



Student Transcript-Enhanced Placement Study (STEPS)

Technical Report

September 2013

Prepared by
Terrence Willett
RP Researcher

Summary

- The Student Transcript-Enhanced Placement Study (STEPS) helps colleges analyze the association between students' high school performance in English and math and their achievement in college English and math courses to inform discussions about practical ways to improve college placement policy and practices.
- Previous studies indicate that the use of information contained on high school transcripts may be a viable option to improve our current placement process.
- Long Beach City College (LBCC) developed data management and analysis infrastructure useful to other colleges analyzing high school transcript data.
- Grassroots efforts lead to the improvement of this infrastructure.
- Many colleges encountered data availability and data quality issues.
- Ten of the original twenty colleges were able to complete their analyses.
 - High school test scores associated most strongly with college placement in English and math.
 - High school grades associated most strongly with college grades for English.
 - Predicting college math grades is complex given the greater number of levels and test types in high school.
- Overall, these findings suggest that high school transcript data are at least partially predictive of college performance and could be used for a variety of purposes:
 - As a part of the multiple measures component of existing community college placement systems
 - As the primary measure for placement of recent high school students
 - To measure the impact of curriculum alignment efforts
 - To create advising guides for high school students
 - To inform broader policies at regional or state levels
- Other implications include the importance of data quality, research capacity, anticipating costs of policy changes, and the potential benefits of aligning high school and college curricula.
- Further research on a statewide dataset is currently underway.

Introduction

The first day of school can be exhilarating with its blend of anticipation and anxiety. Recent high school graduates entering a California community college for the first time often confront an additional burden—assessment results that tell them they have to repeat an English or math class already completed at the secondary level. As John Hetts, Director of Institutional Research for Long Beach City College often notes in his presentations, telling incoming students just out of high school that “you’re not ready for college” can be discouraging. Of particular concern is the fact that while our community colleges place the “remedial” label on these students, it may be our own placement processes that are in need of remediation.

When critically examining California community college placement systems and K-12 curricula, we may ask how aligned are California community college English and math courses to California K-12 standards? To what extent do the K-12 standards prepare students for the core English composition and college-level math courses that are articulated among California public community colleges and universities? How effective are our assessments in informing us about students’ readiness for college-level work? Of course, some students do need remediation. Some did not have a successful high school experience. Others graduated long ago and their academic skills have faded with time. However, when we consider the academic preparation of recent high school graduates from California who earned passing grades or higher in their high school courses, we may be underestimating their ability to succeed in college-level work—in part due to the underutilization of their high school course and test data for advising and placement.

In the context of these questions, a group of colleges, foundations, a system office and researchers have come together to explore responses and strategies to improve student progression through our educational systems through the Student Transcript-Enhanced Placement Study (STEPS)¹. This report documents the process and current state of STEPS, findings and implications discovered to date, and planned continuing efforts and will inform a companion practitioner brief for the field. This document begins with historical background and related efforts before turning to detailed and technical descriptions of the work in which colleges engaged. The technical sections are useful for researchers wishing to replicate or extend the work described but can be skipped by readers more interested in the final section with findings, implications, and future activities.

¹ <http://www.rpgroup.org/projects/STEPS>

What is the STEPS Project?

The RP Group—with funding from The Rosalinde and Arthur Gilbert Foundation, the Walter S. Johnson Foundation and LearningWorks and with support from the California Partnership for Achieving Student Success (Cal-PASS) and the California Community College Chancellor’s Office (CCCCO)—has been conducting a pilot project providing technical assistance on data management and analysis to a group of invited California community colleges who wish to enhance their placement and advising systems for recent local high school graduates by utilizing high school transcript information. This effort, called the Student Transcript-Enhanced Placement Study (STEPS) began in early 2012 and focuses on helping colleges replicate analyses conducted by Cal-PASS and Long Beach City College (LBCC) examining the association between students’ high school performance in English and math and their achievement in college English and math courses, respectively. STEPS analyses are intended to drive discussions about practical ways to improve college placement policy and practices.

Why are Multiple Measures for Assessment and Placement Important?

Historically, California community colleges have emphasized placement testing as an important component of addressing basic skills, also referred to as developmental or remedial education. The assumption is that accurate placement would allow for students with similar skill levels to be in the same course and receive the instruction most appropriate for advancing them to the next level in an English or math sequence. Over the years, each community college has created its own placement system under matriculation regulations that guide placement system development and validation (Matriculation Handbook 2011). These regulations were initially created by the Matriculation Act passed in 1988 and legally prevent incoming students from initially enrolling in higher-level English or math courses unless they earn a sufficient score on a placement test or have successfully completed the prerequisite course at the college. Concerns about and challenges to this approach emerged immediately. A suit (*Romero-Frias et al. v. Mertes et al.*, 1988) brought by the Mexican American Legal Defense and Education Fund (MALDEF) contested the California community college assessment and prerequisite process, suggesting it was biased and unfair and that it ignored other information such as prior coursework at other schools and colleges (Wiseley, 2009). The suit was dropped after a successful negotiation between the California Community College Chancellor’s Office (CCCCO) and MALDEF that resulted in a number of changes to matriculation practices including a requirement that community colleges not use a single test score for placement:

Multiple measures ensure that no single test score or assessment measure is used to place students into courses. Course placement on the basis of a test score by itself is prohibited [Title 5, § 55521(a)(3)] because a test score alone is not as informative and

valid for placement purposes as when applying it with another measure. (Matriculation Handbook 2011, page 2.5)

These “multiple measures” can consist of additional standardized tests, performance assessments such as essays and interviews, surveys of students’ self-efficacy, prior coursework, and other background information. A recent survey of California community colleges found that the strong majority of respondents (81%) reported using high school educational background information as a multiple measure (REL WestEd 2011). Of those, most (over 70%) reported using surveys to collect high school information while only about a quarter to a third used transcripts to verify high school background data.

Despite the changes to assessment and placement policies and practices, concerns about the efficacy of these key matriculation services persist. Test scores can seem to overshadow these additional measures; as stated by one student participating in a related study about assessment and placement in California’s community colleges, “You spent four years in your high school, and they’re judging your four years just off of that test. It puts you backwards” (Venezia, Bracco, & Nodine, 2010).

In addition, many students do not seem to appreciate the consequences of the placements until after they receive their placement test scores and realize that they cannot take college-level courses until after one or more terms of preparatory work (Venezia, Bracco, & Nodine 2010). Students often do not prepare for these tests and may not perceive the placement process as connected to their high school coursework or college registration and matriculation. Moreover, an unintended consequence of the multiple measures requirement has been to enhance the variability in college placement systems. While there are only a handful of commercial assessments and a minority of institutions develops their own tests², colleges generally set their own cut scores, use a wide range of multiple measures, employ numerous methods for collecting and verifying background information, and place variable emphases on test scores versus multiple measures (WestEd REL, 2011). Another measure used by many California community colleges is the Early Assessment Program (EAP)³ lead by the California State University (CSU) system in partnership with the California Department of Education (CDE). This program consists of an additional set of question items on the California Standards Tests (CST) administered to 11th grade students in the subjects of 11th grade English and Algebra II or Summative Math for students enrolled in Pre-Calculus. Students receive a score indicating if they are “ready for college” at a CSU. Those receiving “not ready for college” feedback can then access a series of support efforts through EAP to achieve readiness for CSU by graduation. Currently, 76 California community colleges accept either English or math EAP scores for

² <http://extranet.cccco.edu/Portals/1/SSSP/Matriculation/Assessment/ApprovedInstrumentsApril2009RevSept2011.pdf>

³ <http://www.calstate.edu/eap/>

placement⁴ with some accepting only one subject or the other and some accepting both English and math EAP results. While the number of high school students taking the EAP test has been growing, the majority of students do not take the math EAP as a student has to be enrolled in a specific level of math in 11th grade in order to be eligible to take the assessment.

