Research Report

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Sacramento City College

Office of Planning, Research, and Institutional Effectiveness (PRIE)

PREREQUISITE VALIDATION STUDY
BUSINESS 100 AND 310
CONSEQUENTIAL VALIDITY AND DISPROPORTIONATE IMPACT

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Abstract:
Using standard validation methodologies of consequential validity and disproportionate impact analysis, this study addresses some key research questions regarding the reading and writing prerequisites for two of SCC's Business courses. The evidence suggests that, on average, course success rates are quite high for students who stay in the class at least half of the term. Over 80% of students in the study perceive that they are at least adequately prepared and success rates for the survey respondents support that perception (approximately 80% of the survey respondents were successful). However, a relatively low success rate in BUS 310 suggests that the prerequisites may be necessary but not sufficient to ensure success. The study also finds some disproportionate impact in the case of African-American under-representation in BUS 310 and low representation of that student group in the study.

Introduction

The prerequisites in BUS 100 and BUS 310 were implemented more than ten years ago. BUS 100 has reading and writing prerequisites and the prerequisite for BUS 310 can be met by successful completion of an ENGWR course, BUS 100, or through the placement assessment process.

Research Questions

Once a prerequisite has been in place for some years, a consequential validity study should address the question of whether there is a relationship between students' perceptions about their preparedness and their eventual course outcome. Possible disproportionate impact on demographic groups must also be assessed.

Data and Methods

A student survey and official grades are used to address what the relationship between student perceptions and outcomes is. It is expected that at least 75% of students should agree that the prerequisite has adequately prepared them for successful completion of the course for a prerequisite to meet consequential validity standards. Institutional data sources are employed to examine whether disproportionate impact is evident by 1) comparing student demographics in the survey to student demographics in the course; and 2) comparing student demographics in the course to student demographics in the subject (gender, age, ethnicity, and disability are the demographics compared). A proportionality index is constructed to identify any disproportionality.

The student perception survey used in a *consequential validity* study (see Appendix A), includes three questions designed to determine how a student met the course prerequisite and to assess students' perception of their preparedness for the course and course's difficulty level. These questions help to address both the necessity and the sufficiency of the prerequisite. A student's final grade in the course was also matched to student survey data for additional analyses of the surveys.

Sample

Data were collected for five semesters, from Spring 2012 to Spring 2014. Table 1 summarizes courses, sections, and numbers of student surveys returned by course. In BUS 100, survey materials were returned by 10 sections, yielding 181 matched records. For BUS 310, survey materials were returned by 7 sections, yielding 78 matched records.

Table 1

Course, sections, number and percent of matched responses

Business 100

Section	Number	Percent
16849	23	12.71
17106	15	8.29
17116	22	12.15
17326	25	13.81
17679	16	8.84
17685	16	8.84
18554	13	7.18
18780	15	8.29
20089	22	12.15
20358	14	7.73
Total	**181**	**100**

Business 310

Section	Number	Percent
17021	13	16.67
17321	2	2.56
17735	11	14.10
18017	12	15.38
18540	18	23.08
18865	21	26.92
20242	1	1.28
Total	**78**	**100**

Note that very few of the BUS 310 surveys in Fall 2012 (sections 17321 and 20242) had valid student ID data that could be matched to Institutional Research (IR) data. This limitation reduced the BUS 310 comparison group to 149 enrollments rather than 189. However, pooling the valid observations yields a sample that exceeds the required sample size of 50 in each course.

Demographic Characteristics of the Sample

Characteristics of the survey respondents are examined to see how closely they mirror the overall characteristics of the two BUS course students during the time period. Students who were surveyed were matched to transcript and profile data for the term of enrollment. Table 2 contains comparisons by course for age group, gender, ethnicity, and disability status or students who provided a student ID number that could be accurately matched to SCC IR data.

Table 2

Pooled survey respondents compared to pooled BUS 100 and pooled BUS 310 data.

