

An International Cooperative Education Experience for Engineering and Technology Students

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Abstract

Indiana University Purdue University Indianapolis (IUPUI) and the Berufsakademie Mannheim (BA-M), a cooperative education university located in Mannheim, Germany, have a unique student cooperative education exchange program that has served a total of forty IUPUI students and forty-eight BA-M students for the past 10 years. Sixty-eight percent of the students who have participated in the program have been engineering and technology students.

The IUPUI exchange students spend approximately eight weeks working in a business or industry in Germany, while students from the BA-M do the same in the Indianapolis area. Work assignments and housing are arranged for the students by the hosting institution. The German students normally begin their exchange in mid January while the IUPUI students commence in mid-May. In most situations, all students are normally placed in a family home while participating in the program.

This paper will provide a review of the program over the past decade from an IUPUI perspective. It will include all benefits, challenges, results, and rewards for the participating students, companies, and the institutions.

I. Introduction

Foreign language education at the post-secondary level in the United States has been battling declining enrollments, with the notable exception of Spanish as a foreign language, despite the fact that the term 'globalization' has evolved from a fancy buzzword to a common household word. Even Kindergarten teachers nowadays make every effort to introduce world cultures into their curriculum. A number of institutions of higher education offer coursework in international business; many offer degrees in the field. Nevertheless, the number of U.S. students studying a foreign language or participating in a study abroad program still remains a minority. For instance, less than 1 % of American undergraduates study overseas, many of them majoring in humanities and social sciences. Since English is the self-declared 'global language' which rules not only the Internet but also the corporate world and popular culture, graduates and young professionals in business, engineering, technology or science do not see the need for

international experience or foreign language competency. The answers are as obvious as challenging.

In April 2000, President Clinton made a strong point in an executive memorandum, calling for a federal government policy to encourage and support international education. He declared: "To continue to compete successfully in the global economy and to maintain our role as a world leader, the United States needs to ensure that its citizens develop a broad understanding of the world, proficiency in other languages, and knowledge of other cultures....Today, the defense of U.S. interests, the effective management of global issues, and even an understanding of our nation's diversity require ever-greater contact with, and understanding of, people and cultures beyond our borders." Clinton was the first president to call for such a comprehensive national strategy, and the effects are already taking shape.

In a meeting for Title VI project directors on May 5, 2001, Congressman Lee Hamilton from Indiana summarized the importance of international education under five major categories: globalization, prosperity, diversity, security, and international cooperation. "Americans will need to be well-informed about the world, fluent in other languages, and proficient in a wide range of fields." Ranging from competitiveness in the global marketplace to being the "most powerful foreign policy tool," international education is taking on an unparalleled level of significance and responsibility.

Yet in reality, we still have a long way to go to achieve such a noble goal. Many professional degree programs do not require an international component or foreign language skills. On the other hand, many foreign language departments are still pursuing a traditional curriculum, favoring language and literary studies over applied linguistics. While course offerings in Business German, French, or Spanish can now be found at a wide range of universities, courses teaching foreign languages to prospective engineers are still a rare exception.

Programs that offer an overseas experience to engineering, technology or science students are even harder to find. That is all the more astonishing since the success of the few existing programs is well known. Among those we should mention the Global Engineering Education Exchange (Global E³), administered in the U.S. by the Institute of International Education, the International Engineering Program at the University of Rhode Island, or programs offered through Carl Duisberg International. All of these programs form partnerships between universities worldwide as well as the industry and business community, with the shared goal of training global-minded engineers and business professionals. They are usually well funded, with corporate sponsors, scholarships, and paid internship options.

Various models of integrating a professional degree with foreign language or international education should be considered to see which approach might fit best for the individual institution, ranging from a dual-degree program such as the Rhode Island model to summer internship opportunities overseas. There is even the most radical of approaches, recently instituted by Drake University in Des Moines, which abolished all of its foreign language programs in favor of studying abroad, internships, and online education.¹

II. A Model Program

A model that has proven its worth over more than ten years is the German Internship Exchange Program at Indiana University Purdue University Indianapolis (IUPUI). In 1990, individuals at IUPUI and the Berufsakademie Mannheim (BA-M) in Germany instituted a student cooperative education exchange program. This program provides an international internship experience for both IUPUI and BA-M students and has served a total of eight-eight students since its inception.

