

Improving Placement and Retention Rates with the Use of Mathematics Review Courses

Anyone who has ever taught developmental mathematics knows there is a problem in course placement. Some students test well and place clearly above their level, while other students place below their real capability because they either have been away from math for a number of years, or did not prepare for the assessment test. In either case, they end up wasting their time and money. Montgomery College offers two review courses that cover the developmental math sequence of Prealgebra, Elementary Algebra, and Intermediate Algebra. These review courses have proven to do a more accurate job of placement. In addition to helping the placement effort, we have found that the retention rate has dramatically improved.

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At nearly every community college, more freshmen place into developmental math than most educators and legislators think appropriate (Hoyt & Sorenson, 1999). Studies show that the percentage of entering freshmen that require remedial course work varies considerably. A recent study from the Stanford University Bridge Project places the figure at 63 percent (Venezia, Kirst, & Antonio, 2003). Is the problem that all these students are underprepared for math or just underprepared for their math placement test? It is probably a little of both, but both can be helped by taking a review course prior to being placed in a mathematics class. Whether the student has been away from math for only a year or as many as 10 or 20 years, students benefit by reviewing mathematical concepts before taking an assessment test (Scanlon, n.d.).

Without the review, we have students who guess well and are placed too high and those who panic because they have not looked at a math

problem in a long time and place lower than their true capabilities. If the student is placed at too low a level, they end up wasting a semester or two because they should have been placed at a higher math level. These students may become bored with the material, develop bad study habits, and miss classes—not good traits for the next math course they take. If the student is placed at too high a level, they quickly become overwhelmed. In the worst case, they drop the class and end up dropping out of college because they know they need a math class and don't believe they will ever get there because of their experience in the class into which they were placed. Whether placed at too high or too low a level, the student has wasted a semester or two, which carries with it a high cost.

COURSE DESCRIPTION

To address this problem of placement, Montgomery College has developed two review courses that cover the developmental math sequence of Prealgebra, Elementary Algebra, and Intermediate Algebra. The first review course covers Prealgebra and Elementary Algebra and is called Fast Track. The second review course covers Elementary Algebra and Intermediate algebra and is called Advanced Fast Track. The Elementary Algebra portion is common to both courses.

These non-credit review courses are optional and are offered by our Workforce Development and Continuing Education office. The courses are designed for students who have done well in math in the past, need a review of basic concepts, and would like a fast paced, intensive review. We emphasize to all students that these courses are review courses and this is not the time to learn the material for the first time. Those students who have not seen the material before are better served by taking the appropriate semester long developmental math course.

SCHEDULING

Each review course is generally conducted over 20 hours—two hours per day, Monday through Friday, for two weeks. The courses are offered in August, January, and June each academic year. This schedule is arranged so that the student can finish the Fast Track class and then start the next semester in the course into which they were

placed. The student is tested twice in each class and these tests are used to determine the placement level. If a student does not achieve an acceptable score on the test given at the end of the first week, they are counseled to spend the second week of the class reviewing the first week's material in the math learning center using the tutoring and video tape resources available there. Then, at the end of the second week, the student can retake a form of the first test to determine if they can advance one level. Students who score well on the first test continue with the second week of the review.

In the student evaluations of the course, one common concern is the length of time. Students want more of it! We emphasize that it is a review course and feel the time is appropriate. However, we have experimented with a course over 4 weeks. In January 2003 and again in January 2004, we began a course the week before the spring semester started and ran it for four weeks. The course was offered in the morning (9:00 to 10:50 am) on a Monday, Wednesday, Friday schedule (11 classes) and in the evening (6:00 to 8:30 pm) on a Tuesday, Thursday schedule (8 classes). At the end of the Fast Track class, students were either placed into Elementary or Intermediate Algebra.

Another option for students is to take the review course online. Prior to this option, if students couldn't attend the course in June, August, or January, they were out of luck. Now, if they cannot attend the traditional instructor-led course at the specified times, students can opt for the online version and work from home. The first offering of the online course was in August 2004 and we now offer it periodically throughout the year.

COURSE PREREQUISITES

The prerequisite for the Fast Track course is at least one year of high school algebra and a test score placing them into either Prealgebra or Elementary Algebra. The prerequisites for Advanced Fast Track are an A in the regular semester-long Prealgebra course, or a score on our standard placement test indicating a certain level of math knowledge, or satisfactory completion of the Fast Track course.

COURSE WORKBOOKS

The instructional materials used for these courses are two books developed specifically for the two Fast Track courses. The book for

the Fast Track course has 22 Prealgebra lessons and 20 Elementary Algebra lessons. The book for the Advanced Fast Track course has the same 20 lessons for Elementary Algebra that appear in the Fast Track course plus 18 Intermediate Algebra lessons. Each lesson is organized similarly, with discussion and step-by-step examples, followed by exercises for the student. Following the exercises are step-by-step solutions for the exercises. At the back of each book are extra problems for each lesson with answers, but not step-by-step solutions.

RESULTS

We are now in our sixth year of offering these review courses and have had 838 students take a Fast Track or an Advanced Fast Track course. Our results indicate that the student taking either one of the Fast Track courses improves their placement level, has a higher pass rate, and receives better grades than the non Fast Track student.

