
AC 2012-4667: ENGINEERING ECONOMY: A HYBRID COURSE FOR THE ENGINEERING TECHNOLOGY PROGRAM

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Engineering Economy: A Hybrid Course for the Engineering Technology Program

Abstract

Hybrid courses refer to classes where there is a carefully planned blend of both traditional classroom instruction and online learning activities. It is a combination of the best of both styles of instruction. Instructors can teach a significant part of the course through active-learning assignments over the internet. The advantage is less travel to campus making it easier for more people to get a college education because of the limited on-campus attendance. These kinds of courses are now more accessible to more people in more places, which is perhaps the biggest advantage of all.

Online Course

A course whose instruction is totally delivered via the internet is termed as online course. The professor and students do not meet face-to-face on campus, although some professors give on-campus examinations and/or orientation sessions. In the past decade or so, with the advancement of internet technology, online instruction has been implemented in many schools. Distance learning has become ideal for those students who cannot travel to school on a regular basis due to some limitations (e.g., demanding work schedules, family responsibilities, scheduling conflicts, or physical challenges). This allows students to take courses from home or any location, at their own convenience. Distance learning has been increasing since then.

Hybrid Course

A hybrid course is a combination of face-to-face instruction with online learning. In a hybrid course, a significant part of the course learning is online. Hybrid courses typically feature 50% in a classroom environment and 50% in an online format. As a result, the amount of classroom seat-time is significantly reduced. As an alternative method to online and traditional courses, hybrid courses are now growing in number. The development of hybrid courses has become a growing trend in higher education. Since hybrid instruction combines face-to-face instruction with elements of online learning, the crafting of a meaningful course design can be daunting¹.

The Hybrid Advantage

The advantage of hybrid course is that they make it easy for more people to get a college education because of the limited on-campus attendance. The online component of the course can be accessed from any location where internet connection is available. Other advantages to the hybrid course are reduced traffic on campus and classroom spaces are freed up. Additionally, the hybrid model gives instructors more flexibility with their classes. For example, a professor of technical writing was better able to approximate a “real world” written environment for her students by using the hybrid model².

Engineering Economy as a Hybrid Course

Young³ quoted Graham B. Spanier, President of Pennsylvania State University, stating that hybrid learning is “the single-greatest unrecognized trend in higher education today”. In a move to promote the use of this alternative delivery method of teaching, the Engineering Economy course was converted into a hybrid course by the department. The number of nontraditional students with family obligations, full-time jobs, and with very busy lives in the Engineering Technology program in our department has been growing. Hence, offering this hybrid course is found to be very beneficial.

Engineering Economy is a full three credit-hour undergraduate technical course in a semester system. This is a required course for senior level engineering technology students. Its objective is to introduce students to the concept and fundamental skills for the analysis of the time value of money as applied to the manufacturing and construction environment. The course will have significant impact on everyone’s daily life. It will be useful on a person’s professional and personal life.

The course has been taught on a face-to-face instruction in a traditional classroom for so many years. Due to the growing popularity of online courses, the Manufacturing and Construction Engineering Technology department decided to develop a hybrid course in Engineering Economy for the engineering technology students two years ago. A hybrid course was developed with the hope of making the course fully online in the near future. In addition, it was also designed to accommodate students who cannot take the course if it was offered in a traditional face-to-face lecture only.

Course Materials and Technology

Technological development has changed the way teaching and learning in last decade or so. Its importance has inspired academicians across the globe to embrace technology in higher learning. Technology has illustrated that the classroom does not need to be the heart of learning, as teaching and learning experience can be extended by networked multimedia⁴.

An engineering economy textbook by Leland Blank and Anthony Tarquin was required for this hybrid course. Students were also required to have personal computer with internet connection and must have access to the university’s Blackboard (eLearning). Course materials for the online part of the course were posted on Blackboard(eLearning). Students were expected to check them out regularly.

The class meets face-to-face in the university classroom once a week only as opposed to a twice-a-week classroom instruction. This has reduced the driving of students and the professor as well to and from the campus. More materials are covered during this meeting. In most cases, this is the time when the professor can explain in more details the topics that is difficult to cover online. This will also be the opportunity for the professor to answer any questions that the students may have which they were not able to ask online.

Assessment Methods

Assessment of students' performance was a challenge since this was the first hybrid course for Engineering Economy in the department. The students' work was assessed according to how well they could meet the challenges with the blending of classroom and online instruction. The following are some questions that were used for the assessment, some of which were derived from the work of Spilka².

- Were the students able to demonstrate independent thinking and decision making, and limited reliance on the professor?
- Were the students able to demonstrate the ability to manage their own time and answer problems on their own?
- Were the students able to keep up with the work, even without the structure of a traditional face-to-face instruction?

Students View on Hybrid Course

At the end of the semester the students' comments were solicited as part of the students evaluations to the course. They were asked to list down how they feel about the course. The following are the most common responses from the students about the course:

- They liked the course because it has reduced their travel to the campus, hence, saves them money and time.
- They are impressed by the flexibility of the class in terms of schedule because they can access the course in any place where there is internet.
- They like the hybrid format better than a purely online course because they can still meet with the professor during the face-to-face meeting component of the course.
- They considered it as a good way to train them in managing their time wisely.

Conclusions

A hybrid course in Engineering Economy for the engineering technology program was found to be successful. Considering the fact that class time in a classroom is reduced by moving a significant part of it online, it has been a challenge for both the students and the professor. It definitely needs self-discipline and self-motivation to make the hybrid course a success. Nevertheless, it has also been a very good learning experience. The online component of the course has been found to help students develop their level of responsibility that could benefit them both personally and professionally. Add to all this, that the introduction of hybrid courses in the engineering technology program will greatly be beneficial not only to students but to the professors as well.

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