CALIFORNIA STATE UNIVERSITY, MONTEREY BAY

Award for Innovation 2015 #2
Math@CSUMB
Cover Page

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List of Participants

- California State University, Monterey Bay

Application Abstract

The math department at California State University, Monterey Bay (CSUMB) has developed an innovative and effective program designed to increase the success of students who are required to take and complete developmental math in their first year of college. This program is particularly effective with the student population at CSUMB which is strongly first generation and often coming from educationally disadvantaged backgrounds. To accomplish this, the department worked collaboratively to build a coordinated, unified program organized around activities and student work rather than standard lecture formats. Key to this program is its cost effectiveness with large class sizes reducing the need for multiple sections, each with its own faculty member. Technology plays a key role in this program, being used for enhancing class presentation and discussion; coordination of communications between faculty and between faculty, student assistants and students; tracking of student grades on quizzes, homework and exams; and tracking of student efforts in labs and tutoring sessions.

Since January 10, 2014, the Math@CSUMB program has increased the student support aspects in order to increase student success. These include:

- Videos of lectures, demonstrations and activities for repeat viewing by students.
- Use of communications software to provide online tutoring on demand.
- Implementation of classroom management software to increase individualized contact with students
- Developing new workshops and courses to act as a "back up" plan for the success of students who are not able to pass the initial developmental course the first time.

Math@CSUMB clearly aligns with the Innovation Award priorities by increasing the number of students able to remain in college and eventually graduate. This will also result in shorter time to degree and therefore higher 4-year graduation rates. The data provided supports this conclusion.

Assurance and Signature

"I assure that I have read and support this application for an award. I understand that if this application is chosen for an award, my institution will be required to submit, for approval by the Committee on Awards for Innovation in Higher Education, a report indicating proposed uses of the award funds and, as the fiscal agent, will be responsible for distributing funds to any other participating entities. I also understand that, if this application is selected for an award, my institution will be required to submit reports to the Director of Finance by January 1, 2018, and by January 1, 2020, evaluating the effectiveness of the changes described in this application."

Signed,

12-18-14

Eduardo M. Ochoa, Ph.D.
President
California State University, Monterey Bay

Date

CONTEXT *(10 Percent Weight)*

1. Specific programmatic or institutional goals set by the participants in this application.
California State University, Monterey Bay (CSUMB) has been actively working to address one of the most consistently challenging subjects in the areas of student preparation for college - that of getting students ready for college level mathematics. Developmental math at CSUMB consists of two courses, Math 98 and Math 99, covering basic concepts of Algebra I, Algebra II and Trigonometry. Students must either test out or pass both courses by the end of their first year to remain enrolled and failure rates are traditionally high. The Math@CSUMB program began in 2007 with an effort to improve teaching of developmental math courses. Over time, this effort has grown and expanded to encompass the entire cycle of math preparation starting in 9th grade and going through college and into teacher preparation. The goals of this program, which are well-aligned with the priorities of the Award for Innovation, are:

1. Provide a solid mathematics background for all students and in doing so
    a. Increase the retention rate of first time freshmen from the first to the second year by increasing the chance that students complete remediation in the first year and, at the same time, decrease overall time to degree
    b. Increase the graduation rate of first time freshmen by successful completion of the first year and by instilling greater confidence in students toward their ability to be successful in college
2. Increase the efficiency and cost effectiveness of developmental mathematics programs by
    a. Increasing class size adding appropriate use of technology to lower costs while ensuring student success
    b. Increasing the number of students entering ready to begin college-level math
3. Enhance and improve mathematics teacher preparation, both pedagogy and content, so that the next generation of K-12 students come to college math-literate and prepared.

1.1 How achieving these goals ultimately will increase the number of bachelor's degrees awarded.
Math remediation continues to be a strong deterrent for success in the first year in college. This is particularly true for the underrepresented groups that make up much of the student population at CSUMB including those from lower income and first generation students. By focusing on new pedagogies for developmental math courses, the number of bachelor's degrees will ultimately increase because: 1) completion of developmental math will result in progression to the second year; 2) completion of developmental math helps students build good study skills and develop confidence that can be applied to other subjects and 3) increase of retention from the first to second year results in an overall increase of graduation rate.

1.2 When and how program goals were developed and how they are used on an ongoing basis.
The initial goals stated above were first developed in 2007 with the initial set of faculty seeking a more effective means of ensuring student success. These goals led the faculty to work together in new, more collaborative ways and to include technology as a means of fostering more effective communications both with each other and with students. These same goals led the math department to develop partnerships with local high schools to extend their pedagogies to those venues.

2. Statistical profile of the students served. The most recent cohort of students in the developmental math program at CSUMB is profiled in the table below, compared to the general first time freshmen population.

Fall 2014 Enrollments in Math 98 & 99 by demographics with All First Time Freshmen for Comparison.

