

STUDY TWO: EFFECTS ON RACE/ETHNICITY GROUPS

Purpose

The purpose for this analysis was to examine differences in overall passing rate that may exist for various racial/ethnic groups studying in schools that are implementing the Sharon Wells Mathematics (SWM) curriculum, and comparable schools using any other mathematics curriculum.

Methods

For this study, passing rates across grades and years were examined for different ethnic/racial groups. The sample size for this analysis included 6 campuses with African American students; 167 campuses with Hispanic students; and 17 campuses with Caucasian students. Due to the under-representation of African-American and Caucasian students, further, exploratory analyses focused only on achievement of Hispanic students (see Appendices C through F for supplementary information by grade level and ethnicity).

The variables for this study consist of two independent variables and three dependent variables. The independent, or grouping variables for this study were *Degree of Implementation* of the SWM curriculum, and *Race/Ethnicity*. As in the previous study, degree of implementation was derived by summing the number of grades per school, across years (1999 through 2003) that reported using the SWM curriculum (see descriptive statistics in demographics section for range of scores, Table D1). Total implementation scores were then divided into three groups: (a) not implementing (comparison) schools; (b) schools with a moderate implementation score; and (c) schools with higher implementation scores. A higher implementation score indicates that SWM curriculum is used in multiple grades for a majority of years considered in this study. Racial and ethnic group achievement data was derived from the Academic Excellence Indicator System (AEIS) reports for each campus during the same time period.

Achievement of three racial/ethnic groups were identified as pertinent to this investigation: African-American, Hispanic, and Caucasian students.

The dependent variables for this analysis was the *Average passing rate, across all grades* for African-American, Hispanic, and Caucasian students. The overall passing rate for each group was derived by averaging the campus passing rates for each group of students in each grade (i.e., grades 3 through 6) across years (i.e., 1999 – 2003).

For the present study, we made comparison of ethnic/ racial group means using ANOVA (analysis of variance). Further, exploratory analysis also used this procedure.

Results and Conclusions

Three separate analysis of variance (ANOVA) procedures were used to address this research question – one for each racial/ethnic group. This approach was deemed more meaningful to consumers interested in evaluating the merits of the SWM curriculum than conducting a more comprehensive procedure using race/ethnicity as a single independent variable. In addition, unequal cell size across racial/ethnic groups would make this type of analysis problematic.

Table S2.1 contains descriptive statistics for passing rate by race/ethnicity groups. Results from separate ANOVAs revealed statistically significant differences for both African-American ($F(1, 5) = 11.55, p = .03$) and Hispanic students ($F(2, 166) = 5.81, p = .004$), but no difference was found for Caucasian students ($F(2, 16) = .016, p = .98$). For African-American students, comparison group passing rates were significantly higher. This result should be interpreted with some caution given the fact that only one campus was able to be included in the overall calculation (i.e., grades 3 through 6). Likewise, the fact

that the sample size for Caucasian students were highly unequal makes this result less conclusive.

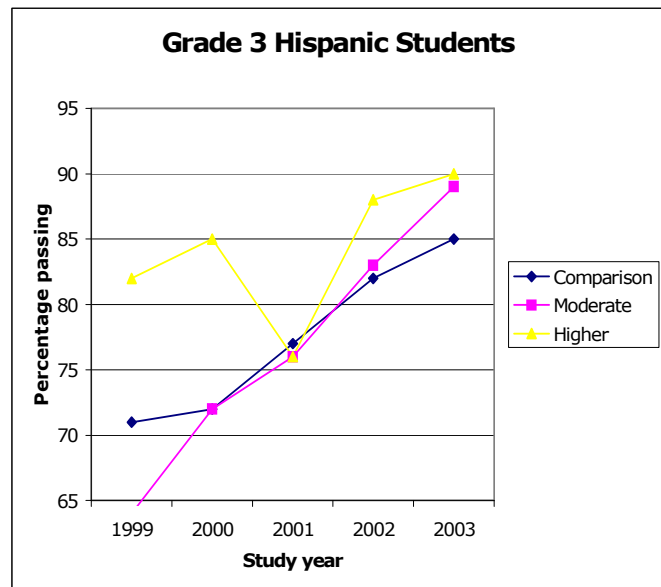
The difference found among Hispanic students, however, represents a statistical and practical difference favoring schools implementing the SWM curriculum. Specifically, Hispanic students in schools where the SWM curriculum has been implemented for a longer period of time exhibited significantly higher passing rates than the same group of students in moderate implementing and comparison schools.

