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Implementing CollegeReady™ to Promote Students' Preparation for College-Level Math: Jacksonville State University Case Study

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Many students who pursue postsecondary education enter college unprepared for college-level coursework. Almost two-thirds of students entering a community college and a third of students entering a 4-year college lack basic math and writing skills, and they often find themselves placed in developmental or remedial courses in their first year of college.[1] Unfortunately, students placed into remedial-math and English courses often have poorer educational outcomes; their retention and degree completion rates lag behind those of the students who enter college ready for college-level work.[2] Colleges and universities have recognized this problem, and many are taking steps to help students improve their academic preparation with the goal of reducing the need for remedial course-taking. In particular, many colleges, including Jacksonville State University (JSU), have implemented EdReady – now offered through ACT as CollegeReady – for this very purpose.

Unlike traditional placement tests, which institutions may use in a high-stakes manner to determine whether students should be placed in a remedial course, CollegeReady is a low-stakes placement system. Students can log on to the system at any time from any location and work at their own pace. If their initial CollegeReady score falls below the institution's target score, students can view study options and follow a personalized learning path to fill gaps in knowledge and skills. Using this approach, many students raise their scores and avoid remediation. In partnership with JSU, ACT researchers examined the relationship between incoming students' initial and most recent EdReady math scores with course placement decisions and math course outcomes. Preliminary findings from this study suggest that CollegeReady can help students bolster their math preparation and be successful going directly into college-level courses.

Course Placement and Course Grades

In the fall of 2015, JSU offered more than 1,100 incoming students the opportunity to use EdReady between the time they matriculated to the start of their first semester. The objective was to help students prepare for their first math courses at JSU, especially for the students identified as needing remediation based on their admissions test scores. For placement purposes, JSU established a target math score of 43 for placement into lower-level, credit-bearing math courses and a target score of 70 for upper-level, credit-bearing math

Note: This report was updated in April, 2019 to correct the EdReady target score for upper-level mathematics courses at JSU. For the 2015-16 school year, a target score of 70 instead of 80 was used for suggesting upper-level mathematics course placement.

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Table 1. Suggested Math Placement by Math Score

Tests	N	Below 43, Developmental (N)	43 to 69, Lower-Level, Credit-Bearing (N)	70 or Higher, Upper-Level, Credit-Bearing (N)
Initial Test	753	20% (153)	68% (510)	12% (90)
Most Recent Test	753	13% (95)	40% (299)	48% (359)

Table 2. Distribution of Initial and Most Recent Math Scores

Initial Test Score Range	Most Recent Test Score Range			
	<43	43 to 69	70+	Total
<43	90	22	18	130
43 to 69	0	254	224	478
70+	0	0	86	86
Total	90	276	328	694

Note: Shaded area indicates students who raised their math scores to avoid remedation and/or moved up from a lower math course category to a higher math course category.

courses.[3] JSU advised students with scores below 43 to take a remedial math course. However, JSU allowed students to enroll in either remedial or credit-bearing math courses regardless of their scores. See Table 1 for breakouts of the 753 JSU students by their initial and most recent math scores.

As shown in Table 1, 153 (20%) students failed to meet the target score of 43 based on their initial math score. However, using EdReady resources, that number dropped to 95 (13%).

Of the 753 students with math scores, 694 students took their most recent math test before the semester began. Table 2 contains breakouts of these 694 students by their initial and most recent test scores. Of the 130 students who had an initial math score below 43, 40 raised their math score above the target score, indicating readiness for college-level math coursework. In other words, 31% of the students who did not initially meet the target score for math and then utilized EdReady's learning path were able to achieve the score needed for credit-level coursework.

Given the low-stakes nature of the EdReady college readiness system, it was important to ensure that math score gains reflected true learning and not artificial test score gains. Therefore, whether students who avoided remediation by raising their math score were as successful in their college-level math courses as their classmates who initially met or exceeded the target score for lower-level, credit-bearing courses was examined. Among the 40 students who raised their math scores enough to avoid remediation, 29 enrolled in a math course that was consistent with JSU's math course placement recommendations; 13 enrolled in a lower-level, credit bearing course and 16 enrolled in an upper-level, credit bearing course.

31% of the students who did not initially meet the target score for math and then utilized EdReady's learning path were able to achieve the score needed for credit-level coursework.

In lower-level, credit-bearing math courses, the 13 students who avoided remediation through raising their math scores succeeded at a rate somewhat higher than that of the students who initially had math scores in the 43 to 69 range, as shown in Table 3. Specifically, 77% of students (10 of 13) who initially earned a math score below 43 but raised it to the 43 to 69 range earned a C or higher in their lower-level, credit-bearing math courses as compared to 69% of students who were classified as ready based on their initial math score.

In upper-level, credit-bearing math courses, the 16 students who avoided remediation by raising their math scores to 70 or higher were not as successful as the students who had moved up from the 43 to 69 score range and the students with initial math scores of 70 or higher (see Table 4). Students who moved up only one level – from the 43 to 69 score range to the 70 to 100 score range – fared as well as the students who initially had a score of 70 or higher. Note that the percentages in Tables 3 and 4 are based on very small sample sizes and should be interpreted with caution.