Multiple measures and traditional placement tests are not the only approaches California community colleges are using for placing recent local high school graduates. There are different local and regional approaches throughout the state as high schools and colleges partner to experiment with different approaches. For example, Grossmont College, the Grossmont Union High School District (GUHSD), San Diego State University, and local elementary and middle schools with support from Cal-PASS created the English Curriculum Alignment Project (ECAP). This multi-year effort saw faculty from elementary through university level meet and align their English sequences. In fall 2009 and 2010, a pilot was conducted to allow students earning a grade of A or B in 12th grade English to enroll directly in college level composition at the community college. The fall 2009 pilot cohort had an 83% success rate (grade of C or better) compared to 70% for comparison group students and 67% for all other composition students (Linfor, Harris, & Jendian, 2011). The fall 2010 pilot cohort had an 86% success rate compared to 68% for other composition students. These early successes have been followed by an expansion of the pilot to more students. This model represents an alternative approach to placement testing for incoming high school graduates in the form of directly articulating high school coursework with college coursework. The amount of time invested by faculty to do the necessary alignment work is substantial, but is counterbalanced by cost savings in a reduced number of testing units that must be purchased and less demand for developmental courses.

The great variation in California community college placement systems can create an additional challenge for students who move among campuses. While some colleges honor each other's placement recommendations, it is not consistent or required. Not being able to transport placement results from one campus to another creates a barrier for students enrolling at more than one college and also incentivizes "placement shopping," where students take placement tests at several different colleges to achieve a higher placement. To help create more consistency for students, the Student Success Task Force⁵ recommendations call for the implementation of a statewide common assessment. In addition, there are efforts to create a statewide centralized repository of assessment data to help placement scores be more portable and to support validation research. Further, there is a growing body of evidence outlined below that detailed high school test and course performance data can provide a valuable enhancement to current multiple measure practices.

⁴ <http://extranet.cccco.edu/Divisions/StudentServices/EAP/AcceptingEAP.aspx>

⁵ <http://californiacommunitycolleges.cccco.edu/PolicyinAction/StudentSuccessTaskForce.aspx>

How Useful Might High School Data Be for College Placement?

Several studies indicate that the use of information contained on high school transcripts, such as grade point average (GPA) and standardized test scores and grades in math and English courses, may be a viable option to improve our current placement process (Belfield & Crosta, 2012; Jaffe, 2012; Brown & Conley, 2007; Brown & Niemi, 2007; Willett, Hayward, & Dahlstrom, 2008; Wurtz, 2008). However, these findings have not been incorporated into placement policy or practice on a large scale in California. In 2011, the Long Beach City College (LBCC) institutional research office replicated and extended one of these earlier studies (Willett, Hayward, & Dahlstrom, 2008) on their campus (Fuenmayor, Hetts & Rothstein, 2011). LBCC researchers used data from the California Partnership for Achieving Student Success (CalPASS) intersegmental data system⁶ to link high school transcript data from high schools in LBCC's largest feeder school district, Long Beach Unified School District (LBUSD), to LBCC course records.

The LBCC researchers used high school data including the highest level of high school English and math completed, scores on the California Standards Test (CST), and overall grades. College variables included level of first English or math course attempted and grade received in that course. Using regression analyses to assess the predictive power of high school information, they found significant associations between high school and college performance in English and math. LBCC researchers presented their findings to the LBCC community, which led to a series of discussions about how to improve the college's placement process. In turn, the institution launched a pilot effort called Promise Pathways⁷ that included placing recent LBUSD graduates based upon their high school English and math performance, which resulted in more students being placed into transfer-level English and math coursework when enrolling at LBCC. Guaranteed space in core courses incentivized students to attend full-time and to take English and math in their first year.

The first semester of the pilot showed a significant increase in the number of students taking and successfully completing transfer-level English and math (Hetts and Willett, 2012). Prior to the pilot, 13% of LBUSD graduates placed into transfer-level English in 2011 while 60% of LBUSD graduates entered transfer-level English under the Promise Pathways initiative in fall 2012. Despite the much greater number of students enrolling in transfer-level English, success rates (earning a grade of C or better) held steady with 64% of former LBUSD students in 2011 being successful compared to 62% of the Promise Pathways students in 2012. For math, 9% of former LBUSD students in 2011 placed into transfer level math compared to 30% of 2012 Promise

⁶ CalPASS is a voluntary data system of student level transcript data with encrypted identifiers to enhance security and privacy. More information on this system can be found at www.calpass.org.

⁷ <http://lbcc.edu/promisepathways/>

Pathway students. Again, despite tripling the number of students in transfer-level math, success rates remained relatively consistent with a 55% success rate for former LBUSD students in 2011 and a 51% success rate for Promise Pathway students in 2012. These results suggest that a very large number of recent high school graduates had been underplaced and in fact were prepared to engage in transfer-level work. These findings have fueled the continuation of the pilot and movement towards institutionalization. A key factor that primed this pilot was a long-standing collaborative effort called the Long Beach Promise that, among other activities, facilitated coordinated curricula alignment between K-12 and postsecondary education segments in the Long Beach area. Further, while exploring the utility of high school transcripts in college placement, the initial discussions, the actual policies put into place included a broad array of strategies. Given that LBCC implemented a suite of changes simultaneously, it would be difficult to impossible to isolate the impact of any single alteration in policy or practice.

LBCC Creates the Foundation of STEPS

In the process of conducting their analyses, the LBCC research office developed infrastructure that would prove useful to other colleges wishing to replicate this study. In particular, they developed a Microsoft Access module that automated the importation of CalPASS Plus data files into a data mart and created a file for analysis in the SPSS statistical program. They also developed a series of programming scripts in SPSS to conduct the regression analyses. Finally, they created extensive documentation that allows others to replicate their analyses and generously shared their work with the field. The infrastructure LBCC created provided the foundation for the statewide pilot replication study described in this report.

STEPS Statewide Pilot Research Questions and Implementation Technical Details

About twenty colleges were invited to participate in STEPS with resources from the Rosalinde and Arthur Gilbert Foundation, the Walter S. Johnson Foundation and LearningWorks and with support Cal-PASS and the California Community College Chancellor's Office (CCCCO). The RP Group provided technical assistance to colleges to download, process, and analyze CalPASS data from their own campus and local feeder high schools. The primary research questions driving the analyses were:

1. What is the relationship between high school performance measures both in general and specifically for English and the **level of** the first English course attempted at the community college?
2. What is the relationship between high school performance measures both in general and specifically for English and **success in** the first English course attempted at the community college?

