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## **The Assessment Pipeline at Cabrillo College**

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Summer 2009

## Introduction

This paper presents a descriptive overview of the Assessment pipeline at Cabrillo College up to the point of a student's first enrollment. The majority of those taking assessments at Cabrillo College place below transfer level: 83% of math placements are below transfer level, 64% of English placements are below transfer level, and 44% of reading placements are below transfer level. Latino students are disproportionately represented. Many students will not enroll in the courses into which they have been placed.

In 2007-08, the assessment office processed 3283 students – a 9.4% increase over the prior year - with a similar increase expected for 08-09. Approximately 95% of those who assess subsequently enroll at the college. About 80% of recent high school graduates who arrive in the fall semester have undergone assessment.

### How many persons undergo Assessment?

More than 3000 persons pass through the Cabrillo College Assessment Center every Academic Year. In 2007-08, Assessment Center experienced a 9.4% increase in number of test takers over the previous year. Based on enrollment growth and increasing community demand, when the 2009-10 data becomes available, it will show a similar increase. The assessment office handles about three times as many test takers during the fall assessment period than during the spring assessment period. Figure 1 indicates the number of test takers in each academic-year cohort.

Figure 1. Number of persons tested per academic year

Academic Year	Number of persons
2003-04	3168
2004-05	3200
2005-06	3158
2006-07	3001
2007-08	3283

Not all new students take assessment tests. Students are exempt for various reasons. Students with bachelor's degrees and those attending part time, for example, are largely exempt, provided no attempt is made to enroll in a course that has a specific prerequisite. Considering the entire student population, only about one out of three Cabrillo students will undergo assessment for placement during their academic career at Cabrillo.

## Is it different for recent High School graduates?

Recent high school graduates undergo assessment for placement at much higher rates than the general population. More than two out of three members of this group will undergo assessment. The rate is even higher if we focus on recent high school graduates who enroll in the fall semester. About eighty percent of this group will undergo assessment testing prior to starting college. These students are typically on an academic track in which English and math courses are required. Some high school students may not need to assess for English or math because they enter Cabrillo with college credits in math and/or English due to credit from AP exams or because they passed college coursework while in high school (i.e. concurrent enrollment.)

## Assessment, Enrollment and Time

The assessment period for a given term typically precedes (or is concurrent with) the expected term of attendance. For example, the fall assessment period begins sometime in May, in preparation for those students planning to enroll in the coming fall. Fall assessment continues to remain open during the summer, and during the first half of the fall term to accommodate late enrollees and those enrolling in late-starting classes. The spring assessment period anticipates the spring semester in a similar manner.

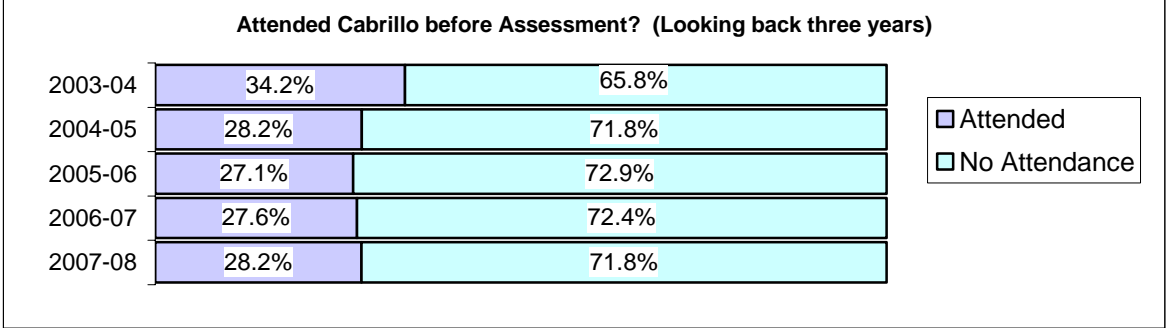
Because students are allowed to assess more than once, students were grouped according to their first assessment (if there is more than one assessment record) for purposes of establishing an assessment date (for comparison with the students' date of first enrollment). These assessment dates and the enrollment records<sup>1</sup> are aligned, and grouped as being prior to, coincidental, or subsequent to the assessment period. Though the results are summarized by academic year, the analysis is performed at the term level.

