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A Highly Successful Summer Accelerator Math Program in a Hispanic Serving Institution

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A Highly Successful Summer Accelerator Math Program in a Hispanic Serving Institution

Abstract

For three consecutive years, the Department of Engineering at Northern New Mexico College has offered a Summer Camp focused on accelerating students to prepare them for college math and to increase their interest in Information Engineering Technology and Mechanical Engineering and other STEM disciplines. The program has been very successful, as measured by the progress made by the students in their math skills. The student body is 85% Hispanic. The first two summer camps targeted high-school students, while the last summer focused on college freshmen students with low-level math skills. This paper describes the strategies used, the recruitment tools used, and the results obtained for three years of Summer Camps. One of the main results shows that an average participant student has improved their math skills the equivalent of one semester or even one year after working 60-90 hours, three hours a day, five days a week for four-six weeks. This is an increase in efficiency compared to the number of weeks that students spend on math courses either at the high school or in remedial math classes at the college. Although other summer boot camps for minority students focused on strategies to build a sense of self-confidence, this one is focused on improving the student math skills in a very expedite way and this helps indirectly to build their self-confidence.

I. Introduction

This paper presents the strategies implemented and the promising results of a successful summer math accelerator program that the Department of Engineering has prepared for students categorized as not ready for Calculus.

The project has been implemented for the last three summers (2010, 2011 and 2012) with very similar results. The program was originally designed as a recruitment tool, but in the last year's summer, it served as a retention strategy as well.

In recent years, high school students have been attracted to our engineering programs (or other STEM fields); however the lack of a solid pre-calculus background contributed to their failure during the first year. This was due to poor grades in the remedial math courses or a delay in moving forward caused by the multiple remedial classes that they had to take. Similar incidents are reported in the literature for colleges and universities around the nation. [2, 4, 5, 7] However, through Math Boot Camps, some universities have successfully improved retention, performance in STEM courses and ultimately graduation rates [1].

For engineering programs, the first math level is Calculus (Math 162), which has a prerequisite sequence of Trigonometry (Math 155), College Algebra (Math 150), Intermediate Algebra (Math 130), Basic Math II (Math 102) and Basic Math I (Math 100). For an incoming student, this remedial sequence means two years of remedial classes before he/she can take Calculus and other entry-level engineering courses.

During the first two summers, the project targeted high school students as a way to help them boost their math skills before attending college. It was also a good way to introduce the new institution, which changed its mission in 2006 from a community college to a 4-year institution.

Last summer, however, the project targeted freshmen students due to the fact that many of the students that were exposed to the high school program were selecting larger and more renowned universities in the state and not attending this institution.

In all cases, the student performance results were very similar in the three summer camps as documented below.

II. Background

The College is located in a rural area. The student body demographics is 73% Hispanic, 11% Native American students and 16% other [8]. The institution at large serves a community with a population of 10,495 inhabitants with a medium household income (2005-2009) of $34,186 USD. According to the 2010 US Census Bureau, 27.2% of the population and 16.5% of families were below the poverty line [9].

In the spring 2009, the overall graduation rate reported for the institution was only 7%. The current 6-year graduation rate for the main three urban universities in New Mexico is 44%, and the three comprehensive regional universities graduate 25% [3]. The most recent placement indicators at the College show that 93% of the incoming student population is placed in remedial math (Math 108, Math100, Math102), and the main student feeder high-school's ranking is 3/10 according to Great Schools, Inc. [6]

The student body that the math accelerator project has served is mainly a Hispanic population (86%) in an underserved geographical area. The work presented here is a good indicator that the strategy does work on a group with these characteristics.

III. Strategies and Implementation

The summer accelerator program has evolved over the three years in the number of hours allocated to math activities. However, the three camps have in common the following strategies:

a) Recruitment of students giving priority to students with low grades in previous math classes;
b) Pre-test used to categorize students according to their level of math and to arrange student groups that are at a similar level;
c) Individualized study plans for each participant and usage of a problem-generator software that includes video and tutoring capabilities;
d) Low student/instructor ratio per class;
e) Freedom to advance students to higher levels at any time of the program by monitoring weekly progress;
f) New topics are released upon proof of mastering of previous topics;
g) Breakfast, snacks and/or lunch provided;
h) Post-test measurements of improvement;

i) Tutoring hours beyond class time for the students;
j) Student on-line homework (study plans);
k) Weekly progress exams;
l) Graduation ceremony (families invited);
m) Stipends, bookstore vouchers as rewards for successful program completion.