Table S2.1 *Descriptive statistics for passing rate by race/ethnicity and implementation group*

Race/ethnicity by implementation	N	Mean	SD	Min	Max
African-American students					
Comparison	5	.84	.10	.74	.98
Moderate	1	.46		.46	.46
Higher	0				
Total	6	.78	.18	.46	.98
Hispanic students					
Comparison	86	.82	.10	.18	.98
Moderate	38	.81	.13	.49	.96
Higher	43	.88	.05	.72	.97
Total	167	.83	.10	.18	.98
Caucasian students					
Comparison	12	.86	.22	.15	.99
Moderate	1	.89		.90	.90
Higher	4	.87	.11	.76	.97
Total	17	.86	.19	.15	.99

Additional, exploratory analyses were conducted for separate years (i.e., 1999 through 2003) in order to better understand the performance of Hispanic students at each grade level in comparison and treatment schools (see Tables S2.2, S2.3, & S2.4). Results from these exploratory analyses reveal an interesting pattern of achievement for Hispanic students.

First, in Grade 3, significant difference in the passing rates of Hispanic students were found for four of the five years included in this study. An examination of the means of implementation groups indicates higher passing rates for students in the high-implementing schools. Differences between students in moderate-implementing



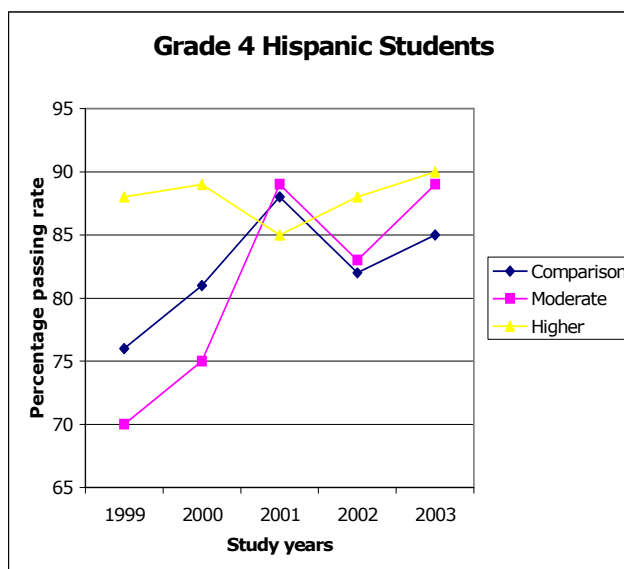
schools, however, were more similar to passing rates in comparison schools. This difference suggests, as mentioned before, sustained, consistent implementation of SWM curriculum may be required before significant gains are observed.

Table S2.2 *Grade 3 achievement for Hispanic students across time by implementation group*

Grade 3		1999¹	2000²	2001³	2002⁴	2003⁵
Implementation group						
Comparison						
Mean		.71	.72	.77	.82	.85
SD		.25	.17	.16	.16	.10
Moderate						
Mean		.64	.72	.76	.83	.89
SD		.32	.25	.15	.16	.07
Greater						
Mean		.82	.85	.76	.88	.90
SD		.16	.10	.21	.09	.07

Note ¹ $F(2, 219) = 7.33, p = .001, \eta^2 = .06$
² $F(2, 215) = 9.34, p = .001, \eta^2 = .08$
³ $F(2, 213) = .07, p = NS$
⁴ $F(2, 213) = 3.68, p = .02, \eta^2 = .03$
⁵ $F(2, 217) = 6.63, p = .002, \eta^2 = .06$

