

Product Name **MyMathLab**

Course Name **Calculus for Business**

Course Format **Hybrid: 50 percent face-to-face lecture, 50 percent online**

Key Results

In this hybrid redesign of a Business Calculus course where the instructor cut class time by 50 percent and utilized lecture videos to supplement instruction outside of class and MyMathLab to assess student learning, final course grades remained constant.

Submitted by

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Course materials

MyMathLab and *Calculus and its Applications*, Bittinger

Setting

Temple University is a public, four-year research university and a national leader in education, research, and healthcare. With a 64 percent admissions rate, Temple is a selective university. Twenty percent of incoming freshmen graduated in the top 10 percent of their high school class, the average combined SAT score is 1129, and the average ACT composite score is 24. Temple boasts a 14:1 student-to-teacher ratio, and has a 66 percent six-year graduation rate.

The Fox School of Business at Temple it is the largest, most comprehensive business school in the greater Philadelphia region and boasts a 59 percent admission rate, 1182 average SAT, and 3.51 high school GPA for incoming freshmen.

In fall 2012, Assistant Professor Darin Kapanjie began to offer his Business Calculus course to students in a hybrid format: 50 percent of the course spent in class, face to face, and 50 percent spent online watching recorded lectures and working in MyMathLab. Kapanjie’s syllabus states, “The course is designed to give students 24/7 on-demand access to content, assignments, and lectures. Being successful in this course puts a great deal of responsibility in the students’ hands.”

Challenges and Goals

Kapanjie has been using MyMathLab since 2002; however, he wanted his students to take more ownership of their learning and more responsibility for their work inside and outside of class. Kapanjie hypothesized that by moving to a hybrid format where students spend 50 percent of their time in lecture and

50 percent of their time working online, students would be more responsible for their learning while still maintaining their performance as well as having more flexibility in their schedules.

Implementation

The course is comprised of two components: prerecorded lectures designed and recorded specifically for the business calculus course, and live instruction/collaboration delivered in the auditorium.

Students start each section with a 10-minute video, created by Kapanjie, that discusses the particular topic at hand. After watching the video, students complete a post-recording quiz, where they are allowed one attempt. At that point, they can move on to the homework. Kapanjie utilizes the prerequisites feature in MyMathLab in order to require students to attempt the post-recording quiz before moving on to the homework assignment.

Kapanjie assigns one homework per class day (available after class); students have unlimited attempts, and it is due six days after it is assigned. Students are able to use the View an Example and Ask My Instructor learning aids in the problems; although those are removed sporadically later in the semester to ensure students aren’t using them as a crutch.

Because the Business Calculus course covers six chapters, students take an exam every two chapters. Halfway through the “unit” of two chapters, there is a quiz that students complete in MyMathLab. They are allowed one attempt on the timed, one-hour chapter quiz that has 10–15 questions and is not proctored, meaning students can take it remotely.

In his live, face-to-face lectures, Kapanjie utilizes Poll Everywhere to encourage classroom participation. He also encourages students to work assigned problems out of the book to prepare better for exams, but those problems are not graded.

“Students will rise to whatever bar you set for them. I expect them to work hard outside of the classroom to prepare for the daily grind of this rigorous course.” — Professor Kapanjie

Assessments

- 50 percent Three exams (16.67 percent each)
- 25 percent Final exam
- 10 percent Three MyMathLab online chapter quizzes (3.33 percent each)
- 10 percent MyMathLab online homework
- 2.5 percent MyMathLab post-recording quizzes
- 2.5 percent Poll Everywhere
- 0 percent Book homework

Results and Data

Of the four years of data analyzed, each semester showed a strong positive correlation between online homework grades and average exam grades with the strongest of the four semesters occurring after the course transformation in 2014, $r(245) = .74, p < .01$ (Figure 1). In other words, a relationship was found between online homework assignment scores and average exam scores. As one increased, it was observed that the other increased as well.

In addition, a one-way analysis of variance was conducted on the four semesters of course grades to determine if there was any difference before and after the course transformation. The

ANOVA revealed no significant difference, $F(3,971) = .575$, not significant. While course grades did slightly increase, the increase was not significant (Figure 2). Kapanjie believes that the fact that course grades remained at least constant is a testament to students taking on the learning initiative outside of the classroom.

The Student Experience

Overwhelmingly, Kapanjie’s students appreciate the format of the course and believe MyMathLab helps them learn the course material. In a survey completed by 64 of 246 students in fall 2014, 96.9 percent of respondents “somewhat” or “strongly” agreed that MyMathLab allowed them enough practice to understand the concepts. The following are the percentage of survey responders who “somewhat” or “strongly” agreed to the statements.