Characteristic:	BUS 100 Study Respondents		BUS 100 Enrollments		BUS 310 Study Respondents		BUS 310 Enrollments**	
Age Group	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
18 - 20	21	11.60	34	12.88	7	8.97	12	8.05
21 - 24	44	24.31	63	23.86	25	32.05	40	26.85
25 - 29	36	19.89	55	20.83	8	10.26	26	17.45
30 - 39	34	18.78	52	19.70	18	23.08	35	23.49
40 and Over	46	25.41	60	22.73	20	25.64	36	24.16
Under 18	0	0	0	0	0	0.00	0	0
Total	**181**	**100**	**264**	**100**	**78**	**100**	**149**	**100**
Gender	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	Percent
Female	130	71.82	184	69.70	47	60.26	100	67.11
Male	49	27.07	76	28.79	31	39.74	48	32.21
Unknown	2	1.10	4	1.52	0	0.00	1	0.67
Total	**181**	**100**	**264**	**100**	**78**	**100**	**149**	100
Ethnicity or Race	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
African American	23	12.71	41	15.53	7	8.97	20	13.42
Asian	41	22.65	48	18.18	16	20.51	25	16.78
Filipino	1	0.55	4	1.52	3	3.85	6	4.03
Hispanic/Latino	36	19.89	51	19.32	14	17.95	34	22.82
Multi-Race	21	11.60	27	10.23	5	6.41	6	4.03
Native American	1	0.55	3	1.14	2	2.56	2	1.34
Other Non-White	0	0.00	0	0.00	0	0.00	1	0.67
Pacific Islander	2	1.10	2	0.76	0	0.00	1	0.67
Unknown	5	2.76	8	3.03	4	5.13	6	4.03
White	51	28.18	80	30.30	27	34.62	48	32.21
Total	**181**	**100**	**264**	**100**	**78**	**100**	**149**	**100**
DSPS	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Yes	13	7.18	16	6.06	6	7.69	17	11.41

** Excludes Fall 2012 sections

The percentages of survey respondents in BUS 100 are higher for Asian and multi-race, and lower for African Americans than BUS 100 enrollments overall during the time period. The percentage of older respondents is higher (25.4% versus 22.7% 40 and over) and slightly higher for DSPS. The differences may be a function of the

survey's timing—it is administered at least six to eight weeks into the semester and thus does not include students who dropped without a "W," while the IR data from the end of semester (EOS) does include those students.

Success Rates of the Sample

Tables 3 and 4 contain success rates for the pooled *sample of surveyed students* and pooled sample overall in the two courses. When we examine success rates for only those students who took the survey ***and*** who were matched to IR data, the success rates for matched students are 82.9% in BUS 100 and 79.5% in BUS 310. However, success rates are much lower for the pooled sample of the courses overall—62.5% in BUS 100 and 54.4% in BUS 310. Clearly, students who remain in these Business courses long enough to participate in the validation study have a very good chance of successfully completing the course. Unfortunately, a relatively high

Table 3

BUS 100 Success Rates and Grade Distribution for Pooled Survey Respondents and Pooled Terms Overall (Five Terms: S12-S14)

	Survey Respondents		Overall	
Successful	**Number**	**Percent**	**Number**	**Percent**
No	31	17.13	99	37.5
Yes	150	82.87	165	62.5
Total	**181**	**100**	**264**	**100**
Grade (excludes survey respondents who received "W")	**Number**	**Percent**	**Number**	**Percent**
F	10	5.81	17	8.63
D	12	6.98	15	7.61
C	34	19.77	38	19.29
B	61	35.47	69	35.03
A	55	31.98	58	29.44
Total	**172**	**100**	**197**	**100**

Table 4

BUS 310 Success Rates and Grade Distribution for Pooled Survey Respondents and Pooled Terms Overall (Four Terms: S12, S13, F13, S14)

	Survey Respondents		Overall	
Successful	**Number**	**Percent**	**Number**	**Percent**
No	16	20.51	68	45.64
Yes	62	79.49	81	54.36
Total	**78**	**100**	**149**	**100**
Grade (excludes survey respondents who received "W")	**Number**	**Percent**	**Number**	**Percent**
F	7	9.46	20	18.69
D	5	6.76	6	5.61
C	9	12.16	12	11.21
B	24	32.43	31	28.97
A	29	39.19	38	35.51
Total	**74**	**100**	**107**	**100**

Note: Fall 12 had only 3 survey respondents who could be matched to IR Data. Thus, F12 is excluded.

percentage of unsuccessful students (68.7% in BUS 100 and 76.5% in BUS 310) did not participate in the validation study. These results suggest that the prerequisite(s) may be necessary but not sufficient for successful completion of these courses.