-
3. What is the relationship between high school performance measures both in general and specifically for math and the **level of** the first math course attempted at the community college?
 4. What is the relationship between high school performance measures both in general and specifically for math and **success in** the first math course attempted at the community college?

The effort also explored data availability and data quality issues. In addition, opportunities for and barriers to making improvements in placement practices received consideration.

STEPS 1.0 – Research Limitations and Lessons Learned. During the early stages of the process, the first institutions to engage in the pilot provided feedback on the extent to which the Microsoft Access module and SPSS scripts developed for LBUSD and LBCC would function with data from their own schools and colleges. Some of the earliest analyses were hampered by a variety of issues. One challenge was inaccurate or ambiguous course coding primarily with high school courses. These courses are coded according to the California Basic Educational Data System (CBEDS) schema⁸. Originally designed for mapping faculty assignments, CBEDS codes were then applied to courses and used not only to distinguish different disciplines but also to map sequences within a discipline such as English or math. In the absence of clear and accurate CBEDS codes, these sequences have to be derived from course titles and other information that requires much more time and introduces a source of error in cases where a course title does not clearly indicate the level of a course.

Another barrier to the analysis consisted of instances where an insufficient number of years of data from a high school to adequately track students through high school and into college. While California’s community colleges have a centralized data system (the Chancellor’s Office Management Information System or “COMIS”) with data from all institutions that dates back to 1994, the analogous K-12 system (California Pupil Achievement Data System or “CalPADS”) is relatively new and still in development. The Cal-PASS data system receives voluntary submissions from K-12 districts that vary greatly in their capacity to submit multiple years of data or any data at all. In some cases, these challenges are due to information technology resource limitations or technical issues such as recent changes in information systems that make historical data difficult to access. In addition, some K-12 districts have missing data elements for some years. For example, a district may have five years of enrollment and grade data but only two years of testing data submitted to the Cal-PASS system. In cases where there are only a few hundred or fewer student records and/or several years of data missing for

⁸ <http://www.cde.ca.gov/ds/sp/cl/documents/assncodemap2010.doc>

certain data elements, regression models can suffer and institutions struggle to draw conclusions from the results.

A third major constraint discovered through the early statewide pilot was the ability of a community college research office to commit sufficient time to the analyses, especially in the face of challenges with data availability and quality. These barriers resulted in about half of the colleges not being able to participate fully in the study.

STEPS 2.0—Improvements to the Transcript Analysis Methodology. At the same time, these experiences also inspired a grassroots effort to improve the efficiency of data screening and analysis required for the transcript analysis initiative. This effort—lead by Dan Lamoree (Mount San Antonio College) with input and assistance from the LBCC research team, Dustin Tamashiro (Pasadena City College) and RP researchers—a “STEPS 2.0” Microsoft Access module was released. This new module underwent field testing among a subset of the pilot colleges leading to further refinements. Some of the significant improvements included:

- 1) A more generalized structure to better apply to any school and college
- 2) Incorporation of all file manipulation into the Access module, leaving SPSS scripts solely for performing statistical functions
- 3) A user-friendly screen to review and easily correct course codings
- 4) Expanded inclusion criteria to capture a larger number of students
- 5) Incorporation of additional variables of interest such as time between high school and college English and math courses
- 6) Additional documentation including a training video

While the 2.0 version began as a grassroots effort among the research community, the RP Group staff formally incorporated these enhancements into the pilot project and supported Dan Lamoree’s efforts. To accompany the module, the RP Group staff created a new set of SPSS scripts that included LBCC’s regressions, alternate forms of the regressions to accommodate colleges that had more limited software licenses, and two additional analyses. The first analysis was a set of bivariate correlations (both parametric and non-parametric) to help those with a small number of cases and/or a large number of missing data elements. While the regressions consider all variables simultaneously, bivariate correlations compare only two variables at a time and allow for interpretation of the more robust data elements. The drawback to this approach is that sometimes simple two-way associations can be misleading if there are other variables with a strong influence. For example, correlating a high school grade point with a college grade point alone does not account for the level of the course taken in college.

The second analysis created a set of two tables that cross the last English or math course taken in high school with the first English or math class respectively attempted in college. One table

populates the cells with row percentages to assess the level to which students are transitioning in college in relation to the highest level they completed in high school. The second table populates the cells with college success rates (grade of C- or better) to assess the achievement of students in the college course attempted. These tables were intended to provide researchers with an intuitive display of student transition and achievement for a broad audience (see example table for math in Appendix A).

The release of STEPS 2.0 was accompanied by webinars and presentations at the RP Group researcher conference. User feedback indicated that the new version significantly reduced data processing time while increasing accuracy through more management screening and correction tools. Some of the earliest participants reran their analyses to include the new students in the expanded inclusion criteria and apply some of the changes made to the regression modules. By the end of the analysis phase, a total of ten colleges were able to participate in addition to LBCC's efforts.

What Did the Statewide Pilot Study Find?

Eleven pilot colleges were able to complete regression analyses. Each college conducted four regressions to:

- Predict level of first college English course attempted
- Predict level of first college math course attempted
- Predict success in first college English course attempted
- Predict success in first college math course attempted

Predictor variables included:

- Most recent California Standards Test (CST) score in English (or math) (standardized)
- Count of "A-G" or college preparatory courses completed⁹
- Level of most recent high school course in English (or math) (ordinal rank)
- Grade point in most recent high school course in English (or math)
- High school grade point average excluding English (or math)
- Level of first college course attempted in English (or math) (ordinal rank, only used for predicting success in college course)

High schools and colleges had differing numbers of levels of English and math offerings although three to four levels was common for English and five to eight levels was typical for math for both high schools and community colleges. Ordinal regressions were used to predict

⁹ California has seven categories of high school courses to complete in order to be eligible for admission to a University of California or California State University.

<http://admission.universityofcalifornia.edu/freshman/requirements/a-g-requirements/>

the level of college English or math for all 11 colleges. To predict success, eight colleges used logistic regression, two used ordinal regression, and one college was unable to conduct regressions for predicting success in English or math in the time frame of the pilot. Table 1 shows the count of students in the regressions and regression strength indices.

Table 1. Counts of colleges and students in the regression models with sample size weighted mean pseudo R²s.

		Count of Colleges	Count of Students Within Community College			Weighted mean pseudo R ²	
			Minimum	Maximum	Average (Mean)	Cox and Snell	Nagelkerke
College variable predicted	English level	11	128	9,717	1,844	0.32	0.36
	Math level	11	65	9,717	1,985	0.11	0.16
	English success	10	65	8,299	1,362	0.35	0.37
	Math success	10	65	8,299	1,462	0.13	0.18

The number of students ranged from 65 to nearly 10,000 with an average around 1,500 to 2,000. One measure of strength of ordinal and logistic regression models is the pseudo R² (r squared). This index ranges from zero to one (asymptotically) where zero indicates the predictors have almost no predictive value and indices close to one indicate the predictors have almost perfect predictive value. There are several different pseudo R² values reported for ordinal and logistic regressions with the Cox and Snell and Nagelkerke being two of the most commonly reported. The pseudo R² values for predicting English level and success were moderately strong in the context of education research and suggest the models may include many of the most important predictor variables. The pseudo R² values for predicting math level and success were moderately weak in the context of education research and suggest the models could benefit from either additional variables or other changes to the models.

