

Comparing Student Satisfaction in Full-Term vs. Half-Term Online Course: Results of a Pilot Study

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Introduction

There are an increasing number of engineering degree programs for working professionals offered online. In terms of student achievement, significant characteristics associated with these programs include persistence in the program and time to degree completion. It is common in online programs for students to register for two courses a term so as to complete the degree in a timely manner. Student persistence is facilitated through various factors including frequent communication, resolving issues in a timely fashion and providing opportunities for students to engage with other learners (Hart, 2012). Another factor that has been reported to contribute to both persistence and degree completion (Kucsera, J and Zimmaro, 2010) is the format of the course, specifically shorter “intensive” courses versus full semester courses. A number of programs are being implemented wherein courses are taught in shorter sessions than a traditional semester, often half-semester sessions. In this way a student can complete two courses in a semester while focusing on a single subject at a time.

The literature on student satisfaction for “intensive” courses is primarily drawn from students in education programs and liberal arts programs. Understanding the preferences of working engineers for this format is beneficial. This paper compares student evaluations and performance for the half-semester versus full-semester versions of an online course taken by working engineers enrolled in an online Master’s program. Two distinct evaluations are examined: the traditional college evaluation that is administered to all students in all courses and an evaluation designed specifically for online courses. The evaluations probe student satisfaction with the content, the format, and the instructor as well as perceived learning. Also discussed are instructor considerations and satisfaction with the courses taught on the different time scales.

Student participation in this study was too small to draw definitive conclusions, however results do help define opportunities for improved communication and student satisfaction for this population.

Course Characteristics

The University of Cincinnati offers an online Master of Engineering in mechanical engineering focused on design and manufacturing and is targeted toward working professionals seeking a graduate degree. The program consists of ten courses with two courses offered each semester so that the program can be completed in five semesters. Courses in the program are offered in an accelerated half semester format with one course being offered each half semester.

One course offered through the program is Quality Control. This course was developed in an online format several years ago to help meet student demand (from the traditional in-person programs) for the subject area. With the establishment of the online degree program, a half semester version of the course was also created. The content and learning outcomes are identical for the full semester course and the half semester course. The course continues to be taught online in a full semester format for traditional campus-based students.

The course covers the processes and tools used to ensure quality of an item, a system, a process, or an engineering endeavor. Topics covered include: total quality management, statistical process control, and quality systems. Historical development and current trends in quality are also presented. The textbook *Fundamentals of Quality Control and Improvement* by Amittava Mitra is used. Specific topics covered and book sections used are shown in Figure 1.

Figure 1 Course Topics

Total Quality System	Chapter 1
Quality Advocates	Chapter 2
Quality Philosophies	
Quality Management Practices	Chapter 3
Quality Function Deployment	
Quality Management Standards & Tool	
Basic Axioms of Probability	Chapter 4.1-4.4
Probability Distributions	Chapter 4.5-4.6
Concepts of Descriptive Statistics	
Inferential Statistics	Chapter 4.7
Tests of Hypotheses	
Data analysis and Sampling Concepts	Chapter 5.1-5.7
Basic concepts of Control Charts	Chapter 6.1-6.2
Causes of Variation, Analysis of Patterns in Control Charts	Chapter 6.3-6.5
Variable Control Charts for Mean, Range and Standard Deviation	Chapter 7.1-7.5
Control Charts Individual Units	Chapter 7.6
Control Charts for Short Production Runs	Chapter 7.7
Control Charts for Variable Subgroups/Moving Averages	Chapter 7.8
Control Charts for Linear Trend/ Medians	
Control Charts for Attributes	Chapter 8.1-8.9
P, np, c, u, U charts	
Process Capability Analysis	Chapter 9.1-9.7
Capability Indices; Capability Ratio	
Acceptance Sampling Plans	Chapter 10.1-10.8
Standardized Plans	
Reliability	Chapter 11.1-11.4
System Reliability: series and parallel	
Experimental design	Chapter 12.1-12.5
Factorial and additional experimental design	

The same course is required for the fully online Master's program but is offered in a half-semester format in that program. The material in the full semester course is segregated into nine learning modules while the half semester course uses seven learning modules but the same material is covered in both courses. The full semester course has three tests and a final exam while the half semester course has two tests and a final exam. Both courses have identical homework assignments.

During the spring semester of 2016, both the full semester version and the half semester version were taught by the same instructor. Data from this semester was used to compare student satisfaction and performance in the course.

Results

The College administers end of course surveys for every course taught each semester. These surveys ask for students' responses to questions regarding ABET student outcome criteria (ABET, 2015) and general questions regarding student satisfaction. Students used a modified Likert scale with 1 representing strongly disagree or very poor; 3 representing neutral; and 5 representing strongly agree or excellent. Responses from this survey are provided in Table 1 for both the half semester course and the full semester course.

Table 1 College-wide Student Evaluation of Course

	Half n=13	Full n=21
The course was well planned	4.4	4.5
The professor was approachable to discuss problems related to the course	4.1	4.2
Class assignments and exams were relevant to the course material	4.5	4.5
The grading was fair	4.1	4.3
Overall, how do you rate this course?	4.2	4.4
Overall, how do you rate this professor?	4.1	4.3

A survey specific to distance learning courses was also given to each group of students. Data from this survey is presented in Table 2. Unfortunately response rates were very low so that the reader should be careful not to draw conclusions that are not supported. The same Likert scale was used for this survey though the last question asks about hours spent on course work, not satisfaction.

