Examination of the Math Assessment Program for Disproportionate Impact
Fall 1991

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Summary

Matriculation guidelines require examination of the college's assessment program to determine if disproportionate impact exists for various student populations based on age, ethnicity, gender, and disability status. This study addresses the first three of these with regard to math assessment.

In the Fall 1991 semester, 1,663 students at Los Angeles Harbor College were tested and given placements in math. The Math Diagnostic and Placement Test (MDTP) was used. Two forms were employed, the Algebra Readiness and Elementary Algebra tests. This study includes a comparison of these two tests. A significant number of students were placed at the Math 113, 114, and 115 level from each test, enabling comparison in this category.

The data shows that for Fall 1991, Harbor College math Elementary Algebra Test placement does not reflect significant disproportionate impact with regard to gender or age. The Algebra Readiness Test data reflects disproportionate impact with regard to age in the Math 105 level of placement. The difference of 23.7% between the under 20 and 35-54 years age groups is slightly greater than the 20% allowable range guidelines. However, all other course placements in both test forms are within allowable guidelines.

Both tests show some disparity with regard to ethnicity. When comparing all other groups with the White groups in both tests, we find no differences greater than the 20% allowable (18.4% maximum in the Algebra Readiness Test placements and 15.5% maximum difference in the Elementary Algebra Test placements). However, ranges of disparity between other ethnic groups are higher. The Asian group had a higher placement by 25.2% than the Black group in the Elementary Algebra Test and 26.5% higher than the Hispanic group in the Algebra Readiness Test. These disparities warrant further research to determine possible causes and effects.
Introduction

To address Matriculation guidelines, Los Angeles Harbor College recorded math assessment results for the demographic groups of gender, age, and ethnicity for Fall 1991. One thousand, six hundred sixty-three students were evaluated according to their math placement using one of two tests of the Math Diagnostic and Placement Test. One thousand, three hundred six students took the Algebra Readiness Test and three hundred fifty-seven took the Elementary Algebra Test. Math course numbers are arranged such that the higher the number, the higher the level of placement. Age and ethnic groups comprising less than two percent of the tested student population are not shown due to statistical unreliability.

Gender

Tables 1 and 2 show an inconsistency between the two tests. The Elementary Algebra Test results placed 15.4% more females (60.1%) in Maths 113, 114, and 115 than males (44.7%). However, the Algebra Readiness Test placed more males (27.0%) than females (22.1%) in Maths 113, 114, and 115 (5.1%).

In both tests, the range of placement shows a trend of higher placement for males than females. By combining the two tests, we find that the overall percentage of females in Maths 113, 114, and 115 is 28.3% to the 32.2% of males. This 3.9% difference is less than the 9% found in 1989.

Of interest is that 62.6% of all females tested took the Algebra Readiness Test to the 44.3% of males. Conversely, 37.4% of the females and 55.7% of the males were placed according to the Elementary Algebra Test. Overall, the findings consistently indicate that males were placed higher than females. However, placements were within acceptable ranges.
Age

Table 3 addresses the age breakdown of those taking the Elementary Algebra Test for the levels of Math 120, 125 and Math 113, 114, 115. The groups of under 20, 20-24, and 25-34 years show great similarity. However, the age group of 35-54 years placed higher than the other age groups. The difference in placement (19%) for the 35-54 year age group may not be as significant as it might first appear. This age group comprises only 2.5% of the population taking this test. An n of 9 in 357 students polarizes this data and would tend to magnify any disparities.

Table 4 addresses the age breakdown of those taking the Algebra Readiness Test. Again, as in gender, we see a discrepancy between the results of the two testing methods regarding Math 113, 114, and 115. The Algebra Readiness Test shows definite trends of higher placement for younger age groups.

A case of disproportionate impact should be considered. The 35-54 years age group varied as much as 23.7% (Math 105 placement) from the under 20 group. If the Elementary Algebra Test showed similar results, one would need to perform further investigation of real disparities in math ability due to age. However, it does not support the trend shown with the Algebra Readiness Test.

When combining the results of the possible gender bias, the Algebra Readiness Test appears to be less reliable than the Elementary Algebra Test. In order to determine the validity of this conclusion, it would be appropriate to evaluate the grades of each impacted group.

Ethnicity

The measures of disproportionate impact of both math placement tests, with respect to ethnicity, are complex. Tables 5 and 6 address this issue.
When comparing any one group with the White group, the disparities with the Elementary Algebra Test placements are within acceptable matriculation guideline ranges (a difference of 15.5%—less than the 20% allowed). However, the Algebra Readiness Test placements vary to a greater degree (18.4%).

Both tests show a trend of higher placement for the Asian group. Comparing the Asian group with the Black group, the disparity is 25.2% in the Elementary Algebra Test and a high of 26.5% when compared with Hispanics in the Algebra Readiness Test. Again, the signs of disproportionate impact are greater in the Algebra Readiness Test results. Both tests are outside the under 20% disparity acceptable limits when examining all ethnic group variability equally, rather than focusing on the White group.
Table 1

Elementary Algebra Test
Gender

Math Placement

Math 120,125
Math 113,114,115

Percent

0 10 20 30 40 50 60 70

Male
Female
Algebra Readiness Test

Gender

<table>
<thead>
<tr>
<th>Math Placement</th>
<th>Male</th>
<th>Female</th>
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</thead>
<tbody>
<tr>
<td>Math 113,114,115</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Math 112</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>Math 105</td>
<td>20%</td>
<td>15%</td>
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</table>
Table 3

Elementary Algebra Test
Age

Math Placement

<table>
<thead>
<tr>
<th>Math Placement</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 120, 125</td>
<td></td>
</tr>
<tr>
<td>Math 113, 114, 115</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Under 20
- 20-24
- 25-34
- 35-54
Table 4

Algebra Readiness Test

Age

Math Placement

Math 113, 114, 115
Math 112
Math 105

- Under 20
- 20-24 yrs
- 25-34 yrs
- 35-54 yrs
Table 6

Algebra Readiness Test
Ethnic Group

Math Placement

Math 113, 114, 115
Math 112
Math 105

Percent
0 10 20 30 40 50 60 70

Black
Hispanic
White
Asian
Unknown
Other