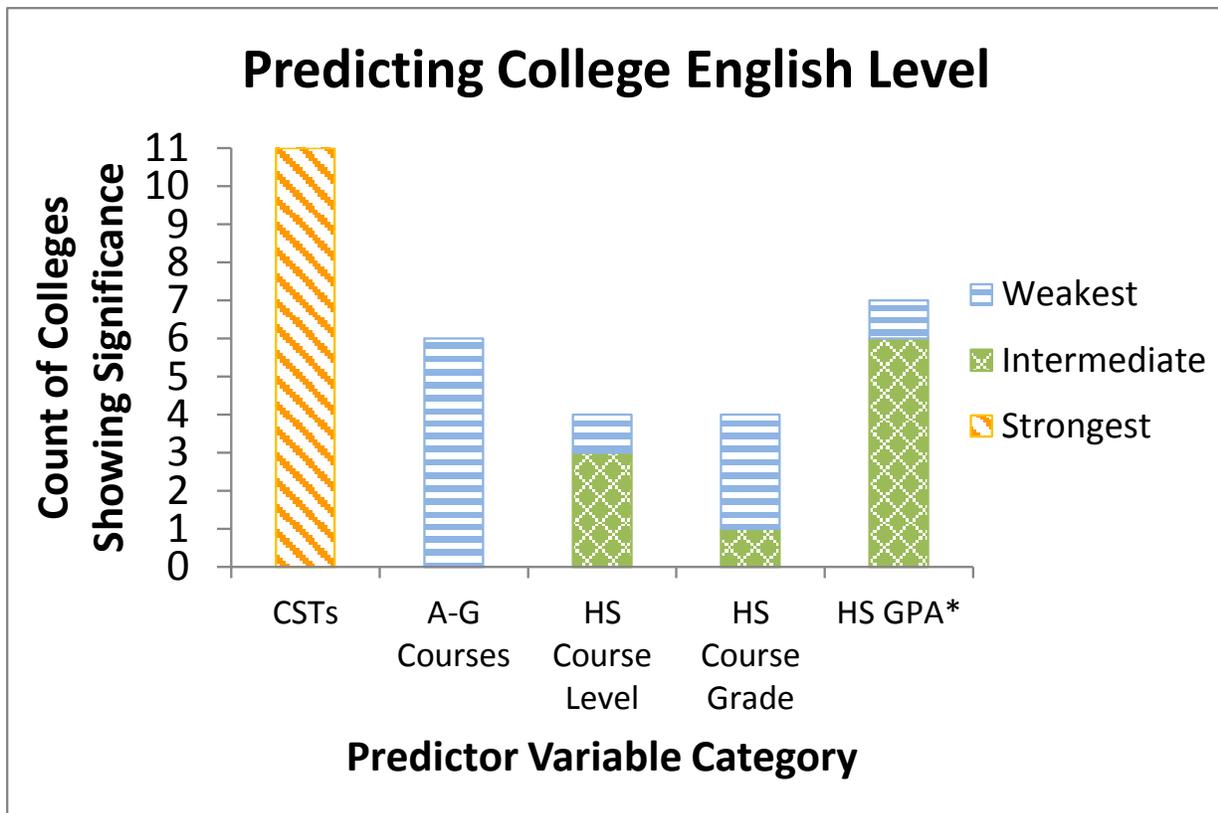
One challenge in the math models results from the California Standards Test (CST) forms that relate directly to the type of math taken. For example, if a high school student's last math class was Algebra II in 11th grade, they would take the Algebra II CST. If a high school student's last math class was Pre-Calculus in 11th grade, they would take the "summative math" CST. In contrast, all high school students in 11th grade English take the same form of the English CST with the exception of students taking alternative test forms for special circumstances. One strategy to address these challenges in math is to conduct separate regressions for each different CST form. However, this approach requires a larger number of students. Another possible approach would be to include the CST form as an additional categorical variable or as a series of indicator variables.

To convey to a broad audience how the utility of different predictors varies among the colleges, a set of descriptive charts was created. In each chart, the horizontal axis shows predictor categories and the vertical axis indicates the number of colleges for which that predictor had a statistically significant association with the predicted outcome (level of or success in college English or math). The color of the bars indicates the strength of significant predictor variables with “warmer” colors (orange) being stronger predictors and “cooler” colors (green to blue) being weaker predictors. The strength of predictors was determined by an RP Group staff researcher inspecting regression coefficients within each college and assigning the coefficients to one of the three categories of strongest, intermediate, and weakest. This method involves human judgment and arbitrary categories and therefore the charts should be viewed as illustrative rather than as an objective meta-analysis. As described later in this report, a statewide analysis is in progress that will conduct a series of regressions among a large number of high schools and community colleges to more objectively discern the variability of predictor utility among educational institutions.

When predicting level of college English (Figure 1):

- The high school English CST predictor category is the most consistent and strongest as seen by the bar indicating that the variable was significant for all 11 colleges and the shading being orange for all colleges.
- The count of A-G courses was significant for six colleges but was weak for all six of these colleges.
- High school English course level was significant for only four colleges and was an intermediate predictor for most of those colleges.
- High school grade in English was significant for only four colleges but was a weak predictor for most of those colleges.
- High school GPA excluding English grades was significant for seven colleges and was an intermediate predictor for most of the colleges.

For predicting college English level, the CSTs were clearly the most important predictor variable. As college English levels were generally determined by placement processes that typically weight placement test scores heavily, one could simplify this interpretation to “tests predict tests”. While a concise statement, it should be cautioned that other variables had predictive value that varied among colleges.