The following section describes each strategy listed above.

III. a) Recruitment

For the first two summer camps, the main recruitment activity consisted of visits to local high schools by faculty members of the Department of Engineering. Applications were distributed and students were required to submit a letter from their math or science instructor explaining their performance in math classes. The applications were reviewed and priority was given to those students who struggled with math according to their grades and to the opinion of their high school instructor or counselor. The idea here was to recruit not the best students who would probably succeed without any intervention. The philosophy was that by building some self-confidence in the students in math, they would select a STEM field as a career option.

For the third year, when the program targeted college freshmen students, the recruitment strategy was mainly based on visits to the Math 100 and Math 102 classes. Students recently admitted to the college also received an invitation by mail and email.

Table 1 shows the number of students per summer camp.

	Female	**Male**	**Hispanic**	**Total**
Summer 2010	14	9	23	23
Summer 2011	13	13	26	26
Summer 2012	5	5	8	10

Table 1: Number of students who participated in the Summer Camp.

III. b) Pre-test and sorting

A general exam was given to the students the Friday before the summer camp began. The exam covered all topics in the three levels of the camp. Details are shown in Table 2.

The exam's purpose is to sort students according to their current math level so that they could be grouped in small teams with similar pretest scores. Although this has been the strategy for the three years, it is obvious that one exam cannot determine the real level of a student. Therefore, a common drawback was that a small number of students ended up in a group beyond or below their actual level. However, the process has worked well for the majority of the students.

130 Math (Intermediate Algebra)
Graphs, Equations, and Lines
Systems of Equations
Exponents, Polynomials, Polynomial Functions
Rational Expressions and Equations
Radical Expressions and Equations
Quadratic Equations, Functions, and Inequalities
Exponential and Logarithmic Functions
150 Math (College Algebra)
Functions and Graphs
Polynomial and Rational Functions
Exponential and Logarithmic Functions
Systems of Equations and Inequalities
Matrices and Determinants
155 Math (Trigonometry)
Six Trigonometric Functions
Right Angle Trigonometry
Radian Measure
Graphing and Inverse Functions
Identities and Formulas
Equations
Triangles (Law of sines and cosines)
Complex Numbers and Polar Coordinates

Table 2: Topics covered in the Summer Camp.

The groups had around five students per instructor (Table 3).

	Beginner	Intermediate	Advanced
Summer 2010	15	5	3
Summer 2011	15	10	0
Summer 2012	4	5	1

Table 3: Enrollment per year and per level

III. c) Individualized Study Plans and Problem-Generator Software

At the core of the success of the program is the use of a problem-generator software MyMathTest® by Pearson Education. This software allows for the design of customized exams at any desired level. Moreover, the software automatically creates individualized study plans based on the student's performance on a test. The software generates similar problems to the ones where the student showed weaknesses, and it provides videos and step-by-step instructions to help students learn on their own.

The study plan may be updated as the student improves according to result of further exams as developed by the instructor and implemented in the software. Individualized study plans help students to focus only in the areas where they need more assistance or practice.

Every student group was exposed to a 20-30 minute lecture on a topic that was relevant to their background, in particular, topics that seemed to be difficult for all the students in the group. The other 90 minutes were for the students to work at their own pace, with individual tutoring as requested. This strategy is very important for the program's success. The program is designed on the assumption that solving a large number of math problems builds confidence and guarantees mastering of the concepts. Our experience indicates that many students fail math exams due to both lack of practice and passive learning methodology.

III. d) Low Student/instructor ratio

Students with a similar skill level were placed in the same group or class. However, at any time the premise was to have no more than six students per tutor/instructor. This is crucial as it allows every student to receive 30 minutes per class of individual interaction with the tutor/instructor to clarify problems. If more than six students were at the same level, then they were split in two groups with the same curriculum.

III. e) Freedom for students to advance to higher levels at any time of the program by monitoring weekly progress

The first time that the math accelerator program was offered, it was expected that every student should improve one grade level (measured by the post-test compared to the pre-test) as a measure of success. A financial award was given if the goal was accomplished. We learned that this not to be the best approached because the incentive led to obtaining a minimum score as a condition for the award with no further incentive to learn new material.

For the second and third year, this policy was changed, and students could freely advance to a higher level of math at any time of the program if they demonstrate knowledge at their current level. The students were monitored by weekly exams and a threshold was established for every level. The benchmark was to replicate a version of the typical final exams that are used for the different levels of math: Intermediate Algebra, College Algebra and Trigonometry, in the case of the college student summer camp.

