

Gordon Associates, LLC

Ronald J. Gordon, EdD
16382 Lawrence 2170
Aurora, Missouri 65605
Phone: 417-678-0946
FAX: 417-678-0491
rgordon@docgord.com
<http://www.docgord.com>

Research Report

Citrus College
Cut Score Validation Analysis

Acknowledgments

We would be remiss if we did not acknowledge the contribution of Robert Coutts to this project. His dedication to accuracy and to thoroughly completing the surveys in the best manner possible made the rest of the project flow smoothly. He not only produced the survey documents and saw to their distribution and collection, but he produced them with the students' identification on them to facilitate greater accuracy. He provided data files promptly and was always friendly and supportive as we worked together. The success of this project is at least partly his.

Introduction

Gordon Associates was engaged to conduct an analysis of the cut scores for the ACCUPLACER[®] placement system at Citrus College during the fall, 2007 term. Survey formats were provided, and college staff developed survey forms for each class to be surveyed. The students' survey forms contained each student's identification. Students and faculty in all placement level English, mathematics, ESL, and reading courses were to be surveyed. The completed survey forms were shipped via express freight to Gordon Associates for data input and analysis. The college also provided electronic files with students' test scores and prior history in the subject areas, along with ethnicity, gender, age, and disability demographics. These files were transferred via File Transfer Protocol from the college's network under the supervision of Robert Coutts. Data input was completed by Gordon Associates, and after thorough analysis for errors, the survey forms were immediately incinerated under close supervision to protect student confidentiality.

Data files were combined so as to create a single record for each student in each subject area. The record contained the survey results, current enrollment, placement, test scores, level and grade of most recent prior course in the discipline, and demographics. Students were divided into three groups in each subject file: those who were placed into the current course by the placement system, those who passed a prerequisite course to be placed into the current course, and those who took a prerequisite course and failed it, but somehow arrived in the current course. For purposes of analyzing cut scores, only those students who were placed into the current course by the placement system were used. After the files were combined into one complete file for each discipline and final grades were added, the student identification was removed from the data files. After the correlation tests, the section identifiers were removed from the files to

protect faculty identity. Backups of the files without identification were created, and all files containing identification were purged.

Survey Results

Faculty could rate students “Under-Prepared,” “Adequately Prepared,” or “Over-Prepared,” and “Unlikely,” “Probable,” or “Highly Likely” to be able to earn a “C” or higher grade based on their ability. For the preparation question, students were given definitions rather than terms, and were asked to select the one that best described how they were doing in the course. Rather than the likelihood of earning a “C” or higher, students were asked to rate the difficulty of the course by selecting the description that most closely described them. Copies of the survey format documents are included in the appendix. Survey data were received for 1520 students in English, 281 in ESL, 2456 in Mathematics, and 668 in Reading. Not all students completed the surveys, even when faculty provided survey data for them. Four students indicated on the survey that they declined to participate. Most faculty completed the surveys according to instructions and provided a nearly normal distribution of results. Some, however, simply marked all students “adequately prepared.” This issue will be addressed in the analysis section.

For the most part, students seem to have understood the questions they were being asked. Some, mostly in ESL, added comments or critiques of the course or instructor. All comments were ignored. A few students marked more than one response for each section. Those were treated as non responses.

Analysis Method

Data were analyzed by discipline for correlation between the faculty and student responses. When faculty and student responses are well correlated, analysis can be conducted by combining the responses into a single variable. When correlations are weak, both student and faculty results must be analyzed. A correlation of .600 with a confidence rating of .01 is sufficient for combined analysis. In this case, only the mathematics discipline achieved sufficient correlation for combined analysis. All other disciplines will report both student and faculty results.

Student records were marked to indicate how each student was placed into the course. Analyses were conducted separately on those who passed a prerequisite course, and those who were placed by the placement system. The tables below will display those results for each placement level. As might be expected, with the exception of ESL, fewer students were placed by the placement system into the higher levels in each discipline than in the mid and lower levels.