Consequential Validity: Student Perceptions of Preparedness and Prerequisite Skills

Table 5 shows the summary of results by course for the student surveys. We compare each Column 2 of the table with the last column, looking for evidence that at least 75% of students *perceived* that they were adequately prepared for the work they encountered in the BUS course and that at least 75% of students *were* adequately prepared to receive a passing grade. The expected standard for prerequisite validation was met in each course. Appendix A contains the full response set from the survey.

Table 5

	Student Responses (%)		**Respondent Success Rate (%)**
COURSE	**Prepared: *Adequately or Over Prepared***	**Level of Work: *Just right or too easy***	**Success rate: Final Grade of A, B, C, or P (%)**
BUS 100	90.5	92.8	82.9
BUS 310	88.5	89.7	79.5

A correlation between students' perception of preparedness and ultimate grade is calculated to see if actual end-of-semester grade is a "fit" to students' perceptions of their preparedness part way through the semester (not shown). Results from a correlation between student estimate of preparation level and the final "numericized" grade received suggest that for BUS 100 there is a weak, positive, statistically significant correlation between the two metrics (0.2138, P=0.015, n=170). For BUS 310, the correlation is very small and is not significant (0.0323, P=1, n=74). Although it does not appear that students' perceptions are predictive of final grade, these statistical findings may be artifacts of the rating and grading scales or may be indicative of an absence of formative evaluation mechanisms such as assignments and exams at the time the surveys were administered.

Disproportionate Impact on Student Groups

To address concerns about whether a prerequisite would limit student access for some student groups more than others, ethnicity, gender, age, and disability status are considered one-by-one. The composition of students in the BUS 100 and BUS 310 courses compared to the composition in BUS courses overall exhibits some key patterns discussed below. Appendix B contains proportionality indices for the underlying data used to construct the figures in this section.

Ethnicity or Race

This section examines whether ethnic composition in the target courses is proportionate or disproportionate to the overall BUS enrollment composition. Many factors may be associated with ethnic composition in a particular course, so this study cannot establish causality. Using a *Proportionality Index* methodology set forth by the California Community College Chancellor's Office (CCCCO) and the Equal Employment Opportunity Commission (EEOC), this section compares the proportion of each ethnic subgroup in BUS 100 or BUS

310 to the ethnicity's proportion in BUS courses overall.[1] If there were perfect proportionality, the proportion in the Proportionality Index would be 1. Proportions over 1 mean that the group is overrepresented and those below 1 mean that the group is underrepresented compared to the enrollments in the subject overall. Although some of the smaller groups such as *Pacific Islanders*, *Native Americans* and *Other, non-White* are disproportionately under- or over-represented in the individual courses, the numbers are so small that they must be excluded.[2]

Figure 1 illustrates BUS 100 ethnic composition during the study period compared to overall BUS percentages during the study period. While Table 2 contains a comparison of students in the consequential validity study to students enrolled in the courses being studied, figures 1 and 2 illustrate the enrollment composition of the studied courses to the subject enrollments overall. The figure focuses on students identifying as African American, Asian, Latino, Multi-race, or White.[3] Only the Multi-race category does not meet the standard according to the 80% Rule guidelines set forth by the EEOC. Students identifying as Multi-race are over-represented in BUS 100 when compared to BUS enrollments overall.

Figure 1

In Figure 2 below, African-American students are under-represented in BUS 310 when compared to BUS overall. Only 35% of the African-American students enrolled in BUS 310 participated in the validation survey, but they were all successful. However, all of the students who did *not* participate in the validation survey were also *not* successful (not shown). This set of statistics suggests that not only are African –American students disproportionately under-represented in the course, but that they are also

