 30% female. We tried to keep the ratio 50/50 better group dynamics when choosing our participants.

Course Structure

The classes as part of Spring semester consisted of seven lectures and a dinner hosted by the instructors. The class covered topics such as "Art, its history as a process of composition, concept and craftsmanship," a lecture and discussion led by Dr. Moseley-Christian of the Art department at Virginia Tech. The National Academy of Engineering's "Greatest accomplishments of the 20th Century" was discussed as related to the role of the engineering in our culture. The class was taught the basics of graphic design as it relates to web page design. One of the class expectations was the development of a web site, reflecting their thoughts and experiences while traveling. Another class was devoted to web page development. Class discussion was strongly encouraged. The topics covered were diverse and thought provoking.

There were a number of assignments given throughout the semester. Each student was asked, for example, to look into their personal national and racial background and tell the group about it. The students seem to genuinely enjoy reporting on their background and hearing about others. Student buy in for the travel portion of this class is crucial so groups of two were assigned one of the stops abroad and were charged with researching that town. The assignment read:

> **Be the virtual tour guide for the class**.
> *Each group will present to the class*:
> Maps (local and regional)
> Language, population, currency, short history, notable landmarks:
> Must sees *and why*
> Unusual attractions (related to engineering, architecture, science)
> Your planned outing *with details*

Many of the goals of RSAP look to broaden, enrich and help the students to think outside the box. We hope to increase their understanding of our global community. Our class structure and travel helped to meet those objectives.

Funding

Several avenues were reviewed for funding this program. The Dean's office assisted with a small fund, the university international office awarded the faculty instructor a small grant, and the students contributed by purchasing their airline tickets through the Student Universe site and also they were responsible some of their meals while abroad. Some industry sponsors contributed with meals while abroad and small scholarships to each student to reduce their overall cost. Also every effort was made to make hotel reservations where breakfast was included in the price.

The college of engineering formed an International Industry Planning Board, consisting of alumni who work internationally. Their assistance was requested to help support this program; two of the industries stepped up to do this on such short notice and helped with monetary contributions.

Many grant opportunities were reviewed and two grants were put in: both were rejected because they were not on target with what their grants were focusing on. The focus changed between the inception of the grant writing and the deadline for proposal.

The Alcoa grant was approved and the dollars were awarded for two years to help support 4-7 students in the RSAP Asia 2009 program with $1500-$2000 grants. The second year dollars would be awarded the following November and contingent on how the first dollars were distributed and met the criteria of assisting underrepresented groups.

As the program continues it is hoped that the RSAP Alumni group will contribute back to the program they had been a part of when in college. It is also anticipated that the Alumni International Industry Planning Board made up of engineers living or working abroad would also play a bigger role in assisting the program.

It was important to the program to keep the cost to the students as low as possible. The class and travel were part of Spring semester so the students would not have to register for summer semester and pay additional tuition. This allowed us to spend the Spring semester preparing the students for the trip, both academically and logistically. We required the participants to sign up for at least 12 credits, or a full academic load, in addition to the RSAP class during the Spring so they would not have to pay any extra tuition. For many of the students, the RSAP class put them over the number of credits they could sign up for without approval from the Office of Academic Affairs. We worked with Academic Affairs to ensure that the students completed then necessary request for overload paperwork. Academic Affairs was also instrumental in adding the students to this class, since we restricted access to it and did not make it available for the students to sign up for during the regular registration period.

Even with our efforts to keep the cost as low as possible, the $1200 cost of the trip was still beyond some students' means. The college of engineering was committed to not letting finances prevent anyone from participating in the RSAP. The Rising Sophomore Champion Award was created as a way for the college of engineering to meet a participating student's financial need. Several students were also offered jobs by faculty and staff associated with the RSAP, allowing them to spend Spring semester earning some extra funds for the trip. Students were also encouraged to apply for scholarships offered through Virginia Tech’s Education Abroad Office. However, because the credit-bearing portion of their study abroad trip occurred during the Spring semester while they were still on campus and because they were not charged extra tuition for the RSAP, it was eventually determined that students were not eligible for traditional study abroad scholarships.

