

MyLab educator study observes increased retention rates in College Prep Math at College of Western Idaho

Key Findings

- Retention rates increased 29 percentage points after redesigning to an emporium format.
- A prescriptive orientation period with specific benchmarks provided students a firm foundation, while flexibility in the course format throughout the remainder of the semester met their academic and personal needs.
- Weekly communication between Group Instructors and students ensured personal contact in this large emporium course.

Study Specifics

School: College of Western Idaho, Nampa, ID
Course name: College Prep Math
Course format: Emporium
Course materials: MyLab Math in MyLabsPlus for *Developmental Mathematics* by Trigsted

Timeframe: Fall 2016–Spring 2017
Educator: Carol Crothers
Results reported by: Julie Labbiento, Pearson Customer Outcomes Analytics Manager

Setting

- Locale: The [College of Western Idaho](#) (CWI) is a comprehensive community college offering a full range of academic and career-technical courses leading to associate's degrees, continuing education, and certificates.
- Enrollment: approximately 17,000 credit students
- Part-time students: 88%
- Female students: 57%
- Online students: 21%
- Ethnicity/race: 34% minority
- Student/faculty ratio: 22:1

About the Course

[College Prep Math](#) is designed to prepare students for transfer-level college math courses through mastery-based learning-lab instruction. A diagnostic test is administered to create an Individualized Learning Plan for each student.

- Mastery of Units 1–4 is necessary to meet the prerequisite for Math for Modern Society. Topics include basic algebraic equations, solving equations, using equations in problem solving, equations including fractions and decimals, basic geometry formulas, mean, median, mode, ratio, proportion, percent, real numbers and algebraic expressions, linear equations, inequalities in one variable, and graphs of linear equations.
- Mastery of Units 1–6 is necessary to meet the prerequisite for Elementary Statistics. In addition to those listed above, topics include exponents, polynomials, and factoring.
- Mastery of Units 1–12 is necessary to meet the prerequisite for College Algebra or Precalculus. Additional topics in this set of units include inequalities in two variables, systems of linear equations and inequalities, rational expressions and equations, introduction to functions, radicals, rational

exponents, quadratic equations and functions, transformations, composites, inverses, and exponential and logarithmic functions and equations.

The course may be worth one to six credits, depending on the number of units required in each student's Individual Learning Plan. Students are restricted to a maximum of three credits per semester, so it may take more than one semester for a student to complete the course. A non-graphing calculator is allowed.

Challenges and Goals

The CWI Math Department sought to design and implement a new delivery system for college preparatory math at its Nampa County and Ada Center campuses to allow students to complete their curriculum in a modular, self-paced emporium format structured to help more students enroll in a transfer-level course earlier in their college careers. The traditional sequence of three developmental math courses (Prealgebra, Beginning Algebra, and Intermediate Algebra) was reshaped into one college preparatory component called College Prep Math, delivered using MyLab™ Math at Math Solutions Centers (MSCs) facilitated by qualified instructors. Carol Crothers, Manager of the MSCs, says they recognized that the student body in a college preparatory math class is very diverse and, therefore, a one-size-fits-all approach to instruction doesn't serve the greater need. In the new format, the department planned to provide students with Individualized Learning Plans to concentrate only on areas of deficiency, rather than requiring students to spend time on coursework in which they are already proficient. They also hoped to increase retention rates, ultimately leading students to transition more quickly to their college-level courses, thereby saving them money and expediting their time to degree completion.

Implementation

College Prep Math is designed to provide each student with a unique curriculum, tailored to his or her specific proficiency level and degree path, with opportunities for both review and acceleration. At the beginning of the College Prep Math course, students take a diagnostic test using [MyMathTest](#). All of the objectives required for the course are grouped into units on the diagnostic test, and any units in which the student can demonstrate mastery are automatically removed from that student's assigned workload for the semester, referred to as their Individual Learning Plan, or ILP. A student must earn at least 80% in units containing pre-algebra objectives and at least 70% in all other units to have them waived from the ILP. By eliminating objectives that are already mastered, students are able to spend more time working on those non-mastered objectives than they may have in a traditional lecture course.

College Prep Math courses are held in one of two Math Solutions Centers, located at the Nampa County and Ada Center campuses. Each [Math Solutions Center \(MSC\)](#) offers an 88-seat, scheduled-lab classroom, with availability for students to drop in to work outside of their set class time. Crothers shares that the MSC is a community of learners. It is a place for discovery, learning, and sharing, where the faculty provide just-in-time assistance on math content, course navigation, and study skills. She notes that the students themselves are also a source of assistance for their fellow classmates. Students working on similar content are encouraged to gather at the white boards and work together to solve problems.