Test takers are not always new students; they may have already enrolled in classes at the college. If we look at the three-year period prior to the initial assessment, more than one quarter of test takers show a record of enrollment at the college during that period. Figure 2 shows the percentage of test takers who have prior enrollments, grouped by the academic year in which they underwent assessment.

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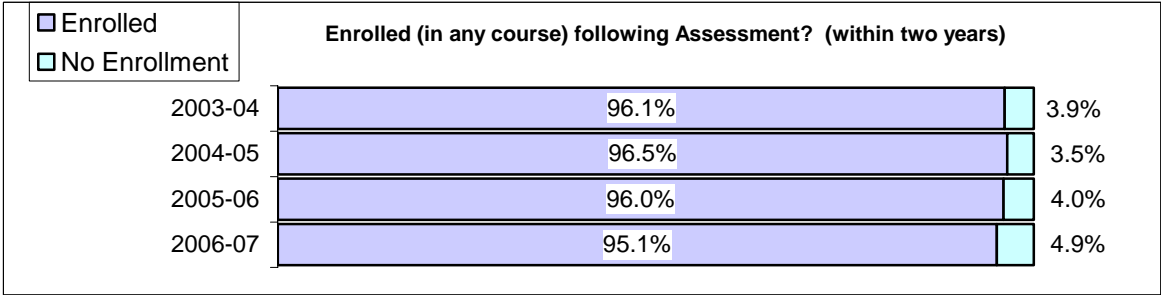
<sup>1</sup> *Enrolled* is defined as remaining in a course through the Census date for that section (about three weeks into the term). Drops that occur prior to Census day are not counted as enrollments.

Figure 2. Attendance at Cabrillo prior to assessment by academic year



Most persons who undergo assessment will subsequently enroll at the college. Looking ahead two years from the date of initial assessment, about 95% of those who have undergone assessment will have enrolled. Figure 3 shows the enrollment rates of test takers by academic year. The 2007-08 group is omitted as not enough time has elapsed to draw conclusions about them.

Figure 3. Enrollment subsequent to assessment for placement by academic year



Whether students enroll into the course into which they are placed is a separate question, which will be addressed later in this document.

**How soon after Assessment do students enroll?**

Of those who do enroll within two years following assessment, 95% of them will enroll immediately. They have an enrollment record coinciding with the assessment term. An additional 3% will enroll the second term following assessment, with a few more delaying into the third and fourth term.