Each response variable was examined for anomalies in the distribution. In a system that has been in operation for some time and has been validated previously, one expects a high degree of kurtosis, or central tendency in the distribution. Most students should be rated “Adequately Prepared” if the system is working. However, there still should be a nearly normal distribution of results. In mathematics, both the student and faculty distributions were nearly normal, with slight left skewness, indicating more “Under-Prepared” than “Over-Prepared” students. The ranges and shapes of the two distributions were nearly identical. In the other disciplines, the student distributions were similarly near normal with some left skewness. However, the faculty distributions were critically narrow, with severe kurtosis. This was due to the fact that a

significant number of faculty simply marked the “Adequately Prepared” variable for every student. For this reason and those cited above, faculty and student responses were analyzed separately in the language disciplines.

For purposes of analysis, students who were rated “Over-Prepared” were advanced to the next level, since by definition, they should have been placed there. In the student results analysis, those who selected the third option in the preparation question also were advanced to the next level for the same reason. Therefore, in the reports below, the “Over-Prepared” variable means those who would be excluded from placement in that level at the optimum cut score. Those are the students who were misplaced into the lower level.

Data were analyzed by examining the frequency of the response variables, using the combined variable in mathematics, and using the combined faculty responses and the combined student responses separately in the other disciplines. The optimum cut score in the tables below is that point in the score range at which the percentage of “Adequately Prepared” responses is near its highest point and the number of “Over-Prepared” responses has not yet begun to rise critically. The optimum cut score is indicated based on analysis of this particular data set. There naturally is some variance in data sets, so the real optimum cut score is contained in a range of cut scores defined by the margin of error. This analysis method has proven to leave a rather small margin of error, but there is a small range nonetheless. Recommendations for change should be made only when the current cut score falls outside the margin of error for the optimum cut score.

Disproportionate Impact

Using demographic data supplied by the college, an analysis for disproportionate impact was conducted only on those students who were placed into the course by the placement system. Disproportionate impact occurs in a placement system when it treats any identifiable group or groups differently than it treats any other group or groups. Groups may be identified by age, gender, ethnicity, or disability. Although other groups could be identified, such as cultural identity, those listed were used for this analysis. There was no statistically significant difference in the distributions of test scores in any discipline on the basis of age or gender. The means and standard deviations of the gender distributions were nearly identical. The age variable was divided into 5-year brackets. The distribution of the mean scores for each bracket was normal, with only slight right skewness. This indicates that the variance among the age brackets was random and no significant difference exists.

The disability identification as supplied by the college was not divided by type of disability. The distribution contained both physical and learning disabled people. The students flagged as having a disability had somewhat lower mean scores and higher standard deviations on all tests than the non-disabled group. The higher standard deviations indicates a less similar group, or students with more widely divergent academic skills.

Significant differences in test scores requires further analysis to determine whether the differences are due to the way the test instrument measures the two groups, or whether the two groups actually differ in the area being measured by the instrument. In this case, analysis was done to determine whether the measurement was accurate, and resulted in equally accurate placement for both groups. In each discipline, no significant difference was found in the accuracy of placement between disabled and non disabled students. It is therefore determined

that the placement system does not have disproportionate impact on the basis of a student being disabled.

The ethnic variable provided by the college contained too many values, many very few in number, for satisfactory analysis. The values were narrowed to six: Asian, Black, Caucasian, Hispanic, Native American, and Unidentified. The Black, Hispanic, and Native American groups had lower mean scores and higher standard deviations than the others. This is not an unusual finding in this type of analysis, but it must nonetheless be addressed.

Again, when disproportion is shown in scores, it must be determined whether the measurement is accurate or the instrument is treating an identity group differently. Table 1 below shows the results of the overall analysis of disproportionate impact by ethnicity. According to the results of the surveys from both students and faculty, no disproportionate impact exists in the placement system at Citrus College.