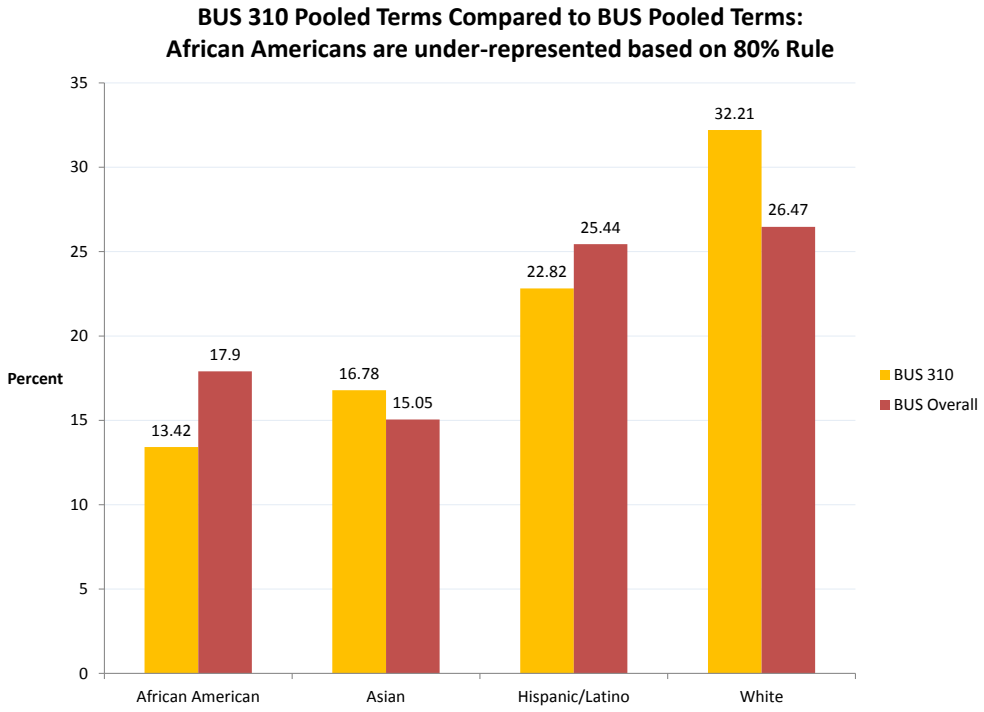
[1] The standard of 20% or more difference from a selected reference group—in this case the BUS identifier—being considered as *disproportionate* is based on the "80% Rule" that comes from Section 60-3, Uniform Guidelines on Employee Selection Procedure (1978); 43 FR 38295(August 25, 1978). The CCCCO makes clear that other standards could be chosen for the proportionality index, however, this analysis is consistent with the U.S. Equal Employment Opportunity Commission's (EEOC) guidelines. http://www.eeoc.gov/policy/docs/qanda_clarify_procedures.html (retrieved 10/1/2014).

[2] Groups with fewer than 10 enrollments must be excluded from the analyses

[3] Students who identify as more than one ethnicity or race are coded in the research files as "multi-race."

under-represented in terms of successful completion of the course. Although it appears from the figure that White students are over-represented, the proportionality index is within an acceptable range according to the EEOC guidelines.