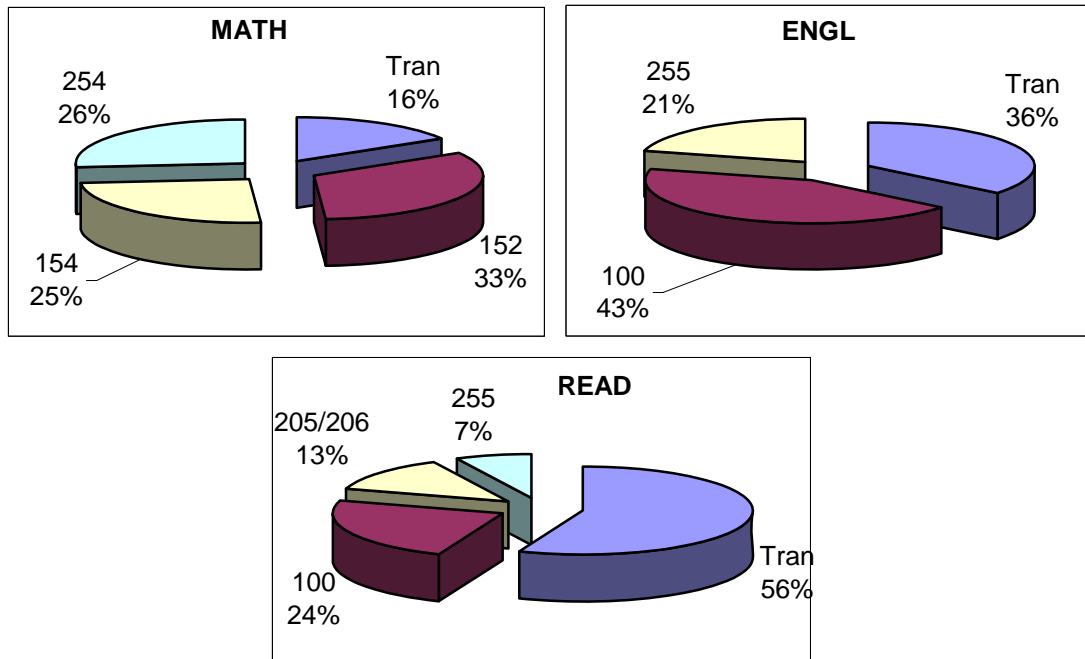
**Placements results**

Placement results are published annually in the Cabrillo College Fact Book, using aggregate summaries provided by the Assessment Office<sup>2</sup>. The charts in

<sup>2</sup> In the 2008 Cabrillo College Fact Book, see pages 30 and 31.

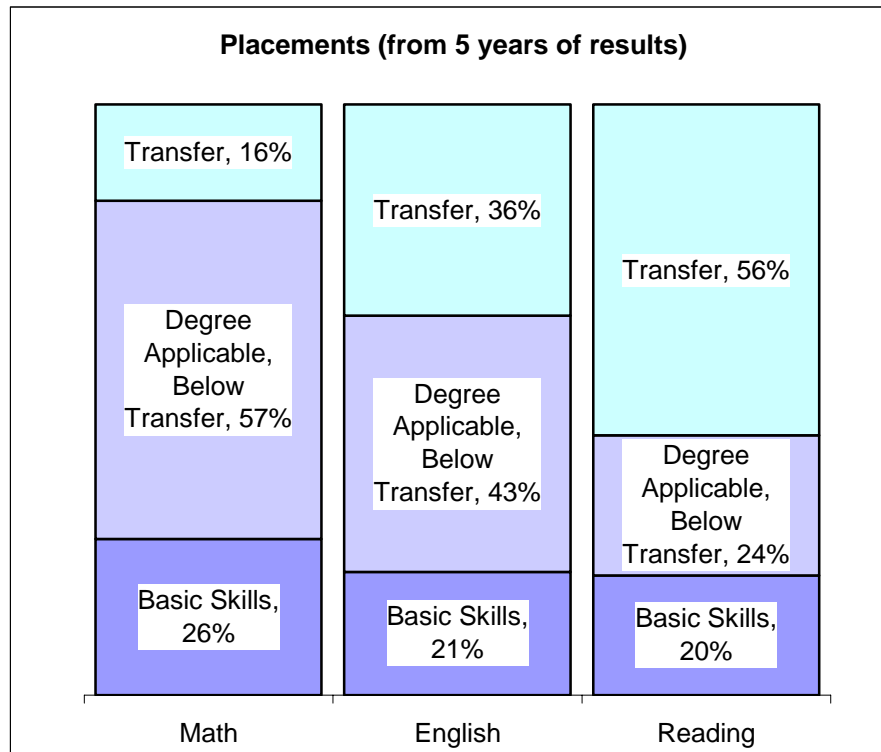
Figure 4 show the Cabrillo course placement results for everyone with a valid test result for the subject shown (using five years of assessment data). These percentages are adjusted to exclude the “re-test” category that has been published in the Fact Book. The re-test result is not a valid placement. It is the result when a student scores low enough that a lower level version of the assessment test is recommended for accurate placement. Even with the adjustment, Figure 3 shows a placement pattern that is about the same as the annual percentages published in the 2008 Fact Book.

Figure 4. Average placement results (by course) by subject from 2003 through 2008



The charts in Figure 4 use Cabrillo course numbers for indicating placement levels. In Figure 5, the *same information* is presented again, using generic descriptions of the academic level.

Figure 5. Average placement results (by level) by subject from 2003 through 2008



Placement rates into the lowest level basic skills<sup>3</sup> courses represent 26% of Math placements, 21% of English placements, and 20% of Reading placements. More broadly, students who are *under-prepared* in Math, English and Reading (i.e. those placing below transfer level) include 84% of those assessing in Math, and 64% of those assessing in English, and around 44% of those assessing in Reading for the five years studied.