The course is designed to be both prescriptive and flexible for the student. The Individualized Learning Plans, a well-defined communication component between instructor and student, and specific benchmarks that must be met early in the semester provide a firm foundation for students. All work is done in MyLab Math and faculty utilize the [coordinator course](#) feature to ensure consistency between sections. The [prerequisites](#) feature is employed to guide students through the material.

The first two weeks of the semester are viewed as orientation weeks, according to Crothers, with students encouraged to attend their scheduled classes in the MSC and complete specific work. Classes meet twice a week for 75 minutes with up to 60 students per section, leaving 28 computers available for drop-in students and testing. During this time, faculty orient the students to the course format and give them time to get accustomed to the workload. Faculty also give students guidance on best practices to use when studying for the course, as well as how to gauge their performance and modify their study habits accordingly to achieve the best chance for success. Students are advised to spend at least two to three additional hours per week working on the course and more if they are not meeting the benchmarks set in their Individualized Learning Plans.

Week 1 Activities

During the first week in the MSC, students set up their MyLab Math account, fill out their ILP, and start their first homework assignment in MyLab. Students also choose a Group Instructor on [Blackboard](#), who will have weekly communication with them regarding their progress during the semester.

- **Individualized Learning Plan:** The diagnostic test given prior to the beginning of the course informs a student's Individualized Learning Plan (ILP). During the first week of the course, students consult their ILPs to confirm which units have been assigned as their curriculum. These units are based on those required as prerequisites for their subsequent college-level course and those eliminated due to proficiency on their objectives. The ILP guides the student on what topics to work and gives a sense of the pace required for them to complete their full ILP by the end of the semester. One student raved, "I really liked our individual learning plan — it kept me on task and I can see where I am in the semester so it didn't feel daunting." There is no limit on the number of units a student can complete in a semester; students who are able to accelerate may complete more than their assigned units, where students needing more time to review objectives may require more than one semester to complete their transfer-level math course prerequisites by choosing to develop and ILP with fewer units.
- **MyLab homework:** In the first week, students begin coursework by completing their first MyLab homework assignment for their initial unit, as determined by their ILP. Throughout the course, students are required to complete up to eight MyLab homework assignments per unit, with all [learning aids](#) available. A minimum score of 90% must be earned before they are allowed to move on to a homework quiz, but students have unlimited attempts to reach mastery, and faculty encourage students to strive for scores of 100% on all homework. In voluntary survey responses, students expressed appreciation for the MyLab tools and unlimited attempts, sharing, "I think being able to go over, over, and over a problem in the homework assignments is critical to learning material," and "It has impacted my learning because I no longer fear math. With time and effort and the examples, it gave me confidence to learn the math."
- **Group Instructors:** The College Prep Math design provides students with a team of instructors to assist with each student's journey through the course. In addition to the MSC classroom instructor, each student is also required to go to the course shell in [Blackboard](#) and choose a Group Instructor. This Group Instructor may or may not be one of the student's classroom instructors, with the latter arrangement providing the student with multiple independent sources of support for the course. Said one student, "[Having a Group Instructor] enabled me to ask for help when I needed it and helped me stay confident in my work."

Week 2 Activities

Second week activities include learning about taking MyLab quizzes and tests, identifying resources in Blackboard and MyLab, and filling out the Week 1 Progress Check. Said one student, "I always struggled with math before taking this course. This course has helped me go at my own pace and understand the concepts

completely before moving on. There are many resources available to help me understand the concepts, so I never feel lost.” By the end of the second week, all students are expected to have completed, but not necessarily mastered, at least one quiz in MyLab. Students not completing the Week 2 requirements are dropped from the course.

