Washington State University Case Study

Pullman, WA



Study Specifics

School Name
Washington State University

Educator
Sandy Cooper

Course Name
Math 106: Precalculus College Algebra and Math 108: Precalculus Trigonometry

ALEKS Implementation
Traditional lecture

Course Setup
ALEKS College Algebra with Trig, ALEKS PreCalculus, Miller: *College Algebra*, 2e

Enrollment
Math 106 = 491 students
Math 108 = 370 students

Introduction

Prior to using ALEKS, the biggest challenge Washington State University faced was high Drop/Fail/Withdrawal rates in its precalculus classes. The vast majority of students in the precalculus sequence are preparing for calculus, as opposed to having a mixed audience. Thus, the school maintains a high level of rigor in these classes so that students who pass have the algebra and trigonometry skills needed for success in calculus.

Washington State began using ALEKS in the fall of 2008. Sandy Cooper, Associate Professor and Director of Foundational Studies, noted that after using ALEKS for a couple of semesters and doing some preliminary analysis comparing the success of students who used ALEKS to students who didn't, she became a believer and advocate for its use wherever it made sense in the curriculum.

ALEKS Experience

Washington State's current implementation ensures that ALEKS works to its best advantage for its students. The school found that most of the out-of-class practice was best accomplished by ALEKS because of the following:

- **Students have help readily available through written explanations and short videos.**
- **The mastery-based, adaptive learning ensures students are truly mastering content efficiently.**
- **Students are never given a topic that they are not prepared to learn.**
- **The ALEKS Support Staff are readily available and assist both students and faculty when issues arise.**

For the precalculus sequence, Washington State temporarily switched to another textbook and online homework system in the fall of 2014 that looked appealing to our tech-savvy students. After a year and a half with this system, the pass rate plummetted from 51% to 36%. The school switched back to a McGraw Hill text and ALEKS as the course supplement in the spring of 2016, and the pass rates rose again to an acceptable level of 59%. For Washington State, student success is of utmost importance, and ALEKS has become a critical ingredient to that success. The school now uses ALEKS for the developmental math courses in addition to the precalculus sequence.



Implementation

Math 106 and Math 108 are traditional in terms of how the class time is spent. For out-of-class work, students have a combination of ALEKS and written homework assignments. The courses use letter grades based on in-class work, completion of ALEKS modules, written homework, and exams.

ALEKS is divided into modules that correspond with the flow of the textbook; the ALEKS gradebook is then used to track student progress in the program. The final exam is paper and pencil. Students are placed into Math 106 and Math 108 either through obtaining the appropriate cut score in ALEKS PPL or by passing the prerequisite course.

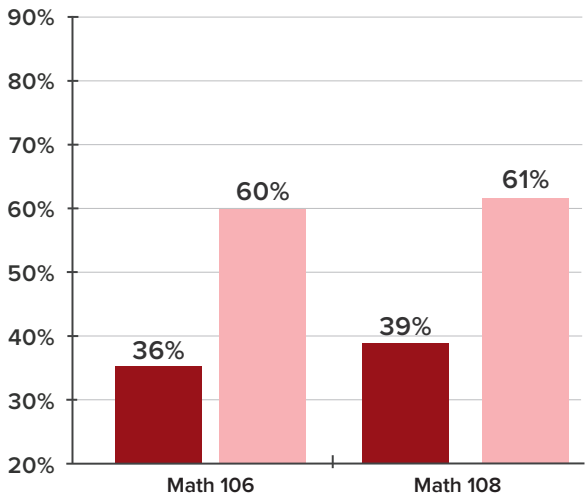
Results Achieved

For Math 106, the lowest pass rate was 36% when Washington State had switched temporarily to another online homework system in the fall of 2014. After switching back to ALEKS in the spring of 2016, the pass rate has been up to 60%. For Math 108, the lowest pass rate was 39% (again during the time the school switched away from ALEKS). After returning to ALEKS, the pass rate rose to 61% (Figure 1).

Washington State attributes quite a bit of the success to ALEKS, but is continually tweaking the design of these classes to improve student success. When ALEKS was first adopted in 2008, there was some resistance because it was a new program. Now that ALEKS is well incorporated in the classes and can speak to the advantages of using it for student learning, negative student comments are rare. Students admit that when they do the required work, it really benefits them.

> **After comparing the success of students who used ALEKS to students who didn't, I became a believer and advocate . . . Student success is of utmost importance to us, and ALEKS has become a critical ingredient to that success."**
>
> – Sandy Cooper

Figure 1
Passing Rates for Precalculus Sequence



Institution Profile

Founded in 1890, Washington State University is one of the country's top public research universities. It spans five campuses and serves nearly 30,000 students annually in undergraduate, graduate, and post-graduate studies.

Instructor Profile

Sandy Cooper has been at Washington State University since 1988, just after she completed her PhD from Colorado State University. Her research interests started in Rational Approximation Theory, but have shifted more recently to Mathematics Education. Teaching has always been a passion of hers, and this research area allows her to blend her research interests with her love of teaching. She is currently the Director of the Foundational Curriculum (often referred to as service courses).

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