* High school GPA excluding English grades

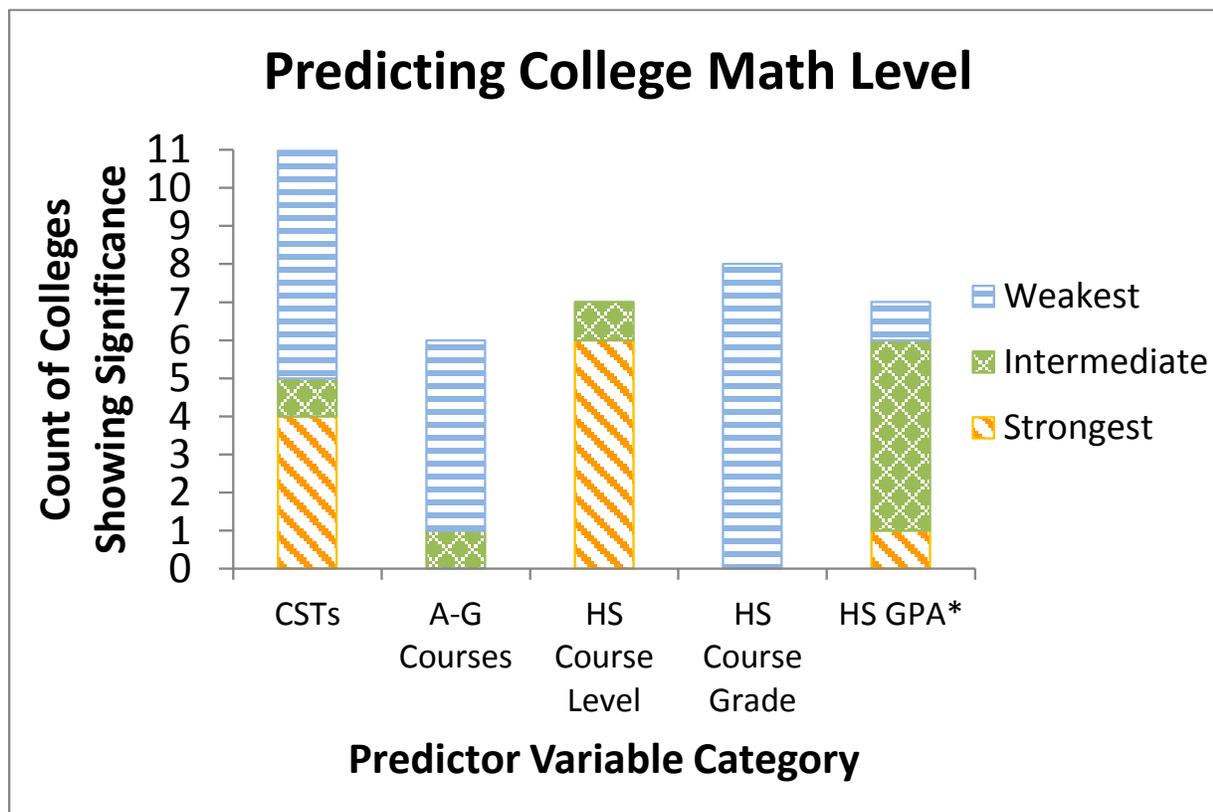
Figure 1. Count of colleges with significant predictor variables for each predictor category and their predicting strength within each college for predicting level of college English.

When predicting level of college math (Figure 2):

- The high school math CST predictor category is the most consistent as seen by the bar indicating that variable was significant for all 11 colleges; however, the strength varied as seen by the variation in shading.
- The count of A-G courses was significant for six colleges but was weak for most of the colleges.
- High school math course level was significant for seven colleges and, unlike when predicting English level, was a strong predictor for most of these colleges.
- High school grade in math was significant for eight colleges but was a weak predictor for all of those colleges.
- High school GPA excluding math was significant for seven colleges and was an intermediate predictor for most of the colleges.

For predicting college math level, the CSTs were clearly the most consistent predictor variable but the strength varied. As with predicting the level of college English, one could also state

“tests predicts tests” for math but the highest level of math completed in high school is also a powerful predictor for the majority of colleges in the pilot study.



* High school GPA excluding math grades

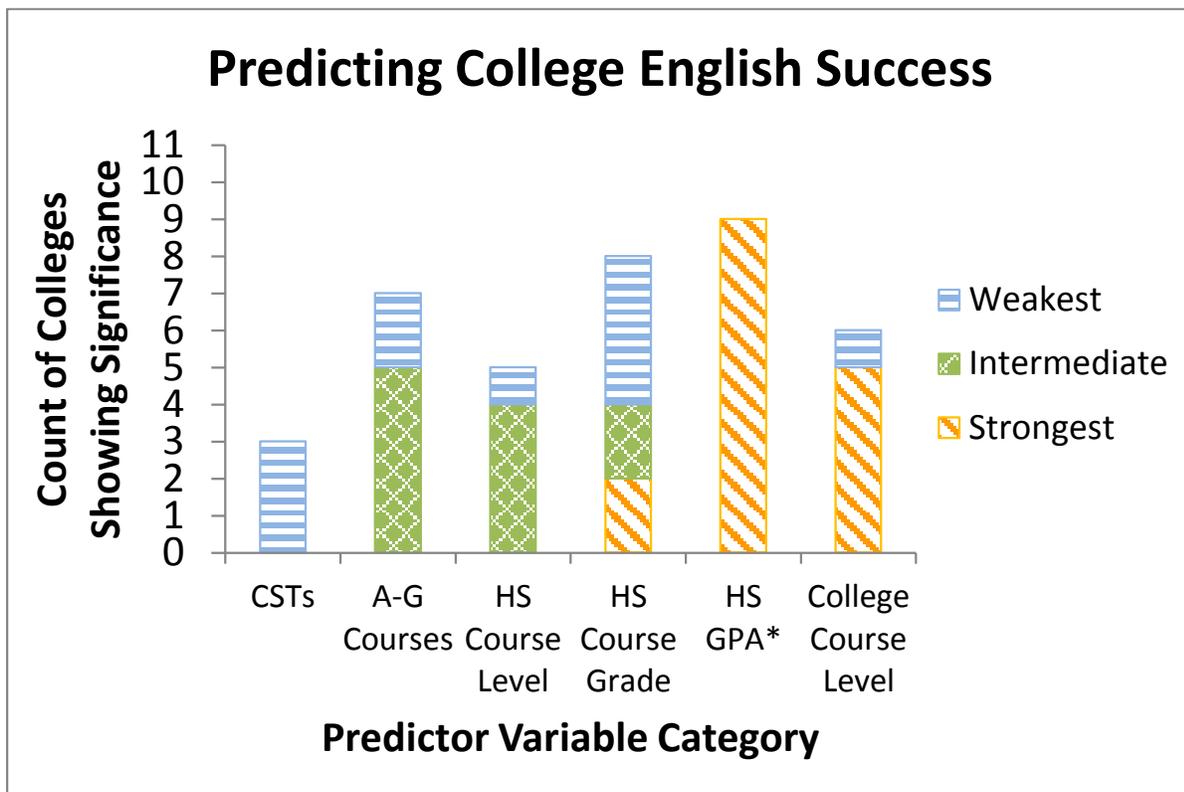
Figure 2. Count of colleges with significant predictor variables for each predictor category and their predicting strength within each college for predicting level of college math.

When predicting success in college English (Figure 3):

- The high school English CST predictor category is the least consistent and weakest predictor being significant for only three colleges and was weak for all three.
- The count of A-G courses was significant for seven colleges and was of intermediate strength for most colleges.
- High school English course level was significant for five colleges and was an intermediate predictor for most of those colleges.
- High school grade in English was significant for eight colleges but the predictive strength varied among colleges.
- High school GPA excluding English grades was significant for nine colleges and was a strong predictor for all of those colleges.

- The level of college English attempted was significant for six colleges and was a strong predictor for most colleges.

In general, students attempting high-level courses experienced lower success rates. For predicting college English success, the non-English high school grades were clearly the most important predictor variable. This result suggests that general student skills rather than subject specific skills may be an important factor in college success. Grades in English also had fairly consistent predictive value. Another simplified interpretation could be “grades predicts grades”. Again, it should be cautioned that other variables had predictive value that varied among colleges.