Second, a similar pattern of achievement across time and among implementation groups was found when examining passing rates of Hispanic students in Grade 4. Differences favoring treatment schools were found in four of the five years included in this study. As in the previous analysis, the SY 2000-2001 proved to be an anomaly for



achievement in treatment schools. Although a similar trend of higher passing rates of Grade 4 Hispanic students was found among treatment schools, this trend appeared to be weaker than that found among Grade 3 students. Still,

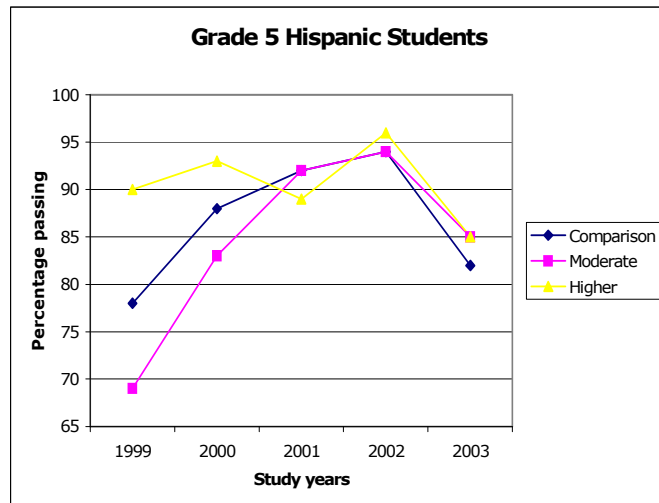
differences in SY 2002-2003 clearly favored treatment schools in the high-implementation group. This comparison is particularly salient given that changes in state-mandated curriculum tests during that year more closely resemble the current TAKS test for SY 2003-2004.

Table S2.3 *Grade 4 achievement for Hispanic students across time by implementation group*

Grade 4 Implementation group	1999¹	2000²	2001³	2002⁴	2003⁵
Comparison					
Mean	.76	.81	.88	.82	.85
SD	.26	.16	.15	.16	.10
Moderate					
Mean	.70	.75	.89	.83	.89
SD	.35	.26	.13	.16	.07
Greater					
Mean	.88	.89	.85	.88	.90
SD	.15	.07	.20	.09	.07

Note ¹ $F(2, 212) = 6.82, p = .001, \eta^2 = .06$
² $F(2, 216) = 8.26, p = .001, \eta^2 = .07$
³ $F(2, 211) = 1.00, p = NS$
⁴ $F(2, 218) = 3.68, p = .02, \eta^2 = .03$
⁵ $F(2, 217) = 6.63, p = .002, \eta^2 = .05$

Third, a somewhat different trend in achievement for Grade 5 Hispanic students was detected from these analyses. In the earlier years included in this study, schools implementing the SWM curriculum appeared to have a sizable advantage over comparison and moderate



implementing schools. This advantage appears to have diminished notably by SY 2002-2003. The difference among comparison and treatment groups was still statistically significant, but the overall practical significance of the differences seems to be modest. At the time of this writing, passing rates for SY 2003-2004 are not available.

The results from the overall passing rates of Hispanic students averaged across time, and then explored by individual years suggests that the SWM curriculum has been effective at boosting achievement of students in implementing schools. More recent changes to state-mandated curriculum testing appears to have diminished, somewhat, the effectiveness of the program for Hispanic students in grade 5, but passing rates in grades 3 and 4 still reveal a practical benefit for students.

Table S2.4 *Grade 5 achievement for Hispanic students across time by implementation group*

Grade 5 Implementation group	1999¹	2000²	2001³	2002⁴	2003⁵
Comparison					
Mean	.78	.88	.92	.94	.82
SD	.27	.15	.14	.14	.11
Moderate					
Mean	.69	.83	.92	.94	.85
SD	.36	.29	.14	.13	.09
Greater					
Mean	.90	.93	.89	.96	.85
SD	.14	.06	.19	.05	.10

Note ¹ $F(2, 201) = 7.64, p = .001, \eta^2 = .07$
² $F(2, 201) = 4.61, p = .01, \eta^2 = .04$
³ $F(2, 203) = .51, p = NS$
⁴ $F(2, 201) = 201, p = NS$
⁵ $F(2, 205) = 3.26, p = .04, \eta^2 = .03$