The Challenges Of Engineering Technology Apprenticeship Programs In The Regional Campus System

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Introduction

Faculty at regional campuses face a variety of challenges, many of which are not experienced by our parent campus colleagues. One significant challenge emerges from the open–enrollment policy of some regional campus systems. This policy waives some (if not most) of the admission requirements that a parent campus imposes, such as the ACT score, high school GPA, and perhaps others. Although the policy has many advantages, the result is a student body that, in some respects, is ill–prepared and/or ill–motivated. A problem arises because there are inevitably some courses with students who have the appropriate academic background and prerequisites mixed with those who do not. A prime example of this inappropriate mix is that of traditional students and those from apprenticeship programs from local companies. The latter group is frequently ill–prepared and may consist of a number of apprentices who lack motivation as well.

Advantages Of Open Enrollment

The college or university, employers, and certainly the students benefit from open enrollment. Its advantages clearly include providing many more people with the opportunity to register for college courses—an opportunity that many students would not otherwise take. Also, many regional campus students not only succeed in their coursework but also continue their education beyond the two–year degree. Thus, it can be said that open enrollment changes the lives of many individuals, literally.

Employers benefit as well. Assuming an employee pursues a course of study related to his or her employment, the employer gains from the

employee's greater knowledge through improved job performance, better insight into specific job tasks and problems, and greater enthusiasm. Employers recognize these and other potential benefits and often pay all (or a percentage of) the costs of the education. Furthermore, partnerships may be developed between local industries and the educational institution for specific training programs, joint research efforts, and individual research opportunities for faculty.

Certainly, the college or university will benefit from the policy. The regional campus gains tuition dollars and recognition from the local community and industries. The parent campus would also benefit when students further their education at that location.

Disadvantages Of Open Enrollment

Notwithstanding the importance of tuition income, serving the local community, and building partnerships with local industries, the open–enrollment policy has some disadvantages, and it is these disadvantages that affect the faculty and the students.

Obviously, there are many traditional students who enroll in the regional campuses, but the majority of the student base is nontraditional. Because most regional campuses lack dormitories, traditional students are limited to those with local permanent addresses. The nontraditional student is the one who is employed full–time and goes to school part–time. The nontraditional student may have family and home–ownership responsibilities as well.

In the Engineering Technology programs at Kent State University—Trumbull, most of the students are nontraditional. Indeed, different types of traditional and nontraditional students enroll in these programs. Some nontraditional students enroll because they are pursuing a two– or four–year degree or are enrolled in a certificate program, and therefore many are highly motivated. However, their educational backgrounds and their levels and state of preparedness for technical courses vary considerably, with many students being ill–prepared for technical courses.

This variation in preparedness is due to one of several reasons. First, the traditional student is a recent high–school graduate, so the fundamental background material for an Engineering Technology program remains fairly fresh. This background material includes basic

physics and mathematics (algebra and trigonometry).

Second, for the nontraditional student the situation is typically that too much time has elapsed since high school. So, understandably, the necessary background material has been forgotten and needs to be reviewed. This student needs to begin his or her collegiate experience with appropriate remedial courses.

Third, many students do not take advantage of course advising; consequently they take courses of greatest personal interest instead of necessary remedial or even prerequisite courses. They look for courses that are offered at times that best fit their current work schedules. This problem is exacerbated in cases for which the necessary background material is not a formal course prerequisite; here the understanding is that students will follow an established curriculum which contains the background courses in an appropriate sequence prior to the courses that require them. If there are no checks and balances in the registration or matriculation system to prevent improper course registration, then this problem occurs. It then becomes incumbent upon the faculty to attempt to weed out those who are unprepared for a particular course. Announcing any course prerequisites and background expectations at the first class meeting is only a potential solution to this problem because the students can choose to take the risk and remain in the course. It also becomes the faculty's burden to attempt to have the necessary background courses formalized as prerequisites—a time–consuming process. The inevitable poor performance is blamed unjustifiably on the faculty and reflected in his or her teaching evaluations which are completed by the students.