* High school GPA excluding English grades

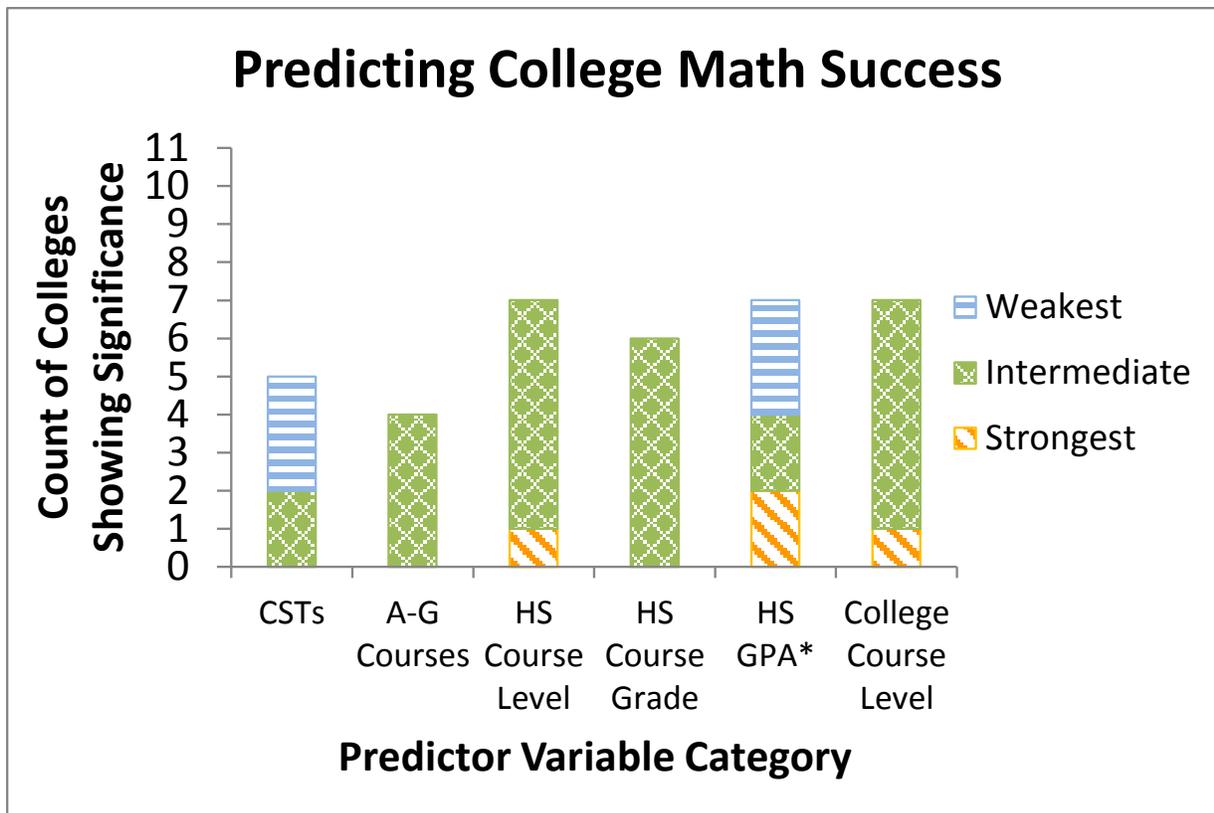
Figure 3. Count of colleges with significant predictor variables for each predictor category and their predicting strength within each college for predicting success in college English.

When predicting success in college math (Figure 4):

- The high school math CST predictor category is among the least consistent and weakest predictor being significant for five colleges and was weak for the majority of those colleges.

-
- The count of A-G courses was significant for only four colleges and was of intermediate strength for those colleges.
 - High school math course level was significant for seven colleges and was an intermediate predictor for most of those colleges.
 - High school grade in math was significant for six colleges and was of intermediate strength.
 - High school GPA excluding math grades was significant for seven colleges but the predictive strength varied among colleges.
 - The level of college math attempted was significant for seven colleges and was an intermediate predictor for most colleges.

In general, students attempting higher level college courses experienced lower success rates. For predicting college math success, predictors had less consistency of utility among colleges than seen for English. Levels of math completed in high school and attempted in college appeared to be the most important predictors of success in college math. However, similar to predicting success in college English, the non-math grades were also among the most important predictor variables again suggesting that general student skills rather than subject specific skills may be an important factor in college success. The more complex situation for predicting math success qualifies the “grades predicts grades” statement, raising instead the more ungainly “predictors of college math success vary among high schools and colleges.” One reason for this additional complexity relates back to the possible reason for the math regressions being weaker than English with the greater diversity of CST forms in math and more variability in the numbers of levels of math in high school and college.



* High school GPA excluding math grades

Figure 4. Count of colleges with significant predictor variables for each predictor category and their predicting strength within each college for predicting success in college math.

Overall, these findings suggest that high school transcript data are at least partially predictive of college performance. A key theme emerging from these results could be “more information on high school performance is better than less when placing students at college”.

Barriers to Implementation of the Use of High School Transcripts in Placement Processes

After conducting these regressions, community college researchers shared the findings within their colleges and, in some cases, also with feeder high schools. College personnel engaged in discussions of the findings typically included discipline faculty, assessment staff, administrators, and researchers. These conversations resulted in the identification of a number of barriers to implementing transcript analysis in the placement process.

Some colleges reporting feeling challenged to address the implications of these results in the face of barriers to changing practice and the demands of maintaining day-to-day operations. One key barrier to utilizing high school information in placement processes was the challenge of incorporating high school transcripts into current practices. While community colleges have

processes for generating transcripts, the open access nature of these institutions means that unlike selective universities, there are generally not processes in place to receive and process high school transcripts. Adding this capacity to community colleges is a significant task that requires a number of steps including developing agreements with feeder high schools and/or the parent of high school students and/or adult former high school students to transfer identifiable data, either electronically or in hard copy. Electronic transfers require information technology infrastructure while hard copy transfers require secure office space resulting in demands for facilities resources. In addition, training is needed and staff time allocated to these new tasks. For at least one college attempting to incorporate high school transcripts into their placement systems, a group of admissions and records staff had to be trained, reclassified and promoted in order to interpret transcripts.

At the same time, no colleges reported strong opposition by any group of faculty, staff, or administrators to the general concept of using high school information in placement. The attitudes and experiences of the personnel involved would need to be monitored during a longer period of planning and implementation to fully assess if other concerns might arise. In general, it appears the most important short-term barriers to initiating the use of high school transcripts in college placement are one-time and ongoing facilities and personnel costs.

Implications for Practice

Importance of Quality Data and Capacity to Manage and Analyze Data

This pilot has a series of implications for practice at both high schools and colleges. The early challenges with the limited extent of data submissions and accuracy of some high school course data underline the fundamental importance of accurate and complete data for the planning, implementation, and evaluation of using high school transcripts in college placement. The data management and analysis infrastructure created for the project reduced the costs associated with conducting analyses. However, it was apparent that many colleges lacked the capacity to conduct the analyses. Capacity in this case is not necessarily the skill or ability to manage and analyze the data but rather the time available to perform this work in addition to the tasks already required by the institution. One skill area that was developed for many of the community college researchers was awareness and knowledge of CBEDS code and English and math offerings in general at their local feeder high schools.