In the third year program, the college students received a certificate to waive remedial classes if they passed the appropriate exam. Therefore, there was a strong financial incentive for students to complete as many topics as possible in order to test out of as many remedial courses as possible. Remedial is defined as any math course previous to Calculus.

III. f) New topics are released when previous topics were mastered.

One of the features of the software was the possibility to automatically release new topics for the student who has mastered previous skills and topics. This software feature allows students to have a smooth transition from one level to the next.

III. g) Breakfast, snacks and/or lunch provided

During the first two summer camps, the students were provided with a mid-morning snack and lunch. For the third summer camp, students were provided with a light protein-based daily breakfast served at 8:30 a.m. as well as snacks and lunch. Besides the nutritional effect on students, these times were important for networking and socialization.

III. h) Post-test measurements of improvement

Students were given a weekly test to measure their progress. Students who excelled were allowed to move to a higher level, as explained in part (e) and (f). When students advanced to a higher level, a new pre-test was generated and applied to students as the new benchmark for the higher level.

III. i) Tutoring hours beyond class time for the students and field experiences

Students were offered peer-instructor services after class time as needed. The tutoring was focused on reviewing the new topics introduced in the class and on addressing specific questions in their homework or issues not well-covered by the online videos.

Students also participated in field experiences to practice the topics learned in the classroom. Examples of such activities included: 1) 3-4-5 Rule in the Construction Trades and its relation to the Pythagorean Theorem; 2) Proportional Triangles--determining the height of a street lamp post; 3) Slopes--determining the rise and run of a ramp (on campus). See Figure 1. These activities were important as icebreakers and help students to reflect on the importance of application of theoretical concepts.

Figure 1: Field Experiences (Applying the 3-4-5 Rule)

III. j) Student on-line homework (study plans)

Students were assigned online homework on a daily basis using their study plans. This strategy helped them to move quicker in the plan and to practice problems. Students were exposed in this way to around 50 problems a day. This intense exposure contributed to a quicker mastery of the concepts. It is difficult to predict if the results would have been equivalent if this strategy had not been strictly followed.

III. k) Weekly progress exams

At the core of the program was the strategy of continuous assessment. The exams provided instant feedback to the students and in many cases it helped the tutors to determine if a student was close to a higher level.   When the results were not promising, these exams triggered remediation actions such as sending students to afternoon tutoring or providing extra assistance in the problematic topics during the 30-minute class time individualized interaction between student and tutor.

III. l) Graduation event

For a community of first-generation college students, it is a matter of pride to be publicly recognized for their achievements. Therefore, the end of the program included a graduation ceremony where the achievement statistics were presented to the students. See Figure 2.

Students were free to invite their families. Parents, siblings, and other relatives were typically present for this ceremony. This was a collateral effect in the marketing of the program for the following years and helped the Department of Engineering in its recruitment efforts.

Figure 2: Graduation event

III. m) Stipends/bookstore vouchers as rewards for successful completion

The program has offered different type of incentives for students. The purpose of the stipends was two-fold: to keep students in the program and to encourage their best efforts. During the summer camps 2010 and 2011, students were offered a stipend of \$200 and \$100, respectively. Students were eligible for the stipend if they attend 28 sessions out of 30 and if they improved (any percentage) from the pre-test to the post-test. A monetary incentive was given because the participants were high school students, who sometimes do not realize the value of the program. During the summer camp 2012, with college students, the students were eligible for a \$120 voucher for textbooks from the college bookstore for the fall 2012 semester. In this case, the students were eligible for the voucher if they attend 28 sessions out of 30 and if they advanced one level (from level one to two or level two to level three or passed out of level 3).

During the last summer camp, due to the fact the participants were college students, they received a certificate to waive the remedial courses that otherwise were required. The certificate waived the remedial level of math that they passed. This is the reason behind the 80/100 threshold that was used. The Math Department assisted in the planning of the learning outcomes so the standards of the post-test were equivalent to their final exams.

IV) Methodology

The data that will be presented in the next section consist on the pre-test and post-Test exams. These results were gathered directly from MyMathTest® Software. For the summer camps where the students were able to move from one level to the following, pre-test and post-test results are shown for every one of the levels that the student attended.
On the third summer camp, when the program was implemented for college students, it was possible to follow up the students. The students were tracked on their sequential math courses and math instructors were surveyed with the goal of comparing math accelerator program participants from students who have done the traditional remedial courses.

