APPENDIX V - 29

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Executive Summary

This study examined the impact of Culturally Relevant (CR) courses on student performance in grades 6 – 12 during SY 2019-20 in the Tucson Unified School District (TUSD). Five outcomes were selected to assess if students who were enrolled in one or more CR courses (the treatment group) performed differently than a matched cohort of students who were not enrolled in any CR courses in SY 2019-20 (the comparison group). A regression analysis was used to understand the amount of impact of CR course enrollment on each of the outcomes for students who chose to take CR courses. One methodological challenge with assessing impact of CR courses is that students could self-select to enroll in a CR course rather than being placed in the course through randomization. The results of this study must therefore be read with caution because one group may possess characteristics that are systematically different and/or may be specific to its members.

This study revealed that enrollment in a CR course in High School or Middle School did not impact overall academic performance in terms of English Language Arts (ELA) and Math benchmark testing or the number of F's received when compared to the comparison group. This finding is not surprising because students in the treatment and comparison group were matched on prior academic performance from SY 2018-19.

The results did show that greatest difference between High School and Middle School was that Middle School students who enrolled in CR courses had a significantly higher attendance rate than those not enrolled in CR courses as well as a significantly lower overall GPA. It is possible that these students enrolled in one or more CR course not only attended school more frequently but also had a more rigorous course load than students who were not enrolled in CR courses.

Introduction

Tucson Unified District currently operates under a desegregation order, referred to as the Unitary Status Plan (USP) that was implemented in SY 2014-15. The USP evolved out of a school desegregation case that began in 1974 and continues to this day. The Court recently mandated a study on the impact of Culturally Relevant (CR) courses on student performance. The purpose of this evaluation thus is to determine whether TUSD's Culturally Relevant (CR) courses had a measurable impact on selected student outcomes for which data exists. During SY 2019-20, CR courses were offered in grades 6 – 8 and 11 and 12. These courses were open to all students and they could choose to enroll or not.

To determine program impact, the definitive experimental technique is by random assignment that assigns participants to different groups with, for example, a random number generator to ensure that each participant has an equal chance of being placed in any group. This approach guarantees that any

> ## The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

differences between and within the groups are not systematic at the outset of the experiment and that any differences between groups at the end of the experiment can be more confidently attributed to the experimental procedures.   One methodological challenge in assessing impact of CR courses is that students could self-select to enroll in a CR course rather than being placed in the course through randomization. The results of this study must therefore be read with caution because one group may possess characteristics that are systematically different and/or may be specific to its members.

This study used a quasi-experimental design using a matched comparison group because a random experimental design was beyond the scope of this study in both time and resources.   Two groups of matched students were identified that met specific criteria: the treatment group and the comparison group. The treatment group was made up of students who took one or more CR course in SY 2019-20 and the comparison group was made up of students who did not take any CR courses in SY 2019-20. Criteria for the group identification are shown below in Table 1:

Table 1. Criteria for Identified Groups	
Treatment Group	**Comparison Group**
- Enrolled at a single TUSD school for all of 2018-19 - Enrolled at a single TUSD school for all of 2019-20 - Did **not** take any CR courses in 2018-19 - Took **one or more** CR courses for the **entire** 2019-20 - Was not missing data for any treatment, outcome, or control variables (complete case analysis)	- Enrolled at a single TUSD school for all of 2018-19 - Enrolled at a single TUSD school for all of 2019-20 - Did **not** take any CR courses in 2018-19 - Did **not** take any CR courses in 2019-20 - Was not missing data for any treatment, outcome, or control variables (complete case analysis)

The N size for the two matched groups varied depending upon the outcome and is reported separately for each table of results. Please see Appendix 1 for a more detailed explanation of how the matched groups were formulated. The five SY 2019-20 outcomes selected for analysis were:

- Attendance rate
- GPA for students who had 5 or more letter grades in Semester 1
- Number of Fs received in Semester 1
- ELA Benchmark mean proficiency levels
- Math Benchmark mean proficiency levels

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Findings: Average Treatment Effect Using Regression Analysis

To examine impact, the treatment group (students who were enrolled in one or more CR courses in SY 2019-20) was compared against a matched comparison group (students who were not enrolled in any CR courses in SY 2019-20) using a regression analysis. This approach is meant to reveal evidence of causality between treatment and the associated outcome where such evidence exists. A major advantage of a regression model is the ability to control for as many other factors as needed. For the five outcomes variable below, the coefficient explains the average expected treatment effect on the treatment group, holding all other factors constant. The P-value explains if the difference between the two groups is statistically significant at .05 or less. For this study, the regression outputs can answer the following question: If two students have the same FRL status, same ethnicity, same 1819 core course GPA or AzMERIT scores, same gender, same ELL status, same ExEd status, and same 1819 baseline outcome, but only one of them took CR courses, *how would that student's SY 2019-20 outcomes change?*