	MATH 98		MATH 99		All First Time Freshmen	
	Count	Percentage	Count	Percentage	Count	Percentage
Female	222	75%	112	69%	846	65%
Male	73	25%	50	31%	459	35%

	MATH 98		MATH 99		All First Time Freshmen	
	Count	Percentage	Count	Percentage	Count	Percentage
African American	51	17%	23	14%	128	10%
Asian American	15	5%	11	7%	99	8%
Latino	146	49%	77	48%	513	39%
Native American	1	0%	1	1%	13	1%
Other/Decline	3	1%	1	1%	12	1%
Pacific Islander	5	2%	0	0%	11	1%
Two or More Races	20	7%	14	9%	112	9%
White	54	18%	35	22%	417	32%

2.1 Proportion of students who are current or former foster youth, students with disabilities, low-income students, and veterans. Information on proportions of students who are current or former foster youth is not known. Only 1 freshman had veteran status and did not enroll in Math 98 or 99. The table below shows the number of students requiring remediation who are low-income, are first generation or have known disabilities, shown in comparison to the overall first time freshmen population.

Fall 2014 Enrollments in Math 98 & 99 by special categories with All First Time for Comparison.

	MATH 98		MATH 99		All First Time Freshmen	
	Count	Percentage	Count	Percentage	Count	Percentage
First Generation	187	63%	101	62%	745	57%
Not First Generation	108	37%	61	38%	560	43%
Low Income	128	43%	59	36%	433	33%
Not Low Income	167	57%	103	64%	872	67%

	MATH 98		MATH 99		All First Time Freshmen	
	Count	Percentage	Count	Percentage	Count	Percentage
Verified Disability	8	3%	4	2%	27	2%
No Verified Disability	287	97%	158	98%	1278	98%

2.2 Analysis of the factors that affect the ability of students to earn bachelor's degrees, graduate within four years, and/or transfer.
It has long been known within the California State University (CSU) that lack of mathematics readiness and the inability on the part of students to succeed in developmental courses prevents many students from being successful. Students entering the CSU must take a math test (Entry Level Mathematics or ELM). Failure to pass the test results in students needing to complete math developmental courses in their first year or face disenrollment. Prior to the start of the Math@CSUMB program in 2007, roughly 55% of entering freshmen at CSUMB were required to take developmental mathematics. Approximately 15% of those entering were unable to complete developmental math and were disenrolled from CSUMB, unable to enter any CSU campus. Clearly, success in developmental math would increase the numbers of students successfully moving from the first to second years which in turn would increase the numbers of students eventually graduating.

2.3 Factors influenced by changes to policies, practices, or systems.
The faculty designing the initial Math@CSUMB program investigated current research for characteristics of successful developmental math programs. As later outlined by Deka & Lieberman (2013), these features included mandatory assessment, mandatory placement, trained tutors, student-centered learning environments, early start programs and highly coordinated and organized sections. Additional research uncovered support for the use of technology including diagnostic and tutoring software and use of classroom response systems. The identification of these characteristics lent support and credence to the system being developed by the CSUMB math faculty.

Similar techniques have been applied in a number of other institutions for STEM (science, technology, engineering and mathematics) education including the University of Colorado at Boulder physics department (Pollack and Finkelstein, 2008), University of Maine (Smith, et al., 2014) and University of British Columbia together with University of Colorado (Wieman, 2014)

The most important factor which can be influenced by changes to developmental math pedagogy is one which has been repeatedly identified as critical in the success of under-educated populations: providing support to students as individuals in both academic and personal ways. The various aspects of this program, from coordinated curriculum across sections to use of teaching assistants in the classroom to in-class exercises and practice to use of technology for attendance and performance tracking, all lead to a single goal – that students are not anonymous but are fully aware of instructor interest in their success. The math faculty at CSUMB also proposed that success in mathematics would lead to increased academic confidence, a trait which has been shown to have strong connection to college retention (Lotkowski, et al., 2004).

INNOVATIONS *(40 Percent Weight)*

3. Key policies, practices, and/or systems in place prior to January 10, 2014, that were initiated to achieve the goals identified in Item 1.
In 2007, math faculty at CSUMB came together to find an innovative solution to the problem of high remediation needs of incoming freshmen combined with low success rates which in turn led to lower retention to the second year of college. In doing so, they re-designed the developmental math curriculum consisting of 2 courses: Math 98 and Math 99. Each course section is supported by an instructor and two student assistants. All sections use the same course material (instead of a text book), homework and exams. Each class session consists of a quiz, several short mini-lectures, demonstration practice problems and students working exercises in class. Students may work at times individually or in groups.