### Placement results and demographics

Data regarding placement levels according to ethnicity and age-range are presented in Appendix A and Appendix B, respectively. Data from all five assessment cohorts are utilized. The ethnicities and age-ranges are drawn from information supplied by the student at the time of the placement test.

The disproportionately lower scores among Hispanic students in all three subject area tests are of crucial importance for the college and the community. Latinos represent a growing proportion of the student body, currently representing over

<sup>3</sup> Strictly speaking, Basic Skills courses are those whose MIS Course CB08 code="B". These are all 200-level courses at Cabrillo and are not degree-applicable. Note also that these courses categorized as *two levels below* college-level.

one quarter of all Cabrillo College students. African Americans and Native Americans are also placing disproportionately lower in Math; Filipinos and African Americans are also placing disproportionately lower in English; and African Americans and Asians are also placing disproportionately lower in Reading. The most interesting age-related generalization is that, among those who undergo assessment, younger students do much better on Math assessments than older students.

### **Assessment and subsequent enrollment in English or math**

The Cabrillo College Research Data Warehouse was employed to see, within two years<sup>4</sup>, how many of those who underwent assessment in English actually enroll in English, and how many who underwent assessment in math actually enroll in math<sup>5</sup>.

In the Assessment Center, under certain restrictions, a student may re-test. The methodology used in this study addresses two scenarios that deal with multiple test dates (and multiple test scores). When there are multiple *subject*-test dates for the same individual (which occurs in about 5% of the cases), a student's most-recent test date for the subject-specific test will be used for determining the *date of assessment (in the subject area)*. And, in alignment with Assessment Center practice, where there is more than one test result, a student's best score is used.

The academic records of English and math test takers who became Cabrillo College students (i.e. they enrolled in something!) are examined to see if the student enrolled in an English or math course within two years of undergoing assessment in that subject. The percentage of assessed Cabrillo students who enroll (or abstain from enrolling) into the respective subject course (English or math) are shown in Figure 6 and Figure 7. There is a tendency, particularly in math, for the students with the lowest level placements to abstain from enrolling more often than those with higher level placements.

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<sup>4</sup> Is two years a big enough window? When the window was experimentally extended from two years to five years for the 2003-04 Math Assessment cohort, only 19 additional first-time Math enrollments (a 1% increase) were found.

<sup>5</sup> Students who had a *subject* (Math/English) enrollment within three years (*prior*) to their date of Assessment are excluded from this analysis, as they have already taken their first-ever course in the subject.

Figure 6. Percentage of Cabrillo students enrolled an English course within 2 years of undergoing assessment for English, by placement level.

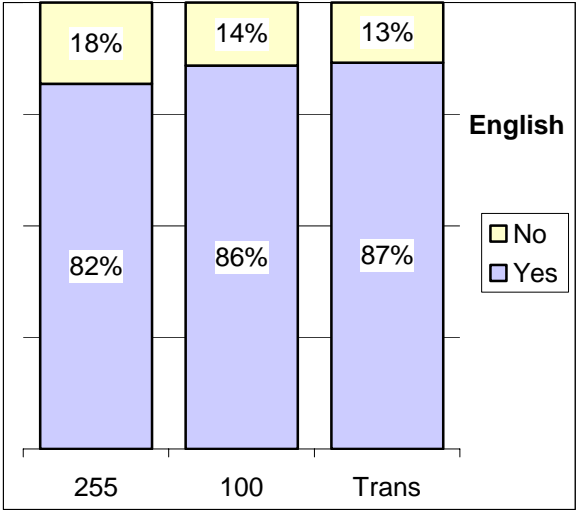
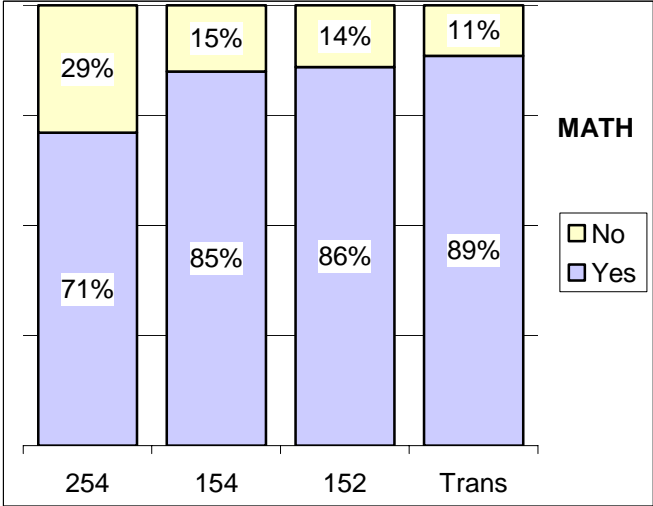