A. Outcome 1: Attendance Rate

The findings are organized into two groups: High School and Middle School. The tables below explain not only how big the treatment effect is (the Coefficient) and if the difference is statistically significant (P-value), but also gives information on the control variables and if their contribution to the identified outcome is significant or not. For example, in Table 2 below, High School Attendance is the outcome variable. The small negative Coefficient of -0.0038 indicates that enrollment in CR courses did not have an impact on attendance rates and the P-value of 0.989 shows that the difference is not significant. A result that is non-significant indicates that we cannot be confident that CR courses produced any impact on attendance for High School students outside of the initial dataset. Additionally, the coefficients on the control variables reveal that differences in attendance rates among students are most likely to be driven primarily by SY 2018-19 core course GPA, gender, and SY 2018-19 attendance rate. All control variables that were significant for the coefficient are highlighted in a darker grey.   Significant control variables in Table 2 therefore are more likely to have affected attendance rates among all high school students than enrollment in a CR course.   This analysis therefore demonstrates that CR courses were not found to have a significant impact on attendance rate at the High School level.

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Table 2. High School Attendance Rates

High School (N=2,168)	Coefficient	P-value
	-0.0038	0.989
Control variables		
FRL Status	-0.1968	0.442
White	-1.8567	0.086
AfAm	-1.7579	0.105
Hisp	-1.9099	0.057
NaAm	--	--
AsAm	1.4905	0.616
Multi	-2.1388	0.108
1819 Core Course GPA	1.0280	<0.001
Gender	-1.3674	<0.001
ELL Status	-0.4393	0.525
ExEd Status	0.6289	0.296
1819 Attendance Rate	0.7907	<0.001
R^2 =0.5376		

Table 3 presents the Middle School attendance rate findings. The Coefficient is .3412 and the P-value is statistically significant at .05 indicating that enrollment in one or more CR courses is expected to raise a Middle School student's attendance by 0.34 percentage points on average with all other factors being equal. CR course enrollment therefore did have a significant, positive impact on SY 2019-20 attendance rate at the Middle School level.

Table 3. Middle School Attendance Rates

Middle School (N=2,779)	Coefficient	P-value
	0.3412	0.050
Control variables		
FRL Status	-0.5722	0.005
White	-0.7251	0.677
AfAm	-0.9688	0.585
Hisp	-1.2319	0.478
NaAm	-1.3632	0.447
AsAm	--	--
Multi	-0.9962	0.587
1819 AzMERIT ELA	0.0044	0.780

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

1819 AzMERIT Math	0.0188	0.217
Gender	-0.2140	0.203
ELL Status	0.6137	0.147
ExEd Status	-0.9810	0.001
1819 Attendance Rate	0.6525	<0.001
R^2 =0.5466		

B. Outcome 2: 2019-20 Semester 1 GPA

Table 4 shows that CR course enrollment did not have a significant impact on GPA at the High School level with a non-significant P-value of .30.

Table 4. High School GPA for Semester 1 2019-20

High School (N=2,146)	Coefficient	P-value
	0.0307	0.302
Control variables		
FRL Status	-0.0386	0.165
White	-0.2411	0.429
AfAm	-0.3007	0.325
Hisp	-0.3048	0.313
NaAm	-0.3920	0.223
AsAm	--	--
Multi	-0.0086	0.978
1819 Core Course GPA	0.6434	<0.001
Gender	0.0205	0.462
ELL Status	0.1254	0.094
ExEd Status	0.8189	0.217
1819 S1 GPA	0.0938	0.020
R^2 =0.5884		

Table 5 demonstrates that CR course enrollment did have a small, significant, and negative impact on GPA at the Middle School level with the Coefficient of -0.07 and a P-value of 0.039. In other words, students who did not enroll in CR courses could be expected to have a somewhat higher GPA than those who were enrolled in CR courses. It is unclear from this study what impact Math or Science grades might have on the overall GPA for the treatment or comparison group.

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Table 5. Middle School GPA Semester 1 2019-20

Middle School (N=1,644)	Coefficient	P-value
	-0.0685	0.039
Control variables		
FRL Status	-0.1057	0.007
White	-0.1861	0.606
AfAm	-0.1678	0.649
Hisp	-0.3235	0.368
NaAm	-0.6480	0.084
AsAm	--	--
Multi	0.0625	0.872
1819 AzMERIT ELA	0.0122	<0.001
1819 AzMERIT Math	0.0010	0.001
Gender	0.0856	0.010
ELL Status	0.1584	0.064
ExEd Status	0.1148	0.049
1819 S1 GPA	0.6616	<0.001
R^2 =0.5861		

C.   Outcome 3: 2019-20 Semester 1 Number of Fs Received

Tables 6 and 7 reveals that CR course enrollment did not have a significant impact on the number of Fs a student received at both the High School and the Middle School level with P-values that exceeded the 0.5 threshold.