Table 1						
Disproportionate Impact Analysis by Ethnicity						
Values indicate placement accuracy as a percentage, or the percent of each group that was placed accurately						
	Asian	Black	Caucasian	Hispanic	Native	Unidentified
Reading	81	80	83	85	83	84
English	86	84	82	88	84	86
Arithmetic	91	88	88	92	87	89
Algebra	84	84	86	83	86	84
CLM	92	90	88	88	92	87
ESL*	78	**	**	84	***	81
Notes: * Using student response variables because nearly all students were rated adequately prepared by faculty. ** Too few students to analyze *** No students in group						

Validation Results

Each placement level in each discipline was analyzed separately, using frequency distributions of the survey results and the appropriate test score or combination of scores. The optimum score identified in each case is the point in the score distribution for that particular sample at which the number of “Over-Prepared” ratings has not yet risen sharply and the percentage of students rated “Adequately Prepared” is near its highest point. Except as noted, the Placement Accuracy value is at or slightly below the highest percentage of “Adequately Prepared” ratings. Placement Accuracy is defined as the percentage of “Adequately Prepared” ratings for students who scored at or above the assigned cut score. In the tables below, the optimum cut score is used to determine the rating percentages.

English Validation Analysis

The correlation between faculty and student survey responses was determined for the surveys in the English classes. Table 2 below illustrates that there was not sufficient correlation between the responses to combine them and achieve satisfactory analysis. Therefore, results are presented for both faculty and student responses.

Table 2 Test for Correlation Between Faculty and Student Survey Responses in English		
First Variable	Second Variable	Pearson's R Value
Faculty Prepared	Faculty Likely	.761
Student Prepared	Student Difficulty	.854
Student Prepared	Faculty Prepared	.114
Student Prepared	Faculty Likely	-.210
Student Difficulty	Faculty Prepared	.181
Student Difficulty	Faculty Likely	.168

Tables 3 and 4 below illustrate the placement accuracy that would be achieved if the cut score were placed at the optimum cut score level. Only if there is wide divergence from the current cut score would current placement accuracy be significantly different. The Prerequisite % Adequately column indicates the % of responses from those who had taken a prerequisite course which indicated the student was adequately prepared for the course. Analysis was conducted using the combined Reading Comprehension and Sentence Skills scores. Although various combinations were examined, the current combination of 50% of each score is presented here. Also examined were $.4 * SS + .6 * RC$ and $.6 * SS + .4 * RC$. Those combinations proved less accurate than the current one.

Only 28 ESL students were surveyed at the 4006 level, where they are placed by these tests. Only six did not take a prerequisite ESL course. All of them were rated "Adequately Prepared."

Table 3 Citrus College Cut Score Validation--English Faculty Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
1003	030	35.5	40.5	3	97	0	18	91
1004	040	57.5	54.5	10	83	7	36	83
1005	100	77.5	73.5	12	82	6	120	79
1006	101	90.5	88.5	9	84	7	97	81
4006	101	90.5	90.5	0	100	0	6	85

Table 4 Citrus College Cut Score Validation--English Student Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
1003	030	35.5	40.5	2	98	0	16	91
1004	040	57.5	59.5	4	95	1	33	88
1005	100	77.5	75.5	3	93	4	102	92
1006	101	90.5	90.5	3	93	4	79	86
4006	101	90.5	90.5	0	100	0	6	90

Conclusions and Recommendations--English Validation Analysis

With one exception, the divergence of the optimum cut score from the current cut score is within the statistical error range. The difference at level 1003 is significant, and consistent between faculty and students. A change should be considered, but is not recommended at this time. Of greater concern is the lack of correlation between faculty and student responses, and the differences between the resulting optimum cut scores, particularly at the 1004 level. It is not within the scope of this analysis to address the issues surrounding those differences. However, it would be an omission not to draw attention to it. No change recommendations are made for English or ESL 4006 cut scores at this time.