- 98.4%** I would recommend my instructor continue having students use MyMathLab.
- 96.8%** I wish I could use MyMathLab like this in other courses.
- 85.5%** I got a better grade in this class because of the work I did in MyMathLab.

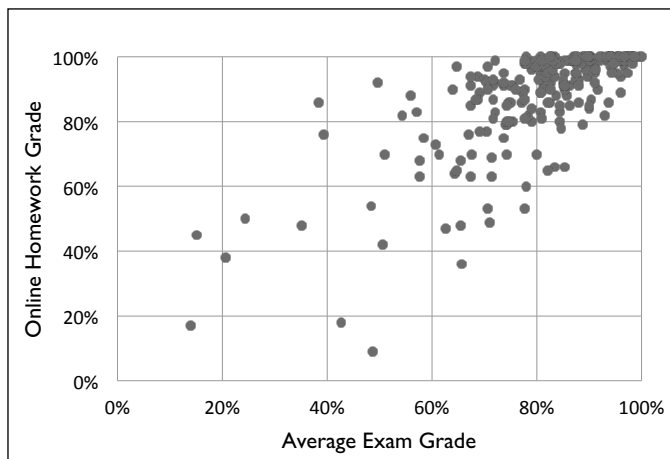


Figure 1. Correlation between Average Exam Grade and Online Homework Grade, Fall 2014 (n = 246)

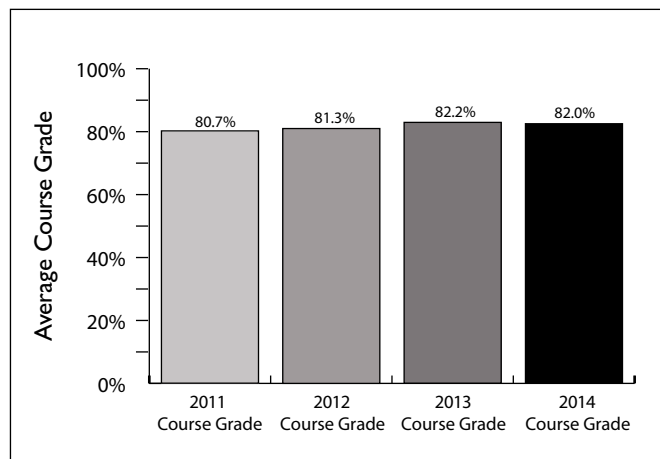


Figure 2. Average Final Course Grade before Redesign (2011 n = 240, 2012 n = 243, 2013 n = 244) and After (2014 n = 246)

In addition to valuing MyMathLab, survey responders also found the course format to be very helpful. Following are the percentage of survey responders who “somewhat” or “strongly” agreed to the statements below.

- 98.4%** The format of the course let me take responsibility for my learning.
- 98.4%** The format of the course provided the flexibility I needed.
- 96.9%** I like the format of the course.
- 95.3%** The amount of time we spent in lecture was appropriate.
- 93.7%** I would recommend this format to other instructors for other courses.

Prerecorded lectures were just as accepted and appreciated by the students:

- 95.3%** “Somewhat” or “strongly” agree with the statement, “I like the prerecorded lectures.”
- 95.3%** “Somewhat” or “strongly” agree with the statement, “The prerecorded lectures provide a good introduction to the concept.”
- 95.2%** “Somewhat” or “strongly” agree with the statement, “Watching the prerecorded lectures helped me understand the concepts better.”

Conclusion

In conclusion, student performance and survey data collected to date suggest the course is producing what Kapanjie believes are acceptable results. The fact that students can spend half the time they were spending in the classroom and still maintain their performance is a testament to Kapanjie’s faith in his students’ abilities and work ethic outside of class: “Students will rise to whatever bar you set for them,” he states. “I expect them to work hard outside of the classroom to prepare for the daily grind of this rigorous course.” Moving forward, Kapanjie plans to rely more heavily on the video and MyMathLab components to build students’ basic understanding of concepts. Then, during the live class sessions his strategy is to push them further by integrating more challenging application problems.

Implementation and results case studies share actual implementation practices and evaluate possible relationships between program implementation and student performance. The findings are not meant to imply causality or generalizability within or beyond these instances. Rather, they can begin to provide informed considerations for implementation and adaptation decisions in other user contexts. For this case study, mixed-methods designs were applied, and the data collected included qualitative data from interviews, quantitative program usage analytics, and performance data. Open-ended interviews were used to guide data collection.