Probability of Success

The optimal target scores for math placement at JSU were estimated using logistic regression. Specifically, the most recent EdReady math test scores (as well as the ACT© mathematics test scores, for reference) associated with a 50 percent chance of earning a course grade of B or higher in lower-level and upper-level credit-bearing math courses were estimated. Table 5 contains the results of these analyses.

A score of 43 was estimated as the optimal target score for the lower-level, credit-bearing math courses, exactly the target score used at JSU. Students meeting this target score can avoid remedial math coursework, fulfilling one of JSU's objectives, and the 50 percent chance of earning a grade of B or higher in these math courses matches the standard that ACT has used for its College Readiness Benchmarks.[4] Turning to the

Table 3. Academic Performance in First Math Course, Lower-Level, Credit-Bearing Math Courses

Initial Math Test Score Range	Most Recent Math Test Score 43 to 69		
	N	Course Grade C or Higher	Course Grade B or Higher
<43	13	77%	69%
43 to 69	81	69%	54%
Total	94	70%	56%

Note: Shaded area indicates students who raised their math scores enough to avoid remediation.

Table 4. Academic Performance in First Math Course, Upper-Level, Credit-Bearing Math Courses

Initial Math Test Score Range	Most Recent Math Test Score 70+		
	N	Course Grade C or Higher	Course Grade B or Higher
<43	16	50%	31%
43 to 69	196	86%	70%
70+	70	87%	77%
Total	282	84%	70%

Note: Shaded area indicates students who raised their math scores from 69 or lower to 70 or higher.

Table 5. Optimal Target Scores for Most Recent EdReady and ACT Mathematics Test Scores at JSU

Level of Math Courses	Measure	N	Target Score	Probability of Earning a Grade of:	
				B or Higher	C or Higher
Lower	EdReady	139	43	.50	.64
Lower	ACT Mathematics	188	17	.50	.68
Upper	EdReady	396	60	.50	.69
Upper	ACT Mathematics	511	20	.50	.74

upper-level math courses, the optimal target score was 60, 10 points below the target score set by JSU. However, JSU had intentionally set the target score for the upper-level math courses high because they wanted to be sure that students entering upper-level math courses were adequately prepared. Students who scored a 70 – the JSU recommended target score – on their most recent math test had a 60 percent chance of earning a grade of B or higher and a 77 percent chance of earning a grade of C or higher in the upper-level math courses. These high probabilities of success support JSU's decision to set high standards for placement into these courses.

Conclusions

The preliminary results from JSU are encouraging. Offering students the opportunity to work independently to improve their math skills before entering college leads to fewer students requiring remedial coursework and higher levels of success in credit-bearing math courses. Students who avoid remedial coursework increase their likelihood of persisting in their studies and ultimately earning a degree, as do students who earn higher grades in their first year of college. As more data becomes available, ACT will continue to evaluate whether these findings generalize to other higher education institutions. Specifically, as the number of institutions implementing CollegeReady increases, ACT will analyze usage data to verify that the features of the CollegeReady system do, in fact, result in the intended outcomes, such as accurate course placement, gains in math and English knowledge and skills, as well as successful postsecondary course performance and completion.

Notes

1. Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation (National Educational Longitudinal Study - NELS: 88). *Journal of Higher Education, 77*(5), 886-924.

Bailey, T., Jeong, D. W., & Cho, S. W. (2010). Referral, enrollment, and completion in developmental education sequences in community colleges. *Economics of Education Review, 29*(2), 255-270.

U.S. Department of Education, Institute of Education Sciences (2014). Percentage of first-year undergraduate students who reported taking remedial education courses, by selected student and institution characteristics: 2003-04, 2007-08, and 2011-12 [Table]. *National Center for Education Statistics.* Retrieved from https://nces.ed.gov/programs/digest/d15/tables/dt15_311.40.asp.

2. Barry, M. & Dannenberg, M. (2016). *Out of pocket: The high cost of inadequate high school student achievement on college affordability.* Washington, DC: Education Reform Now.

3.The EdReady math assessment used at Jacksonville State University was a customized instrument that measured the skills Jacksonville State University considered important for success in their math courses. The skills measured in ACT CollegeReady assessments are more uniform than those in the customizable

EdReady assessments. Given this customization, the score scale of this version of EdReady is not comparable to the score scale of ACT CollegeReady. Thus, the target scores derived here should not be used as the basis for setting target scores at other institutions. Furthermore, we recommend that institutions conduct local placement studies to develop target scores that meet the unique needs of their institution.

4. Allen, J., & Radunzel, J. (2017). *What are the ACT College Readiness Benchmarks?* Iowa City, IA: ACT. Retrieved from http://www.act.org/content/dam/act/unsecured/documents/pdfs/R1670-college-readiness-benchmarks-2017-11.pdf.