Outreach Degree Completion Program

Michael B. Spektor, Malcolm Grothe, Walter W. Buchanan
Oregon Institute of Technology/The Boeing Company/Northeastern University

I.   Introduction

In our previous paper entitled "Delivering a Manufacturing Engineering Technology Program to Boeing Company", in June of 1999, we reported about the mutual educational project between OIT and Boeing.[1] In this paper we address the Initial Plan, Memorandum of Understanding, First Academic Quarter, Lessons Learned, and our Future Plan. All of the recommendations from the earlier paper have been achieved during this academic year. However, due to our lack of experience, the Initial Plan and the MOU did not address many organizational issues that actually make the program work. This paper will discuss the challenges that we faced during the first academic year and how we resolved them.

II.   Student Body

The program has doubled in size with approximately 110 students who have applied for admission. Boeing assumed that the vast majority of students would have two or more years of college education and requested that OIT provide upper division courses for degree completion. The actual backgrounds of the students showed that less than half have this level of college education. In addition, the lower division course work the students attained in most cases did not meet OIT's requirements. Examples of lower division courses that are missing from student transcripts include chemistry, physics, material science, math, and writing composition. It was assumed students would be able to get these courses from local community colleges. However, our experience shows that during the 1998-1999 academic year, only a few students were able to complete some of required classes at community colleges.

Severe time conflicts and traffic problems in the Puget Sound area make it unrealistic to expect that students would be able to attend community colleges on a regular basis. Consistency among community colleges makes transferring credits difficult at best and in some cases impossible. Students would be distributed among many community colleges and would lack an OIT peer

support group for these courses. This inconsistency made it necessary to find an approach to improve the program operation structure.

To improve the situation and guarantee degree completion in a reasonable time frame, we decided to deliver all OIT courses required for this program. Our research found that similar degree completion programs take many years (up to 13) to complete, increasing the probability that the student may not finish the program. By providing student access to all courses, students will have fewer barriers while working toward their degree. The model we used included small weekend classes (four to seven students) and was offered during four annual academic terms. For example, for Fall 1999 we offer 13 weekend and five weekday classes. We also try to have at least two OIT faculty delivering classes during any one term. As a result of this model, the enrollment more than doubled for Fall 1999. We are planning to offer 24 courses during the Winter 2000 quarter, including 19 weekend courses. This new approach requires a substantial amount of coordination with Boeing, adjunct faculty, and the Klamath Falls campus. Small problems with few classes grow to enormous proportions with 20 or more classes. As a result workload is significantly increased and processes must be clearly documented and communicated. Solving problems in an ad-hoc manner in a program of this size proves to have disastrous results.

III.   Registration

Registering students from a remote site was difficult. The on-campus model of filling out paperwork and mailing forms to Klamath Falls that we began with was a failure. Students were unable to get required forms, needed help to complete them, forms got sent to the wrong department at OIT, and last minute sign ups were impossible. We finally gave up and told the students to "go to class" and we would address their registration at that time. This crisis management technique worked for the first quarter, but would be impractical and unprofessional to continue. To resolve this problem we developed an on-line Web-based registration process.

The on-line registration worked well. However, it created additional problems. Students who registered in classes did not get any confirmation that they had registered. There was no way to revise the course selection or drop classes once the quarter had begun and had to be completed through phone calls and e-mail to the Registrar's Office. To improve the process we have added an e-mail confirmation and a printed schedule delivered by the US Postal Service. Adding an ADD/DROP section to the on-line registration form has solved the ADD/DROP problem. Students can now register for courses and ADD/DROP courses from anywhere and be confident that OIT received the information.

IV.   Admissions

The process that we originally used for Boeing students to apply to OIT was similar to that of the paper registration process. Therefore, admitting students via paper admission forms had many limitations. One of the unique problems was the University had a difficult time identifying which students are attending classes at Boeing. Boeing students would get letters asking them to attend functions on campus at Klamath Falls. This would generate concerned phone calls from

students. When we moved to an on-line process a special box was added to identify the "Boeing" student. We used the same process for developing an on-line admissions form that was used with he registration form and received positive results. However, the process for actually admitting the students still needed improvements.

At Boeing, we did not wait for the students to become fully admitted to OIT before letting them attend classes. Some students just wanted to take one class. For example, Boeing has several courses offered in Geometric Dimensioning and Tolerance (GD & T). Some people who have taken the Boeing classes are considered resident experts, and wanted to take the OIT GD & T class to improve their skills in that subject. Other students did not hear about the program until just prior to the quarter starting, and rather than making them wait for the next quarter, we admitted them as non-degree students and had them begin applying to OIT as a student. In addition, several students had transcripts from foreign countries and they were also admitted as non-degree students until their transcripts could be converted and evaluated. This customer-focused approach dramatically increased the complexity of admitting students.

The ability to be flexible and get students started in the program was a good thing. However, we had the problem of students waiting to hear which of their classes would transfer, so they could make intelligent decisions as to what classes to enroll in the next quarter. In many cases, the Admissions Office was able to admit the student in a few weeks. The hold up came with the evaluation of transcripts. In many cases transcripts were not received from the student's previous school, or foreign transcripts had to be sent to a vender who converted them into English. These students have diverse backgrounds, which is quite different from our typical student at the Klamath Falls Campus. An additional problem is that OIT requires students to submit their SAT scores. Some Boeing students graduated from high school 40 years ago. We are requesting that the campus drop this requirement for Boeing students. Our process at OIT exacerbated the time delay by having the main campus evaluate the general education requirements and the Boeing Program Director evaluate the engineering requirements. This process requires that files be reviewed in Klamath Falls by the Registrar's Office and be sent to Seattle for evaluation by the Program Director.