After taking the review course, the students are again tested. Table 1 shows the number of students who placed down one level, placed at the same level, or who were placed one or two levels higher than previously determined by their placement test.

Table 1

Placement Levels After Taking Fast Track

| Placement level | Number of students | Percent of students |
|--------------------------|--------------------|---------------------|
| Placed down one level | 8 | 1.0% |
| Placed at the same level | 196 | 23.4% |
| Placed up one level | 276 | 32.9% |
| Placed up two levels | 105 | 12.5% |
| Placement undetermined | 253 | 30.2% |

Also shown are a large number of “undetermined” students. A student is in this category because there was no starting point available. That was the case for many students taking Fast Track in the first two years. These Fast Track students were not required to take the placement test before taking Fast Track since we gave them either the standard placement test (first year) or our own placement test (after

the first year). After the first two years, students who plan to take a course at Montgomery College are required to have a placement score on record with the college before taking Fast Track. However, we have found a number of students who take Fast Track do not plan on taking a Montgomery College math course. Some take it to review for the GRE test, others take it to review math before heading off to some other school, and still others take it so they can better help their high school son or daughter with their math homework! So, even though we strongly encourage students to have a current placement score, there are reasons when a score is not needed.

Since the second year of the Fast Track program we require the Fast Track student, who is planning to take a Montgomery College math class, to take our standard placement test prior to taking a Fast Track course and then we test them with our own tests at the end of the course to determine their placement level. In August 2003, we decided to see how a Fast Track student would do on the standard placement test after taking Fast Track and then compare that score to their placement score prior to taking Fast Track. In other words, we wanted to compare their two standard placement scores—prior to taking Fast Track and after taking Fast Track to see how much they improved their placement level.

The results were dramatic. The average score prior to taking Fast Track indicated a placement level of Prealgebra. After taking Fast Track, the placement level was Intermediate Algebra. So, on average, the student jumped past two developmental courses—Prealgebra and Elementary Algebra.

Referring to Table 1, our results show that about 45 percent of the students advance at least one level. However, if the undetermined category is left out, almost two-thirds (381 of 585 or 65 percent) of the students we measure, advance at least one level. The University of Texas El Paso has used review courses to assist in their placement efforts and have found a similar benefit. UTEP offers a shorter review course (6 hours versus 20 hours at Montgomery College) and has found that 29 percent of the students taking the review course improved at least one level (Flores et al., 2003). The experience at UTEP confirms our experience that a review course is beneficial to the placement process.

Looking at the placement level is one measure of the effectiveness of the Fast Track courses, but if the student doesn't perform well at that level, then the placement is inappropriate. So we have to look at how the Fast Track student did in the class into which she or he was placed and then compare that to how the non Fast Track student did. Table 2 shows the pass rate of the Fast Track/Advanced Fast Track (FT/AFT) student compared to the non-FT/AFT student. Note that the Fast Track/Advanced Fast Track student did better at each level—sometimes considerably better.

Table 2

Pass Rate of Mathematics Students

| Course | Pass Rate FT/AFT Student | Pass Rate Non-FT/AFT Student |
|------------|--------------------------|------------------------------|
| Prealgebra | 60% | 48% |
| Elem Alg | 63% | 44% |
| Interm Alg | 65% | 54% |

The results in Table 3 show the percentage of students who received A's or B's. The results indicate that the FT/AFT student received grades of A or B at a higher rate than the non-FT/AFT student did.

Table 3

Percent of Students who Received a Grade of A or B

| Course | FT/AFT Student | Non-FT/AFT Student |
|----------------|----------------|--------------------|
| Prealgebra | 75% | 69% |
| Elem Algebra | 66% | 55% |
| Interm Algebra | 71% | 59% |

RETENTION

Most students who start out in a developmental math course do not graduate either from a two or four year school (Laughbaum, n.d.).

Anything that we can do to improve the retention rate is beneficial. Our results show that the Fast Track student completes a college level math course at a significantly greater rate than the student population as a whole. For example, 64 percent of the Fast Track students have successfully completed a college level math class within three years after taking Fast Track. This compares to 34 percent of students who successfully completed Elementary Algebra and went on to complete a college level math class within three years.

REPLICATION

The dramatic results from our experience may motivate other schools to replicate the program. I have three suggestions for any school trying to set up a similar program. First, take some time to prepare the instructional material and customize them to fit your courses. Using standard textbooks for the two-week course would make the cost prohibitive for the student. Second, make sure you advertise the program well. Since the course is not required, many students may not hear about it or may not consider taking it. We put notices in the credit and non-credit section of the class schedule, distribute brochures to incoming freshman, hand out flyers to students taking the placement test, and even do some direct mailing to students. Third, get the support of your counselors since they are the ones who meet with each student and can advise them to take the course where appropriate.

CONCLUSION

The Montgomery College Fast Track review courses seem to put the students at a better starting level in math than a standard placement test, thereby saving the student considerable time and money. Additionally, the students taking a review course seem to stay in school and complete a college level math course at higher rates than those not taking a review course.

The success of the program has encouraged us to expand the program. By the fall of 2007, we hope to have the structure in place to require all students entering Montgomery College that test into developmental math to take the Fast Track program.

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