Challenges and Road Blocks in Funding

In planning the RSAP 2008, we encountered and overcame several roadblocks that will be instructive for future programs. Financial arrangements constituted one of the biggest challenges. We needed to follow the guidelines and requirements of the state. However, we also needed to reduce the financial burden on the faculty/staff who made the trip and to make sure that the students' cost was kept to the specified amount.

1. The college of engineering planned to pay for housing of expenses, but only one night's lodging can be pre-paid out of state funds. Possible options to deal with this situation included having one of the group leaders put the lodging expenses on his or her credit card or getting a sizeable travel loan from the university and using this to pay for the lodging. The latter option was unattractive because it would require us to carry very significant amounts of cash; the former option was also unfavorable because the personnel on the trip were already going to accumulate significant charges on their personal credit cards to cover other expenses.

   Because faculty-led study abroad programs are not uncommon at Virginia Tech, we knew that there had to be a way around this problem. Most study abroad programs charge students a fee that covers transportation, room and board, and the other expenses associated with their study abroad program. This money is deposited into a local account, which the program director can then use to make payments, including pre-payments, as necessary.

   Initially, we did not plan to establish a local account since there was no program fee for the RSAP. When we realized that a local account would be necessary after all, college of engineering finance personnel worked with the Controller's Office to establish one for the RSAP program. We were then able to move money from our university foundation funds into the local account. Based on the different rules associated with these types of accounts, the Controller's office was then able to cut checks or wire finds to the hotels. We pre-paid for lodging everywhere possible

   In the end, there were advantages and disadvantages associated with pre-paying for lodging. The benefits were that we avoid the problems mentioned above in terms of carrying large amounts of cash or having to put even more significant charges on anyone's personal credit card. The disadvantage was that when one of the staff members was unable to go on the trip, most of the hotels refused to refund the cost of the room and that money was lost.
2. Museums Admission: We were able to purchases tickets for many museums before we left on the trip. This was primarily done online, and charged to a staff member's personal credit card. While in Europe, the students were responsible for a few entrance fees and the trip leaders purchased other tickets for the whole group.
3. Reimbursements: The three faculty and staff who went on the trip were reimbursed for their personal travel expenses and for the charges they accumulated on behalf of the group. Given the staff to student ratio on the trip, regular travel expenses could be

covered out of state funds for only two of the chaperones. For the third, non-state monies were used to reimburse these costs which included meals and incidentals. Foundation funds (monies donated to the university without the restrictions of state money) or other accounts were also used to reimburse the faculty and staff for the group meals, entrance tickets, and other expenses.

We worked with Student Universe to arrange the airline tickets for the students and faculty/staff on the trip. Student Universe was selected based on the recommendation of another faculty member at Virginia Tech who had directed a study abroad program for several years. There were many advantages to using Student Universe. First, we were able to get a good price on tickets on that matched our ideal itinerary of flying from Washington, D.C. to Frankfurt, Germany and then back from Paris, France to Washington, D.C. Secondly, the plane tickets were the main expense that the students were responsible for and we wanted them to be able to complete the purchase directly, rather than collecting money from them and buying the tickets in bulk. Student Universe created a website for the group and the students were given a deadline by which they had to go to the site and make the payment for the ticket. This meant that the only funds our office had to collect from the students were for the initial $150 deposit on the plane tickets. Finally, tickets purchased through Student Universe have low change fees, which was advantageous for several students who wanted to make alternate arrangements at the end of the trip.

Engineering Student Awareness Growth

One of the primary goals of the International Programs office in the college of engineering is to increase the number of students taking advantage of an international experience. The Student Engineers Abroad Council (SEAC) was founded to assist in the dissemination of information about studying and working abroad. Membership in SEAC provides the students with the monthly newsletter and the fastest ways to find out about scholarships and study abroad opportunities.
The chart in Fig. 1 depicts the change in number of members on Student Engineers' Abroad Council. Information about RSAP is spreading by word of mouth and has played an impact on the students wanting to keep in touch with what is happening through the College of Engineering by signing up for membership.