The multiple measures system for English improves placement accuracy by several percentage points at all levels of placement. The number of Adequately Prepared students who would be restricted from each level by the cut score is nearly cut in half by the multiple measures. The system seems to be working as projected and no recommendations for change can be made at this time.

ESL Validation Analysis

Correlation tests between faculty and student responses among the ESL surveys failed to achieve adequate levels for combined analysis, as shown in Table 5 below. Therefore, ESL survey data and cut score analysis are present for both students and faculty. There were 281 valid responses to the ESL faculty survey. However, only 149 of those students had valid test scores. The rest could not be used for cut score analysis. There were 251 student responses. Of those, 134 had valid test scores. The N in Tables 6 and 7 below indicate the numbers of students at each level who had valid test scores and had not taken a prerequisite course. Data were reported for various courses within each level. Where possible, tests were conducted for differences among the various courses within the level. No differences were found. In some cases, the numbers were too small for such analysis. Consequently, this report is limited to the placement level and does not address individual courses.

Table 5		
Test for Correlation Between Faculty and Student Survey Responses in ESL		
First Variable	Second Variable	Pearson's R Value
Faculty Prepared	Faculty Likely	.607
Student Prepared	Student Difficulty	.821
Student Prepared	Faculty Prepared	.088
Student Prepared	Faculty Likely	.114
Student Difficulty	Faculty Prepared	.111
Student Difficulty	Faculty Likely	.154

Various combinations of the three ESL test scores were examined. The current combination (.35*RS + .40 * LU + .25SM) appears to be the most effective. Overall placement accuracy was reduced with every other combination tested.

Table 6								
Citrus College Cut Score Validation–ESL Faculty Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
4002	020	49.5	*	*	*	*	3	100
4003	030	68.5	*	*	*	*	9	100
4004	040	84.5	85.5	0	100	0	28	100
4005	100	104.5	90.5	2	98	0	51	99
4006	101**							
Notes	<p>* Insufficient responses for analysis ** Students are not placed into English/ESL 101 from the ESL tests. ESL students in the 101 level were validated with the English analysis. Only six students surveyed were placed by the placement system into ESL 101. Additional Note: Nearly all ESL students were evaluated by the faculty to be adequately prepared for the particular course they were in.</p>							

Citrus College Cut Score Validation–ESL Student Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
4002	020	49.5	*	*	*	*	3	77
4003	030	68.5	*	*	*	*	8	82
4004	040	84.5	77.5	4	93	3	22	89
4005	100	104.5	95.5	2	96	25	46	94
4006	101**							
Notes	<p>* Insufficient responses for analysis ** Students are not placed into English/ESL 101 from the ESL tests. ESL students in the 101 level were validated with the English analysis.</p>							

Conclusions and Recommendations–ESL Validation Analysis

There were not enough students enrolled in the ESL levels into which they were placed by the system for adequate analysis. The current cut scores could be somewhat high, but no change recommendations can be made from this data set. We recommend that the system be allowed to work for a semester, without adjusting placements manually, and another analysis be conducted to validate cut scores. From the student responses, it appears that the cut scores are quite close,

at least in their opinions. ESL students were more likely to rate themselves “Under-Prepared than “Over-Prepared.” From the faculty responses, the cut scores are exactly right, since nearly all students who scored above them were rated “Adequately Prepared” to be in their classes.

The multiple measures system seems to move some students who would otherwise be restricted from the course by the cut score into the next level, and to improve placement accuracy by a few percentage points. It is difficult to draw a conclusion with such small numbers, but the system seems to show no negative consequences.

Mathematics Validation Analysis

Correlations between faculty and student survey responses in mathematics courses were adequately high to be able to combine the responses into a single response variable. Table 8 below illustrates substantial agreement between faculty and students. A Pearson’s R value of .60 is required in this method. All correlations are above that. The values assigned to the faculty responses were doubled, then added together and added to the student responses. That sum was divided by six, then rounded to the nearest integer. The result was three values representing “Under-Prepared,” “Adequately Prepared,” and “Over-Prepared.” Although doubling the value of the faculty response does not have a great effect on the resulting value, it does ensure that when there is a 2-point difference between the faculty and student responses, the faculty response will prevail. If the student did not respond to the survey, only the faculty response is used.