Key to student success is an individualized approach which occurs despite class sizes of 50-75. These elements increase the chances of student success:

- A collaborative learning environment: Instructors and student assistants actively move through the room during exercises to answer questions; the aim is to create a learning environment where students feel comfortable asking questions.
- A personal approach that does not permit anonymity: Students are given individual instruction both in and out of class.
- Early alert system: Technology provides a means of keeping track of student attendance, recording it into a class grade book within the course learning management system (LMS), grading quizzes and homework immediately and posting to the grade book; tracking of the grade book entries by the instructor with personal follow up.
- Outside class support: Beyond class work, students can access help through group and one-on-one tutoring, drop-in open labs held most evenings and extra review sessions held just before exams; logs are kept of student attendance at these support sessions.

Because of the success of this program (described below), this program has been expanded to reach secondary students directly and in advance of their entry to college.

- K-12 outreach programs: In Imagine College, a privately-funded Summer Scholars Institute for 9th and 10th graders, students learn Algebra 2 and Geometry in a 6-week component.
- Pre-college programs: CAMP (College Assistance Migrant Program) summer program, EOP/UPWARD BOUND, and Summer Bridge students study Algebra 2. There is also the Migrant Junior Otters program, in which 4th through 9th graders from migrant families are brought to campus to take language and math developmental classes.
- Math Boot Camp: Students scoring above 28 on the ELM come 5 days before the fall semester begins and participate in intensive (7 hours per day) workshops with faculty. At the end of the workshop they are given the regular final exam for the course.
- 6-day workshop for CAMP incoming freshmen in both Math 98 and 99, without restriction of ELM scores (some were as low as 16), using the same pedagogy as in the Math Boot Camp.

The next step in the expansion of Math@CSUMB was to further the professional development of middle and high school teachers.

- One-day professional development workshops for high school teachers focused on preparing

their students for success in the CSU ELM test.

- CSUMB math major concentration in Teacher Preparation is aligned with the California standards and qualifies as a CSET waiver program. 70 % of CSUMB math majors plan to be math teachers.
- Professional development workshops for local K-12 math teachers, held both at local schools and on campus by CSUMB faculty to enhance math pedagogy and content in all grades.

3.1 The impact of these policies, practices, or systems, to date

The successful impact of the initial CSUMB developmental math model has been substantial. Some 2300 students needing developmental math classes have gone through the program over the past 5 years. The success rate in the courses has gone from 75% to 90%, with a steady increase over that time. Further, the retention of freshmen taking developmental math has not only increased substantially but students taking Math 98 and 99 are more likely to return for the second year than are students who did not require remediation (see below).

Freshmen to Sophomore Retention rates

	Math 98		Math 99 only		No Math Remediation	
	Cohort	Retention Rate	Cohort	Retention Rate	Cohort	Retention Rate
Fall 2013	186	76%	104	87%	576	85%
Fall 2012	216	71%	129	85%	557	83%
Fall 2011	320	78%	57	86%	496	80%
Fall 2010	349	82%	78	76%	402	75%
Fall 2009	384	75%	67	72%	498	77%
Fall 2008	381	70%	60	73%	472	71%
Fall 2007	340	65%	51	75%	355	68%
Fall 2006	270	67%	1	100%	263	63%

3.2 Lessons learned

There have been challenges in creating and implementing this new pedagogical approach to developmental math. A key component to the program is coordination across all sections. This required considerable agreement across faculty to the same schedule, course materials, tests and homework. Concerns over academic freedom were raised and to overcome this, all instructors were included in the creation of the program. After one semester of implementation, all instructors were asked to provide feedback. The presence of a course coordinator who works with all faculty in the development of tests and assignments helps assure cohesiveness throughout the program.

From an instructional point of view, assuring regular attendance and regular homework completion are critical to student success. This challenge was met through the use of technology for regular posting and review of both attendance and grades. Use of technology also makes possible the personal contact necessary to ensure students feel supported.

Finally, the developmental program requires additional resources in some areas but balances those with lower resources elsewhere. Use of technology – including multiple screens in the classroom – allows for larger classes. This reduces the need for as many faculty but student assistants are then required for sufficient support both in and out of the classroom.

4. Key changes to policies, practices, and/or systems initiated since January 10, 2014 intended to achieve the goals identified in Item 1.

This past year, the overarching emphasis for the Math@CSUMB program has been to expand in ways which work to fulfill the primary goals of providing students with a strong background in mathematics in order to ensure student success, retention and ultimately, graduation. This has been accomplished primarily by additional use of technology in the developmental math program in several areas of student support and communications. Another enhancement is the expansion of this successful pedagogy to other key math courses (see below).

Curriculum/Program Materials. One of the important aspects of Math@CSUMB is the continuous improvement nature of the program. This is not a static curriculum and all materials, tests, and assignments were reviewed by the chair, faculty and the coordinator for changes based on examining the student work from the last year. Faculty and student assistants also provide feedback on what has worked in classroom, lab and tutoring sessions.

Classroom Management Tools. Within Math 98 and 99, there has been enhanced technology for student support due to a grant from Hewlett-Packard which provided Surface tablets and classroom management software (Moodle). Through this new software, feedback to students on their progress is increased with the potential of each student receiving a note each day. Thus, technological improvements increase the efficiency and make possible the larger class sizes at reduced personnel costs but at the same time allow the program to achieve a high level of individualized support despite a large class size.

