

# SUMMARY REPORT "GATEWAY ALGEBRA PROGRAM"<sup>1</sup> SUMMER 2008

By  
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## Summer 2007 Research Model

The sample for this research study was 16 and all these students selected were the "most academically challenged," meaning that all them would have to enroll in the lowest level remedial math course, Basic Math 005. Obviously, students who performed well on the placement test were not considered.

After the eight-week summer 2007 intervention and based on the UDC placement test, the *Accuplacer*, and the Math Department final examinations, nine of the 16 students (56%) tested out of both remedial courses, thereby saving a full year of remedial math courses that do not even count toward graduation. Five others (31%) were able to test out of the basic math course, thereby saving a semester of remedial math. The remaining two students showed increased readiness for the basic math course, but were advised to enroll in this course.

## Statement of the Problem

The challenge for this summer 2008 "Gateway Academic Programs (GAP)" in Algebra was to test the efficacy of the research model developed during the earlier two summers. Specifically, it was to test whether the model can be expanded to multiple sections and to a larger group of students when the various sections are taught by different content and pedagogically trained professionals.

## Program Results for Summer 2008

The results of the "Gateway Academic Program (GAP)" in math for the summer 2008 session are presented under four headings: results in terms of students' placement, the *Accuplacer* results, the results of Math Department final examinations for the two below-college level courses, and proven efficacy of the research model. This mix of testing was considered ideal for program rigor and to provide an accurate placement of students.

### Results in Terms of Placement

Based on the UDC placement test, the *Accuplacer*, and the Math Department final examinations, the results are. Fifteen of the 25 (60%) students tested out of both remedial courses, thereby saving a full year of remedial math courses that do not even count toward graduation. Four others were able to test out of the basic math course, thereby saving a

semester of remedial math. The remaining six students showed increased readiness for the basic math course and were advised to enroll in this course.

### The Accuplacer Results

Twelve percent of the students tested at the 90 percentile based on the national *Accuplacer* test. These students were from Anacostia, H.D. Woodson and Ballou senior high schools. Without this GAP program, even these students could have been stuck with remedial math courses for at least a year.

On the pre-test for 005, Basic Math, the mean score for the group (N=25) was 34.3, with the passing score being 70. The standard deviation was 11.56 suggesting a non-homogeneous group to start with. On the post-test, the mean increased to 60.06 showing an improvement of 60 percent, meaning that the entire group had gained. The s.d. was 23.84 suggesting that the instruction profited some of the students more than others. Turning to the results for Math 015, Introductory Algebra, the pre-test mean for the group (N=25) was 38.10 with an s.d. of 14.83. The passing score for Introductory Algebra was 70 percentile on the university's placement test. On the post-test, the mean increased to 58.05, showing a general improvement of 52.36% for the entire group.

### Math Department Final Exam Results

For the program, UDC Math Department final examinations for both Basic Math, 005, and Introductory Algebra, 015, were used at various points in the program to measure students' progress for placement purposes. During the program, students took a total of eight in class-tests (at least every Friday), the *Accuplacer* test on August 14 & 15, 2008, and a number of take-home assignments. In addition, these students completed independently a total of at least 29 sets of classroom problems (ranging from 50-75 problems per set) and five sets of problems that they completed when they went home.

The passing score in Math Department final examinations is 70%, equivalent to the letter grade of C. If a student's scores on the *Accuplacer* fell within five percentile of the cutoff score, then the higher score of that particular student in Math Department's final examinations also was factored in for placement purposes.

The raw test averages for the final examination were converted to a 100-point scale in order to equate them to the *Accuplacer* results. The averages in Basic Math, 005, jumped from 17.73 (taken on 6/23/08, beginning of the program) to an average of 66.88 (taken during the program), showing an improvement of 277%. The test average for the final examination in 015 Introductory Algebra improved from an average of 9.46 to 48.64 (414% improvement) during the program. One of our observations in this situation is that some students probably did not take these examinations too seriously, specially in the beginning.

### Proven Efficacy of the Research Model

The lead trainer for the afternoon section was the program leader, Dr. Daryao Khatri, whereas the lead trainer for the morning section was Dr. Russell Goward who had received several months of pedagogical training on several occasions during the last two years. Both lead trainers were assisted I review and homework completion by other pedagogically trained UDC faculty members. Professor Brenda Brown of the mathematics department acted as a rotating coordinator to insure the rigor of the curriculum and its efficient and effective delivery in both sections. Dr. Anne Hughes was the internal evaluator for the program.