Figure 7. Percentage of Cabrillo students enrolled a Math course within 2 years of undergoing assessment for Math, by placement level.



**How many students assess, then enroll in math/English?**

Figure 8 and Figure 9 show the annual average number of students (per academic year) accessing at each placement level, average enrollments at each placement level, as well as the count of students moving through the assessment pipeline every year who have no record of a math/English enrollment within two years of undergoing assessment. These averages are from the four assessment cohorts for the academic years 2003-04 through 2006-07. The cutoff at 2006-07 is to allow for two years of enrollment records to accumulate since the date of

assessment. In light of recent enrollment increases experienced at the college in the last year, these numbers are certainly greater today.

Figure 8. Average number of Cabrillo students per academic year who assess in math, and enroll in a math course (within 2 years), by placement level.

Math Placement levels	Math Placements (enrolled students)			No Math enrollment	
	Take Math				
<b>254</b>	653	464	71.1%	189	28.9%
<b>154</b>	612	520	85.0%	92	15.0%
<b>152</b>	772	664	85.9%	109	14.1%
<b>Trans</b>	403	357	88.5%	46	11.5%
<b>Totals</b>	2439	2004		436	

Figure 9. Average number of Cabrillo students per academic year who assess in English, and enroll in an English course (within 2 years), by placement level.

English Placement levels	English Placements (enrolled students)			No English enrollment	
	Take English				
<b>255</b>	512	419	81.8%	93	18.2%
<b>100</b>	1121	963	85.9%	159	14.1%
<b>Trans</b>	933	808	86.5%	126	13.5%
<b>Totals</b>	2566	2189		377	

### Who are the math/English abstainers?

Demographic variables for students who do not enroll in English or math after placement were examined in order to understand more about who is abstaining from enrolling in a course into which they were placed. Abstainers were compared with those who did enroll, noting any significant differences.

Overall, gender has only a slight influence on the probability of a student abstaining. Males abstain from taking English slightly more often than females, no matter the placement level. While males with low-level math placements abstain from taking math more often than females, this propensity reverses as the math placement level increases. For transfer level math, female abstainers outnumber males.

Ethnicity seems to play little role in the likelihood that a student will abstain from enrolling in English or Math. A small difference can be observed for placements into transfer-level English, where white students are slightly more likely than Latino students to abstain from enrolling.

It does appear that a student's age functions as a predictor of who is more likely to abstain from enrolling. Older students are proportionately more likely to abstain from enrolling than younger students. For math, students aged 26 and older abstain more often, and in English, students aged 31-50 are more likely to abstain. However, the fact that older students constitute only a small portion of all those who undergo assessment minimizes somewhat the significance of these findings.

### **Conclusions and Recommendations**

Participation in the assessment process requires that potential students spend several hours in testing. The fact that someone shows up, and completes the process is itself an indicator of some level of interest in the idea of attending college. Yet, there are substantial numbers of students who engage in assessment, enroll in some courses at the college, but then somehow postpone and ultimately fail to enroll in courses that the college has determined are appropriate to their success.

