WHAT DOES RESEARCH SUGGEST ABOUT SUCCESSFUL PROGRAMS FOR WOMEN AND MINORITIES?

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Introduction

By examining the academic performance in science and mathematics for Virginia students in 1999, achievement gaps can not only be identified, but subsequently related .to research findings on successful programs for female and minority students in elementary, middle, and high schools.

Virginia is Changing

As an example of changing demographics in Virginia, the Arlington Public School system in northern Virginia has 18,900 students, of which 41% are White, 32% Hispanic, 17% Black, and 10% Asian. Within the last five years, the school district has become a minority majority school system. The rapid rate of change, especially in non-English speaking students, has brought many new challenges to the school district.

African-American Students

Virginia Standards of Learning (SOL) scores are significantly lower for African-American students than the statewide passing rate. Below are summarized the science (see Figure 1) and mathematics (see Figure 2) student achievement for 1999 on the (SOL) test [1,2].

Figure 1. 1999 Statewide Science Passing Rates for Standards of Learning Tests

SOL Test	All Students	African-American Students
Grade 3	68	43
Grade 5	67	41
Grade 8	78	56
Earth Science	65	40
Biology	81	64
Chemistry	64	41

Figure 2. 1999 Statewide Mathematics Passing Rates for Standards of Learning Tests

SOL Test	All Students	African-American Students
Grade 3	68	45
Grade 5	51	27
Grade 8	60	36
Algebra I	56	36
Algebra II	51	29
Geometry	62	34

Science scores for African-American students are about two-thirds the statewide passing rate and mathematics about 60%. There is no information reported for other minority groups. This data clearly indicates that there is a minority achievement gap to be overcome, at least for African-American students.

An additional observation from the school district test scores is that the higher the school district scores, the higher the minority scores as compared to the statewide passing rate.

Gender

The only gender related information reported on the Virginia Department of Education website for 1999 is the Scholastic Aptitude Test (SAT-I) mathematics scores. High school juniors generally take these tests because many colleges and universities require these tests for admission. The scores below compare Virginia students to national student scores for males and females (see Figure 3). Female students in Virginia, as well as nationally, score below their male counterparts [3].

Figure 3. 1999 National and Virginia Scholastic Aptitude Test (SAT-I) Scores

	National	Virginia
All Students	511	499
Male	531	516
Female	495	484

Achievement Differences

Achievement gaps appear early and remain throughout school years for minority students. According to the research, poverty and parent education are among the contributing factors for minority students' low performance [4]. In schools with high rates of impoverished children, families tend to move more often which is disruptive to student learning and often causes extended student absences. Schools with high percentages of low-income families tend to have a slowed-down curriculum and teachers with less experience and fewer credentials.

Parent education also appears to be a contributing factor. Parents who have been successful in school are more effective advocates for their children. They tend to do more of the things that make a difference in student performance when raising their children, such as read to their children, answer questions and help their children find out information, seek tutors for their children when they need help, and provide extensive enrichment experiences, such as trips to local parks and museums.

Improving Achievement

Research suggests multiple ways to improve achievement for minority students:

- Preschool programs

- Parent education programs

- Standards with a clear pathway to achievement

- Small classes

- Small schools

- Social and academic support [4].

Comprehensive Reform

Improvement for minority students is most effective when reform is comprehensive and includes:

- All students

- Framework using research

- Whole school/system change [5].

When change is based on a whole school or system, it needs to take into account curriculum that is culturally appropriate, instruction that is culturally informed, teacher professional development, and relations between school and home.

Language Minority Research

Collier and Thomas have been conducting language minority research on over one million students since 1982 in fifteen states [6, 7, 8]. A clear picture is emerging on characteristics of programs that produce long-term student achievement. Effective program characteristics include a focus on enrichment—not remediation—recognition of the power of primary language instruction, and peer coaching. The most effective programs are two-way bilingual followed closely by one-way bilingual. In two-way bilingual programs, half the class speaks one language and the other half speaks another language. Instruction takes place in both languages and the students are each learning the other second language. In one-way bilingual, the entire class speaks the same language, are learning the same second language, and all instruction takes place in both the primary and the secondary language. The least effective programs are ESL pullout and ESL content. A major characteristic of the least effective programs is that they lack academic support for students in their native language: instruction is all in their second language.

To close the gap, English language learners have to learn more than the average student in one year. This shows the great difficulty in closing the achievement gap. Collier and Thomas' research also shows that it takes five to seven years for English language learners in effective school programs to become academically competitive in English.

Teacher Professional Development

For teachers to help minority students learn, they need information about their students and their cultures, culturally relevant curriculum materials and resources, and culturally and linguistically sensitive instructional strategies. Curriculum resources and materials should include role models that are as similar to the students as possible and contain relevant content examples that relate the subject matter being studied to the students' cultural background. Instructional strategies should include hands-on activities, cooperative learning, multiple intelligences theory, and other methods that are helpful for many minority students [9, 10, 11, 12].

Gender

Significant gains have been made in gender equity in the classroom. However, there is still a long way to go. The United States is far ahead of most other countries in achieving gender equity according to the *Third International Mathematics and Science Study* [13, 14, 15]. However, girls still take fewer advanced courses, assume they have lower ability, and have less technology experience outside of school. The largest gender gap for girls is now in technology [16].

Research shows that male and female teachers unknowingly discriminate against girls [17, 18]. Classroom observations show that teachers call on girls less often than boys, spend less time assisting girls, provide shallow praise for girls, give less constructive feedback, and ask few follow-up questions of girls. Responses to girls are usually monosyllabic words such as "good" or "fine." By not asking follow-up questions of girls, they do not have to defend their answers.

Conclusion

In summary, there is an achievement gap for female and minority students in Virginia. If we are serious about eliminating the gap, we need to look at what researchers report as effective program characteristics and effective instructional strategies for female and minority students.

Research suggests some clear characteristics of effective programs. For minority students, preschool programs, small class sizes, and parent education programs are among the program characteristics that make a difference in minimizing achievement gaps. For students who are learning to speak English, ·enrichment programs that provide instruction in the student's first language, as well as in English, are key. For a gender equitable classroom, teachers need to spend equal amounts of time calling on both male and female students, have all students defend their answers to questions, and provide meaningful feedback.

As demographics change or achievement gaps are identified. success can be achieved by basing programs and instruction on a research-based framework. If teachers are provided with professional education opportunities that expand their knowledge on research-based strategies to meet the needs of their students, success can be achieved for all students in Virginia.   ■

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