A total of 2456 responses were received from the faculty surveys. Not all students responded to the survey, but the student response rate was at an acceptable level Only those students who had not taken a prerequisite course are included in the cut score analysis. Those who did take a prerequisite course were analyzed separately and are reported in Table 9 below.

Table 8 Test for Correlation Between Faculty and Student Survey Responses in Mathematics		
First Variable	Second Variable	Pearson’s R Value
Faculty Prepared	Faculty Likely	.821
Student Prepared	Student Difficulty	.818
Student Prepared	Faculty Prepared	.674
Student Prepared	Faculty Likely	.622
Student Difficulty	Faculty Prepared	.604
Student Difficulty	Faculty Likely	.630

In Table 9 below, the % Adequately Prepared column represents the placement accuracy for each placement level. The response variables for each level were used to construct a frequency distribution of test scores for each variable. The Prerequisite % Adequately column represents the placement accuracy of those students who took the prerequisite course for each particular course. Students who were rated “Over-Prepared” were advanced to the next level for analysis, since by definition, that is where they should have been placed. The “Over-Prepared” values in

Table 9 are those students who are qualified but would be excluded from the course at the optimum cut score. The optimum cut score is determined to be at the point at which the “Adequately Prepared” response is near its highest level, and the “Over-Prepared” response is at or near its minimum. The unshaded areas are placed by the Arithmetic test. The darkly shaded areas are placed by the Algebra test. The lightly shaded areas are placed by the College Level Math test.

The 2006 level proved problematic in analysis. The number of inadequately prepared ratings was too high to achieve a good optimum cut score. Each course in that group was then analyzed separately. The optimum cut score for Math 151 proved to be somewhat higher than that for the rest of the courses in the group. It is displayed in Table 9 as placement level 2007. The other courses had optimum cut scores within the error range for the current cut score. Of course, sample size decreased significantly when splitting the placement group into its separate courses, reducing confidence levels somewhat. However, the findings proved to be statistically significant at the 0.10 confidence level. With the trigonometry course removed from the group, the combination resulted in an optimum cut score within the error range with confidence level at 0.05. In simple terms, the confidence level describes the probability that the results could have occurred randomly.

Conclusions and Recommendations--Math Validation Analysis

The placement system seems to be working exceptionally well for mathematics students, except as noted above in Trigonometry. All other optimum scores are within the error range of the current cut scores. We recommend adding the 2007 placement level and using the optimum cut score for that level, and using 84.5 as the maximum score for both the 2006 and 2007 placement ranges. The course comment for 2006 should include a note that the courses at that level do not meet the prerequisites for higher level mathematics courses, and that students who wish to take Trigonometry or higher courses should enroll in Math 150 to meet the prerequisite. No other cut score changes are recommended at this time.

The multiple measures system for mathematics improves placement accuracy from that shown here by a few percentage points. That indicates that some of the “Over-Prepared” shown here would be moved up to the next level on the basis of their additional measures.