Fourth, the mixing of both traditional and nontraditional students with some apprenticeship students is, in practice, a losing proposition. While the apprentices from some companies have the proper course background, others do not. Apprentices from one company may have erroneous expectations about some courses and about the collegiate experience altogether. These false expectations, together with the influence of some corporate cultures brought into the classroom, lead to frustration on everyone's part. The traditional and adequately prepared nontraditional students suffer because the pace of the class is slowed by the inadequately prepared students (usually apprentices) who need to ask too many questions, many of which reflect the inadequate

background. This problem results in omission of some course material due to lost time. These apprentices in turn suffer from lack of understanding of much course material and frequently from a course pace that is too fast for them. The faculty may suffer from the frustration of attempting to solve an impossible situation: needing to deliver what is presented in the syllabus while trying to satisfy all the customers. The apprenticeship students present yet another set of challenges.

Apprenticeship Programs

The apprenticeship programs at local companies vary in terms of course requirements. The number of courses such programs require may differ from one company to another, but apprenticeships normally do not require all courses leading to a two–year degree. (Upon completion of their apprenticeship program, some apprentices continue their education to earn a degree.) With all due respect to those apprentices who are adequately prepared and/or who may be trying their best, in general, apprentices are a very challenging group of students consisting of (1) those who are interested in learning but lack some knowledge fundamental to the course or curriculum, and (2) those who attend only because they are paid to attend (and they think college is an extension of high school). The latter students might sleep in class or even attempt to disrupt the class in some way unless the professor squelches such behavior quickly. Disruptions include inappropriate comments intended to be humorous, asking the same questions with the intention of slowing the course pace or frustrating the faculty, much talking amounting to the distraction of other students, and complaining like children. For those whose sole motivation is to legitimately avoid work while still receiving pay, their behavior is sophomoric, and their attendance is a waste of everyone's time. Motivating these latter students and effectively teaching these different types of students in any given course, while maintaining the quality teaching standards in the classroom that all students expect and deserve, amount to an extremely challenging task for which there is no clear answer. There is certainly a need to effectively engage these students and to foster further development of their capacities.

Also, is it fair to the professor that apprentices be allowed to complete

course evaluation forms? This is a valid question, considering that their intentions and course expectations differ from those of the majority of students. It is human nature for dissatisfaction to be aired through the easiest channel, even though it may not be the appropriate channel: the teaching evaluation. Written responses to some evaluation questions indicate that too many evaluations do not reflect the quality of the instruction but rather the frustration of being placed in a course for which the students are unprepared or for which the students' expectations might not be met. Understand that these students have no choice; if they are in the apprenticeship program, they must take the course and pass with a company–established minimum grade. Additionally, not all faculty are even willing to teach classes with apprentices.

Solutions And Practical Considerations

The solutions to the problems that have been identified are so simple, yet for various reasons these solutions are not always implemented. While possible solutions appear straightforward, there remain practical considerations that prevent the application of these solutions. Consider the following solutions to problems discussed.

For the variation in preparedness—if a student lacks a background course, good advising will steer the student in the proper direction. The problem arises from either poor advising, self–advising, or lack of a computerized course–registration system that would automatically block a student from registering in a course for which the student lacked the appropriate prerequisites. Effective advising is especially important in a system with open enrollment. Good advising will assure that the unprepared student begins his or her collegiate experience with the appropriate remedial courses; the shortfall of this solution is that it does not solve the apprentice problem. Faculty should be involved in student advising when possible and practical. At some colleges and universities student advising is expected of all faculty, while at others it is assigned for additional pay. Despite open enrollment, either faculty should be allowed to prohibit the student's enrollment or the student should not be permitted to complete a teaching evaluation.