This high level of complexity, combined with the dramatic increase in enrollment, called for clear plans to resolve our admissions dilemma. Our short-term solution was to bring a person from the Registrar's Office during the break, to focus on Boeing transcript evaluations and get that information to the students. For a long-term solution we plan to petition the University to give the Boeing Program Director authority to evaluate both the general education and the engineering requirements.

V.   Scheduling

Course scheduling is one of the most important issues of a degree completion program. It was assumed that OIT would deliver the upper division courses that consist of approximately 90 credits. An average student can take 7.5 credits per term (one term six credits, the next term nine credits). Most upper division courses consist of three credits. It was decided to offer four or five courses (12 or 15 credits) per term and classes be offered during four evenings per week (no

Friday classes) and during some weekends. If five courses (15 credits) per week would be offered, there would be twice as many courses as an average student needed. This practice should minimize time conflicts and guarantee that during an expected graduation cycle (three years including summer terms), all courses will be offered twice; providing the opportunity for every student to take the needed classes during one graduation cycle. Following these assumptions, it was considered that the course offering wold be based on the existing curriculum map for the junior and senior years.

The preliminary analysis of the student body has shown that the majority of students also need many lower division courses. The vast majority students, including those who have the appropriate two years of junior college education, needed to take four credits in Chemistry, eight credits in Physics, eight credits in Mathematics, three credits in Materials Science, nine to twelve credits in Communications, Humanities and Social Science (all lower division courses). It became clear that course scheduling should be based on students' actual need and should reflect the sequences in prerequisite requirements. A special student-course matrix was developed that was instrumental in determining an optimized course-offering schedule. However, appropriate adjustments, when necessary, should be made while using the matrix.

Scheduling becomes more complicated with new students entering the program. The matrix is changing, indicating the increased need of courses that already have been taught. If these courses are to be offered, the "old" students will be slowed down. If these courses are not offered, the "new" students will be slowed down. Every term new students continue to join the program. The number of courses per term had to be increased. During Fall 1999 we offered 19 courses (instead of five) and for Winter 2000 we are scheduled to offer 26 courses. We are offering five upper division courses during the weekdays and the rest during weekends.

The course scheduling process is based on five variables:

- Small classes (four to five students)
- Repeatability of lower division classes during the next term, depending on student enrollment
- Sequencing by prerequisites
- Progressing with upper division classes toward graduation, according to the curriculum map of the junior and senior years
- The matrix output

Counseling students on which courses to take became much more challenging with the additional courses being offered. Prerequisites had to be considered when selecting courses to ensure new students could continue, and advanced students were not held back.

VI.   Books

Getting the right books to the right students at the right time proved to be an ordeal for both the students and OIT. For the first few quarters of the program, the OIT Bookstore did a reasonable job. Most of the time they were able to send books to the students and instructors on a moment's

notice. During Fall 1999, the director of the Bookstore retired. This retirement along with the doubled enrollment, and the Registrars Office's failure to forward registration information to the new director, created serious problems. Many students never received books and were forced to purchase books from other sources.

We developed a partnership with on-line textbook provider. We send them a list of books that we will need for the next quarter and they verify whether they can get them. A link to their Web site has been added to our Web site for registration. The student clicks on the book they need and the Web site brings up the purchase information. The student can make their purchase and the books are shipped to them in three days, or overnight for an additional charge. Students have up to 45 days to return books if necessary. We anticipate this new book purchase process will help increase the probability that the right books will get to the right students at the right time. We hope this process will help reduce some of administrative work required to maintain the program.

VII.   Faculty Support

With the large number of courses offered came the need for a large number of part-time faculty. Identifying, interviewing, and employing part-time faculty was less difficult in the Puget Sound area with a rich labor pool to draw from, including many highly credentialed and experienced Boeing employees willing to teach part time. The difficulty was to address them all at one time. These people were teaching at different times and in different places. We decided to select one Saturday morning to have faculty orientation to share the OIT culture with the part-time faculty and deliver administrative details. For the winter quarter, we will be sharing how the portfolio for prior learning works, and how we plan to use Boeing retirees as tutors for students.

VIII.   Conclusion

Much progress has been made with this degree completion program in Manufacturing Engineering Technology at Boeing since last year. Enrollment has doubled and many bugs have been ironed out. Persistence pays off.

Bibliography

1.   Spektor, M.B. & Buchanan, W.W. (1999). Delivering a Manufacturing Engineering Technology Program to the Boeing Company, Proceedings 1999 ASEE Annual Conference, North Carolina Universities Consortium, Charlotte, North Carolina, June 1999, pp. 254751-54.

MICHAEL B. SPEKTOR

Dr. Spektor is Professor and Director of the Boeing Program of Manufacturing Engineering Technology at the Oregon Institute of Technology. He received his ME and Ph.D. in Mechanical Engineering from Kiev Polytechnic University. Michael is an Academician of the Ukrainian Academy of Science and has written over 50 papers in various scientific journals. He is a member of ASME, ASEE, and PEO.

MALCOLM GROTHE

Mr. Grothe works for the Boeing Company and is in charge of setting up opportunities for Boeing employees to get academic degrees in Seattle area. He has an AS in Manufacturing Engineering Technology and a master's degree in education.

WALTER W. BUCHANAN

Dr. Buchanan is a Professor of Electrical Engineering Technology and Director of the School of Engineering Technology at Northeastern University. He was formerly dean at OIT until July of 1999. He received his BSE and MSE from Purdue University, and his Ph.D. and J.D. from Indiana University. Walt is a P.E. in four states, and is Chair of ETD. He has written over 60 papers, and is a member of TAC of ABET and Chair of IEEE's CTAA.