Table 9								
Citrus College Cut Score Validation–Mathematics Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
2001	017	N/A	N/A	11	89	#	147	N/A
2002	020	27.5	27.5	4	91	5	150	88
2003	029	42.5	42.5	7	90	3	124	86
2004	130* [@]	71.5	72.5	9	88	3	112	87
2004	130* [@] [@]	47.5	47.5	7	88	5	210	88
2005	150**	71.5	69.5	11	86	3	287	82
2006	170***	54.5	56.5	7	90	3	113	87
2007 [^]	151	54.5	67.5	5	92	3	87	88
2008	175	84.5	84.5	4	94	2	24	90
2009	190	103.5	103.5	1	99	0	12	91
Notes	<p>* Includes Math 115, 129, & 130 ** Includes Math 131, 148, & 150 *** Includes Math 160, 162, 165, 170 # No lower level in the analysis [@] Elementary Algebra using Arithmetic score ^{@@} Elementary Algebra using Algebra score [^] The trigonometry course does not fit in the same cut score group with Statistics and Finite Math. Its cut score should be somewhat higher. The optimum score derived here is about eight points lower than the statewide average for Trigonometry (75.5), but it was the optimum score for this sample group.</p> <p>Placement by Arithmetic Score (Unshaded) Placement by Algebra Score (Darkly Shaded) Placement by CLM Score (Lightly Shaded)</p>							

Reading Validation Analysis

A total of 668 responses were received from faculty for the reading survey, with 610 student responses. Correlations between faculty and student responses were very weak and not statistically significant. Lack of statistical significance indicates that the relationship between the two variables could be random. Therefore, student and faculty responses were analyzed separately and are reported here in separate tables. Table 10 illustrates the correlation coefficients for the reading survey responses.

Table 10		
Test for Correlation Between Faculty and Student Survey Responses in Reading		
First Variable	Second Variable	Pearson's R Value
Faculty Prepared	Faculty Likely	.761
Student Prepared	Student Difficulty	.826
Student Prepared	Faculty Prepared	.280
Student Prepared	Faculty Likely	.226
Student Difficulty	Faculty Prepared	.261
Student Difficulty	Faculty Likely	.323

In Tables 11 and 12, the % Adequately Prepared column represents the placement accuracy for each placement level. The response variables for each level were used to construct a frequency distribution of test scores for each variable. The Prerequisite % Adequately column represents the placement accuracy of those students who took the prerequisite course for each particular course. Students who were rated “Over-Prepared” were advanced to the next level for analysis, since by definition, that is where they should have been placed. The “Over-Prepared” values in the tables below are those students who are qualified but would be excluded from the course at the optimum cut score. The optimum cut score is determined to be at the point at which the “Adequately Prepared” response is near its highest level, and the “Over-Prepared” response is at or near its minimum.

Table 11								
Citrus College Cut Score Validation–Reading Faculty Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
3003	019	37.5	37.5	9	89	2	242	86
3004	040	54.5	56.5	5	93	2	138	89
3005	099	72.5	70.5	9	87	4	176	81
3006	120	90.5	*	*	*	*	4	87
Notes	* Too few students for analysis. This cut score is approximately 10 points above the statewide average for meeting graduation reading competency among ACCUPLACER® users.							

Table 12								
Citrus College Cut Score Validation–Reading Student Survey								
Level	Course	Current Cut	Optimum Cut	% Under Prepared	% Adequately Prepared	% Over Prepared	N	Prerequisite % Adequately
3003	019	37.5	35.5	4	95	1	216	85
3004	040	54.5	55.5	2	96	2	128	90
3005	099	72.5	70.5	3	94	3	163	84
3006	120	90.5	*	*	*	*	4	81
Notes	* Too few students for analysis. This cut score is approximately 10 points above the statewide average for meeting graduation reading competency among ACCUPLACER® users.							

Conclusions and Recommendations--Reading Validation Analysis

Although the correlation between faculty and student responses was weak and non-significant, the optimum cut scores from either analysis are within the measurement error. Therefore, no cut score change recommendations are made at this time. It is significant that there were too few students who were placed at the 3006 level for analysis. Obviously, not all students placed at this level take Reading 120. The statewide average cut score among ACCUPLACER® users for graduation competency in reading is 82 (not all users are included, only those who reported their cut scores in response to our request). Without data to support it, however, we cannot recommend a cut score change.

The multiple measures system reduces the number of students who were rated “Over-Prepared” at the lower level who are restricted from enrolling on the basis of the cut score by about half. That improves placement accuracy significantly, and it indicates that the system is working about as well as it can. No recommendations for change are made at this time.