- **Weekly Progress Checks:** While the Group Instructors do serve as facilitators in the MSC, it is not expected that students meet with their chosen Group Instructors face to face. Rather, these instructors are available to answer emails, provide guidance, and are required to have weekly communications with their students regarding their progress. Beginning in the second week, students fill out Weekly Progress Checks for the previous week and submit them to their Group Instructors as part of their weekly communications requirement. Based on these and other interactions with their assigned students, Group Instructors provide the students with feedback, offering guidance and tips, such as time management advice or study skills reminders, all aimed to keep the students engaged with a positive attitude, propelling them forward in the course.
- **MyLab quizzes, unit tests, and comprehensive exams:** Once the necessary homework prerequisite is met, students take a unit quiz in MyLab. By the end of the second week, all students are expected to have completed, but not necessarily mastered, at least one quiz in MyLab. Up to ten attempts are allowed to reach the 90% mastery level necessary to move on to the unit test, but again, faculty encourage students to earn the highest score possible. Quizzes are not password-protected and are accessible from any location.
- **MyLab unit preps and tests:** Faculty have created unit test preps in MyLab, offering students the opportunity to review their skills prior to taking the actual assessments. Students must earn at least 80% on each unit test prep to gain access to a unit test. Students then have five attempts on each unit test to earn at least 80% on that assessment. Once mastery on a unit test has been reached, a student may move on to either the next unit or the comprehensive exam prep for the set of units just completed. While unit test preps are accessible from any location, all unit tests are password-protected and must be taken in the MSC. If a student does not earn a score of 80% or better on a unit test, the student must review the test with an MSC faculty member. The faculty member then gives the student a “golden ticket” that will allow the student to attempt the unit test again. Unit tests must be retaken in the MSC at least one day following the previous attempt; a student may not attempt a unit test twice in the same day. This ensures that students have given themselves ample time to review before their subsequent attempt.
- **MyLab comprehensive preps and exams:** Four comprehensive exams are incorporated into the course, based on the prerequisite units of the course that are needed for enrollment in a transfer-level course.
 - Comprehensive exam over Units 1–4, required for Math in Modern Society
 - Comprehensive exam over Units 5–6, required for Elementary Statistics
 - Comprehensive exams over Units 7–9 and Units 10–12, required for College Algebra or Precalculus

Students whose diagnostic test score places them in a unit within the range of a comprehensive exam must complete the exam for the whole group. A MyLab prep is built for each exam and students must earn at least 70% on the prep for the exam to become available. The comprehensive exams are delivered online in MyLab, populated with questions from the preps. Comprehensive exams are password-protected and proctored in the MSC. A student who does not earn at least 70% on a comprehensive exam must review with an MSC faculty member, before being issued a “lavender ticket” that will allow the student to take another attempt on the exam. As with unit tests, any retake of a comprehensive exam must be done in the MSC at least one day following the previous attempt.

Autonomy, with support

“A one-size-fits-all approach to instruction doesn’t serve the greater need.”
—Carol Crothers, College of Western Idaho

After the second week of classes, students are given quite a bit of autonomy as they proceed through the course, with the faculty continuing to offer guidance to help them make good decisions as they work. Crothers shares that faculty want the students to be successful and to complete the material in the most efficient manner to them. As the semester progresses, students work on the appropriate homework, quizzes, unit tests, and comprehensive exams, as defined by their ILPs. They also continue to report on the progress of their ILPs in weekly reports to their Group Instructors via ILP Progress Checks in Blackboard. But, Crothers says, if working remotely is best for students academically, faculty support them and encourage them to do so. Students appreciated this accommodation, with one sharing, “I can work from home, since it is difficult for me to get to the lab.”

Best practices shared

No matter where they work, students are reminded that, while faculty are always there to assist them virtually, the most effective way to get assistance is by attending the MSC and asking questions. They are also encouraged to maintain the two-to-three-hour weekly work time as a guideline, with the course syllabus advising, “Only if you are making progress and staying up to date on your ILP, obtaining the required level of mastery on homework and quizzes, and successfully completing your proctored unit tests, should you attempt to spend less than two to three hours/week in the MSC. Indications that you need to be spending more time are a lack of steady progress or consistently taking more than five attempts on quizzes.” Students are reminded to study the unit content in MyLab via the eText, PowerPoints, video lectures, or animated explanations, in addition to asking questions of the MSC instructors. Faculty also recommend that students keep all work on homework, quizzes, and prep assignments in an organized notebook, making it easier to review for unit tests and comprehensive exams and for quick reference when asking an instructor for assistance. “It really put all of the pressure and decision-making on me, which I think has prepared me for other things,” said one student.

If a student completes all content required for the units assigned in the ILP prior to the end of the semester, the student is exempt from attending the MSC for the remainder of the semester. In addition, while the ILP determines a set number of units to be completed to earn a passing grade in the course, MyLab allows students to step down to lower units for independent review at any time. The use of prerequisites also enables students to work beyond their ILP, provided they meet the set mastery levels. Constant communication with instructors helps students stay on track, even if they choose to work outside of their ILPs.