Online Tutoring. Using Zoom, a communications software, online tutoring has become possible with students logging in at a time and place of their own choosing. There are several advantages to this program. First, students can get to assistance as it fits their schedule – which is critical for students who are likely working and or commuting to and from campus. Second, the software permits real-time tracking of student effort so that the instructor can see if struggling students are taking advantage of available help. The instructor can then more efficiently suggest appropriate assistance. Thus, a student not only can get appropriate assistance but is also keenly aware of the interest and concern on the part of the faculty. Third, the tracking of student use of online tutoring gives faculty another means of evaluating what topics are difficult for students and to evaluate and adjust the online tutoring or even the classroom activities as necessary.

Supplemental Instruction. New this last year also was the introduction of supplemental instruction, again through use of technology with the development of videos that students can access via a website. The videos demonstrate both the math concepts and the processes which are supplied in class, acting as a back up to the actual class session. Students can not only access this at a time and place of their own choosing, they can also repeat the video over and over. This is particularly important for those students for whom English is a second language. The student population at CSUMB draws heavily from communities where parents speak a variety of other languages in the home and some 60% of developmental math students are first generation.

Back Up Success Plan. Another important addition to the program is support for students who, for a variety of reasons, still are not successful in Math 98 and 99 despite the class activities,

review and other support services. In the past, the only option for a student would be to repeat the course. Depending on timing, a student might easily become marked for disenrollment with no possibility of success. For example, a student failing Math 98 in the fall term would have to repeat it in the spring term. But that student is required to pass both Math 98 *and* Math 99 by the end of spring term – impossible in this situation. A number of back-up options give students another chance for success while still staying within the CSU guidelines requiring remediation to be completed in the first year:

- Intensive winter workshops are conducted between fall and spring term which might allow a student failing Math 98 in fall to complete in winter and then move on to Math 99 in spring.
- Summer intensive workshops allow students to complete developmental requirements before their first fall term.
- A 6-unit spring course allows a student failing Math 98 in fall to take both 98 and 99 in spring.

Adoption by Non-Developmental Math Courses. Because of the success of this program with developmental math courses, the math department has expanded the use of these same pedagogies to other math courses. In keeping with the goal of higher retention and graduation, it was decided to implement this program with Statistics 100. This is a bottleneck course which satisfies a general education requirement but also is a necessary prerequisite for a variety of research and methods courses in quantitatively-oriented majors such as mathematics, psychology, health and human services, environmental sciences, sociology, business administration and environmental studies. Making success more likely in a lower division course which is a prerequisite to so many other courses will have both short- and long-term impacts in the overall retention, success and ultimate graduation of a large number of students. As with Math 98 and 99, there is a common set of materials across all sections and the emphasis is on student engagement in the classroom tied to student support both in and out of the classroom. Technology is used both for communication and to help faculty more accurately track student progress and identify weak areas.

4.1 Why the changes initiated will achieve those goals.

All the changes initiated in this past year build on the already successful program begun in 2007. The same fundamental principles of student engagement, activities within class, personal attention and support to students, real-time tracking of attendance and progress, are all still in place. What is new to developmental math is identification and shoring up of a weak area through expanded use of technologies and even more support infrastructure in order to accommodate students when they require support. Also new is an alternate pathway to success should the student fail the primary path.

As mentioned earlier, the work done in the Math@CSUMB program is very much in keeping with the current research and practice occurring at universities across the country in STEM fields. These types of pedagogies have been found especially helpful in engaging underrepresented and first generation student populations. (See http://www.nytimes.com/2014/12/27/us/college-science-classes-failure-rates-soar-go-back-to-drawing-board.html?ref=education&_r=0). It is reasonable to expect that with additional support which is specifically directed to the underrepresented and first generation student making up the largest percentage of the developmental math class (see table under item 2), a larger proportion

of students will be successful in achieving math remediation and be able to return the second year.

4.2 Expected impact of the changes.
These changes are expected to increase student engagement with higher numbers of students taking advantage of tutoring and supplemental instruction through video. This in turn will result in better understanding on the part of instructors as to the individual needs of students – their areas of weakness. For future classes, the information can be used to adjust exams and assignments to focus on identified weak topics. For the present classes, the personal attention given to each student makes a connection which results in better retention.

Another impact of these changes is increased student success. For the student, this means more than simply passing a class or completing a requirement. For students who have been disadvantaged educationally, success in these courses can result in increased academic confidence. This will impact not just success in math but in all the courses taken by the student.

The introduction of a non-developmental class to this pedagogy (Statistics 100) broadens the impact on retention and eventual graduation as well as lowering time to degree.

For all these courses, there is also impact on costs to the institution and to the student, which is further described in item 6.

