

## IMPROVING RETENTION OF ENGLISH-AS-A-SECOND-LANGUAGE ENGINEERING STUDENTS BY SIMULTANEOUSLY ENROLLING THEM IN A SINGLE, ENTRY-LEVEL ENGINEERING COURSE

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**Abstract** *This paper discusses an experiment in which international Engineering students with English language deficiencies were successfully integrated into the Aircraft Maintenance Engineering Associate degree program by taking an entry-level Engineering course while participating in an English-As-A-Second-Language program called OUSA. A large group of the original Aviation Maintenance Engineering students from the United Arab Emirates quit the University and returned to their country, frustrated by a lack of progress toward their degree. Only six remained. The stringent English proficiency requirements had necessitated some remaining in that program for as long as four semesters. The director of the OUSA program contacted me to see if the surviving students could be integrated into an entry-level engineering course simultaneously with OUSA course work. We worked out a program to create a special Basic Electricity class, where they did well. They continued to take simultaneous courses with OUSA and have subsequently earned their Associate degrees in Aircraft Maintenance Engineering.*

**Index terms** *Cultural differences in teaching, English-As-A-Second-Language problems, Entry level engineering courses, Student retention.*

### INTRODUCTION

This paper discusses the results of an experiment involving students from the United Arab Emirates enrolled in the Aviation Maintenance Engineering Associate degree program at Parks College of Engineering and Aviation of Saint Louis University. When first enrolled, these students were unable to successfully pass the TOFEL English proficiency test. After as long as two years in that program, all but a few had returned home. As an experiment, the remaining students were integrated into an entry-level Engineering course while participating in the English-As-A-Second-Language program, called OUSA. The mixed results of this experiment suggest that further discussion and exploration of these findings with other educators could yield beneficial solutions that would strengthen engineering education on an international level.

### UNIVERSITY REQUIREMENTS CAUSE DISCOURAGEMENT

By the fall 1997 semester most of a group of more than two-dozen students from the United Arab Emirates had dropped out of Saint Louis University and returned to their country. Only six students of the original group, who themselves were also preparing to leave, remained. The OUSA program required students to reach an English proficiency capable of taking a full load at the highest level of course work before leaving the program. Because of this requirement, some students had already been in OUSA for as long as four semesters. Discouragement and lack of credit toward their degrees were stated as reasons for leaving. It is easy to understand their situation. They were by no means hasty in their decision to leave. In fact, they showed an extraordinary patience.

### CALL FOR HELP

At that time, the director of the OUSA program contacted me as a professor in the Airframe and Powerplant Program of the Aircraft Maintenance Engineering Department, to see if the surviving students could in any way be integrated into an entry-level engineering course. They would take this course simultaneously with their OUSA course work. The OUSA personnel and I considered several possibilities. One factor we considered, that I had observed by working with other students from the Middle East is that most of these students are very comfortable and proficient with mathematics. Problems with language are not as great when studying mathematics and the concepts cross over easily. Since I taught the Basic Electricity course required by the Federal Aviation Administration, which includes a great deal of mathematics, I volunteered to create a class especially for these students as an experiment. I had also developed a rapport with the Arab student community and was able to relate to their needs easily. The OUSA department and I carefully coordinated study materials so that the text and the topics used in the Basic Electricity class were also used by OUSA in their daily lesson plans for the Arab students. This allowed for reinforcement and provided two differing approaches, which broadened and enriched the exposure to American language and culture.

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### RENEWED STUDENT ENTHUSIASM

Students immediately applied themselves to both programs with enthusiasm. They showed a renewed interest in attendance and participated more readily in class. After the breakthrough of the first credit course, students continued taking engineering courses along with OUSA. Enthusiasm grew and the students quickly developed proficiency to pass the TOFEL. They subsequently graduated with Associate degrees in Aircraft Maintenance Engineering.

### POSITIVE ASPECTS OF THE PROGRAM

The experiment proved that there are several positive aspects to this program. Scholastic interest in both programs and overall morale improved immediately. As soon as the students realized that they were actually taking courses for credit and working toward their intended purpose, their interest rose considerably. Where there had been a problem with consistent attendance in the OUSA classes, the students now attended regularly and arrived promptly.

Small class loads are allowable in our A & P courses. This created several benefits. First, it allowed me to devote more time to each student. I was able to relate on a more personal basis to individuals and analyze their strengths and weaknesses. I had more opportunity to guide individual students toward the study skills that would most benefit them. Students were also able to communicate easily in the casual classroom and laboratory settings without creating a disturbance.

Once or twice weekly, our two departments would coordinate materials and topics. By using Basic Electricity topics in the OUSA classroom, the OUSA teacher was reinforcing what I was teaching in my Basic Electricity class. I was also using the vocabulary and language skills that OUSA was teaching. In this way we developed a symbiotic relationship that benefited both departments.

Another positive aspect of this experiment was that the students experienced social and cultural differences in a realistic environment. They operated on the whole campus, as opposed to centering all their activity in one building. They related to the student body of the entire campus and were able to meet and interact with more American students than they would have if they were concentrated in the international group studying English.

Another possible solution to the problem of frustration with not being in the mainstream while studying English-As-A-Second-Language has previously been to allow the students to audit classes until they develop the proficiency needed to leave the OUSA program. This has been done at our University. However, working toward a "real" grade that counts toward their degree, proved to be a greater incentive to study and attendance. The improvement in morale that was exhibited by

the experimental students was considerably higher than that seen previously in auditing students.