Assessments

College Prep Math is a pass (P) or no pass (NP) course. A student receives a grade of P if, by the end of the term, the student successfully completes the number of units of course content identified on the initial ILP used to assign the number of credits in which the student is enrolled. A unit of content is deemed completed if a student demonstrates mastery by scoring 80% or higher on the unit test.

If a student has not completed the necessary units, the student receives a grade of NP. All completed units, as determined by scoring an 80% or higher on the unit test, remain on the student’s record. Units incomplete at the end of the semester must be restarted in a subsequent semester.

Results and Data

The Math Department hoped that their new implementation as an emporium course would help to increase the retention rate. The emporium format would allow students to focus on the skills they needed to master, rather than being forced to work on content that they already knew, leading to apathy. It would also make strides to alleviate student anxiety and potential course withdrawal, as they would no longer be required to attend lectures on content that they were under-prepared to comprehend. Retention rates for the traditional three-course sequence and the College Prep Math implementations were examined. The data show that retention in the emporium course was 29 percentage points higher than retention in the traditional sequence for the specified time periods (figure 1).

Comparison of retention rates

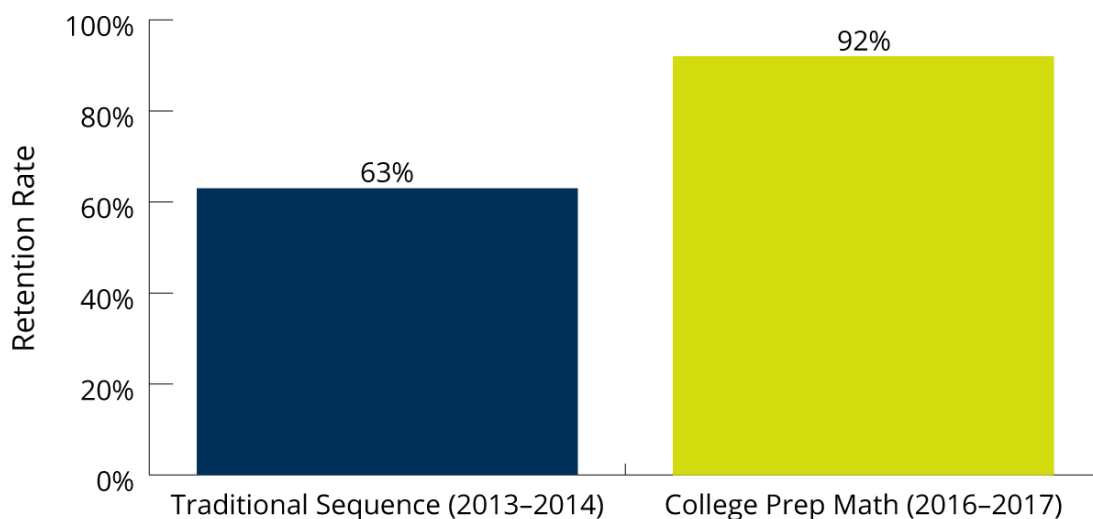


Figure 1. Comparison of Retention Rates Pre-implementation, Fall 2013-Spring 2014 ($n=4,386$) and Post-implementation, Fall 2016-Spring 2017 ($n=3,064$)

Figure 2 explores the distribution of students based on their final ILP unit assignments for Fall 2016 and Spring 2017. For example, if a student's ILP assigns him or her to complete Units 2-4, the student is represented in the Level 1 group. If a student's ILP requires him or her to complete Units 2-5, the student is counted in the Level 2 group. The data show that the greatest number of students were enrolled in the Level 2 group for Fall 2016, with nearly twice as many students in Level 2 than Level 1. In Spring 2017, however, those two levels held nearly equal enrollment, with Level 4 containing the most students. In both semesters, Level 3 held the least number of students.

