MyProgrammingLab

School Name Guilford Technical Community College, Jamestown, NC

Course Name Introduction to Programming and Logic

Course Format Online

Key Results Students who earned As and Bs on MyProgrammingLab assignments earned higher final course grades (A/B) than students who did not. Data also show a significant, positive correlation between MyProgrammingLab homework scores and quiz performance.

Submitted by
James Carrier, PhD, Professor

Course materials
Starting Out with Python, Gaddis

Challenges

Guilford Tech, one of the three largest public community colleges in North Carolina, serves more than 15,000 students from four suburban campuses. Introduction to Programming and Logic is taken by students seeking computer technology-related degrees, such as computer programming, information systems, networking technology, Web technologies, mobile device development, database management, and information systems security. Upon completion, successful students are able to manage files with operating system commands, use top-down algorithmic designs, and implement algorithmic solutions in Python programming language.

Introduction to Programming and Logic can be challenging, particularly for students who may not be prepared for the time investment necessary to succeed in an online environment. In an effort to support these students, James Carrier, professor, sought a way to provide them with more opportunities to practice programming. In 2012, he adopted MyProgrammingLab—in addition to providing more practice, the program offers the kind of in-the-moment, personalized feedback that benefits online students who are more likely to study during off hours.

Implementation

The course comprises 13 units; each unit includes a variety of assignments. Students are required to complete weekly MyProgrammingLab problems and programming assignments by specific due dates to ensure that work is done on time and prior to other, graded unit assignments.

Quizzes are given for the first six units. There is a midterm exam after Unit 4; a final quiz and Python project are assigned after Unit 13.

Assessments

535 points	Programming assignments (not in MyProgrammingLab)
135 points	Final quiz and project
120 points	MyProgrammingLab assignments
90 points	Midterm exam
60 points	Quizzes
50 points	Discussion forum posts
10 points	Extra credit

Results and Data

Data indicate a clear relationship between MyProgrammingLab grades and successful completion of the course: students who earned an A or B in the course had significantly higher MyProgrammingLab homework scores than students who earned a C, D, or F (figure 1). In addition, there is a significant correlation between MyProgrammingLab homework scores and average quiz scores. It appears that the first-hand programming experience the students gained in MyProgrammingLab helped prepare them for their other course assessments (figure 2).

Some students occasionally skipped homework assignments. Analysis reveals that the more homework assignments a student skipped, the lower his or her course grade (figure 3). As MyProgrammingLab counts as only 10 percent of the final grade, Carrier notes that learning via MyProgrammingLab assignments transferred to other course assessments, which in turn led to higher course grades. To point, students who skipped three or more MyProgrammingLab assignments achieved an average final course grade of 60 percent.

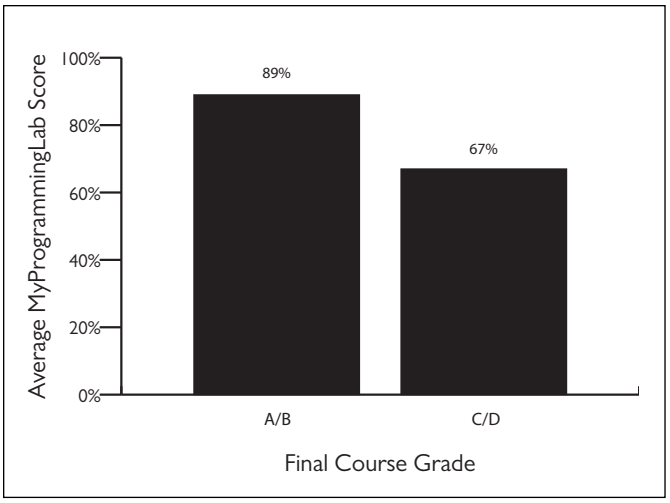

Figure 1. Relationship between Average MyProgrammingLab Homework Scores and Final Course Grades, Fall 2013, (*n*=32)