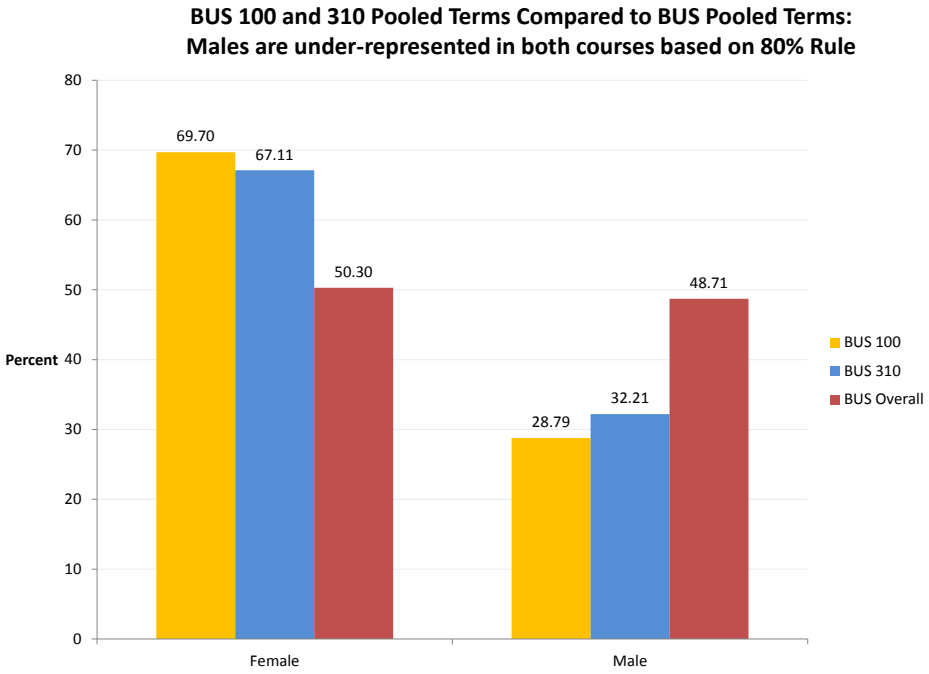
Figure 2



Gender

Figure 3 illustrates the percentages of each gender for BUS 100, bus 310, and overall BUS during the study period. For both courses, male enrollment is disproportionately low compared to the composition of enrollment in overall BUS. However, there is no evidence of any college or department factor related to this pattern.

Figure 3



Age Group

Figures 4 and 5 illustrate the percentages of each age group for BUS 100, bus 310, and overall BUS during the study period. For both courses, traditional college-age enrollment is disproportionately low and older student enrollment is disproportionately high compared to the composition of enrollment in overall BUS.

Figure 4

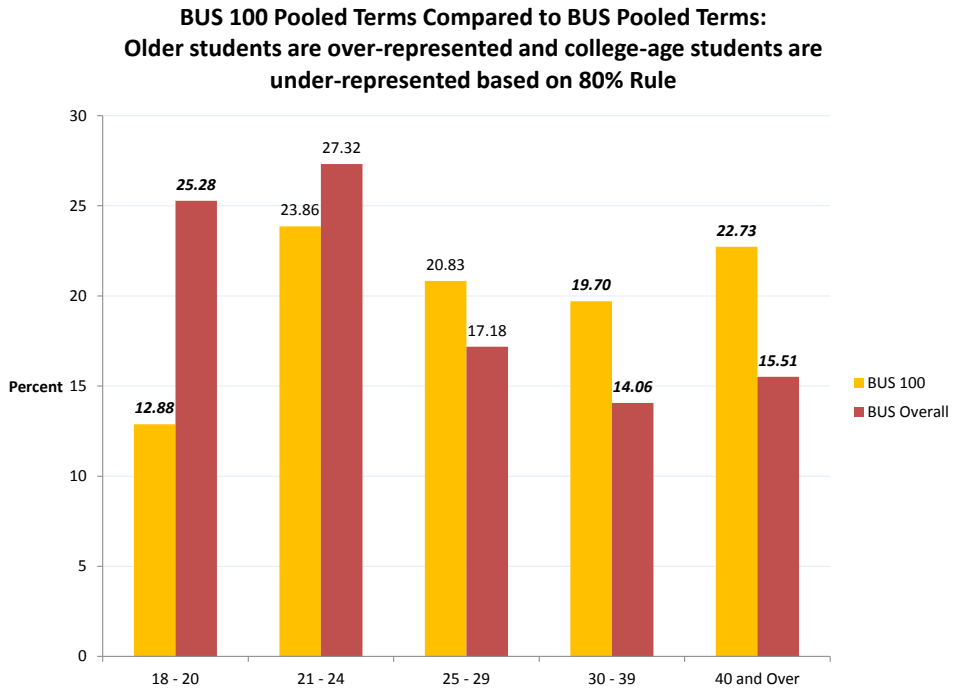
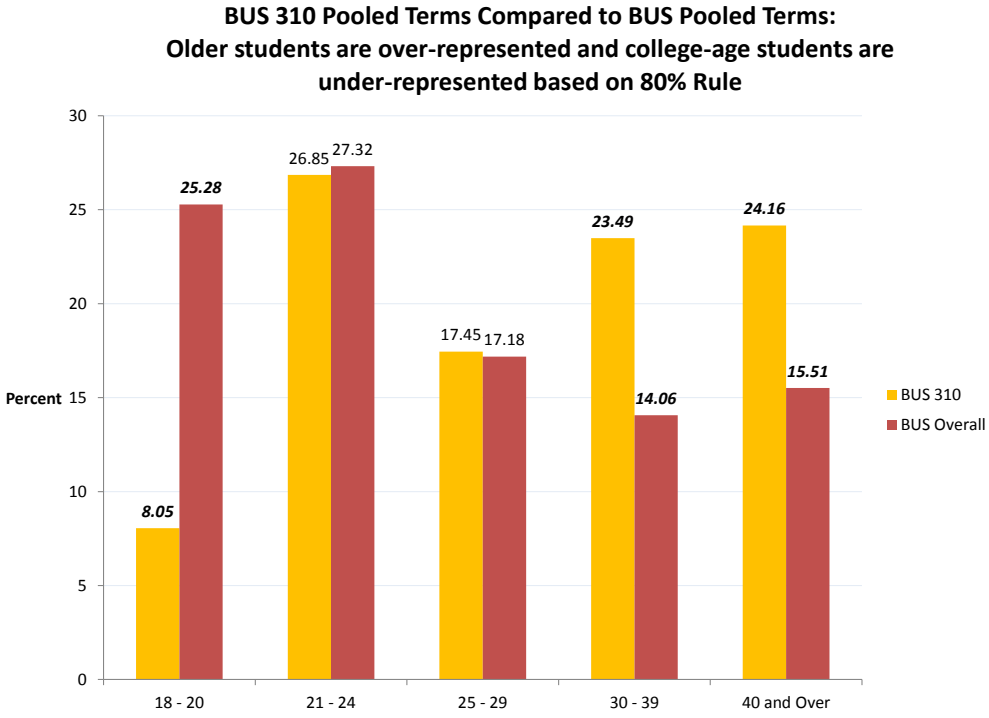