While it may not be fair to mix these groups of students (i.e., both traditional and nontraditional students with some apprenticeship

students—the adequately prepared and the unprepared, the motivated and unmotivated), offering separate sections of the courses requires both sufficient enrollment in each section and a sufficient number of faculty. However, apprenticeship programs often generate sufficiently high enrollments so that a second section of the course can be justified financially, even with a shortfall of students in that section. Offering a second section is especially important if the course includes laboratory exercises and the requisite lab equipment is limited. Even if lab teams of three or four students are assigned, if one lab team is conducting an experiment, no more than one additional lab team should be observing the experiment; more than this implied maximum of eight students in one location is too congested, probably unsafe, and a waste of time. If experiments can be conducted simultaneously, there must be adequate laboratory personnel support.

Another possible solution is to restructure the academic portion of an apprenticeship program in a manner similar to a cooperative education (co–op) program. A co–op model has been proposed that improves both traditional and nontraditional co–op programs.[1] (The traditional co–op program alternates terms of full–time school and full–time work experience; the nontraditional program is typically a single repeatable course.) This new approach, called Manufacturing Assistance for Cooperative Education (MACE), provides "*appropriate* work experiences to integrate and apply knowledge accumulated during the student's educational program. The work experience must be at an appropriate level of technological intensity with a focus on problem solving in an industrial environment."[2] Additionally, "MACE can combine and unify several academic programs, such as engineering technologies, business, marketing, and computer science; . . . MACE also offers the opportunity for interdisciplinary interactions among students."[2]

Summary

The open–enrollment policy of some regional campus systems provides the opportunity to many individuals who might not otherwise pursue post–secondary education. The college or university, employers, and certainly the individuals themselves all benefit from this policy. Despite the advantages, problems do emerge from the implementation of open

enrollment. These problems are not insurmountable, but frequently the solutions are not implemented. The faculty member is then faced with the challenge of trying to keep everybody happy by satisfying mutually exclusive goals. The non–apprentice student suffers from the slower pace of the course; the apprentice suffers from not fully understanding course material due to inadequate preparation. The student interested in learning is often deprived of an optimal learning environment from the lack of seriousness and distractions of other students. The faculty member suffers from frustration and poor teaching evaluations, regardless of his or her teaching ability because dissatisfied students vent their frustrations in the only manner readily available to them. Incurring the cost of a second section of the course to segregate the apprentices from the rest is a straightforward, affordable solution. Also, effective advising is especially important in a system with open enrollment.

Open enrollment has the potential of raising the educational level of a greater percentage of the population. However, to maximize its effectiveness, additional cost incurrence is inevitable: when necessary, campus resources must support the faculty in terms of student advising and multiple course sections. The optimal learning environment for engineering technology courses entails separate course sections for apprentice and non–apprentice students. Apprenticeship programs might be restructured to be more like co–op programs.

References

[1]Wentz, C.P., and Wojtecki, R. (1999). "The Best of Both Worlds: A New Look at Cooperative Education." In *American Society for Engineering Education North Central Section Annual Meeting Proceedings* (pp. 306–313). Erie, PA: Penn State Erie: The Behrend College.

[2]Wentz, C.P., and Wojtecki, R. (1999). Pp. 311–312.

Biography

Charles P. Wentz is an assistant professor of mechanical engineering technology at Kent State University—Trumbull and teaches courses in aeronautics and in mechanical and industrial engineering technologies.

He has worked as an aerospace engineer for such companies as Northrop, Gould, and Singer, where he served as project manager and test director for a variety of aircraft and missile programs, including Tacit Rainbow and Sea Lance. An active pilot, Wentz currently serves as a Flight Instructor in airplanes and helicopters and an FAA Designated Pilot Examiner. Wentz holds a Master of Science in Engineering from the Catholic University of America and a Master of Business Administration from Lake Erie College. He may be reached by e–mail at wentzc@trumbull.kent.edu.