Unexpected Costs

A second implication is the recognition that such an implementation can have unexpected costs such as changes in job descriptions, training, new equipment acquisitions, or expanded office space requirements. These costs are in addition to more readily anticipated costs such as the

need for participation of high school and college personnel, students, parents, and the broader community in collaborative discussions of proposed changes and the development of agreements and protocols.

Potential Benefit of Aligning Curricula

A third key implication is the potential benefit of aligning English and math curricula among high schools and community colleges. Aligned curricula would allow students to progress forward in their English and math sequences after transitioning from high school to college. Increases in alignment of sequences between high school and college would be expected to increase the predictive validity of high school information. Curricular alignment that achieves the level of virtual articulation between high school and college would obviate the need for placement tests for recent high school students. However, placement systems would still be needed for out-of-state students who were educated under a different framework of standard or re-entry college students whose high school coursework may be dated. Exactly how long a high school course remains a sufficient prerequisite for the next level of coursework in college is unclear. Expiration dates for prior coursework should be established based on clear evidence and may vary widely among individuals complicating efforts to create simple, uniform policies on recency requirements. While the basic principle of aligned curricula appears simple, it requires significant effort to establish and maintain. K-12 curricula in the past have been guided by state standards and are currently shifting to meet new Common Core State Standards¹⁰. Community colleges have to meet articulation agreements for transfer-level English and math courses with universities. Within each of these shifting frameworks, discipline faculty from high schools and college have to commit substantial time and effort to determine how to align sequences and then establish on-going collaborative work to maintain alignment in the face of changes in standards, articulation agreements, and other factors. To help the alignment effort and assess its effectiveness, utilizing high school transcripts as a multiple measure in current community college placement systems will allow for the collection of data for monitoring and research as institutions increase the weight given to high school transcripts over time.

Possible Uses of High School Transcript Data

The associations between high school and college performance could be used for a variety of purposes:

- As a part of the multiple measures component of existing community college placement systems
- As the primary measure for placement of recent high school students

¹⁰ For information on California's implementation, see <http://www.cde.ca.gov/re/cc/>.

-
- To measure the impact of curriculum alignment efforts
 - To create advising guides for high school students
 - To inform broader policies at regional or state levels

The items in this list are not mutually exclusive or exhaustive. Findings from STEPS effort cannot suggest a single most effective strategy or change in practice or policy as curriculum, placement, and advising are composed of many complex issues most of which were not directly addressed by STEPS. Each region will have to engage with their data and determine the best course of action for their students and community.

Current Developments

Common Core

There are several current developments that have impacts on these efforts. One previously mentioned impending change is California's adoption of the Common Core State Standards¹¹. This comes not only with new standards but new tests to assess students on these standards. College placement systems that begin to utilize high school transcripts will have to prepare for validating their systems with a new set of K-12 tests and grades based on a different set of standards. The Common Core promises updated standards for K-12 and greater consistency among states choosing to adopt that framework. This change could result in K-12 students who move among Common Core states experiencing a more consistent education. Further, California community colleges that align their curricula with the Common Core would theoretically be aligning not just within California but also with other states utilizing the Common Core framework.

Student Success and Support Programs

For the California community colleges, one change includes the Chancellor's Office renaming the processes and services bundled under of the name of Matriculation to Student Success and Support Programs. Beyond a name change, this signals shifts in priorities and strategies and may impact placement procedures and resources. In addition, two longstanding members of the Matriculation Advisory Committee, Douglass Glasnapp and John Poggio, who developed the placement test guidelines currently in use, are retiring from the committee. Their role will be replaced by the Buros Center for Testing who may update the guidelines. The Chancellor's Office is also developing a statewide multiple measures assessment warehouse that promises to lower the burden on colleges wishing to expand their multiple measures to include high school transcripts by providing centralized access to student information for placement,

¹¹ Mike Kirst provides a brief history of California standards and policy implications of the common core: <http://www.edpolicyinca.org/publications/common-core-meets-state-policy-changes-almost-everything>

advising and research. This assessment warehouse is connected to the Chancellor’s Office plan to design and implement a common set of placement tests for all California community colleges. These centralization efforts are intended to create more consistency and portability of placement results for students.

Accelerated Developmental English and Math

Some faculty, such as Katie Hern of Chabot College and Myra Snell of Los Medanos College, have called for substantial changes in remedial English and math course sequences to reduce the number of levels students must progress through to reach transfer level. The argument is that each level of a sequence creates an opportunity for a student to drop out and that a shortened pathway will help “accelerate” students to college level coursework. One such effort led by Hern and Snell is the California Acceleration Project (CAP)¹². A key to the CAP effort is identifying the core content in English and math required for success in transfer level (or college level) coursework. Outdated or peripheral content is identified and de-prioritized to streamline and focus the remedial courses on preparing students for either college composition or statistics, as appropriate. Because the accelerated math sequence focuses on a pathway to statistics, students who are preparing for science, technology, engineering, or math (STEM) majors would be expected to take additional math coursework. One accelerated math program, developed by the Carnegie Foundation for the Advancement of Teaching, includes two accelerated curricula; one is for statistics preparation while the other is for liberal arts math preparation¹³.

CAP is currently being evaluated by the RP Group at a group of over 15 colleges that implement accelerated curricula in the 2011-2012 academic year. In addition to the question of the impact on student outcomes for those in the accelerated courses versus the traditional sequence, questions remain as to how student placement would be impacted.

One possible consequence is that placement could be used solely to determine whether a student is ready for transfer-level work. Students who are not ready would take a single preparatory course as opposed to potentially facing two or more semesters of remediation. This change could potentially simplify placement decision systems as there would be only two levels into which to place students. Another possibility is for colleges to have both accelerated and non-accelerated curricula thereby increasing the complexity of placement and advising but providing more options for students from a variety of backgrounds. The next several years will

¹² <http://cap.3csn.org/>

¹³ <http://www.carnegiefoundation.org/developmental-math>

reveal how accelerated curricula efforts perform, how they are perceived, and how they are incorporated into colleges' English and math offerings.

Northern California STEPS

A group of community colleges in the far northern reaches of California have formed a research alliance to conduct STEPS analyses at their colleges. One of the colleges involved was in the initial STEPS pilot but encountered technical barriers during the time frame of the study. The colleges in this sparsely populated region are providing support to each other to share problems, solutions, and findings to accomplish the analyses and participate in regional discussions of how to improve placement systems. The Northern California STEPS group represents yet another grassroots effort coalescing around the issue of improving placement for students at California community colleges. These colleges are receiving technical assistance from Cal-PASS and the RP Group with Dan Lamoree providing the direct support on the STEPS 2.0 Microsoft Access module.