5. Planned changes to policies, practices, and/or systems to be implemented after January 9, 2015, intended to achieve the goals identified in Item 1 *(2 pages maximum).*
At the current time, the next set of changes that are planned can be described as continuation of a successful pedagogy, increased use of technology and expansion wherever possible. The near-term changes include:

- Continued evaluation of the current program in Math 98 and 99 using feedback from activity and test results, the tracking of student efforts in online tutoring and supplemental instruction to see if those new practices are resulting in increased success rates.
- Evaluation of the new back-up success pathways to determine how many students are taking advantage of those and to determine success rates.
- Evaluation of the use of tablets in the classroom and a determination of what other technologies might be used to increase faculty-student communication.
- Evaluation of the use of this pedagogy for non-developmental courses to see if student success rates have increased and failure or repeat has decreased.

Expected changes over the longer term include:

- Increased expansion to other math non-developmental math courses within CSUMB.
- Increased use of technology, particularly video.
- Increased outreach to the local middle and high schools (Monterey Peninsula Unified School District) for ultimate adoption in their math programs (See Appendix D for current partner web sites)
- Initiation of outreach to school districts beyond the local area to get more middle and high schools to adopt this pedagogical platform. Some 60% of CSUMB undergraduates come from geographical areas outside of the immediately surrounding three-county area. Ultimately, getting better math instruction at the middle and high school levels across the state will benefit not only CSUMB but other CSUs as well.
- Initiation of outreach to local community colleges in order to better coordinate math preparation for transfer students who might eventually enroll at CSUMB. (See Appendix D for interest letters)

5.2 Expected impact of planned changes.
There are two broad impacts expected with the implementation of changes described above. First, there will be increased impacts to students at a variety of educational levels from middle school through university. If the Math@CSUMB program can be successfully adopted by a larger group of schools, students will begin to graduate high school with improved math skills. There will also be an increase in student confidence to successfully achieve academic work. This will be true not just of students intending to enter CSUMB specifically but for all students in middle and high schools that participate in the program. That means students entering the local community colleges whose students transfer to CSUMB will also benefit from increased math skills and general ability to succeed academically.

Increased success in math for entering freshmen and transfers will result in increased retention, increased graduation and, with fewer repeated courses, faster time to degree. The huge benefit to a faster time to degree is not only less cost to students, but also the potential to enter the job market sooner with more potential earnings.

The second major impact of these planned changes will be the overall reduction of instructional costs to the institutions. This is covered in more detail under item 6. Use of this math program has resulted in significant savings at CSUMB while still providing a very hands-on, individualized experience for the student.

5.3 Evidence of commitment to future changes.
The math department, College of Science and CSUMB administration are all strongly committed to the continuance and expansion of this program. The results seen so far demonstrate the usefulness and efficacy of the program. As seen in the following item, costs for educating students in developmental math have been cut by roughly 2/3 using the methods described here. That fact alone will provide substantial impetus for the continuation of the program.

Because the Math@CSUMB program is so efficient in its operation, the continuation and expansion of this program is not dependent on the award funds. The program started with funds committed from the University and has continued with grant funds from a number of companies including Hewlett-Packard, Graniterock and from agencies such as the Gates Foundation. Commitments from these and other local organizations, used mainly to test new technologies, are ongoing and growing. (See Appendix D for sample of grant awards).

6. How the changes described in above responses will impact the average cost to award a bachelor's degree *(1 page maximum).*

The developmental math model described in this application, together with the outreach to middle and high schools and teacher preparation, have the potential for decreasing costs both to the student and to the institution.

Direct reduction of costs to the students will come through:

- A reduction in the number of developmental courses thereby spending more tuition dollars directly toward a degree. This also results in less time to degree and therefore less costs for the student such as housing, meals, tuition, and fees.
- Despite the fact that the faculty have been steadily increasing the rigor of these classes to prepare students for additional college mathematics courses, the pass rate continues to climb, and currently averages close to 95% for those in Math 99, 87% for those in Math 98. And with the new practice of putting those who fail Math 98 in the fall semester into an intensive 6-credit class to complete both terms in the spring semester, the cumulative pass rate is closer to 95%. The national average pass rate for mathematics remediation courses continues to hover around 50%. So, for every 1000 students a year in remediation, instead of 500 failures, and required repeats, CSUMB has about 50. Students' ability to enter college-level classes makes it more likely they will be retained, and shortens their time to degree.

For the institution, there are potential decreased costs coming from:

- Larger class sizes reduce the number of full time faculty needed (see below).