Table 2 Student Evaluation Specific to Online Courses

	Half n=8	Full n=3
Compared to other classes I've taken I enjoyed the online format as much as a traditional classroom lecture class	4.1	4.0
It was difficult to stay motivated for this course	2.3	2.0
Communication with the instructor was effective	4.4	3.3
Compared to other courses I've taken, the workload was too high	3.4	2.0
Compared to other classes I've taken, the overall learning experience was as good as a traditional class	3.9	3.0
The class suffered by not having regular, scheduled meeting times	1.3	2.3

The graded assignments were graded in a timely fashion	4.1	5.0
Feedback from the instructor was received in a timely fashion	3.9	3.3
Lack of face-to-face communication (with other students and the instructor) was a detriment to the class	2.3	3.0
The video modules were effective at presenting the content	4.4	3.0
The readings were an effective way to present the content	3.4	3.7
The pace of the course was appropriate for learning the course material	3.9	4.7
I was able to learn the course concepts well	4.1	4.3
On average how many hours per week did you spend on the class (hours)	13.6	7.7

Although the number of tests given for the accelerated half semester course differed from the full semester course, there was one common test given to students in both courses. This test was an objective test consisting of 40 problems. The comparison of the student performance for this test in the two courses is shown in Table 3.

Table 3 Student Performance Comparison

	Half Semester n=31	Full Semester n=75
Average score (40 questions)	35.3	37.4
Median	36	38
Standard Deviation	2.95	3.04
Range	12	12
Maximum score	40	40
Minimum score	28	28

The criteria used to evaluate the overall student performance in each course was similar but not identical. Final course grades were dependent upon homework assignments, tests, and a final exam with identical weighting for these elements in both courses. Table 4 provides a comparison of the overall semester weighted averages between the full semester and accelerated half semester courses.

Discussion

Since this is a pilot study, it did not seek to apply more rigorous statistics than a simple look at averages which, given the small number of responses, seems appropriate. Based on data in the college-wide survey (Table 1) students evaluated the full semester and half semester course essentially equally. In particular both groups rated the course between very good and excellent. By way of comparison the average score for all courses in the college that semester was 3.9. All measures indicate that regardless of format, the course and instructor were effective. These

findings are consistent with other studies of course and instructor effectiveness that found students did not show significant difference in preference between full semester and intensive courses (Anastasi, 2007; Kucsera and Zimmaro, 2010).

Table 4 Student Overall Semester Average Performance Comparison

	Half Semester n=31	Full Semester n=74
Average score	86.4%	92.6%
Median	89.2%	94.3%
Standard Deviation	8.8%	4.8%
Range	31.5%	24.8%
Maximum score	96.6%	99.2%
Minimum score	65.1%	74.4%

While the responses were low, Table 2 provides some items worth noting, specifically:

- Students in the half semester course were more inclined to indicate that the workload was too high as compared to students in the full semester course.
- Students in the half semester course were less favorable that the pace was appropriate compared to students in the full semester course (though in both courses the students were favorable).
- Students in the half semester course had higher ratings for the video content as compared to the written content while for the full semester course this was reversed.
- Students in the half semester course viewed communication and feedback from the instructor more favorably than students in the full semester course.
- Both groups indicated they were able to learn the concepts well.

The results summarized in Table 3 indicate that student performance on the objective test was slightly better for students in the full semester course and the range in student performance on the objective test was the same. In general terms both groups of students performed adequately.

Table 4 also provided some basic insights into overall student performance at the end of the semesters.

- Overall semester average was higher for the students enrolled in the full semester course.
- The standard deviation for the half semester course was higher than for the full semester course. This implies more consistency in the semester averages for the full semester course.

Ferguson and DeFelice (2010) found that students in intensive courses were less satisfied with communication with the instructor but performed slightly better than students in traditional semester length courses. Again acknowledging the small sample size of this study, the findings presented in Tables 2 and 3 suggest different conclusions. In particular students in the half-semester course in our study found communication with the instructor to be very satisfactory. Also data from the engineering course comparison suggests that students in the full semester course achieve slightly higher scores than students in the half semester course.

Taken on its own for students in the half semester course, the data in Table 2 indicates that students are satisfied with the learning experience as compared with traditional courses and that the format and content of the course were appropriate for learning the material. While the data in Table 3 indicates students did slightly less well on the one test, in general students performed similarly to students in a full semester course. Overall course grades suggest students in the intensive course do not perform quite as well as students in full semester courses. This data differs from what others have reported (Daniels, 2000; Ferguson and DeFelice, 2010).

The last row in Table 2 does indicate that the workload in a half semester course is about double of that in a full semester course. These findings are consistent to data reported by Johnson (2009) regarding student performance and workload.

Another characteristic that needs to be considered is instructor satisfaction with the format. For this one small study the instructor offered the following observations;

- The pace of the half semester course is challenging, particularly as it relates to grading assignments in a timely fashion.
- More attention is given to communication in the half semester course recognizing that students have to be on schedule if they are to complete the work in the allotted timeframe.
- It is necessary to purposefully arrange content and potentially modify some course elements to accommodate the shorter time frame.
- Expectations on students learning outcomes were not changed.
- A full semester version is preferred as compared to the half semester version.

Conclusions

While half semester courses include challenges for both students and instructors, this pilot study suggests that for engineering courses student learning and satisfaction are similar to learning and satisfaction in full semester courses.

A more comprehensive study could yield useful information regarding best practices related to communication between instructor and students, structure of intensive courses, and student academic performance.

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