

**EXECUTIVE SUMMARY**  
**“GATEWAY ACADEMIC PROGRAM”<sup>®</sup>**  
**IN BASIC MATH AND ALGEBRA**  
**FOR PRINCE GEORGE’S COUNTY HIGH SCHOOL GRADUATES**

**SUMMER 2011**

By  
Dr. Daryao S. Khatri, Professor of Physics  
Dr. Anne O. Hughes, Professor of Education/Sociology  
Professor Brenda Brown, Department of Mathematics  
University of the District of Columbia

Mr. Andre Nottingham, Director, Educational Talent Search Program  
University of Maryland, College Park Campus

INTRODUCTION

In its fifth year of the Math-Algebra program, the Gateway Academic Program (GAP) team achieved outstanding results for 21 high school graduates and two juniors of Prince George’s County School System; 91 percent of the students tested out of both of the remedial math courses (Basic Math and Introductory Algebra) at the end of the eight-week summer program.

For the 2011 summer eight-week program, twenty-one students, who had graduated in June 2011, were selected from various high schools of the Prince George’s County, Maryland. The criteria for selection of 21 students were low scores. The average of the low scores were 45 in Basic Math and 54 in Introductory Algebra on the *Accuplacer* tests administered on June 18, 2011 by the Educational Talent Search Program, University of Maryland, College Park Campus. Based on these results, all 21 students<sup>1</sup> were slated to take the remedial math courses as entering freshmen in their respective colleges and universities.

All 21 participated in the 10:00 AM – 2:00 PM, Monday-Friday, eight-week summer program. Scores on the pre- and post-*Accuplacer* of two students were not included in the final analysis because one of the students missed more than three weeks of the program due to the early start of his college. The other student’s scores are questionable because of inconsistent performances on the seven in-house tests and the post-*Accuplacer*. Therefore, statistics are reported for only 19 students who successfully completed the program.

The summer program did not allow the use of calculators in the classroom, and no textbooks were used for instruction. GAP’s Classroom management rules were strictly enforced; specifically, the use of cell phones in any mode during instructional period was not allowed. Students received a stipend of \$1200 for this period to offset their summer income. Funding for the program was provided by Urban Online University, a division of Lewis Limited LLC, Maryland.

## RESULTS

During the program, students took a total of seven in-class tests: Two tests were created by Dr. Lorenzo Hilliard, Professor of Mathematics; three were created by Dr. Antonio Acevedo-Ortiz, a Math Skills Specialist in the Academic Achievement Program, University of Maryland, College Park. Two others were created by the Gateway Academic Program (GAP) team. All tests were proctored and scored by Dr. Hilliard.

Class means increased from 52.05 to 83.75 (61% increase) in Basic Math and from 44.43 to 78.33 (increase of 76.3%) in Elementary Algebra. In addition, students independently completed 68 sets of class work and 37 sets of practice and priming (testing their readiness for the next math topics in the program) homework.

The post-assessment, the National College Board *Accuplacer* was administered on August 19, 2011. The results for placement both the Basic Math and Elementary Algebra are, as follows:

1. Nineteen of the 21 (91%) students tested out of both remedial math courses (Basic Math and Elementary Algebra), thereby saving a full year of remedial math courses that do not count toward graduation. Of these 19 students, eleven scored in the 91<sup>st</sup> -99<sup>th</sup> percentile range.
2. The two remaining students, who did not test out of either of the two remedial math courses, made considerable gains in their math skills. One of them might have tested out of the remedial courses if she had been able to participate in the entire program.
3. For Basic Math, the mean score for the group on the *Accuplacer* increased from 44.1 to the mean post-test score of 83.95, an increase of 90.56%. However, further analysis was required to satisfy school officials and researchers. So, because of the small samples involved, a statistical technique, Student's t, was used to compare the two means of the same 19 students with the *Accuplacer*. The t-ratio derived from the comparison of the two means for Basic Math was 12.24 with 18 degrees of freedom (d.f.). The t-ratio of 12.24 tells us that when the two means are compared statistically, there is less than 1 chance in a 1000 that this improvement in performance could have occurred by some other extraneous factors. Thus we can conclude that the math program made the difference in the student performance, and it did not occur because of some other extraneous or chance factor.
4. For Elementary Algebra, the mean score increased from the pre-test score of 52.11 to the post-test score of 95.53, an increase of 83.33%. The t-ratio for Elementary Algebra was 11.41 with 18 degrees of freedom. The explanation given for the t-ratio for the results in Basic Math also is applicable here as well.

At the end of the eight weeks, the students were asked to complete a questionnaire assessing their experience in the Basic Math and Algebra program of GAP.

- Twenty of them reported they were much more confident in their ability to learn than they had been before they entered the program. More than three-fourths of them were confident they could successfully test out of both Basic Math and Introductory Algebra on the post-testing with the *Accuplacer*; the remainder hoped they could. The 19

students who participated in the entire program all said the “instructional quality” of the program was “Excellent.”

- Two factors that were not formally measured but which the GAP team clearly observed were the parental support the participants had right from the start of the program and the unflagging support of the Educational Talent Search staff.
- Not a single problem with student behavior was experienced at any time during the eight weeks of the program. The students made it clear they had come to learn all they could—and learn they did.

## RECOMMENDATIONS

The institutions of higher education should consider two options for ending and/or reducing the need of remedial courses: (1) try to close the gap of incoming freshmen students in remedial math courses during the summer months prior to their registration in the Fall Semester, (2) close the remedial gap by teaching all remedial math courses during one semester.

---

<sup>1</sup> An additional two students (a 9<sup>th</sup> grader and a 10<sup>th</sup> grader participated voluntarily) in the program. These two students tested out of both of the remedial math courses even at this young age. Their average percentile scoring was 82<sup>nd</sup> percentile in Basic Math and 91<sup>st</sup> percentile in Elementary Algebra.