

## **Moving from a Traditional Classroom Setting to an On-Line Teaching Environment**

Pete Hylton & Wendy Otoupal  
Indiana University / Purdue University at Indianapolis

### Introduction

Changing needs of students and universities have forced some courses to move from traditional classroom settings to on-line learning and virtual classrooms. At Indiana University Purdue University at Indianapolis (IUPUI), several Mechanical Engineering Technology classes ranging from Engineering Statistics to a Capstone Design Course have been caught up in this transition. This paper will examine the approach taken in two of these courses, comparing results to those from traditional classroom sections, and making recommendations for faculty facing similar transitions in the future.

### Complete Conversion to On-Line Instruction

The first approach to be examined is the complete migration of a semester of traditional material to a virtual classroom, where the students and teacher never meet face to face. In this case the class in question is IET 150, Engineering Statistics. Two sections of the course were taught by the same professor, one in a traditional classroom setting (14 students), and one on-line (16 students). In this case, exactly the same material was presented to both sections. For the traditional section, the material was presented by the professor in a typical lecture environment, including weekly homework assignment and in-class tests. For the second section, the exact same lecture material was presented by transcribing the professor's lecture notes and examples into a written text which was posted for students via IUPUI's Oncourse on-line system. Every attempt was made to produce an easy to read document which readily transmitted the concepts and examples in a manner comparable to that of the lecture environment. The same homework assignments were made to the on-line students, with submission of the student work to be made either electronically or on paper at the student's choice. The tests for the on-line section were made up of similar problems to those for the classroom section, scored as multiple choice questions. The order of the questions was shuffled for each on-line student, so that the possibility of cooperative effort was minimized. Other than that, the two sections took essentially identical tests. An outside professor was used as an objective observer to determine if on-line and in-class materials were being presented both clearly and equivalently. Tests and homework assignments were likewise evaluated. It was deemed that the material was presented as equivalently as could be reasonably expected given the difference in environments. Even the professor's sense of humor translated into the on-line lecture materials.

Everything described up to this point was fully understood by the professor as she prepared to conduct the two simultaneous classes. She anticipated that there would be

difficulties associated with the effort to present identical materials live and on-line. Also expected were the difficulties of receiving homework assignments over the internet and creating tests which could be constructed as just described, yet still adequately cover the material that the professor felt were appropriate. However, the challenge of creating all these on-line materials proved not to be the toughest challenge of the two courses.

Rather, the biggest difficulty arose in the relationship between the professor and the students. The classroom students reacted to the professor in a manner similar to what she had experienced throughout her teaching career. The students were friendly, yet respectful. These students did an average job of staying abreast of material and keeping up with homework. By comparison, the on-line students, who contacted the professor only via impersonal on-line forums and email, regularly exhibited discourtesy, dissatisfaction with the performance of the professor, and they made their feelings plain, as exhibited by this on-line quote: "If you have not noticed I am not the only one who thinks your instructions are completely vague and not clear to the point. I can read, that was back in elementary, that is not the issue of concern here. Please do not insult my intelligence. Not only is that completely rude, but it is unprofessional and I'm sure against school standards. As a student, I am to be "taught" by the professor. When assigned homework questions that I have questions to the actual answers, it is my only resort to go to the professor since they are the one who not only assigned the problem, but get paid to Teach!" By the same token, it was obvious from the quality of the homework assignments that the on-line students were not staying abreast of the material and were putting very little effort into their homework.

Two of the on-line students were quite outspoken early in the semester about the material being difficult to understand, and the professor's expectations being unreasonable. When they found themselves struggling, they opted to drive to campus and begin attending the classroom sessions, where they students were covering the exact same material. Interestingly, once these two students began interacting with the professor and the other students, their attitude changed, their understanding of the material improved, and their homework and test scores significantly improved. Yet, on the basis of evaluation by other professors, the material was being equally well presented in both environments and the homework and tests were comparable. Thus the reaction by the students appears to be attributable virtually entirely to the environment of the presentation and the lack of interpersonal interaction with the professor and other students.

In reading both post-course student evaluations and on-line comments made during the course, it is obvious that one major philosophical difference existed between the students. The classroom students clearly expected that they would have to spend not only the scheduled classroom hours, but also additional homework time to achieve success in the class. On-line students must manage their own time more effectively, since they have no commitment to be in the classroom at certain times. It is apparent from reviewing the results that they did not dedicate the equivalent amount of time to the class. It is almost as if they felt taking an on-line course eliminated the time in the classroom, without the expectation that the time be made up in self directed study. Also, it was obvious that the classroom students expected that they would have access to the professor in class and

perhaps before and after class for a reasonable amount of time. On-line students, however, can address their studies at any time of the day or night, and they showed that they felt they should have access to the professor 24 hours per day 7 days per week as well. They were quick to express their displeasure if emails sent to the professor were not responded to within hours of their submission, almost as if they felt the professor should live on-line and be constantly at their beckon call.