The Berufsakademien (BA) are cooperative education academic institutions, which were developed by the State of Baden-Wuerttemberg in Germany with the cooperation of business and industry. They were created approximately 27 years ago in response to industry's need to hire a highly skilled workforce with abilities in applications beyond those of the graduates of the traditional theoretical university programs. A common complaint from industry was the need to be more responsive to change. They could not afford to wait for students to graduate from universities with their master degrees without formal job experience, thus, the birth of the Berufsakademie.

To be admitted to a Berufsakademie, a German student must have at least 13 years of school and be at the level of German Abitur. In addition, an applicant to the BA must have a training contract with one of the participating supporting companies. The company with approximately 20 applicants or more per slot competitively selects applicants who are then admitted to the Berufsakademie. During the three-year period, students earn a salary from their employer sufficient to meet cost of living; therefore allowing the student the ability to concentrate on their studies.

The BA cooperative education academic institution, as it exists, is unique to Germany and the United States. Throughout the three years of enrollment in the program, phases of study at the BA alternate with phases of work in the sponsoring company, with each phase lasting 12 weeks. Depending on the program, comprehensive oral and written examinations are periodically scheduled throughout the three-year period. At the completion of the program, students graduate with the equivalent of a bachelor's degree and are ready to be employed in a business or industry. The sponsoring student is under no obligation to accept a full time position with the sponsoring company; likewise, the company is under no obligation to offer the student a full time position. However, many of the students continue with the company that provided them with their BA sponsorship. The industrial and business supporters of this unique educational program have been pleased with the graduates of the Berufsakademie. Unlike most educational institutions, a board of directors, consisting of both members of the Berufsakademie as well as industry and business leaders, designs the curriculum for the BA.

Founded in 1969, Indiana University Purdue University Indianapolis is an urban campus serving a population of over 27,000 traditional and non-traditional students. Students can study either full-time or part-time, choosing from approximately 180 different degree programs. The IUPUI campus houses a total of eighteen schools, sixteen Indiana University schools and two Purdue University schools. Students from all schools are eligible to apply to participate in this exchange program. While cooperative education and industrial internships are not typically a requirement for the degree programs at IUPUI, these educational opportunities are offered to engineering and

technology students. The programs expose them to practical industrial or business practices while working on their degree. The cooperative education exchange program with the BA-M adds an international experience to the practical experience for students.

III. Program Goals and Objectives

The IUPUI international cooperative education program goals are to provide students with an international experience related to their degree, to encourage students to learn a foreign language to be better prepared for global competitiveness, to introduce students to business and industry practices different from their home country, and to help students understand and appreciate cultural differences, abroad and at home.

The BA-M program goals are similar to those of IUPUI. The BA-M instituted this program to provide smaller German companies with a means to arrange an international exchange for their BA-M students. In addition, this experience provides German students with some lessons in responsibility and risks, including: (a) having the responsibility to arrange their own transportation to the United States; (b) working in a new company and getting used to a new environment and surroundings; (c) integrating into a new host family; (d) finding a place to live for their American counterpart; and (e) helping their American counterpart in adjusting to Germany.

Based on the goals of both programs, the students who have participated in this program both from IUPUI and BA-M have been enriched in knowledge that normally could not have been achieved through books, lectures, movies, or any other means. Their classroom education has been made more salient through the experiences the work and life experiences they have had with this cooperative education internship program.

IV. The Exchange Program

The German internship for IUPUI students begins in May and ends July, lasting a total of eight weeks. IUPUI participants work in a German business or industry and receive a small stipend from their German employer. German students who have participated in the exchange program the previous semester provide IUPUI students housing. It is the responsibility of the German exchange students to find housing accommodations for IUPUI students as part of their participation in the exchange program. In most cases, IUPUI students are normally placed in German companies whose student employees have participated in the exchange the previous winter. Costs for IUPUI students include (a) airfare of approximately \$800; meals approximately \$400; local transportation of approximately \$200; and (d) a three-credit independent study course in German of approximately \$375.