Statewide STEPS Study

Currently, an effort is underway between the RP Group and Cal-PASS Plus to conduct an expanded analysis of the relationship between high school and community college performance. This study will include a large number of schools and colleges that were unable to participate in the pilot. The project will add additional variables and explore questions that arose in the pilot phase such as the impact on college performance of 1) the time elapsed from when students take English and math in high school and when they take it in college, 2) students' EAP scores, and 3) various student characteristics. Results of this study will be of particular use to colleges unable to participate in the STEPS pilot. Findings will also be used to inform the development of the statewide multiple measures assessment warehouse by suggesting data elements of the greatest value and creating a baseline placement algorithm that colleges can utilize or modify for their placement systems.

Conclusion

The STEPS effort revealed the intense interest and motivation on the part of a large number of college personnel to improve community college placement systems. This work resulted in a refined infrastructure lowering the burden for those wishing to conduct STEPS research at their campus. The findings from the pilot colleges suggest that high school information can be useful in college placement but that local validation studies are important to capture variation among student populations and curricula and to generate locally appropriate strategies.

References

- Belfield, C. & Crosta, P. (2012). Predicting Success in College: The Importance of Placement Tests and High School Transcripts. Community College Research Center. New York, NY. CCRC Working Paper No. 42.
- Brown, R. & Conley, D. (2007). Comparing state high school assessments to standards for success in entry-level university courses. Eugene, OR: Center for Educational Policy Research. Retrieved June 28, 2007, from <http://www.s4s.org/cepr.articles.php>.
- Brown, R. & Niemi, D. (2007). Investigating the alignment of high school and community college assessments in California. San Jose, CA: National Center for Public Policy in Higher Education.
- California Community College Chancellor's Office Student Services and Special Programs Division. (2011). Matriculation Handbook. Sacramento, CA: California Community College Chancellor's Office. Retrieved August 9, 2013 from, <http://extranet.cccco.edu/Portals/1/SSSP/Matriculation/MatriculationHandbookRevSeptember2011.pdf>
- Fuenmayor, A.; Hetts, J., & Rothstein, K. (2011). Assessing Assessment: Evaluating Models of Assessment and Placement. Long Beach, CA: Long Beach City College.
- Geiser, S., & Santelices, M. V. (2007). Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. Research & Occasional Paper Series CSHE.6.07. Berkeley, CA: University of California, Center for Studies in Higher Education.
- Hetts, J., & Willett, T. (2012). Assessing Transcript-Based Placement. Long Beach, CA: Association of Institutional Research Annual Forum. Retrieved from http://forum.airweb.org/2013/Documents/Presentations/1708_94318854-0d27-410b-9e32-41fc835de98a.pdf
- Jaffe, L. (2012). Mathematics from High School to Community College: Preparation, Articulation, and College Un-readiness (Unpublished doctoral dissertation). Los Angeles, CA: University of California at Los Angeles.
- Linfor, C.; Harris, C.; & Jendian, M. (2011). Reconceptualizing Secondary English Instruction: A New Professional Development Model. Anaheim, CA: California Education Research Association Conference. Retrieved from http://www.cera-web.org/wp-content/uploads/presentations/nancy_brynelson_cali_linfor_tracy_huebner/CERA%20presentation%20combined.pdf

-
- REL West at WestEd. (2011). 1.2.110 Types of Multiple Measures Used in California Community College Mathematics, English, and English as a Second Language Course Placement: Summary Report of Survey Results. San Francisco, CA: WestEd.
- Romero-Frias et al. v. Mertes et al.*, No. 502341, (S. C. Sacramento County 1988) in Wisely, W. C. (2009). Effectiveness of contextual approaches to developmental math in California community colleges (Unpublished doctoral dissertation). Stockton, CA: University of the Pacific.
- Venezia, A., Bracco, K. R., & Nodine, T. (2010). One-shot deal? Students' perceptions of assessment and course placement in California's community colleges. San Francisco: WestEd.
- Willett, T.; Hayward, C.; & Dahlstrom, E. (2008). An Early Alert System for Remediation Needs of Entering Community College Students: Leveraging the California Standards Test, Report 2007036. Encinitas, CA: California Partnership for Achieving Student Success.
- Wisely, W. C. (2009). Effectiveness of contextual approaches to developmental math in California community colleges (Unpublished doctoral dissertation). Stockton, CA: University of the Pacific.
- Wurtz, K. (2008). Relations among high school math performance and college placements and achievement. Rancho Cucamonga, CA: Chaffey Community College.

Appendix A. Sample High School to Community College Math Transition Tables Using Artificial Data.

		First level attempted in community college						Total	
		Pre-Alg	Beg Alg	Int Alg	Stats	Pre-Calc	Calc	Percent	Count
Highest level successfully completed in high school	Pre-Alg	67%	33%	0%	0%	0%	0%	100%	30
	Algebra I	25%	50%	25%	0%	0%	0%	100%	80
	Geometry	25%	50%	25%	0%	0%	0%	100%	40
	Algebra II	10%	19%	38%	19%	10%	5%	100%	210
	Pre-Calc	8%	17%	25%	25%	17%	8%	100%	120
	Calculus	0%	0%	20%	20%	40%	20%	100%	50
Total	Percent	15%	25%	28%	15%	11%	6%	100%	
	Count	80	130	150	80	60	30		530

		Success in first level attempted in community college						Total
		Pre-Alg	Beg Alg	Int Alg	Stats	Pre-Calc	Calc	
Highest level successfully completed in high school	Pre-Alg	60%	50%	na	na	na	na	57%
	Algebra I	65%	60%	55%	na	na	na	60%
	Geometry	65%	60%	55%	na	na	na	60%
	Algebra II	70%	65%	55%	80%	65%	60%	64%
	Pre-Calc	75%	70%	60%	85%	75%	70%	73%
	Calculus	na	na	60%	70%	75%	65%	69%
Total		66%	62%	56%	81%	72%	65%	65%

Notes: Geometry is not shown in the community college sequence as it is generally not required to progress in the math sequence.

Key to Abbreviations

na = Not Applicable

Pre-Alg = Pre-Algebra

Beg Alg = Beginning Algebra (note this is similar to Algebra I in high school)

Int Alg = Intermediate Algebra (note this is similar to Algebra II in high school)

Stats = Statistics and other non-science major math such as Finite Math

Pre-Calc = Pre-Calculus

Calc = Calculus

STEPS Team Members

All participating colleges

Kathy Booth, RP Group

Andrew Fuenmayor, Long Beach City College

John Hetts, Long Beach City College

Craig Hayward, RP Researcher

Dan Lamoree, Lead RP Developer

Emily Lawrence, CalPASSplus Researcher

Nathan Pellegrin, RP Researcher

Karen Rothstein, Long Beach City College

Ken Sorey, CalPASSplus Manager

Nick Wade, CalPASSplus Developer

Terrence Willett, Lead RP Researcher

Alex Zakharenkov, CalPASSplus Developer

Special Thanks to Dustin Tamashiro of Pasadena City College

For more information...

Contact Terrence Willett, Senior Researcher
twillett@rpgroup.org

Who Supports This Project?

The Rosalinde and Arthur Gilbert Foundation

Walter S. Johnson Foundation

LearningWorks

With in-kind assistance from:

The California Partnership for Achieving Student Success (Cal-PASS)

The California Community College Chancellor's Office (CCCCO)