### A Partial Conversion to On-Line Teaching

In another instance, a different professor has taken the senior capstone design class, formerly taught traditionally, and transitioned it to being half on-line. The material which had originally been lecture topics covering the presentation of concepts, formulas, and derivations was converted to on-line documents. Additionally, on-line homework assignments were given each week. However, the students still met for lab time and presentations.

Part of the motivation for this change was to decrease classroom congestion on campus. A second motivation for this change was that nearly half of IUPUI's MET students are non-traditional, taking night classes while dealing with day jobs and frequently with families. Thus, this change was popular because it afforded them the opportunity of less classroom meetings, and the flexibility of studying the on-line material whenever they could fit it into their own schedules.

This transition proved to be much easier than the previous scenario. It was just as difficult to create on-line lectures that were as clear and concise as it was in the previous situation. However, the advantage of this scenario is that there was still face-to-face time with the instructor and other students. This allowed the professor to get a much better feel for how well the students were grasping the material. In-class problem solving sessions also gave the students the opportunity to interact with the professor regarding how the on-line lecture material applied to the solution of actual problems.

An additional benefit of this approach is that the anonymity created by the totally on-line course did not occur. Thus the negative student reactions were much reduced and there were no unreasonable expectations on behalf of the students. The expectation of 24 hour availability and immediate on-line response did not occur. Student expectations on instructor availability were much as the professor had found them to be in traditional classes, not as the first professor had found them in the fully on-line class. All-in-all, the student-professor interaction was much as it would have been in a full classroom setting. Thus, developing the class into a half-live, half-on-line concept avoided the most negative impacts of the fully on-line course.

### Quantitative Results

Most of the discussion thus far has been of a qualitative nature, based on professor observations. However, the following chart shows the comparison of post-course student evaluations for the two scenarios just discussed. Scores from the most recent traditional

course are compared against the new version for each concept. The evaluations were scored on a 5 point Likert scale (with 5 as high score). All classes had at least a 74% response rate.

<u>Evaluation Statement</u>	<u>Evaluation Scores</u>			
	<u>First Concept</u>		<u>Second Concept</u>	
	<u>Trad.</u>	<u>New</u>	<u>Trad.</u>	<u>New</u>
1. The instructor explained the subject clearly	3.25	2.43	4.58	4.00
2. The instructors responses helped me learn	3.58	2.27	4.75	4.07
3. The instructor provided regular feedback	3.17	2.20	4.42	4.20
4. Instructor provided a motivating environment	3.75	2.87	4.92	4.47
5. The instructor covered appropriate amount	3.33	3.31	4.50	4.27
6. Course content matched course description	3.92	2.79	4.58	4.13
7. Instructional material provided was helpful	3.27	2.87	4.58	4.40
8. Assignments were helpful in meeting objectives	3.00	3.21	4.33	4.13
9. Lab computer equipment was adequate	3.67	2.90	4.50	4.14
10. Non-computer lab equipment was adequate	3.50	2.86	4.67	3.60
11. Overall, I would rate this course as	3.09	2.00	4.42	3.93
12. Overall, I would rate this instructor as	3.50	2.67	4.83	4.40

The second quantitative evaluation is a comparison of the student grades for the new concept versus the most recent traditional teaching of the class.

<u>Student GPA</u>			
<u>First Concept</u>		<u>Second Concept</u>	
<u>Trad.</u>	<u>New</u>	<u>Trad.</u>	<u>New</u>
2.68	2.95	3.56	3.51

## Conclusions

This limited comparison of traditional and on-line courses has indicated that there are significant factors that should be considered when transitioning traditional courses to an on-line environment:

1. Students in totally on-line courses may develop a more adversarial relationship with the professors, whom they never actually meet.
2. Students in totally on-line courses may have unreasonable expectations of professor availability when compared to classroom sections on split classroom/on-line sections.
3. These problems did not occur when comparing a traditional course to the partial on-line course.
4. When significant effort was made to ensure that the material presented on-line was as close as possible to classroom material, there was not a noticeably difference in student performance between sections.

## Author Biography

Pete Hylton is currently Assistant Professor of Mechanical Engineering Technology at Indiana University Purdue University at Indianapolis, where he is in charge of the new Motorsports Technology Certificate Program. He previously spent 25 years in the aerospace industry in design and analysis positions.

Wendy Otoupal is an adjunct faculty member for the Department of Mechanical Engineering Technology at Indiana University Purdue University at Indianapolis, teaching Engineering Statistics. She also teaches Middle School Mathematics and Gateway to Technology in the Brownsburg Community School System and previously spent 28 years in the aerospace industry.