Chemistry Analysis

Survey forms were provided for Chemistry 110 and Chemistry 111. There were 47 students in Chemistry 110, and six in Chemistry 111 who did not have a prerequisite on record. Those in Chemistry 111 all passed with “C” or higher, but only 3 had mathematics test scores. All had algebra scores above 85. Two had CLM scores above 55. Of those in Chemistry 110, 12 had mathematics test scores in the record. Among those rated “Under-Prepared,” three passed and five failed. Among those rated “Adequately Prepared,” three failed and 36 passed. None was rated “Over-Prepared.” It is not known whether some of these students transferred a prerequisite course from another institution.

Conclusions and Recommendations--Chemistry Analysis

There appears to be a relationship between both algebra and CLM scores and success in Chemistry. However, this data set is not sufficient to establish a cut score for either test. The college may wish to set a tentative cut score based on professional judgment, and allow students who meet the requirement to enroll in Chemistry 110 or Chemistry 111 without taking the prerequisite mathematics course. The ACCUPLACER[®] algebra test is an elementary algebra exam and does not test intermediate skills. For that reason, the CLM should be used for Chemistry. A tentative score between 55 and 60 should be adequate for a pilot study, based on the ACCUPLACER[®] proficiency statements and on this analysis. In future analyses, students with transfer prerequisites should be identified.

No other recommendations for use of these tests for Chemistry placement can be made from this analysis.

Final Grade Analysis

A file containing students’ final grades in the surveyed courses was received after the end of the term. The grades were inserted into the data file before the student identification was removed. After validation, all files containing student identities were purged.

Grades were converted to numeric values for analysis, and a Pass/Fail variable was created. The objective of placement is to place students into courses which they can successfully complete. By definition, successful completion means earning a grade of “C” or higher (*California Code of Regulations, Title 5, § 55023*). Therefore, **students who received a grade of “D” or “F” or “NC” or “W” were deemed to have failed. Students with “CR,” “C,” or higher were deemed to have passed.** In-progress grades were eliminated, as were unreported grades. Analyses were conducted by discipline to determine whether students who were rated “Under-Prepared” failed or dropped at higher rates than students rated “Adequately” or “Over-Prepared.” No statistically significant differences were found according to course level. The samples were

too small in reading and ESL to divide them in that manner, and there were no significant differences in English. The tables below illustrate the findings by discipline.

Table 13			
Citrus College Cut Score Validation–English Final Grade Analysis			
	Under-Prepared	Adequately Prepared	Over-Prepared
% Passed	37.22	62.55	67.69
% Failed	62.78	37.45	32.04

It was noted that the percentage of Over-Prepared students who failed was remarkably high. Further analysis showed an approximately equal distribution across the levels. More than half of the students in this group dropped the course, and most of the rest earned “D.” Only 4% actually failed the course. It also should be noted that students drop courses for a variety of reasons, including the perception of failure. While we cannot interpret drop reasons in this analysis, we acknowledge that some students defined as having failed actually were properly placed but dropped the course for other reasons. Overall, approximately 25% of failures are students who dropped their English courses. Grades also were examined on the basis of how the student was placed into the course. Students who were placed by the placement system were only slightly more likely to earn passing grades than those who took and passed a prerequisite course.

Table 14 Citrus College Cut Score Validation–ESL Final Grade Analysis				
Placement Method	Outcome	Under-Prepared	Adequately Prepared	Over-Prepared
Placement	% Passed	16.67	66.67	90.0
	% Failed	83.33	33.33	10.0
Passed Prerequisite	% Passed	28.57	35.0	100
	% Failed	71.43	65.0	0
Failed Prerequisite (N = 4)	% Passed	0	75.0	0
	% Failed	0	25.0	0
<p>Fewer than 100 students were enrolled in the ESL course into which they were placed. However, the survey was highly predictive of the failure outcome. The difference in the “Under-Prepared” column between students placed by the placement system and by the prerequisite course is statistically significant. This may be explained, in part, by the difference in sample size, and by the fact that most ESL faculty marked all students in the section “Adequately-Prepared.”</p> <p>There were no significant differences in the above data between the various ESL levels or ESL courses.</p>				