Figure 5



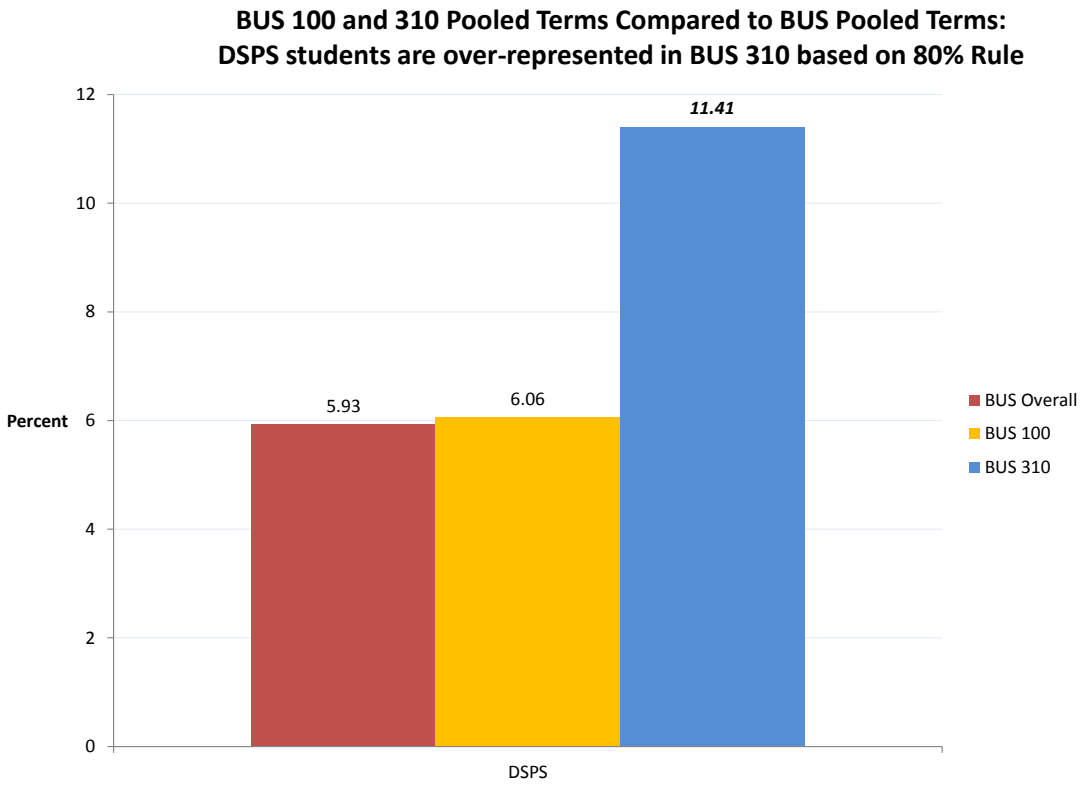
However, for both courses, there is also no evidence of any college or department factor related to this pattern.