Table 6. High School Number of F's Received Semester 1

High School (N=1,839)	Coefficient	P-value
	0.0024	0.971
Control variables		
FRL Status	0.8686	0.187
White	-0.0995	0.727
AfAm	-0.1452	0.622
Hisp	0.1899	0.454
NaAm	0.3761	0.201
AsAm	-11.3282	0.986
Multi	--	--

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

1819 Core Course GPA	-1.2300	<0.001
Gender	0.1099	0.078
ELL Status	-0.2372	0.113
ExEd Status	-0.3238	0.015
1819 S1 Number of Fs	-0.0411	0.108
Pseudo R² =0.3024		

Table 7. Middle School Number of F's Received Semester 1

Middle School (N=2,782)	Coefficient	P-value
	0.0442	0.405
Control variables		
FRL Status	0.2750	0.001
White	-0.0612	0.794
AfAm	-0.1495	0.551
Hisp	0.1648	0.464
NaAm	0.8256	0.001
AsAm	-12.9765	0.978
Multi	--	--
1819 AzMERIT ELA	-0.0271	<0.001
1819 AzMERIT Math	-0.0517	<0.001
Gender	-0.3064	<0.001
ELL Status	-0.2276	0.035
ExEd Status	-0.3171	<0.001
1819 S1 Number of Fs	0.3081	<0.001
Pseudo R² =0.2225		

D. Outcomes 4 and 5: 2019-20 Average ELA and Math Benchmark Proficiency Level

Tables 8 and 10 show High School ELA and Math Benchmark scores and Tables 9 and 11 show Middle School ELA and Math Benchmark scores.   For High School, Tables 10 and 12 both indicate that CR course enrollment had a small, near-significant positive impact on average ELA and Math Benchmark proficiency. This data should be viewed with caution because of the relatively small N size. Benchmark testing was offered in grades 9 - 11 in High School in SY 2019-20 whereas CR courses were only offered in grades 11 and 12.   These results may or may not be representative of all High School students enrolled in one or more CR course. Tables 9 and 11 indicate that CR course enrollment did not have a significant impact on ELA or Math Benchmark proficiency levels with P-Values that exceeded 0.05.

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Table 8. High School ELA Benchmark Proficiency

High School (N=341)	Coefficient	P-value
	0.1897	0.075
Control variables		
FRL Status	-0.0747	0.395
White	0.2727	0.713
AfAm	0.3188	0.668
Hisp	0.2448	0.740
NaAm	--	--
AsAm	--	--
Multi	0.5822	0.450
1819 Core Course GPA	0.1219	0.010
Gender	0.1422	0.104
ELL Status	0.2112	0.571
ExEd Status	-0.0915	0.597
1819 ELA BM Avg	0.6054	<0.001
R^2 =0.4223		

Table 9. Middle School ELA Benchmark Proficiency

Middle School (N=1,613)	Coefficient	P-value
	-0.0317	0.220
Control variables		
FRL Status	0.0102	0.739
White	-0.2207	0.059
AfAm	-0.1670	0.200
Hisp	-0.1386	0.221
NaAm	-0.2346	0.096
AsAm	-0.0914	0.760
Multi	--	--
1819 AzMERIT ELA	0.0391	<0.001
1819 AzMERIT Math	0.0091	<0.001
Gender	0.0504	0.045
ELL Status	0.0068	0.932
ExEd Status	-0.0569	0.226
1819 ELA BM Avg	0.4316	<0.001
R^2 =0.7171		

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Table 10. High School Math Benchmark Proficiency

High School (N=314)	Coefficient	P-value
	0.1903	0.060
Control variables		
FRL Status	-0.1924	0.026
White	0.3135	0.408
AfAm	-0.3458	0.368
Hisp	0.2045	0.574
NaAm	--	--
AsAm	--	--
Multi	0.3220	0.449
1819 Core Course GPA	0.2983	<0.001
Gender	-0.1576	0.069
ELL Status	-0.1098	0.529
ExEd Status	0.3277	0.054
1819 Math BM Avg	0.4104	<0.001
R^2 =0.5376		

Table 11. Middle School math Benchmark Proficiency

Middle School (N=1,645)	Coefficient	P-value
	-0.0081	0.776
Control variables		
FRL Status	-0.0133	0.696
White	0.1451	0.642
AfAm	-0.1105	0.728
Hisp	0.0048	0.988
NaAm	-0.2029	0.530
AsAm	--	--
Multi	-0.0926	0.782
1819 AzMERIT ELA	0.0100	<0.001
1819 AzMERIT Math	0.0380	<0.001
Gender	-0.0607	0.029
ELL Status	-0.0314	0.670
ExEd Status	0.1163	0.021
1819 Math BM Avg	0.2804	<0.001
R^2 =0.5884		