The Indianapolis internship for BA-M students begins in Indianapolis in early January and ends early March, again for a total of eight weeks. The financial arrangements for the BA-M students are different than for IUPUI students. BA-M students are paid a monthly stipend from their German employers during their internship in Indianapolis, so no compensation is requested from the business or industry employing the student in Indianapolis. In addition to their monthly stipend, some of the German students are given additional support from their German employers

to assist with their transportation and living expenses. Unlike their German counterparts, IUPUI students do not have the responsibility for providing housing; rather, IUPUI's Office of International Affairs performs this function.

V. Eligibility Criteria

To be eligible to apply for this program, IUPUI students must be in a junior or senior standing, be enrolled in a degree program at the time of the internship, have a GPA of approximately 3.0 or higher, and be a U.S. citizen or permanent resident. For liberal arts and business majors, two years of German language is required. Five credit hours of German are required for engineering, technology, and science majors, and these credits may be taken during the spring semester prior to the exchange. Priority is given to students with related work experience. Selected students are expected to help host their German counterparts during their internship stay in Indianapolis, although, as noted above, this is not a formal requirement of the program for IUPUI students.

All BA-M students are eligible to apply for this program if approved by their business or industry. The main opportunity for the students at the BA-M is the international experience. BA-M has many agreements with other universities in other countries that help serve the number of students at the BA-M who want to participate in this program. In addition, some of the major corporations make the exchange internally within their own organizations internationally for the BA-M students.

VI. Program Coordinators

Professors Kay Wilding (BA-M) and Claudia Grossmann (IUPUI) are the coordinators for the IUPUI German Internship Exchange Program. Both individuals have been involved in coordinating this program since its inception 1990. Dr. Giles Hoyt, Associate Dean of International Affairs at IUPUI, has been a major supporter and the initiator of this program for IUPUI.

This program would not be possible without the commitment and dedication of these three individuals. These individuals go to great lengths to make sure that the students are welcomed in each country and that their needs and concerns are taken care of while they are in their host country. Both Claudia Grossmann and Giles Hoyt have served as host parents to BA-M students and Kay Wilding hosts many social events to make IUPUI students feel welcome while they are in Germany. This program is successful, in part, because the program administrators are committed to making the student's experience meaningful and valuable to their future as a professional and as an individual.

VII. Germany Site Visit

During the summer of 2000, a site visit was conducted at the BA-M campus along with a visit to EDS and the Forschungszentrum Karlsruhe (a research organization). These two organizations were chosen for the visit because of their long track record with hosting the IUPUI students. EDS had hosted four engineering and technology students and the Forschungszentrum Karlsruhe

had hosted five engineering and technology students. Interviews were conducted with the managers at both companies to get their feedback on how the exchange program was working.

The outcome of the interviews was mostly favorable. There was a misconception on the part of the manager at EDS about the work experience of IUPUI students. They perceived the IUPUI students' résumés to be weak because of the lack of work experience in the students' chosen field. We explained that IUPUI and U.S. students in general don't normally get practical experience in their chosen field until after they graduate. This is contrary to the concept of the cooperative education degree at the Berufsakademie. This misunderstanding is understandable given that the BA-M's German business and industry partners work solely with the BA-M education model. It would be helpful in the future to have an annual survey for employers to get immediate feedback to assist with clearing up ambiguities or misconceptions in addition to receiving valuable feedback information for program improvements.

In general, both organizations have been very pleased with the students selected to work in their organizations. The Forschungszentrum KA was extremely pleased with the students working in their organization. They indicated they would like to see the program expanded to a longer time period. They believe the program is too short; just as the student is adjusting to the culture, language, and become familiar with work system; it is time for them to leave. One interesting finding emerged: both organizations indicated that the students' knowledge of the German language was less important for their work experience; however, it was valuable for their cultural experiences.

VIII. Student Perspectives

Students from IUPUI and BA-M are required to write reports as a part of their final grade. The following are quotes taken from student final reports that summarize their experience in their own words.