Disability Status

The number of BUS 100 and BUS 310 students in Disabled Students Programs & Services (DSPS) is quite small—only 16 in BUS 100 and 17 in BUS 310. The numbers in the consequential validity survey are even smaller—13 and 6, respectively. Extreme caution must be used when drawing conclusions about disabled students based on such small numbers.

Figure 6 suggests that DSPS students are over-represented in BUS 310 while in BUS 100 they are enrolled proportionally to BUS overall.

Figure 6



Conclusion

This study has addressed some key research questions regarding the reading and writing prerequisites for two of SCC's Business courses. The evidence suggests that, on average, course success rates are quite high for students who stay in the class at least half of the term. Over 80% of students in the study perceive that they are at least adequately prepared and success rates for the survey respondents support that perception (approximately 80% of the survey respondents were successful). There is little worrisome disproportionate impact evident in the sample, with the exception of African-American under-representation in BUS 310

What the Business Department's prerequisite policy is in the future is a philosophical question for the department; however, it does not appear from the data examined in this study that an English prerequisite is harming most students by unduly limiting access and opportunities for success.

Appendix A: Individual Course Survey Results

Table A.1

How did you meet the prerequisite requirements for this course?	Number	Percent
Took ENGWR and ENGRD course(s) at SCC	63	35.00
Took ENGWR and ENGRD course(s) at another institution	39	21.67
Assessment process	54	30.00
Took one (1) course at SCC and 1 course elsewhere	9	5.00
Other (Counselor verification/waiver, challenge process)	15	8.33
Total	**180**	**100**

How prepared do you believe you were for the work you have encountered in this course?	Number	Percent
Under prepared	17	9.5
Adequately prepared	149	83.24
Over prepared	13	7.26
Total	**179**	**100**

Describe the level of work in this class.	Number	Percent
It is too hard.	13	7.22
It is just right.	162	90
It is too easy.	5	2.78
Total	**180**	**100**

Table A.2

How did you meet the prerequisite requirements for this course?	Number	Percent
Took ENGWR and ENGRD course(s) at SCC	28	35.90
Took ENGWR and ENGRD course(s) at another institution	16	20.51
Assessment process	18	23.08
Took one (1) course at SCC and 1 course elsewhere	10	12.82
Other (Counselor verification/waiver, challenge process)	6	7.69
Total	**78**	**100**

How prepared do you believe you were for the work you have encountered in this course?	Number	Percent
Under prepared	9	11.54
Adequately prepared	64	82.05
Over prepared	5	6.41
Total	**78**	**100**

Describe the level of work in this class.	Number	Percent
It is too hard.	8	10.26
It is just right.	69	88.46
It is too easy.	1	1.28
Total	**180**	**100**

Appendix B: This appendix contains Disproportionate Impact tables for BUS 100 and BUS 310.

Table B.1: BUS 100

Pooled BUS 100 *survey respondents* compared to pooled BUS 100 and pooled BUS overall data.

	BUS 100 Study Respondents		BUS 100 Enrollments		BUS Identifier		Proportionality (numbers closest to 1 are the most-proportional. Numbers in ***bold italics*** have more than 20% gap.)	
Age Group	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Study / 100**	**BUS 100 / BUS**
18 - 20	21	11.60	34	12.88	1,897	25.28	0.9	***0.5***
21 - 24	44	24.31	63	23.86	2,050	27.32	1.0	0.9
25 - 29	36	19.89	55	20.83	1,289	17.18	1.0	1.2
30 - 39	34	18.78	52	19.7	1,055	14.06	1.0	***1.4***
40 and Over	46	25.41	60	22.73	1,164	15.51	1.1	***1.5***
Under 18	0	0.00	0	0	48	0.64	n/a	n/a
Total	**181**	**100**	**264**	**100**	**7,503**	**100**		
	BUS 100 Study		**BUS 100**		**BUS Identifier**			
Gender	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**		
Female	130	71.82	184	69.7	3,774	50.3	1.0	***1.4***
Male	49	27.07	76	28.79	3,655	48.71	0.9	***0.6***
Unknown	2	1.10	4	1.52	74	0.99	***0.7***	***1.5***
Total	**181**	**100**	**264**	**100**	**7,503**	**100**		

Table B.1, cont.