V) Results

For the summer camp 2010, student progress was measured with a post-test compared to a pre-test after the four weeks of the camp. However, students worked only on one level and it was not possible to move forward to a higher level. Moreover, students were allowed to take the post-test twice if they were not satisfied with the first result. The results (Table 4) were very satisfactory.

It is remarkable that four weeks of classes were enough for the students to improve their performance 146% in average. Notice that student 21 improved 641% while student 17 did not improve at all. For the rest of the students, the results were promising, and it was decided to repeat the methodology in the summer camp 2011.

As explained in Section III.b, for the summer camp 2011, students were allowed to move to a higher level if they advanced fast enough at their current level. This policy was an incentive for students to finish as many levels as possible. This camp had a four-week duration. Results are shown in Table 5.

	Pre-test	Post-test	Improvement
Student 1	37.5	80.8	115%
Student 2	30	90.8	203%
Student 3	21.7	85.8	295%
Student 4	46.1	80	74%
Student 5	21.4	56.7	165%
Student 6	43.9	83.1	89%
Student 7	16.7	56	235%
Student 8	39.9	82.1	106%
Student 9	23.7	90.4	281%
Student 10	27.3	65.9	141%
Student 11	50	100	100%
Student 12	19.7	76.1	286%
Student 13	22.7	65.9	190%
Student 14	50	80	60%
Student 15	56.7	77.1	36%
Student 16	30	48.1	60%
Student 17	30	30	0%
Student 18	30	53.3	78%
Student 19	29.6	74.6	152%
Student 20	20	87	335%
Student 21	10.7	79.3	641%
Student 22	8.6	62.9	631%
Student 23	17.9	80	347%
Average	**29.74**	**73.3**	**146%**

Table 4: Pre-test and post-test results of Summer Camp 2010

Note that some students moved among different math levels. For example, student 13 started in level 1 and then advanced to levels 2 and 3 successfully. The threshold to move from one level to the next was 75/100 in the post-test exam. The post-test was given when the instructor believed the student had acquired the required knowledge based on weekly exams and daily homework/assignments.

From Table 5, it can be seen that out of 26 students, 13 stayed at the same level (from whom seven students obtained the minimum 75/100); 10 students moved from one math level to the following level (and eight students obtained the minimum 75/100 at the second level); 3 students moved two levels (although none obtained the minimum 75/100 at the third level); finally, one student dropped the program. Besides the one dropout, if failure is defined as any student who stays at his/her first math level without obtaining the minimum 75/100, or any dropout, then only four students were in this status (15% of the entire body). This statistic is better compared to an average of 25% of students who fail or drop a remedial math class at the college.

	Level 1			Level 2			Level 3		
	Pre-test	**Post-test**	**Change**	**Pre-test**	**Post-test**	**Change**	**Pre-test**	**Post-test**	**Change**
Student 1				60	90.7	51%			
Student 2				82.7	100	21%	13.9	93.7	574%
Student 3				90.7	84	-7%	17.1	95.1	456%
Student 4				76	88	16%	6.3	98.1	1457%
Student 5				58.7	100	70%			
Student 6				76	96	26%			
Student 7				68	92	35%			
Student 8				60	96	60%	18.3	61.1	234%
Student 9				64	96	50%	11.1	34.9	214%
Student 10				66.7	96.1	44%			
Student 11	48.5	75.6	56%	6.3	72	1043%			
Student 12	42.4	86	103%	13.9	77.3	456%			
Student 13	68.2	93.9	38%	62.7	93.9	50%	48.4	48.4	0%
Student 14	56.1	76.3	36%	54.7	76.3	39%	17.1	30.2	77%
Student 15	62.1	82.3	33%	42	82.3	96%	5.6	20.2	261%
Student 16	56.1	97	73%	76	97	28%			
Student 17	59.1	92.4	56%	68	92.4	36%			
Student 18	45.5	97	113%	84	97	15%			
Student 19	54.5	90.9	67%	76	90.9	20%			
Student 20	63.6	100	57%	72	100	39%			
Student 21	33.3	72.7	118%						
Student 22	40.2	80.3	100%						
Student 23	33.6	59.1	76%						
Student 24	50.5	96.4	91%	48	58.7	22%			
Student 25	21.2	58.1	174%						
Student 26	NA	NA	NA						
Average	**48.99**	**83.86**	**71.18%**	**62.2**	**89.36**	**44%**	**17.22**	**60.21**	**250%**

Table 5: Pre-test and post-test results of Summer Camp 2011

For the summer camp 2012, students were college freshmen and the camp had a six-week duration. Results are shown in Table 6. The threshold to move from one level to the next was again 80/100 in the post-test exam.