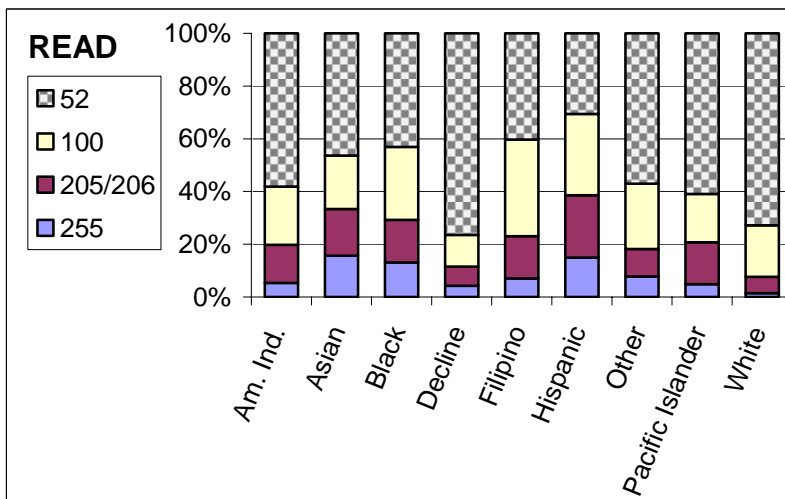
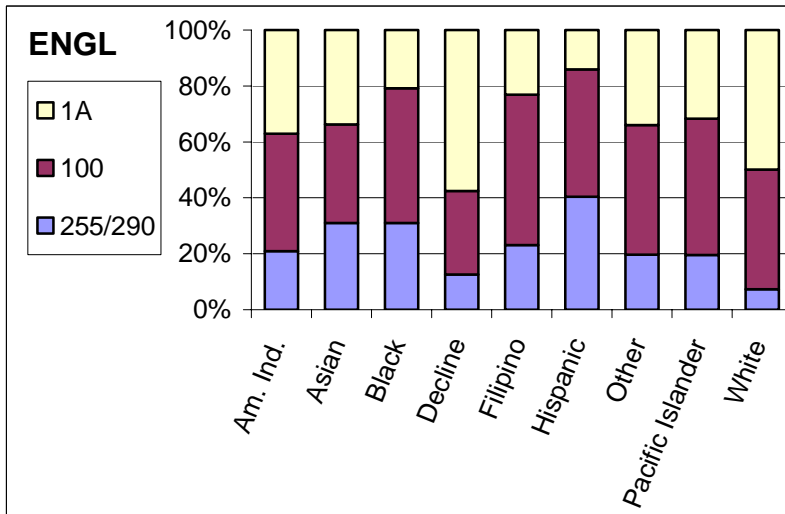
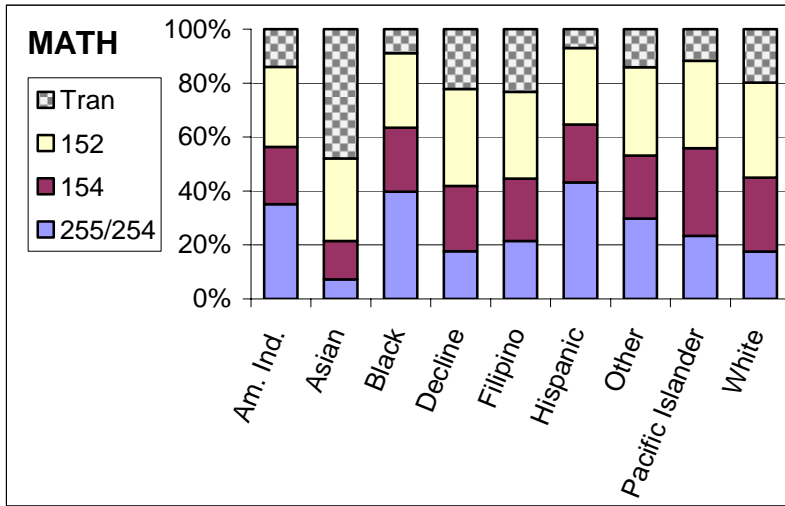
Clearly enrollment in math and English courses are crucial to any assessed student's academic success. Faculty and administrators should consider implementing policies that encourage or require assessment and enrollment in math and/or English at some point during a student's first year. (Boroch et al., 2007, p.24)

Of those who assess and are placed into below-transfer level English, around 15% will not enroll in an English course. Of those who are placed at below-transfer level in math, around 18% will not enroll in a math course. The college should consider interventions or changes in procedures that would result in increased rates of enrollment into below-transfer level English and math courses for students who have been so placed.