Table 15 Citrus College Cut Score Validation–Reading Final Grade Analysis			
	Under-Prepared	Adequately Prepared	Over-Prepared
% Passed	33.3	72.2	88.6
% Failed	66.7	27.8	11.4
<p>There were no significant differences by course in the relationship between the survey results and final grades. Although the prediction of failure was not as accurate as we would like to see, it is obvious that the survey results are adequate for use in setting cut scores. Students rated “Under-Prepared” are highly likely to fail or drop the course.</p>			

Table 16
Citrus College Cut Score Validation–Mathematics Final Grade Analysis

	Under-Prepared	Adequately Prepared	Over-Prepared
% Passed	21.35	61.49	74.24
% Failed	78.65	38.51	25.76

The relationship between surveys and grades is adequate to affirm that the cut score analysis is valid. Although the relationship between survey results and final grades was reasonably consistent across the various mathematics levels, some anomalies were noted.

Among the students deemed to have failed in the higher levels, most received “D” grades.

The failure rates among students rated “Under-Prepared” are statistically different between students placed by the placement system and those who took prerequisite courses. Those who were placed had a slightly higher failure rate. However, among those rated “Adequately Prepared,” those who were placed had a slightly higher pass rate.

Further analysis of the anomalies would be beyond the scope of this project.

Overall Observations and Conclusions

The survey process appears to have been exceptionally well done. The forms were clean and well organized, and the distribution and collection were very well performed. No errors were noted as a result of distribution or collection. Producing the student surveys with the identification on them helps to ensure accuracy when combining data files, and significantly improves data input.

The surveys did a good job of predicting final grades. In this type of analysis, we expect that students who are rated “Adequately Prepared,” or even “Over-Prepared,” will still fail or drop the course, simply because academic preparedness is not the only criterion for successful completion of a course. However, academic preparedness is a major criterion for success in college courses. Therefore, we expect that students who are rated “Under-Prepared” will fail or drop at a significantly higher rate than those considered to have the necessary skills. That was the case in every aspect of this project. By comparing final grades with survey results, we were able to validate the survey method as a proper means to establish cut scores for this population.

Although the lack of correlation between faculty and student responses in the language areas does not affect cut score recommendations in this analysis, it is nonetheless troubling. It is especially bothersome that careful observation of the data and the distribution of responses indicates that many faculty gave the same response to every student in the class. In even the best placement systems, there will be some students in the class who cannot keep up, and there often will be a few who are functioning well below their capabilities. These surveys are designed to identify those students and help keep their numbers to a minimum.

By comparing students' placements with their test scores and analyzing the accuracy of their placements using the multiple measures placement system, we were able to determine that the multiple measures weighting scheme is adjusting placements for about 14.5 percent of students. With ESL excluded, overall placement accuracy is improved 3.4 percentage points over placement by test scores alone. Moreover, only 17 students whose placements were adjusted by multiple measures were rated "Under-Prepared" for the course in which they were enrolled. Because so many ESL students were enrolled in courses below their placement levels, it was not possible to include them in this analysis.

Finally, with the possible exception of ESL, the Citrus College Placement Systems seems to be functioning with better than acceptable accuracy. There were not enough data in ESL to make that conclusion, because too many students were moved from their initial placements into other levels before the surveys were administered. From the data that were available, the system seems to be capable of placing students into all ESL levels from 4003 (ESL 030) to 4005 (ESL 100) with better than acceptable accuracy. The current cut scores may be somewhat high, but there are not enough data to make that determination here. Placement of ESL students into ESL 101 using the Reading and Sentence Skills tests seems to be working very well.