

Examinations of the Effectiveness of the Sharon Wells  
Mathematics Curriculum in Texas Schools

By

**SIGMA *Plus***

**Research & Evaluation, Inc.**

2321 18<sup>th</sup> Street  
Lubbock, TX 74401  
(806) 438-9340

for

Sharon Wells Consulting, Inc.

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## Executive Summary

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Five separate studies were conducted to provide an empirical examination of the effects of the Sharon Wells Mathematics curriculum on students' passing rates on Texas' state-mandated, mathematics assessments. A randomly selected sample (n = 231) of schools in Texas were used to carry out this investigation. Treatment schools were selected based upon their implementation status in SY 2002-2003, and comparison schools were matched to each of these schools based upon demographic, economic and participation rates.

### Major Findings

1. Schools that had a greater degree of implementing the Sharon Wells Mathematics curriculum produced a higher student passing rates compared to moderate and non-implementing schools.
2. Schools that implemented the Sharon Wells Mathematics curriculum had a positive impact on passing rates of students

representing the three major ethnic groups, but especially for Mexican-American students in Title I schools.

3. Schools that implemented the Sharon Wells Mathematics curriculum showed a consistent, significant higher passing rate across 5 academic years and across four grade levels.
4. Schools that consistently implemented the Sharon Wells Mathematics curriculum across grade levels and across time had student passing rates that were less effected by teacher experience than were schools that implemented the program in a limited number of grades or for a shorter period of time.
5. Schools implementing the Sharon Wells Mathematics curriculum who also had higher rates of student attendance also exhibited higher student passing rates on state-mandated mathematics assessments.

## *INTRODUCTION*

## **Purpose of this Research**

A series of five separate studies were conducted *to examine the effectiveness of the Sharon Wells Mathematics Curriculum at improving students passing rate on Texas' state-mandated curriculum examinations.* For these studies, student performance in schools implementing the Sharon Wells curriculum were compared to schools not implementing this curriculum. Together, student performance in over 200 schools over a five-year period, from 1999 to 2003, were compared based upon whether the SWM curriculum or some other mathematics curriculum was being used.

The five studies attempted to systematically identify possible differences in student passing rate between schools implementing the SWM curriculum and those utilizing another curriculum. The scope of the studies included:

- Study 1 An examination of the passing rates of students in schools characterized by differing levels of implementation of the SWM curriculum. Three groups were identified: (a) non-implementing, comparison schools, (b) schools with a moderate degree of implementation, including grade-levels and time; and (c) schools with a greater degree of implementation, including more grade-levels, and over a greater amount of time.
- Study 2 An examination of the effects of the SWM curriculum on passing rates of students from different racial/ethnic populations.
- Study 3 An examination of the change in student passing rates from 1999 to 2003, and the effect of the degree to which the SWM curriculum was implemented on each campus.
- Study 4 An examination of teacher effects (i.e., years of experience) and degree of implementation on student passing rates in grades 3, 4, and 5.
- Study 5 An analysis only with implementing schools aimed at identifying factors that might predict student passing rates.

## **Creation of the Study Sample**

The sample of schools implementing the SWM curriculum, or treatment schools, were selected based upon two criteria. The first criteria was whether the school was implementing the curriculum during the SY 2002-2003. This criteria allowed for a comparison student performance based upon the degree to which the curriculum had been implemented over time. Some schools had used the SWM curriculum for the entire five-year period, while others had begun implementation during the final year considered for the study. The second criteria was that the school, or the district within which the school was located, had an official contract with Sharon Wells Consulting, Inc. This criteria permitted the examination of student performance solely in schools over which the company had some control concerning the fidelity with which the curriculum was being implemented. Schools that might have had individual teachers using the curriculum were not included in the sample of implementing schools.

The sample of comparison, or non-implementing schools was systematically selected using the AEIS reporting system. School reports available to educators and the public describe key demographic and performance statistics, as well as generating a comprehensive list of comparable schools. This list was utilized for creating the sample of comparison schools. From the report generated for each school implementing the SWM curriculum, a comparable school was selected from the AEIS list. The selection of comparable schools was conducted in a systematic manner, counting four lines below the identified treatment schools. The selected school was then examined to determine if the demographic make-up, including SES and racial/ethnic statistics, matched the target school implementing the SWM curriculum. If the fourth school was not appropriate, due to demographic or other reasons (e.g., school did not house the same grades, or was a newly created school), then they procedures were repeated until all treatment school had a comparable, comparison school with which to compare. In approximately 8 cases, no unique comparison school

could be found because all schools on the list had previously been matched to another school implementing the SWM curriculum. In these cases, the treatment school was retained without a matched non-implementing school.

### **Brief Description of the Sharon Wells Mathematics Curriculum**

The Sharon Wells Mathematics Curriculum is a comprehensive 2<sup>nd</sup> through 6<sup>th</sup> curriculum intended for students in Texas schools. The curriculum has been systematically aligned with state curriculum standards (currently the Texas Essential Knowledge and Standards) as well as the state-mandated curriculum examination (currently Texas Assessment of Knowledge and Standards). According to the developer ([www.sharonwellsmath.com](http://www.sharonwellsmath.com)), the curriculum is concept-based, geared toward the development of problem-solving, and provides opportunities for students to be actively engaged.