Comparison of Traditional vs CSUMB Model for 75 Students

Traditional Remediation			**Math@CSUMB Model**	
3 classes of 25, failure rate 50%			**1 class of 75, failure rate 10%**	
# Students	**Cost**		**# Students**	**Cost**
25	$6,000		75	$6,000
25	$6,000		2 Student Assistants	$2,250
25	$6,000			
Repeats:38			Repeats: 8	
(1.5 sections)	$9,000		(0.11 sections)	$660
Total Cost	**$27,000**		**Total Cost**	**$8,910**
			Cost cut by 2/3	

$6,000 = cost of one instructor per section

- Working w/ middle and high school students and teachers ultimately reduces numbers of entering students needing remediation and therefore lowering the number of remediation courses needed; it also potentially increases high school graduation rate.
- Since another component of the university student population comes from the local community colleges and since those students are overwhelmingly educated in the local school districts, expanding this model to middle and higher schools will ultimately result in transfers from community colleges with better math skills. The expansion of the developmental model into general education courses such as Statistics 100 plays a key role here since studies show that transfers entering with all lower division general education courses completed complete their four-year degree more quickly.

7. Risks or tradeoffs involved in the changes being implementing and methods to monitor and mitigate them. *(2 pages maximum.)*

As with any new program or process, there are risks and tradeoffs with implementation and with changes that occur to the sponsoring institution over time. Some of the risks which have been identified include:

- CSUMB is currently authorized to double in size between now and 2025. With this increasing student population, some of whom will be freshmen, sufficient continuing resources could become an issue.
- This developmental math program works most efficiently with large class sizes but eventually campus facilities could become a factor since the campus has limited numbers of classrooms of that size currently.
- This success of this curriculum also depends on individualized attention and there could be constraints on faculty and student assistants as student population grows.
- There also is a need for sufficient personnel support to do the tracking of activities, exercises and exams.

Risks and tradeoffs are mitigated by these factors:

- While not dedicated solely to this program, the increased enrollment currently authorized will bring additional state funds to the campus which in turn will be available for additional faculty and student assistants.
- CSUMB is currently nearing completion on a new building which includes three classrooms with capacities of 65-75. Any planning for future facilities consistently includes larger classrooms (60-75 and greater).
- Working with middle and high schools to start incorporating these pedagogies of classroom activities, group exercises and immediate feedback will help mitigate the numbers of first time freshmen coming in needing remediation.
- The math department has developed strong support from local community and private grant funding sources for this model which has helped alleviate costs for technology. These sources are expected to continue and new sources are being found.
- The efforts by this program to impact teacher training both for current and future middle and high school teachers will, over time, improve student preparation for college and in understanding math generally.

7.1 Potential adverse effects on student groups that are underrepresented in higher education.

One of the important aspects of this pedagogical model for developmental math instruction is that its components are specifically designed to assist underrepresented students. As noted earlier, a number of institutions have been utilizing similar techniques in various STEM fields to positive effect.

- Underrepresented students frequently come from less than ideal K-12 preparation. CSUMB is dedicated to educating the underrepresented and first-generation student and these are well represented in the developmental math courses (see data from item 2).
- Individual and frequent assessment is a key facet of this curriculum so that students are less likely to get lost even in in the large classroom.

- This program focuses on personalized attention – immediate identification of struggling students with targeted assistance. The student has little opportunity to be anonymous with faculty and student assistants proactively keep in touch with each student. This is supported by research indicating success and retention are increased when personal connections are made.
- Because students might live locally as well as in the campus residence halls, there are multiple venues for extra help given at a variety of times, including evenings and in both group and individual settings.
- The current year's addition of creating video allows for repeat playback of lectures, demonstrations, and activities at any time which also helps those students for whom English is a second language.
- Students have many opportunities for success through multiple pathways for passing the math requirements. While the program strives for successful passage of the courses by all students, there are additional fall back pathways.

SUSTAINABILITY *(35 Percent Weight)*

8. Key strengths and assets for encouraging a culture of innovation and adaptability within and across all entities participating in the application, sustaining the changes made and, ultimately, achieving the goals identified in this application. *(2 pages maximum)*
The most important strength and asset for encouraging a culture of innovation at CSUMB is the overwhelming commitment of faculty, administrators, staff and students to the vision statement (see Appendix F for full statement). This statement, crafted 20 years ago at the institution's founding is a living document that guides every decision and recommendation for process and policy and is part of every candidate search for faculty and staff positions. This excerpt provides a small sample of the culture that exists at CSUMB:

> "California State University, Monterey Bay (CSUMB) is envisioned as a comprehensive state university which values service through high quality education. The campus will be distinctive in serving the diverse people of California, especially the working class and historically undereducated and low-income populations. It will feature an enriched living and learning environment and year-round operation…
>
> The university will invest in preparation for the future through integrated and experimental use of technologies as resources to people, catalysts for learning, and providers of increased access and enriched quality learning…
>
> The university will develop a culture of innovation in its overall conceptual design and organization, and will utilize new and varied pedagogical and instructional approaches including distance learning…"

With this document as its foundation, the institution has hired faculty dedicated to serving historically undereducated and low-income students. Faculty come to CSUMB because of the student population and because of the institution's dedication to assessment, innovation, change and on-going improvement.