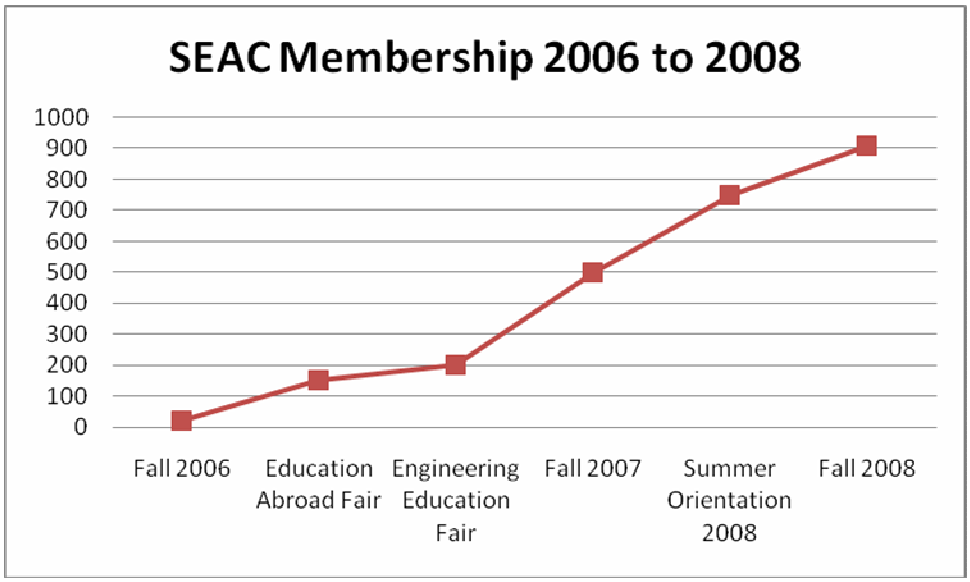

Figure 1: General Membership Growth Chart

The participants of the 2008 RSAP travel group formed what is named "The Ambassadors Club". The role of the club members is to act as advocates for international programs such as RSAP. The students speak to various classes as requested by engineering faculty about their experiences abroad. They use the web sites they built to show off their travel insights. The ambassadors man the study abroad booth at the international fair and talk to the students at freshmen orientation. Engineering students respond very favorably to the fellow students. Their efforts have increased international program awareness greatly.

Performance Measures and Assessment Tools

In order to determine if the RSAP was successful in meeting its goals for this international experience, it was decided that we would use a slightly modified version of the Global Assessment Inventory (GAI) as a post trip measure.[7] There was considerable research done to locate a tool that was standardized and validated and provided insight into how our engineering students compare in terms of global awareness compared the rest of the nation and also to see if participating in RSAP made a change in their awareness. According to the authors, the GAI

- Measures eight distinct individual attributes crucial for successful adaptation to doing business across cultures
- Measures two additional distinct individual attributes if your work involves international business travel
- Focuses on how you can maximize your effectiveness when working with people from different cultures.

This tool is not intended to be definitive, judgmental, or a measure of personality.

The GAI instrument was used because it provided measures of interest, was well tested, and, at the time, it was free. The only disappointment is that we didn't find it during our research at the beginning of the RSAP program and thus we were unable to perform pre-participation measures. Our intention is to use the GAI longitudinally over several years of RSAP experiences to measure effectiveness of the student change produced by the program. We did have the students

fill out the inventory after their return and have also had the candidates for the RSAP 2009 Asia trip take it during their application process. Should there become a charge for the GAI, we will either include a budget item to cover it or produce a local version of a similar measurement instrument.