An important characteristic of this program is the teacher support as evidenced through the on-going professional development and curriculum materials provided to teachers in implementing districts and schools. Teachers at each implementing grade level receive a 6-hour workshop prior to the beginning of each six-week grading period. The workshops at each grade level focus on the teaching of problem-solving strategies, graphing skills, review of basic mathematics facts, and preparation for state-level testing appropriate for the specific grade level. Teachers also receive a master curriculum packet for each six-week period. Each packet contains a teacher's guide, materials list, blackline masters, student assessments, and TAKS practice questions, the results of which can be entered into a classroom profile sheet used to track student performance over time.

## *DEMOGRAPHICS*

## **Analysis of Campus Attributes**

A total of 231 campuses were selected for this study. For comparison purposes, 117 elementary campuses were randomly selected from a total of 509 eligible campuses which are listed as currently using the Sharon Wells Mathematics (SWM) curriculum program (SY 2002-2003). A similar sample of 114 elementary schools not implementing the SWM curriculum were identified by using TEA's system of campus comparability criteria from the Academic Excellence Indicator System (AEIS).

Demographic information ranging from student mobility to levels of English language proficiency was collected for both the treatment and comparison samples. Appendix A presents a detailed tabular description of key variables across a variety of important outcome values such as passing rates and attendance rates for demographic attributes such as gender, ethnic, academic years, and grade levels.

One of the first tasks for the researcher was to verify the comparability of the campuses selected for the study. Tables A1, A3, A5, A7, and A9 present descriptive results about student mobility rates, presence of students' from economically disadvantage backgrounds, rates of students' proficiency in the English language and average teacher' experience for each academic year. Comparisons between treatment (SWM) and comparison schools are presented for these key variables.

For the mobility rates across 5 academic years, the largest difference between the treatment and comparison groups was 2 percent points. In terms of campuses which where economically disadvantages, the rates for both study groups, they were less than one percentage point discrepant. The two study groups were also highly similar in terms of the average rate of those students who where limited English proficient. Teachers' years of experience, in years,

were also found to be not different for both study groups. Statistical t-tests for all of these variables yielded non statistical significant differences at the 0.05 level.

Additionally, average number of students and average student attendance on selected campuses for both study groups, were examined and analyzed. Tables A2, A4, A6, A8, and A10 present the results across five academic years, across grade levels, and between study groups. The t-test for these five years produced non significant differences between the treatment group and the comparison group for the third, fourth, and fifth grades. The largest difference reported among these grade levels was found in grade 3 for the academic year 2002-2003. There was a statistically significant difference found in this analysis due to the fact that far fewer students in Grade 6 were found in the selected schools. This occurrence is likely explained by the fact that far more districts organized students into middle-level schools for grade 6. For this reason, analyses of grade 6 achievement was limited.

Appendix B present the results for the average student attendance rates between the two study groups and across five academic years, across three ethnic groups, gender, and economically disadvantage students. For academic years 1998-1999 and 1999-2000, the largest differences between the study groups were found within the African-American students; however these differences did not reach statistical significance. Average raw score differences with the rest of the variables did not exceed more than 3 points yielding no other statistical significant difference detected across academic years, across ethnic groups, and across gender levels for the two study groups.

## Conclusion

The overall outcome of these results clearly present the similarities that these two study groups have in common allowing the researcher the use of statistical techniques which required certain distributional assumptions to be satisfied. Additionally, in terms of external validity issues, the above results clearly support the principle of proximal similarity proposed by Donald Campbell (1986). This principle permits the researcher to draw, with confidence, the conclusion that treatment effects found with this sub-sample are generalizable to the larger population.

“We can generalize an experimental effect with most confidence where treatment, setting, population, desired outcome and year are closest in some overall way to the original program treatment” (1986, pp. 75-76).

In the present context, the Sharon Wells Mathematics (SWM) curriculum represents the treatment effect, and similarities across years, schools, grades, ethnic groups, and passing rates permit further analyses as to the effectiveness that the treatment has had on these schools’ mathematics passing rates for the last five years.

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## Reference:

Campbell, D. T. (1986). Relabeling internal and external validity for applied social scientists. In W. M. K. Trochim (Ed.), Advances in quasi-experiental design and analysis (pp. 67-77). San Francisco: Jossey-Bass.

## *DISCUSSION*

## **Discussion**

Overall, it appears that schools using the SWM curriculum, compared to schools utilizing some other mathematics program, have been more effective at boosting passing rates for all students, but especially for Hispanic or Mexican American students who represent a subpopulation of students in Texas that are historically challenged by state-mandated assessments. These results suggest that the degree to which schools are implementing the SWM curriculum across grades and over time has a positive effect on student mathematics achievement.

In addition, the teaching experience of staff, which is often a concern in Title I schools, appeared to be less of a factor in schools where the SWM curriculum was being consistently across grade-levels and time. This suggests that relatively new teachers can be successful in boosting student achievement in mathematics in schools that have a culture of teaching that is willing to implement the program with a high degree of fidelity to the program-developer's specifications, and where there is a greater commitment of school administration to the long-range implementation of a single program.

Moreover, these results suggest that factors of which schools often have greater control have a high degree of relationship to student passing rates. That is, student-passing rates in implementing schools was most strongly related to student attendance rates, whereas other factors such as teaching experience of staff, and prior history of implementation were not predictive. This outcome suggests that the SWM curriculum will be most successful in schools that have a culture that values student participation in the learning process. This likewise suggests that other school level factors, such as learning climate, students' sense of belongingness, and collective efficacy of teachers may also affect the degree to which the SWM curriculum will be successful.