Distribution of students by level

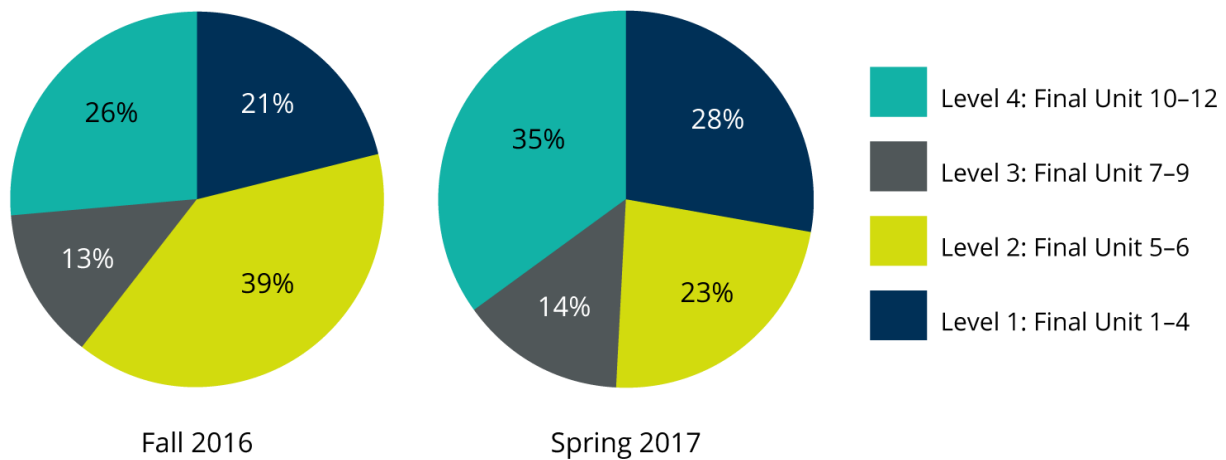


Figure 2. Distribution of Students by Level, Based on Final Unit Assigned, Fall 2016 ($n=1,549$) and Spring 2017 ($n=1,330$)

Crothers says that the College Prep Math course is designed to allow students the flexibility to move at their own pace, charging ahead when they are able to master topics quickly and slowing down to review where necessary, all within the MyLab course shell. As one student commented, “I appreciate the flexible, learn-at-your-own-pace style a lot. You progress when you have learned something, not just because everyone else is progressing.” In a deeper dive into the activities of the students represented at each of the levels, several results surrounding students’ independent work were revealed. The analysis for the results below includes students from both semesters in the time frame of the study.

- 5% of all students chose to independently work ahead onto units that were not assigned on their ILPs.
- 8% of all students chose to independently review assignments in previous units that were not assigned on their ILPs. This activity was more likely to occur with students in the upper levels, with an average of 13% of Levels 3 and 4 students reviewing in earlier units compared to an average of 3% of Levels 1 and 2 students.
- More students in Level 1 successfully completed their ILPs, with a success rate averaging 17 percentage points higher than the other levels.

The Student Experience

In an anonymous, voluntary survey given to the Spring 2017 cohort (16% response rate), students shared their views on the various initiatives incorporated into the course by CWI math faculty. When asked what they liked best about the course, the top three terms appearing in open-ended responses included pacing, instructor, and resources. In particular, students shared:

- *“I loved the set up online, the planning structure and the freedom to complete on my own time, particularly the ability to go ahead.”*
- *“I absolutely liked reading the PowerPoint slides. I thought they were very helpful for the assignments.”*
- *“The multitude of instructors to consult. Various approaches lead to multiple ways of presenting the work.”*

Selected results from other survey questions are displayed below.

In this math class, how important was it for you to do the following?	Percent responding important or very important
Come to the MSC each week	62%
Use the MyLab Math resources (PowerPoints, videos, eText) before attempting the homework	86%
Keep up with the schedule as listed on the ILP	83%
After taking this math class, how prepared are you to do the following in your next course/courses?	Percent responding important or very important
Think critically and analytically	78%
Ask for instructor help when needed	82%
Use MyLab Math learning tools (Help Me Solve This, View an Example, Similar Problem, review tests and quizzes)	92%
Manage your time effectively	79%
Learn effectively on your own	84%
Completing work in MyLab Math...	Percent responding agree or strongly agree
...has prepared me for future courses	77%
...has allowed me to be successful in this class	78%
...allowed me to work at my own pace and devote more time to the specific areas that are difficult for me	81%

Conclusion

While the term “emporium” can often erroneously conjure visions of students working in a lab setting with little to no instructor contact, this is not at all what the College of Western Idaho’s Math Department had in mind when creating its College Prep Math course. Designed to provide students with rigor and a solid foundation for future success in math, as well as flexibility to meet their academic and personal needs, the multiple MSC locations, weekly instructor-to-student communications, and Weekly Progress Checks with students, mean that instructors know what and how their students are doing and are able to provide just-in-time assistance. Required Group Instructors, in addition to classroom instructors, give students multiple options when they need help. The department also made sure that effective study skills and strategies were built into the course, offering unlimited attempts on homework and multiple attempts on other assessments to allow students to constantly strive towards improvement and mastery, and recommending the organized notebook to teach students the value of keeping track of their progress and work. With improved retention and students taking advantage of the remediation and acceleration opportunities in MyLab, the new course is delivering results.