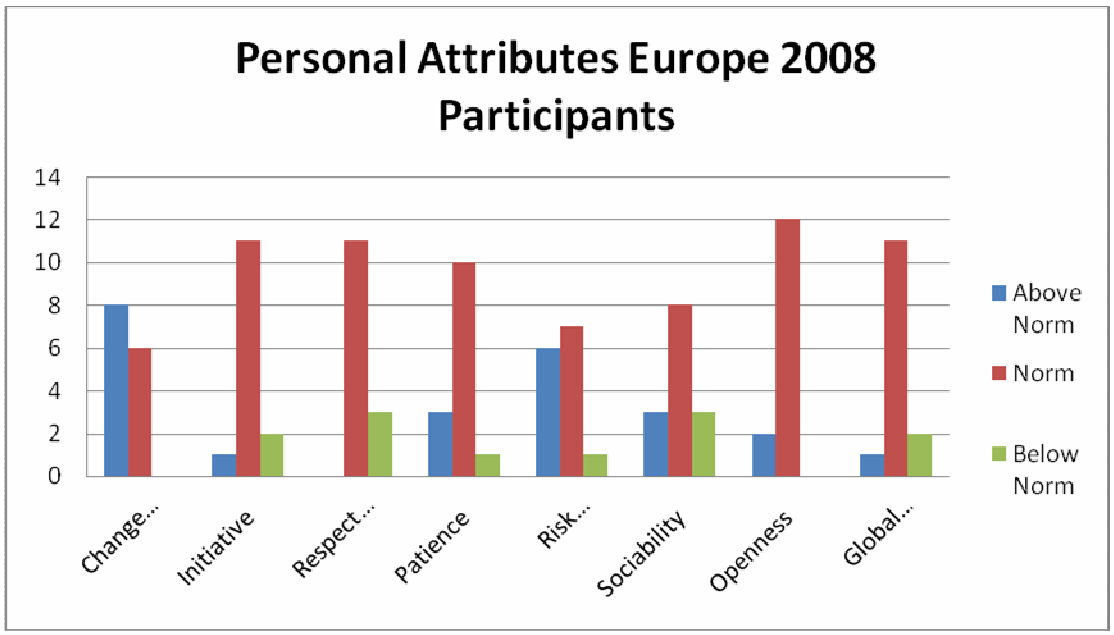

Fig. 2: Global Assessment Inventory Personal Attributes Overview for 2008 Europe Participants

A description of each attribute is provided in the GAI development guide, as follows:

Change Tolerance –	Willingness to meet new challenges and cope with change
Initiative -	Ability to address new or challenging situations
Respect for Beliefs -	Receptiveness to new ideas and respect for the beliefs of others
Patience -	Ability to remain calm in the face of a frustrating situation or unexpected delay
Risk taking -	Willingness to try new approaches and ways of doing things
Sociability -	Extent to which you enjoy being with or communicating with other people
Openness -	Willingness to let others know you
Global Sensitivity -	Listening and understanding another cultural point of view
Travel Expectations -	Anticipation of business travel
Travel Flexibility -	Willingness to endure unfamiliar surroundings and circumstances while traveling[1]

Results from the GAI for the RSAP 2008 Europe engineering participants are shown in Fig. 2. Out of the 14 that filled out the GAI, fewer than three were below national norms on individual personal attributes. It seems that it was consistently the same students who fell below the norms. Further examination of the GAI results from the 2008 program indicates that at the end of the experience, the group appears to score mostly in the above norm category. This is a very positive result. The low score in the Risk Taking category may attributable to their age. Personal observations by the group leaders indicated that many improved in the category during

the two week travel portion of the program. The amalgam of the sociability attribute also appears to be low. It is believed that in part this is due to typical tendencies of engineering students and the maturity level of the group. Since change is what we are interested in, data from the pre and post testing in the 2009 program will be much more meaningful.

The candidates for the RSAP Japan 2009 program were asked to take the GAI survey before being accepted into the program. The summary of their responses follows in Fig. 3. From the group of 46 applicants, 13 participants were chosen and they will take the GAI post program.