Specifically, the strengths that sustain this curriculum and which ensure its goals will be met include:

- A faculty dedicated to investigating and reviewing pedagogies; constantly seeking new ideas and new technologies – not through external motivation or pressure but from their own desire to provide students with the opportunity for greater success.
- A strong Information Technology department focused on supporting academic integrity, quality and performance. At CSUMB, the IT department reports to the Provost and thus has the academic mission clearly at its core.
- Support from both campus planning and academic scheduling so that allocated classroom space is prioritized for this model both in the current facilities and for future growth. Campus Planning works closely with Academic Affairs to determine future classroom needs in both space and technology.

The near- and long-term benefits from this program will also add to its sustainability. As shown

in item 6, there are substantial cost savings to the institution which make it an attractive program for continuation. There are also direct cost benefits to students, which also increases the likelihood of continuation.

8.1 Leadership, institutional commitment, and existing relationships among the application participants.
Nowhere is the sustainable nature of the developmental math program described in this application more evident than in the leadership of the university. It is a hallmark of sustainability that this program has consistently and continuously received both financial and other resource support since its inception in 2007. This has occurred not only through economic downturns but also through a complete change in leadership since both the current President and Provost are relatively new to the campus.

Further, the current President, Dr. Ochoa, is firmly committed to developing and enhancing connections between the university and the local community to include business, K-12, and other support services. He has spearheaded and provided support to a cradle to career program that is bringing together all those stakeholders with the goal of greater student success. (See Appendix F and http://president.csumb.edu/news/2014/nov/21/op-ed-grants-extend-csumbs-reach-local-schools.) Programs such as Math@CSUMB fit with those goals and processes.

8.2 External partnerships and resources being leveraged
Both the math department in particular and the institution as a whole, through efforts such as those mentioned above, are committed to forming and maintaining key relationships around the community for the continued success of students. Specifically, this program has developed partnerships with the following entities:

- Connections to the K-12 districts, starting with a few middle and high schools in the area and now moving to expand to more schools in an effort to enhance math education throughout the region.
- Connections to the local community college math departments in order to streamline and align math programs between the institutions.
- Support from local businesses which are keenly interested in finding workers who are better prepared for jobs. A recent survey by the Monterey Peninsula Chamber of Commerce (see Appendix F) found that local businesses see basic skills, such as mathematics, to be key to a successful employee. Further, a substantial proportion of survey respondents indicated interest in supporting education in some way. Some of these local businesses, such as Graniterock, have provided funding for this program.
- Grant support from a variety of agencies including the Lumina Foundation, Gates Foundation and Hewlett-Packard. (See Appendix F for sample announcement).
- Funding from the CSU Chancellor's Office in the form of funds toward methods for reducing bottleneck courses backlogs.

9. Strategies for engaging stakeholders. *(1 page maximum)*
For a program such as Math@CSUMB, even though the curriculum implementation began just within the university, there are still many stakeholders with which to communicate and connect. The list includes both internal and external agencies:

- Campus leadership – was engaged from the very beginning and their support was key to the foundation and continuation of this program
- CSUMB math faculty – both full-time and non-tenure track faculty have been engaged in the process of program development and sustainment
- Students – are fully informed through the CSUMB website (See Appendix G).
- CSUMB Early Outreach and Support Programs (see Appendix G) – are critical to the communications with students and help organize the Early Start program of which Math Boot Camp is a part. This area also coordinates CAMP and Upward Bound.
- High school administration and teachers – are engaged through regular communication about opportunities for workshops and professional development
- Monterey County Department of Education – has been engaged in conversations regarding extension of this program to middle and high schools
- Local businesses – are engaged to be part of the support structure and are actively interested in education as shown by the local Chamber of Commerce efforts
- Foundations, granting agencies – have been and continue to be sources of funding for identifying and testing new technologies
- Community colleges (Cabrillo, Monterey Peninsula, Hartnell)

Engagement with these entities is critical for continued support and sustainment. This not only impacts possible funding sources but also the political support needed to gain cooperation and coordination across education levels.

Much of the engagement has been carried out by the math department chair and faculty in development of local math educational community. Regular and consistent communication is provided which defines the program with clear goals and outcomes and identifies the benefits for stakeholders. Communications to local businesses and funding agencies identify benefits to local economy. Local school districts are aided by increased professional development for teachers and the potential of increased graduation rates.

As mentioned earlier in item 8, there is also a CSUMB-generated initiative to engage the entire community in student success from cradle to career. The Math@CSUMB program, while predating the initiative, is evidence that community engagement and collaboration across educational levels has long been a hallmark of the CSUMB community.

10. How the changes described in this application will be sustained within existing financial resources.

The Math@CSUMB program has been in existence since 2007 and since that time has been growing, expanding and transforming. Thus, its ability to sustain and even grow and change, even through difficult budget times, has already been demonstrated. The institution is committed to this program because of its demonstrated success in helping students achieve appropriate math preparedness. Additionally, from an institutional finance standpoint, continuation of the program makes sense since it has reduced overall campus costs.