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Summary

According to Gloria Ladson-Billings (1994), culturally relevant teaching or CRT includes "a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes." Geneva Gay (2010) further explains that CRT "uses the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective." (http://avid.org). TUSD's Culturally Responsive Pedagogy and Instruction (CRPI) Department has been instrumental in writing Culturally Responsive (CR) curriculum and training TUSD teachers to provide CR courses to students over the past 7 years.   To date, TUSD provides CR courses in grades 6 – 12 in Social Studies and English Language Arts. More than 150 teachers taught CR courses in SY 2019-20 including Middle School course titles such as CRC Language Arts and CRC Social Studies as well as High School course titles such as English: CRC African American or Mexican American History Viewpoint and Social Studies: CRC African American or Mexican American Government Viewpoint. CR courses are offered in all middle/K-8 schools (grades 6 – 8) and high schools (grades 11 and 12).

The analysis of the five outcome variables for High School and Middle School indicated similar trends in that enrollment in CR courses did not impact overall academic performance over the course of a year as measured by ELA and Math benchmark testing and the number of F grades when compared to students not enrolled in CR courses. However, a higher attendance rate in Middle School was associated with students enrolled in CR courses. Please see Table 12 for a summary of the impact of CR courses on each of the five outcomes, broken out by High School and Middle School.

Table 12. Summary of the impact of CR courses by their Significance level (P-Value .05 or lower = Yes) on the 5 Outcomes between the Treatment Group and the Comparison Group Broken out by High School and Middle School

Outcome	High School	Middle School
Attendance Rate	No	Yes
GPA for students who had 5 or more letter grades in Semester 1	No	Yes (negative)
Number of F's received in Semester 1	No	No

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

ELA Benchmark mean proficiency levels	No	No
Math Benchmark mean proficiency levels	No	No

High School students enrolled in one or more CR courses demonstrated:

- No treatment effect on attendance rates, GPA, the number of F's received or ELA and Math benchmark performance when compared to the comparison group.

Middle School students enrolled in one or more CR courses demonstrated:

- No treatment effect on the number of F's received or Math and ELA Benchmark performance when compared to the comparison group.
- A statistically significant negative treatment effect on GPA. In other words, students who were not enrolled in CR courses could be expected to have a somewhat higher GPA.

Parallel to the High School results, enrollment at the Middle School level in CR courses did not appear to impact overall academic performance in terms of ELA or Math benchmark performance or the number of F's received when compared to the comparison group. The only difference between High School and Middle School was that Middle School students enrolled in CR courses are expected to have a higher attendance rate than those not enrolled in CR courses as well as a lower overall GPA. It is possible that these students may have had a more rigorous course load than students who were not enrolled in CR courses.

The results of this study demonstrated that enrollment in CR courses did not significantly impact mean academic performance over the course of a year. This finding is not unexpected because students in the treatment and comparison group were matched on their prior academic performance and only one year of data was analyzed. This study confirms other research findings that the greatest predictor of a student's academic performance is his/her prior year's performance. Nonetheless, students may be receiving benefits from CR courses over the course of a year that may not be translated into improved grades or test scores such as a sense of connection to the lessons in the curriculum or to the social organization of the class.

The Impact of Culturally Relevant Courses on Student Performance in Tucson Unified School District using School-Based Measures SY 2019-20

Appendix 1

Matched Comparison Groups: To reduce the influence of confounding variables, the two groups were matched on the following control variables using coarsened exact matching in descending order of importance:

- 2018-19 Free and Reduced Lunch (FRL) status
- 2018-19 Unitary Status Plan (USP) ethnicity categorization
- 2018-19 AzMERIT scores (Middle School) or 2018-19 core course GPA (high school)
- Gender
- 2018-19 end of year ELL status
- 2018-19 ExEd status
- 2018-19 grade level

The dataset was analyzed using two techniques. First, post-treatment each of the five outcomes were compared across groups using t-tests. This technique determines whether a statistically significant difference existed in the distribution of outcome observations between treatment and comparison groups. Second, each outcome was regressed on treatment and controls using the weights generated by the coarsened exact matching procedure. The regression technique was either linear regression or Poisson regression, depending upon the outcome under analysis. The regression analyses allowed for the calculation of an average treatment effect for each outcome. This effect describes the average expected impact of CR course enrollment while holding all else constant.

Note that for all analysis, Middle School and High School grades (SY 2019-20) were analyzed separately. This separation accounted for differences in available control data as well as anticipated differences in the unobservable characteristics of the two age groups.