	BUS 100 Study		BUS 100		BUS Identifier			
Ethnicity or Race	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**		
African American	23	12.71	41	15.53	1,343	17.9	0.8	0.9
Asian	41	22.65	48	18.18	1,129	15.05	1.2	1.2
Filipino	1	0.55	4	1.52	159	2.12	***0.4***	***0.7***
Hispanic/Latino	36	19.89	51	19.32	1,909	25.44	1.0	0.8
Multi-Race	21	11.60	27	10.23	491	6.54	1.1	***1.6***
Native American	1	0.55	3	1.14	52	0.69	***0.5***	***1.7***
Other Non-White	0	0.00	0	0	42	0.56	n/a	0.0
Pacific Islander	2	1.10	2	0.76	78	1.04	***1.4***	***0.7***
Unknown	5	2.76	8	3.03	314	4.18	0.9	***0.7***
White	51	28.18	80	30.3	1,986	26.47	0.9	1.1
Total	**181**	**100**	**264**	**100**	**7,503**	**100**		
	BUS 100 Study		**BUS 100**		**BUS Identifier**			
DSPS	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**		
Yes	13	7.18	16	6.06	445	5.93	1.2	1.0

Table B.2: BUS 310

Pooled BUS 310 *survey respondents* compared to pooled BUS 310 and pooled BUS overall data.

	BUS 310 Study Respondents		BUS 310 Enrollments**		BUS Identifier		Proportionality (numbers closest to 1 are the most-proportional. Numbers in ***bold italics*** have more than 20% gap.)	
Age Group	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Study/ 310**	**310 / BUS**
18 - 20	7	8.97	12	8.05	1,897	25.28	1.1	***0.3***
21 - 24	25	32.05	40	26.85	2,050	27.32	1.2	1.0
25 - 29	8	10.26	26	17.45	1,289	17.18	***0.6***	1.0
30 - 39	18	23.08	35	23.49	1,055	14.06	1.0	***1.7***
40 and Over	20	25.64	36	24.16	1,164	15.51	1.1	***1.6***
Under 18	0	0.00	0	0	48	0.64	n/a	n/a
Total	**78**	**100**	**149**	**100**	**7,503**	**100**		
	BUS 310 Study		**BUS 310**		**BUS Identifier**		**Proportionality**	
Gender	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Study/ 310**	**310 / BUS**
Female	47	60.26	100	67.11	3,774	50.3	0.9	***1.3***
Male	31	39.74	48	32.21	3,655	48.71	1.2	***0.7***
Unknown	0	0.00	1	0.67	74	0.99	0.0	***0.7***
Total	**78**	**100**	**149**	**100**	**7,503**	**100**		

Table B.2, cont.

	BUS 310 Study		BUS 310		BUS Identifier		Proportionality	
Ethnicity or Race	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Study/ 310**	**310 / BUS**
African American	7	8.97	20	13.42	1,343	17.9	***0.7***	***0.7***
Asian	16	20.51	25	16.78	1,129	15.05	1.2	1.1
Filipino	3	3.85	6	4.03	159	2.12	1.0	***1.9***
Hispanic/Latino	14	17.95	34	22.82	1,909	25.44	0.8	0.9
Multi-Race	5	6.41	6	4.03	491	6.54	***1.6***	***0.6***
Native American	2	2.56	2	1.34	52	0.69	***1.9***	***1.9***
Other Non-White	0	0.00	1	0.67	42	0.56	0.0	1.2
Pacific Islander	0	0.00	1	0.67	78	1.04	0.0	***0.6***
Unknown	4	5.13	6	4.03	314	4.18	***1.3***	1.0
White	27	34.62	48	32.21	1,986	26.47	1.1	1.2
Total	**78**	**100**	**149**	**100**	**7,503**	**100**		

	BUS 310 Study		BUS 310		BUS Identifier		Proportionality	
DSPS	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Study/ 310**	**310 / BUS**
Yes	6	7.69	17	11.41	445	5.93	***0.7***	***1.9***

** BUS 310 excludes sections 17321 and 20242 because those sections have only 3 survey responses matched to IR data.

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