From Table 6, it can be seen that out of 10 students, 7 stayed at the same level (from whom six students obtained the minimum 80/100); 2 students move from one math level to the following level (and the two obtained the minimum 80/100 at the second level); one student moved two levels and obtained more than the minimum 80/100 in the third level. From the 10 participant students, only one student did not obtain the minimum 80/100 in the first level (10% of the entire body). This will be the only failure of the program according to the previous definition of failure.

	Level 1			Level 2			Level 3		
	Pre-test	**Post-test**	**Change**	**Pre-test**	**Post-test**	**Change**	**Pre-test**	**Post-test**	**Change**
Student 1				16.82	92.86	452%			
Student 2				5.88	91.07	1449%			
Student 3				8.18	91.07	1013%			
Student 4				13.26	83.33	528%			
Student 5							17	81.3	378%
Student 6	34	86.4	154%	35.68	91.18	156%	0	86.4	NA
Student 7	21.57	91.18	323%	25.53	91.46	289%			
Student 8	19.61	22	12%						
Student 9	27.45	86.27	214%						
Student 10	13.73	81.37	493%						
Average	**23.27**	**73.44**	**216%**	**17.55**	**90.16**	**413%**	**25.5**	**83.85**	**886%**

Table 6: Pre-test and post-test results of Summer Camp 2012

At this point, it is important to stress the fact that this was not the typical lecture-based instruction. Rather students were basically working on their own. This makes the program really student-centered. Moreover, the overhead in grading is minimal in comparison to other courses since the software takes care of this issue.

VI) Feedback

VI. a) Student Feedback

For the 2012 summer camp, student input was collected at the end of the program and was very positive. The comments are summarized in Table 7.

VI. b) Faculty Feedback

Due to access to college student information, it is possible now to follow the students' performances into future courses. Therefore, faculty members were asked to answer a survey about the performance of students who participated in the summer camp 2012. The survey results are shown in Table 8. Unfortunately, not all the college-level students who participated in 2012 enrolled in a math class during the Fall 2012, therefore, it was not possible to follow up all students. Eventually, all students will be tracked not just in their math classes but in other STEM areas where a strong math background is key.

Although more data and samples are needed, it is very promising to know that other math instructors felt that students who participated in the summer camp are coming with the necessary prerequisites (which has been always the primary goal of the camp). At this point it is unclear whether the program can claim that is doing better than the traditional remedial courses, but at least it is preparing the students in a shorter period of time, which is the second goal of the program.

Question	Result
What did you enjoy most about the program?	"Small class size", "ease of access to instructors", "friendly environment", "self-paced", "availability of study plans", "free snacks/ lunches and free program (no tuition)".
What did you least enjoy about the program?	"It was all good", "a great experience", nothing, and "long hours".
Suggestions for course improvement	"Need more participants", "fewer class days", "more practical applications/field trips", "make the course a full semester".
Would you be willing to participate in a similar summer math cohort in the future?	88% said yes (8/9).
Would you recommend a similar math program to another student?	100% (9/9), "absolutely", "whole-heartedly"
What were the strengths of the instructor?	"Very good at one-on-one", "good at explaining the material", "always asking students if they need help, knowledge of the subject".
What were the weaknesses of the instructor?	No response (4/9), "none" (4/9), "getting the point cross" (1/9)

Table 7: Results of the Student Survey (Summer Camp 2012)

VII) Future Work

The results are very promising from the point of view of accelerating the remediation process in the students that the college is currently recruiting. The new regulations on federal financial aid require students to keep in track in their academic progress and cover up to150% of total credits so there is less room for remediation credits. If a program like this can accelerate students in much less time than the current four semesters, then there should be a boost in student motivation which will improve their chances of continuing in the program. This is especially true in an engineering program where students do not see the more engaging engineering core activities until after the entry math has been achieved.

An interesting question is, what will be the success if the program lasts one semester with two hours daily, instead of six weeks during the summer with three daily hours?
The project team will implement during the Spring 2013 this idea instead of waiting to repeat the summer program. The expectation is that students will be able to complete the three levels of math. The team is looking forward to learning from this new experience.