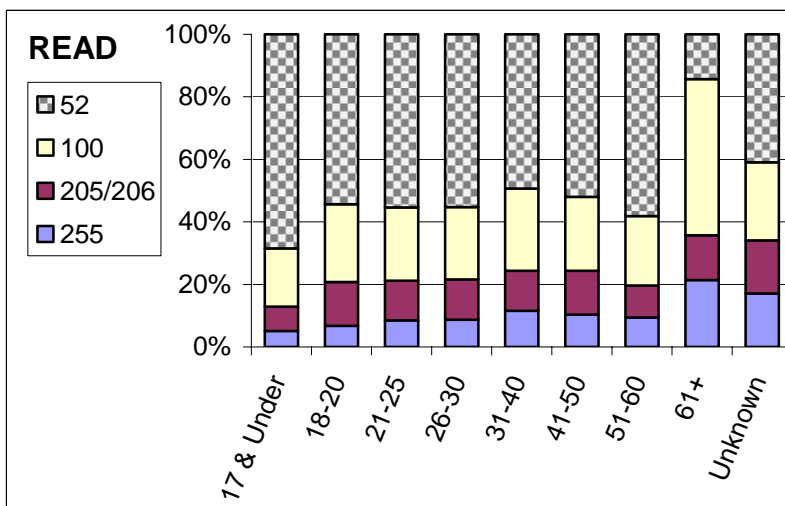
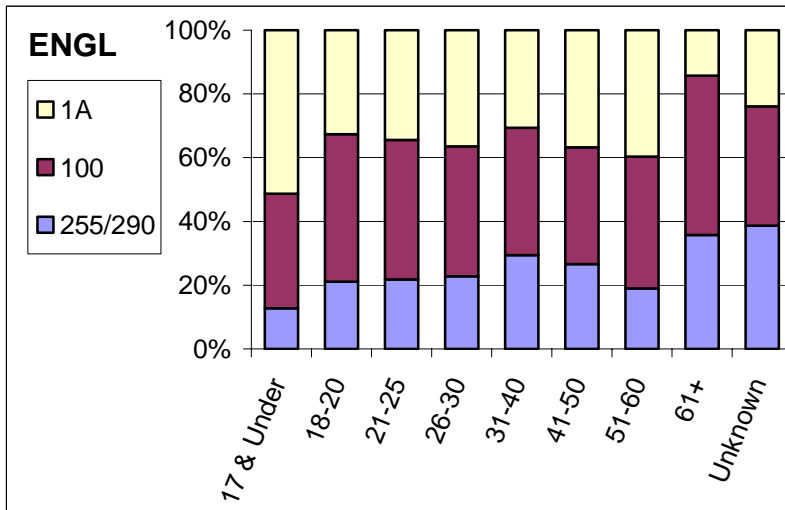
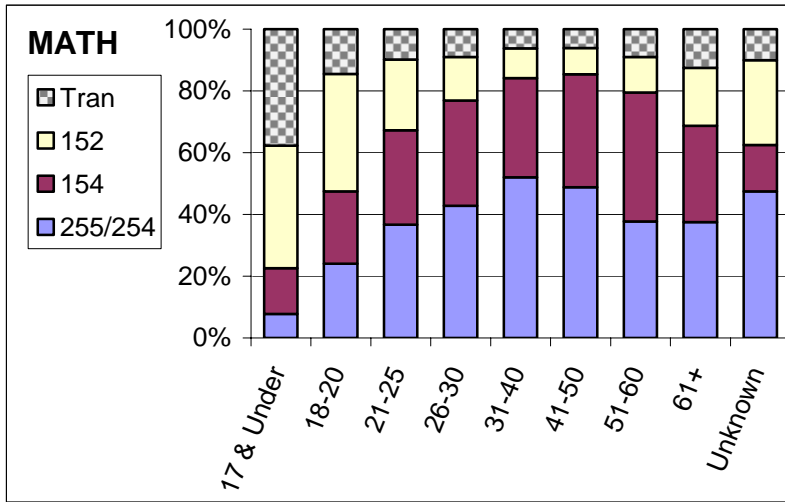
References.