Results for pre GAI RSAP Asia 2009 candidates

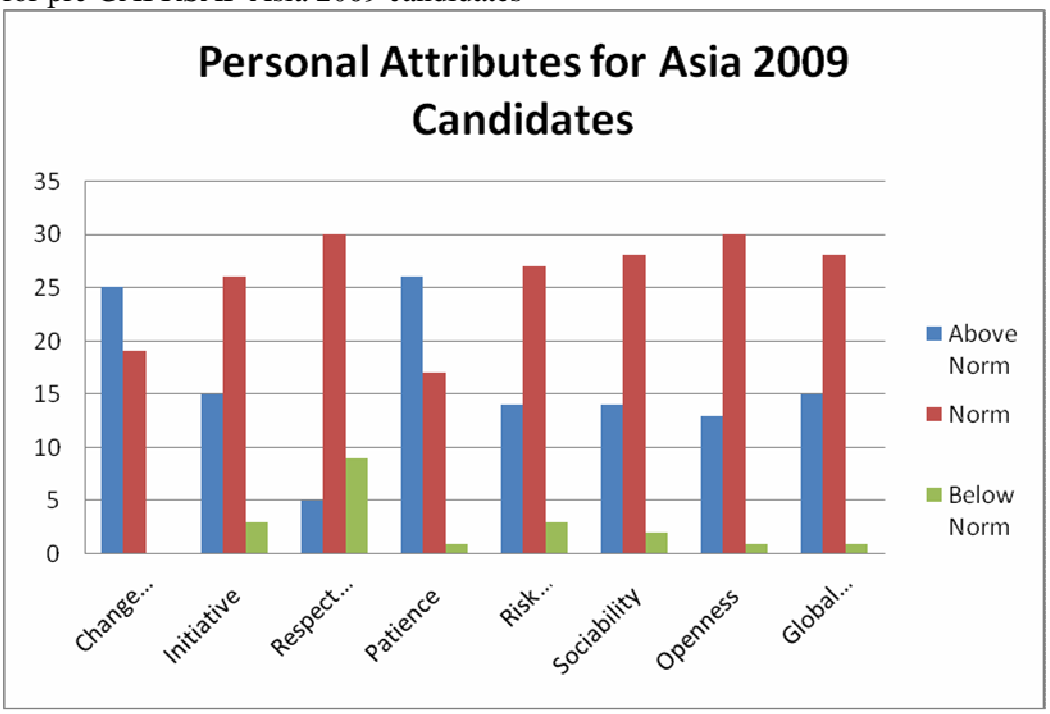

Fig. 3: Global Assessment Inventory Personal Attributes Overview for 2009 Asia Candidates

In addition to the GAI assessment, an in-house developed pre and post survey using the university survey software. In 2008 it was administered to identify the level of the students' familiarity with European art, culture and locations of historical significance. Pictures of landmarks were included to help understand student retention related to places they visited or art they studied. Several questions were added relating to their punctuality and their ability to adapt to change as well as food likes and dislikes. These were included to get an overall view of what type of traveler we might expect the participant to be. The pre-survey was not used in deciding whether the student would be chosen as one of the participants but used to guide our preparations.

Results from the in-house post survey showed that 94.5 % of the students were able to accurately respond to the art and structure pictures, an increase from the 65 % of the pre survey. In open ended questions, students like R.D. said, "The dividing line between art and engineering has become more vague to me. I am now able to appreciate engineering feats as artwork and artwork for its engineering qualities." SW comments, "I have realized how much of a pentacle design is

between art and engineering. Design combines functionality (which is the engineering aspect) and aesthetics (which is the art aspect)."

The post survey also asked for changes they would make on their stateside portion of the course and on their abroad portion. The responses indicated that the students wanted more class time on the cultural aspects of the countries they were going to visit beforehand and maybe some more intense language instruction. They also wanted more instructional time on their final web project state side rather than have class while abroad and requested more industry visits. Finally, the students felt that sitting at long eating tables in restaurants drew attention to them as tourist and smaller tables would be better.

An alternative to GAI is the Global Perspective Survey (GPI), which is a tool with a focus on faculty/staff/students and has an attached fee.[8] This tool may be used in the future will if funds are available.

Summary

Outcomes of the RSAP program in the first year include:

- First recipient of the Virginia Tech International Alumni Award Recognized
- Creation of the Virginia Tech /Industry International Internship Program
- 75% increase in SEAC General Membership
- Currently, 25% increase in engineering students international abroad experiences
- Development of the International Programs Ambassador Club
- Alcoa two year grant of sponsorship for 4-7 students of $1500-2000 grants
- Alcoa two year grant for study abroad with 3 students awarded $2500 grants

RSAP has gone a long way toward meeting its multiple goals. The numbers show it has sparked interest in future international experiences such as an internship or studying abroad for a semester. It has exposed engineering students to different cultures and customs in the workplace, school and daily life. It has attracted many women and minorities into engineering and hopefully they will remain in the college so they can be part interesting social, cultural and art related experiences. RSAP has attracted culturally disadvantaged students--the assessment tools show they have raised their awareness and broadened their horizons. Our post RSAP engineers are better prepared to be productive employees in the global workplace.

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