### NEGATIVE ASPECTS OF THE PROGRAMS AS SEEN BY UNIVERSITY DEPARTMENTS

Several negative aspects became evident during this experiment. It did not take long for other international students in the OUSA program to hear about what the Engineering students were doing. Before long the OUSA department and the AME department were receiving complaints. It seemed that students felt it was unfair to allow a few students to enroll in credit courses while others could not. Other departments received considerable pressure from these students, which in turn brought pressure on my department as well as the OUSA department. This factor probably, more than any other, has prevented this pilot program from being adopted again. This is one of the greatest problems that must be discussed and solved if the program is to be adopted again.

### NEGATIVE ASPECTS OF THE PROGRAM AS VIEWED BY FACULTY

I also found that individual faculty members from other departments with students in OUSA expressed their displeasure at being under pressure by those students to have a similar program. Since no official University decisions were involved in this pilot program, faculty rightfully complained of being left out of the decision making process.

Obviously, some teachers will not want to participate in such a program, for a number of reasons. One such reason is that classes must be tailored to the needs of the OUSA students.

This involved differences in pacing. I found that my students learned some concepts faster than the traditional American student and some concepts they learned much more slowly. This meant that I needed to daily revise my lesson plans. This was evident in lectures, but also affected laboratory assignments. For this reason, it would be very difficult to integrate OUSA students into a "regular" class. It is surprising how greatly culture affects our teaching processes. This needs to be taken into account. Changes need to be made to illustrations, problems, etc. Until one is in such a situation they do not realize how much of our culture dictates how we illustrate and explain things. To some students, terms familiar to any child raised in the United States are completely foreign. For example, while I was discussing magnetism, I used the term "marshmallow." I could tell from the blank expressions on their faces that my Arab students had never heard of a marshmallow.

To cure the problem, the next weekend I set up a small barbeque grill and roasted marshmallows on long forks for the group. This is just one example of adapting teaching (as well as the teacher) to different cultural groups and at the same time relating to the students. Both of these take a great deal of extra

effort on the part of the teacher.

Another negative aspect is that considerable time and effort was needed to coordinate the two programs. The physical layout of our campus, as with most University campuses, is sprawling. Personal contact between the two departments necessarily means much walking to and from each other's venues. Frequent meetings are required to synchronize lesson plans and exchange materials.

### **GENERAL CONSIDERATIONS**

There are several factors that are important for the teacher to consider when integrating international students with language difficulties into mainstream course work. First, it is imperative that the teacher has respect and concern for the intellectual welfare of individual students that crosses cultural differences.

Above all else, the students must know that they are accepted and cared for by the teacher. Due to individual differences in training and sensitivity, it is possible to hold preconceived ideas about certain cultural and racial groups that will make genuine concern difficult. The program described here works well with teachers who are open and free from prejudice. In spite of good intentions, teachers will, at times, stumble into cultural mistakes. It is at this time that true care and concern for a student as a person carries the relationship across such mistakes.

Secondly, therefore, it is critical that teachers make a continual effort to gain a working understanding of the cultural mores and practices of national, religious and ethnic groups. I have found that my Arab students traditionally do little activity in the middle of the day because in their countries, the mid-day heat is oppressive. They perform most activities early in the day or late into the cool of the night. This practice, which is a well-ingrained habit, makes maintaining attention or performing complex skills difficult at certain times of the day. University libraries and the Internet are good sources of information on national characteristics, traditions and practices. Teachers can also benefit from participating in and attending international student meetings and events.

A third factor that teachers must consider is the need to structure an environment that allows students to feel comfortable about asking questions. I have found that a casual setting in the classroom and in the laboratory help to put students at ease. I use a conversational style of lecture and draw students into discussions by asking questions about how things are done in their culture. As they talk about things that are familiar and important to them, they begin to relax and feel a part of the group. Since this program was with a single cultural group, it was easy to get the students involved in a group discussion, which quickly builds a sense of camaraderie.

A fourth factor of which teachers need to be aware is the use of colloquialisms and slang in their lectures and conversations with students. It is best to assume that such terms are not

understood and either avoid them as much as possible or be sure to explain their meanings. One example of a slang term that I might use would be "elbow grease." Taken literally, the term is ridiculous, but most students raised in the United States would have no problem understanding that something that takes "elbow grease" takes a great amount of labor to accomplish. Some of the enjoyment of teaching international students is comparing the literal meaning of slang and colloquialisms and their intended meaning with the students. Doing this is a good way to create a pleasant and open environment in the classroom.

A factor, beneficial to teaching technology is that new technical terminology is specific to an individual discipline. It is therefore equally difficult to learn regardless of the native language spoken by a student. In fact, it may be easier for those students who come from cultures that stress memorization and nomenclature to learn new technical terminology than it is for those students who come from an American culture that stresses analysis.

### **CONCLUSION**

In conclusion, I have found it is beneficial to bring international students with inadequate English skills into entry-level, mathematically oriented courses at the same time as they are taking English-As-A-Second-Language course work in preparation to pass the TOFEL. The problems encountered are not insurmountable. If adequate faculty can be found with the desire to work through the difficulties, I believe that retention of second language students will improve. With the growth of worldwide transportation and communication, meeting the needs of students studying in foreign countries will continue to be present. I believe this is a topic worthy of discussion at an international forum.