The results were similar for both sections, proving beyond any doubt that the research model can be implemented in various settings when taught by content and pedagogical trained professionals and when the curriculum is delivered in a rigorous and structured manner.

## **Selection of Students**

The selection of the students for the summer 2008 GAP program was made by the College Success Foundation (CSF), and has received funding from the Gates Foundation for a program called “DC Achievers”. These are students who have achieved at a certain academic level and have shown interest in attending a college for higher education. They are awarded full scholarships for a period of five years to attend any college in the country. All these students have graduated from one of the high schools in either ward # 7 or 8 of the District of Columbia.

Before students’ participation in the summer GAP program, they were tested by the nationally recognized placement test, *Accuplacer*. Although these students have high expectations for themselves, they were far removed from the college realities. An indication of this status is evident when these students who participated in the program were placed in the first remedial math course, Basic Mathematics, 005, based on the pre-assessment scores on the *Accuplacer*, and some of them scored in the ten and twenty percentile in Basic Math and Introductory Algebra.

## **Program Sample**

Initially the program registered 25 students. After about a week, two additional students joined the program, but they could not attend the program on a regular basis and missed an additional two weeks of instruction. Therefore, these two students are not considered part of the sample. The sample for the program is, therefore, 25 students only.

## **Program Description**

All students finally selected for the program were the “most academically challenged,” meaning that all them would have to enroll in the lowest level remedial math course, Basic Math 005. Obviously, students who performed well on the placement test were not considered.

The program carried a stipend of \$1,200 for each student as an offset for not being able to work full-time during the summer. Students were also provided money or metro fare cards for travel. In addition, students received awards for regular attendance.

There were two sections of the program; the morning section from 10:00 AM to 2:00 PM and the afternoon session from 2:00 – 6:00 PM. Each section of the program ran for four hours per day, five days a week for eight weeks (June 23 – August 15, 2007). The last hour was devoted to “homework”, and no lunch was provided. The classroom management rules, which were handed out to students and discussed on the first day of class of the program, were strictly enforced throughout the duration of the program.

In addition, throughout the program, students were not permitted to use a calculator during any assignment in class or in completing their homework. The whole purpose of not allowing calculators was to enhance students’ mental agility with numbers, accurate estimation of answers, and their own self-confidence in problem solving.

## UDC Capacity Building to Deliver Future Programs

The summer 2008 had a total of 10 faculty members who participated in the entire program in various roles. This was intended to build institutional capability to deliver instructions for a larger pool of students. The institutional capacity building will continue throughout the academic year 2008-2009 through a number of extended workshops. We anticipate that UDC will be able to serve approximately 150-200 students in math and about 50-75 students in reading and English.

## Additional Results

In addition to the quantitative results mentioned earlier, there were several others that are worth mentioning. First, the students really had become “college ready” in their self-confidence in their ability to do college-level math work, increased attention span, and improved study habits and organization. Some of them believe that the UDC summer GAP program has changed their lives in terms of their academic preparation in math. They have gone from “hating math” to “math kids”. Some of them have reported to select science and/or engineering for their majors.

## Conclusions

- ◆ Based on the three successive summer programs, approximately half of the entering Freshmen targeted for the two remedial math courses, that do not count towards graduation, can be prepared for Freshman level college math courses if provided an opportunity for an intensive summer “gateway” program, thereby saving a year of remedial math work.
- ◆ An additional third can reduce the number of remedial math courses required from two courses to one, thereby saving a semester’s worth of remedial math work.
- ◆ The remaining students can benefit from the intensive program by improving their general preparation in math.
- ◆ An unexpected outcome of the intensive program was the students’ growing realization of their being successful in their math learning. In turn, their academic success was reflected in a boost in their self-confidence about succeeding in college.
- ◆ Supplementing these findings, we also found that when these students entered the summer program, the level of math preparation for many of them seems to have been around the seventh grade level as indicated by the placement test. Further observation, however, revealed that the students had seen, been exposed to, or been taught some of these topics in their high schools, but the necessary practice, applicability to other academic disciplines, and mastery of these concepts was lacking to a great extent.
- ◆ Finally, we estimate that the potential for reducing the costs of remedial education and/or eliminating it in non-selective institutions of higher education through programs, such as the one being reported here, has real promise.