“As a student, I found this internship experience very valuable. The opportunity to work in an exciting new field such as computers is an honor in itself. But to have this opportunity joined with the fact that it is located in a foreign country, this is priceless.” Alice Parrotte, 1999 IUPUI internship exchange student

“Through traveling and working abroad, I realized how important it was for me to work for a global and well-diverse company and build skills that would provide opportunities for me to relocate if I decide to do so in the future. The internship might not have met my initial expectations, but I gained far more out of it than I could have ever imagined.” Annemarie Ferguson, 1999 IUPUI internship exchange student

“I expected more challenging work than I received most of the time, but there were times where I was just glad somebody could give me something to work. There was too much idle time for me. My superiors did overestimate the time it would take me to complete the project, which would leave me with nothing to do. The main benefit for me was probably to see a real business at work with all its inefficiencies.” Peer Flach, 1999 IUPUI internship exchange student

“After evaluating my experiences in the Baden-Wurttemberg Summer Internship Program, I feel strongly about my ability to work for a foreign owned company or in a foreign country. If I were offered an interesting opportunity I feel I could work and live in another country for an extended period of time.” Patrick Kowalski, 1999 IUPUI internship exchange student

“The time went fast especially in the second half of my stay in Indianapolis. I learned a lot. But not only in the field of computer related stuff. I also learned much from Americans about them, their heritage and their customs. There are a lot of smaller and bigger things I did not know before my trip. And I’m sure there is much more than that what I have explored. And of course the most important thing: I made new contacts and new friends. Friends which I will never forget. Friends which I cannot forget. They made my stay in Indianapolis a really great and unique time. I am looking forward to the day I will return to Indianapolis and say again hello to all these people I got to know in my spare time or at work.” Arnim Frithjof Brestrich, 1998 BA-M internship exchange student

“Now a half a year later, I still think often on this time in America. This exchange-program is a great thing and I hope all the people who organize it, will keep doing this.“ Dirk Gabler, 1995 BA-M internship exchange student

“ I earned a lot of experience during my visit in America and it was very helpful for applying a job in Germany. Not even working experience, also much of life experience. It was the first time for me in the states and I will be coming back – but in SUMMER!!” Christof Gotz, 1995 BA-M internship exchange student

“I am more than happy to announce that I have gained even more from this internship than I had expected to. Thanks to the coordinators of the exchange program, Professor Kay Wilding on the Mannheim side and Claudia Grossmann on the Indianapolis side.” Sandra Horst, 1994 BA-M internship exchange student

“Time went by too fast and my stay here in Indianapolis will never be forgotten. I hope there is a time when I can come back and say hello to all the people I have gotten to know. Even though the time was very short, I am able to say that I have learned more about the Americans and their customs than I did before this trip. But the most important thing is that I have made new friendships. Don, (this is his host father) you are very welcome at any time to visit me whenever you are in Germany.” Sven Schwerin-Wenzel, 1994 BA-M internship exchange student

“I would like to thank all the people who have made this exchange program between Germany and America possible, and especially for my opportunity to take part in the program. I really enjoyed the time and appreciate the experience. I know it will be a great benefit to me in the future.” Sebastian Wegerer, 1991 BA-M internship exchange student

IX. Bridging the Gap

Foreign language education has undergone a considerable curricular reform to the extent that many departments nowadays stress oral proficiency and communication skills over grammar and literature studies. The American Council on the Teaching of Foreign Languages has developed and strongly supports the following five standards for foreign language learning:

- Communication: oral and aural proficiency in a variety of topics
- Cultures: knowledge and understanding of other cultures
- Connections: interdisciplinary approaches to learning, teaching across the curriculum
- Comparisons: developing insight into the nature of language and culture
- Communities: utilizing language skills beyond the classroom and applying them in a variety of fields, thus becoming lifelong learners.

All of these aspects are well integrated in a program, which combines classroom experience with an overseas stay, particularly a practicum that capitalizes on the students' skills, background and interest. The German Internship Exchange Program at IUPUI pursues this goal. Even students with limited skills in the target language have had considerable learning experiences overseas because they could benefit from the knowledge base in their field of expertise. Research in applied linguistics has shown that learners who can perform a specific task in their own language will not only be more likely to perform the same task in the target language, but will also learn the language associated with it more easily.² Therefore, while many engineering or technology students do not have the same language background as liberal arts students, they function well in their German internship, acquiring the language associated with their particular tasks. Interestingly, some students even continue their German language studies and choose to pursue a minor in German, a secondary effect most welcomed by the small German program at IUPUI.