Question	Results
Does student have necessary pre-requisites for your math course?	Yes, 100% (6/6).
Does student appear to be better prepared than at least half of the class?	No, 67% (4/6), yes, 34% (2/6).
Rank on scale of 1-10 students' knowledge of math.	Ranking was from 5-10: 3 sevens; 1 ten; 1 five; 1 eight.
Can student think and reason mathematically or only "mechanically"?	(Instructors found this difficult to assess); 1 mathematically; 1 mechanically.
Does student take active part in class?	3 yes; 3 no response.
Recommendations for next math cohort	Learn more responsibility for doing work (2/6); nothing (excellent student) (2/6), teach how to graph (1/6) and pass students with more than one assessment (1/6).

Table 8: Results of the Faculty Survey (Summer Camp 2012)

For the first two years, the camp targeted high school students, but it has been very difficult to track them since the majority of them are attending other colleges. However, now that the participant students are part of the college, it will be interesting to run a longitudinal study to see their academic progress after two or three years of graduating from our program. This is another issue that will be explored and it was started this last Fall 2012 as explained in Section VI.

Finally, the most important issue for future work is to recognize that the grant sponsoring this activity will expire. We shall need to develop strategies to institutionalize the effort.

One idea is to institutionalize the program for a regular semester. In that case the funding for breakfast, lunches and snacks (and any other summer incentives) will not be needed. Similarly, if the program is kept free for students, then the main incentive for recruitment is that students will not pay the tuition cost of remedial tuition (up to ten credits). The semester cost for instructors/tutors and software for a program with twenty students is around $8000 USD. This is around $400 USD per student. Moreover, offering a regular program that follows this approach is going to provide more data to validate whether the course is useful for students. At the same time, the program is going to keep the student/instructor ratio low because individual interaction between students and instructors are crucial to ensure that all the topics covered by the courses are clearly understood and practiced by the students.

A reasonable comparison is to assume that a twenty-student cohort is taking one, two or three semesters of remedial math. The current college expenditure on instructors per student is around $120 USD per student per remedial course (using the same twenty-student cohort, which is realistic for the number of students in a typical class at the college). Then an equivalent of three remedial courses would cost the college $360 USD per student in a 3-semester span. In terms of cost, the accelerator program is $40 USD more expensive per student ($800 USD for a twenty-student cohort) than the current traditional model (if the tuition revenue is ignored, which it is not unrealistic given previous arguments).

Currently, the funding formula in the State is changing to an outcome driven model measure by graduation headcounts and course completion. The largest weight of the formula is course completion, but this formula follows a tier classification where upper division courses are paid \$515 per credit completed and the lower division courses are paid \$313 per credit completed. A remedial math class pays only \$113 per credit completed. All credits (upper and lower division) pay the same tuition (\$104 USD per credit). Therefore, it is clear that the college funding can be only boosted by increasing the enrollment and completion of engineering classes and not by remediating students.

If we assume that because of the math accelerator program, one new students is not going to drop college but will complete an engineering program, then this translates into 50 upper division credit and 34 lower division credits in engineering which will mean more than \$6500 per year from that particular student in revenue from the State (without considering tuition). This alone could be a justification for the college to subsidize the program and keep it free for students. Table 9 summarizes this information.

Another possibility is to charge a small tuition to every student (\$40 USD for example), which is the difference that was calculated before between the remedial courses cost and the current cost of this program.

One last alternative is to reform the current way that remedial math is taught by the Math Department but to follow the competency-based methodology that has been tested by the Department of Engineering.

VIII) Conclusions

This paper has presented three years of results from a continuing project in a Hispanic Serving Institution. The project consisted of a math accelerator program with very promising results for students who require remediation. Students exposed to the program have boosted their math skills by more than 200% according to a pre-test and a post-test measure.

At the core of the program is a reduction in the concept of traditional lecture with an increase in student exposure to problem practice using problem-generator software. Students have reported very strong satisfaction with the program, and a longitudinal study has been started to track the progress of the participants.

The project is currently sponsored by a grant and ideas for future institutionalization are presented.

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Cost of Math Accelerator Program	Cost of Traditional Classes	Cost Difference	Potential Program Tuition	Revenue from Engineering Courses
$8000 per class	$7200 per class	$800 per class	-	34 lower division credits and 50 upper division credits.
20 student cohort	20 student cohort	20 student cohort	-	Assuming that only 1 student remains in the program because of accelerator project.
$400 per student	$360 per student	$40 per student	$40 per student	New revenue of $6500 per year.

Table 9: Cost-benefit summary of the Math Accelerator Program

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