Boroch, et al. (2007). *Basic Skills as a Foundation of Student Success in California Community Colleges* [aka the “Poppy Copy”]. Center for Student Success.

### Appendix A – Assessment/Placement by Ethnicity



### Appendix B – Assessment/Placement by Age range



## Appendix C

### Methodology

The Community College Chancellor's Office MIS reporting does not request assessment/placement *results*. The only assessment related info that is submitted is whether or not a student tested, which test was administered, the test date, and any special accommodations. The upshot of this is that the Cabrillo College Research Data Warehouse (DW) is lacking in data regarding assessment/placement results, since its content is a reflection of state MIS data structures.

To analyze assessment test results, raw data files<sup>6</sup> from the Assessment Center were utilized. The benefit of this approach is that we get the complete picture of *all* persons who have taken assessment tests, whether or not the results were ever transferred to the Datatel student record system, and whether or not the assessment test takers ever enrolled at the college.

*All potential students are welcomed by Assessment Center.*

Although the computerized assessment test "CAPP" system requests a Social Security Number (SSN) from the test taker, a prospective student may undergo assessment without providing an SSN. In fact, application and enrollment at a California Community College does not require that a student ever provide an SSN (although one is required when applying for Federal Financial Aid and other services).

The Cabrillo Assessment Center staff may suggest alternatives. Instead of entering an SSN, test takers who have already been issued a Cabrillo College student ID (a "Datatel number") are instructed to use this. However, it is more often the case that potential students who are undergoing assessment may have not yet applied to the college, and therefore do not have a record in the student system. These students are asked to enter some other proxy number, such as their date-of-birth.

*The Assessment Office can be considered to be a data silo.*

Matching test records with student records using a student identifier is problematic due to the variations in the types of identifiers that test takers input into the CAPP Assessment system. Even when an SSN is provided, it is not validated, and typos are inevitable.

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<sup>6</sup> The CAPP System software – a pre-windows DOS application - has features for extracting Assessment results data. The CAPP System is a Clipper (software) application, and a Clipper data file is a DBF (dBASE) format file. For analysis, we bypassed the CAPP System software, and worked directly from the CAPP system data files – the underlying DBFs.

The CAPP system does, however, request various identifying information which will aid in matching. A test taker's name, date-of-birth, as well as some demographic information is collected.

Thus, to make the connection between the raw assessment records and college's enrollment and academic records we rely on a *derived key* consisting of a student's name and date-of-birth. We can call this 'fuzzy matching'. Fuzzy matching uses a portion of the first name, a portion of the last name, and the individual's date of birth in an attempt to uniquely identify students. Working with only a portion of a student name results in a higher match rate, as problems due to spelling variations are somewhat minimized.

Out of 20,919 raw assessment test result records, 18,221 could be matched using the fuzzy matching technique. Since we have SSNs for many of the test takers, a second matching attempt is performed looking for SSN matches. This makes up for plausible scenarios where names are very different, or where students may have mistyped a date of birth. The second pass yielded an additional 1,385 student matches for a total match of 94%.

#### **Additional uses of the fuzzy match between the assessment data and the PRO Research Data Warehouse.**

##### *Unearthing duplicate records in the student records system.*

The process of the name and date-of-birth matching has the potential for false positives. The fuzzy matching methodology did result in a few cases where one individual Assessment records had multiple student matches in the Research Data Warehouse. When the individual records were examined, however, it was apparent that the duplicate matches were actually for the same person. In other words, both matches were correct – no false positives.

The duplicate student identifiers were next traced back through the Datatel system, where two distinct records for the same individual were found. The researcher forwarded a list of duplicate records to the Admissions & Records office to give them the opportunity to reconcile these in the student system, as appropriate.

##### *Determining the ethnicity of the "decline to state" group.*

In recent years, the most rapidly growing ethnicity demographic is the "decline to state" group. However, many of those who are recorded in the Data Warehouse in the "Decline to State" category have indicated an ethnicity choice when they provided personal data in the Assessment Center. Thus, in a future study, we may be able to ascertain some indication of the composition of the "Decline to state" group.