By the same token, small German programs such as the one at IUPUI must do everything in its powers to attract, maintain, and support its students in light of the declining enrollment in German nationally and its growing competition from Spanish. Study abroad, internships, and applied language courses are only some of the approaches. James C. Davidheiser outlines additional suggestions in his recent article in *Die Unterrichtspraxis*, "Attracting and Retaining Students in Small Undergraduate German Programs."³ They include outreach to area high schools, immersion weekends, ethnic walking tours, and opportunities for continuing education.

The IUPUI German program has attracted a considerable number of engineering students to its beginning classes, as well as to the German internship program. About two-thirds of the overseas internship participants have been engineering or technology majors. The department developed a new beginning German course with a more specific focus on business and technical vocabulary, in addition to the more general first year language and culture courses. Therefore, the five standards of foreign language learning outlined earlier are all equally applied in the German language program. Future plans include the addition of online, web-based instruction so that engineering professionals will be also able to take advantage of the course offerings.

In response to the newly defined standards of foreign language learning, instructional models have taken on new directions as well. In particular, ACTFL calls for a stronger emphasis on "learning within the abilities, attitudes, and capacities of learners themselves,"⁴ with the instructor's role being the guide who leads the individual learner to perform. Thus, incorporating what Howard Gardner calls "multiple intelligences" enhances learning: personal intelligences (interpersonal, intrapersonal), academic intelligences (logical/mathematical, verbal/linguistic), expressive (bodily/kinesthetic, visual/spatial, musical/rhythmical), and the naturalist intelligence. Especially, the learning of culture addresses and involves all of these areas.

Global-minded engineers, who combine a solid professional background with intercultural competence gained through language study or overseas experience, appear to be in growing demand, due to the ever-increasing globalization. Such skills, which allow individuals to perform comfortably and effectively outside their own culture appear to be best acquired through experiential learning, which takes place outside of the traditional classroom. Large organizations such as the School for International Training or the Global Engineering Program aim at immersing the student in a new culture.

Although the IUPUI German Internship Exchange Program is rather limited in scope (students work overseas for only two months), the students' level of intercultural competence has increased significantly by the end of the summer. Since language and culture are inseparably linked, intercultural skills are qualitatively different if founded on linguistic competence in the language of the target culture. Proficiency in another language, according to intercultural specialists like Alvino Fantini from the School for International Training is "critical to effective and appropriate functioning in cross-cultural situations and to the development of other views of the world."⁵

X. Conclusion

It is therefore obvious that teaching and learning across the curriculum as well as outside the classroom and one's native culture is essential in preparing young engineering graduates for the challenges of a global marketplace. Although a summer internship exchange program might seem like a small step towards such a noble goal, the results clearly indicate that it is one giant step in the right direction.

There is no doubt that this exchange program has been extremely successful for IUPUI, the Berufsakademie, all of the past participating students, and of course the businesses and industries both in Indianapolis and Germany. Everyone who has been involved with this program appears to have been enriched from the experience of being exposed to a person or persons from a different culture and country. As captured in the quotes of the student participants, the experience is something that will have a lasting and impressionable positive effect on their future. The challenge as educators is to try to increase the opportunities like the one described in this paper for students so that many more students can have this type of experience.

The involvement of the School of Engineering and Technology with this exchange program has also led to other international opportunities for faculty teaching exchanges at the Berufsakademie. Such as, during the summer of 2000, three IUPUI faculty members taught condensed courses for information technology students at the BA-M giving the faculty the opportunity to be exposed to German students in the classroom. A faculty member from the BA-M is scheduled to teach a course at IUPUI this summer for the same type of experience. There are plans to continue a faculty exchange between both institutions in the coming year. In addition, the semester long internships in combination with coursework taken in German or English at the BA-M will be explored.

References

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- ³ James C. Davidheiser, "Attracting and Retaining Students in Small Undergraduate German Programs," *Die Unterrichtspraxis*, 1999, No. 1, pp. 60-65.
- ⁴ Dale L. Lange, "Planning for and Using the New National Culture Standards," in: *Foreign Language Standards: Linking Research, Theories, and Practices*, Ed. June K. Phillips. Chicago: NTC/ACFTL, 1999, p. 106.
- ⁵ Alvino E. Fantini, "Comparisons: Towards the Development of Intercultural Competence," *ibid.*; p. 177.

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