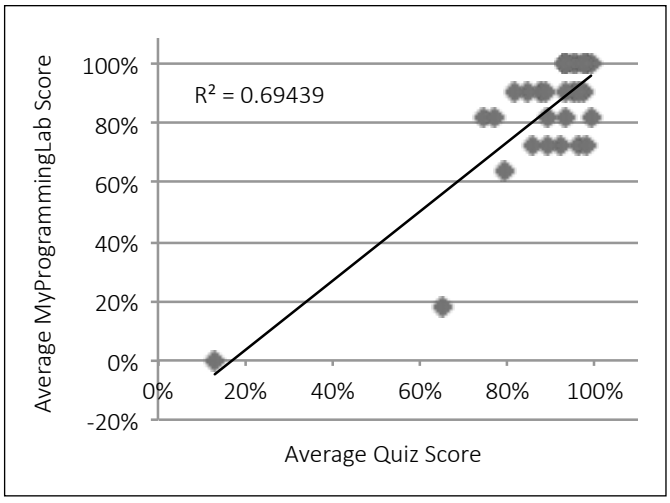

Figure 2. Correlation between Average MyProgrammingLab Homework Scores and Average Quiz Scores, Fall 2013, (*n*=32)

The Student Experience

Students find some of the MyProgrammingLab questions to be quite challenging, even though the program does break down problems into shorter sequences of exercises, where each sequence relates to a particular topic. The level of sophistication increases gradually and can get demanding quickly. It is considerable work to do this kind of programming outside lab. That said, the program is having an impact on student success and students like having the immediate feedback for their errors.

When asked to describe the greatest benefit of MyProgrammingLab, students had the following comments:

- "When [MyProgrammingLab] shows me my errors in code compilation and offers tips to help me correct my coding."
- "Doing the [MyProgrammingLab] problems helps me mitigate the small errors I write in Python. They help me understand and be more comprehensive in my writing."
- "[MyProgrammingLab] assignments make me think out of the box for answers. It also helps me practice more."
- "MyProgrammingLab helps me better understand the course material. It breaks it into steps and makes learning and everything easier."

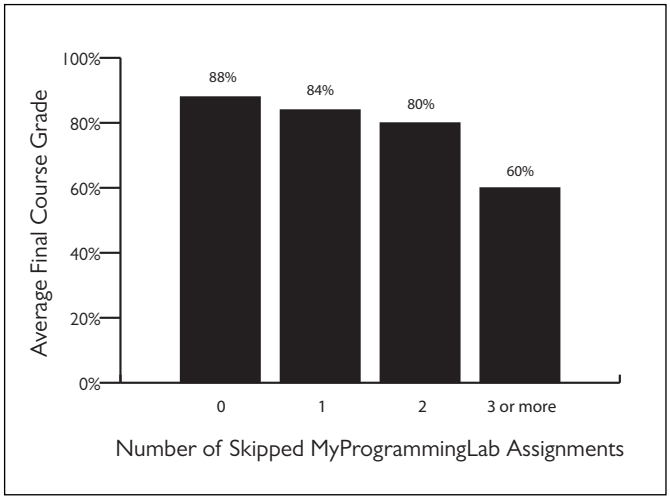

Figure 3. Relationship between Average Final Course Grades and Number of Skipped MyProgrammingLab Assignments, Fall 2013, (*n*=32)

Conclusion

MyProgrammingLab both challenges Carrier's students and provides them with the additional practice they need to succeed in the course. The program's immediate, personalized feedback helps students identify likely causes for their incorrect answers, leading to greater comprehension of course concepts.

In addition, the MyProgrammingLab gradebook helps Carrier to identify at-risk students before it's too late. He contacts those students and offers outside assistance or tutoring that they may not have asked for on their own. These interventions can make all the difference for students, particularly in online classes where there is more anonymity and less direct student contact.