From a resource standpoint, the faculty lines needed are already in place and while more might be needed with expanding campus enrollment, there will also be increases in funds over time from regular state sources. Regular state resources are also available to provide the needed student assistants. Other staff, again, already in place, are found in the Student Affairs division (Early Outreach and Support Program).

In its current status, the facilities are also already in place with sufficient classrooms for the current population. New buildings with large classrooms which will accommodate increasing student numbers are already being built and more are planned.

As already mentioned, there has also been financial support, particularly for technology from companies such as Hewlett-Packard. Support from local companies and granting agencies continues to be strong, particularly since there is more and more research from across the country showing that techniques such as those used in Math@CSUMB are effective in teaching the STEM areas.

Finally, for expansion of this program into middle and high schools, there is an expectation that local school districts will be funding the adoption of this pedagogy into their curriculum. Obviously, this will be impacted by Common Core and other national K-12 curriculum drivers. CSUMB would act as the source of guidance, mentoring and professional development for programs at these educational levels.

EVALUATION (*15 Percent Weight)*

11. How the program will evaluate whether changes described will achieve the goals identified in response to Item 1.
The Math@CSUMB program, since its inception in 2007, has been driven by a continuous improvement model and as such has developed a robust program evaluation system using both quantitative and qualitative measures. As mentioned earlier in this document, program faculty and the coordinator evaluate the success of its program each year, making changes and alterations in response to these findings. The following are current and future measure for each goal as stated in item 1.

Goal 1: Data on retention and graduation rates of first time freshmen are collected through the CSUMB student database and computed annually by the Office of Institutional Assessment and Research. Additional items reviewed include:

- The number of students passing Math 98 and Math 99 each term.
- The number of students taking the 6-unit spring course and the passing rates in the course.
- The number of students not passing Math 98 who attend the winter workshop and their passing rates in the workshop. This item is in progress since this is the newest enhancement to the program (back-up success).

All these items are broken down by subgroups (gender, ethnicity, etc.) to verify that there are no differential impacts.

Goal 2: Since cost containment and effectiveness is key to this program, data are collected by the department regularly to confirm continuing lower costs vs. traditional remediation programs. In addition, the following items are also tracked annually:

- The number of students requiring remediation at admissions.

Goal 3: Improvements to mathematics teacher preparation is the longest-term goal of this program. While some data items are already being collected, there are more which will be available in the future and which will come from the local K-12 school districts.

- Number of schools adopting the Math@CSUMB model (long-term)
- Pass rates for middle and high school math classes (long-term)

11.1 How evaluative feedback will inform future changes.
Math@CSUMB has already utilized feedback from instructors, student assistants and students to implement changes to the initial program. The data items noted above, with the exception of math success at middle and high schools, are already being collected and reviewed annually. Additional tutoring, videos and other supplemental instruction were all the result of that feedback.

The math department expects to continue to monitor student success and make adjustments based on that data.

12. Target outcomes for each academic year through 2018-19 for the measures identified in your response to Item 11 *(Two pages maximum)*
The key target rates for the developmental math program are shown in the table below going out to 2018-19.

Target Success Rates

	2015-16	2016-17	2017-18	2018-19
Pass Rates				
Math 98/99	80%	83%	85%	85%
Math 99 Only	90%	90%	95%	95%
1 Year Retention Rates	80%	80%	85%	85%
6 Year Graduation Rates	49%	49%	50%	52%

12.1 How targets were chosen. Targets were chosen based on an evaluation of current data trends, an estimation of the qualifications of future students and, in the case of graduation rates, on external inputs. The rates are somewhat conservative since qualifications of students can vary significantly between incoming cohorts. The 6-year graduation rate has been assigned to CSUMB by the Chancellor's Office. However, since the most recent 6-year rate attained is very close to 49%, these targets should be achieved within the time frame specified.

12.2 The most recent baseline measures for each target outcome for each participant in the application by academic year that data reflects. The data below show the key data items for the Math@CSUMB program. As noted in item 11, some evaluation measures are in process since they are related to parts of the program started only this year (e.g. winter workshops and the spring 6 unit course). Measures for goal 3 are slated for future collection and analysis.

ELM Scores and Percent Requiring Remediation by Freshmen Entering Cohort

Cohort Year	ELM Median Score	ELM Range	% Requiring Math Remediation
Fall 2008	42	12-80	51%
Fall 2009	42	12-80	48%
Fall 2010	42	10-80	52%
Fall 2011	40	10-74	44%
Fall 2012	42	10-76	33%
Fall 2013	n/a	n/a	31%
Fall 2014	n/a	n/a	34%

This chart shows that over time, and with some variability, the percent of students needing remediation has decreased.

The first chart on the following page shows the student cohort and pass rate in the two math courses over time. An important characteristic to note is the lack of spring Math 98 courses after 2008 which indicates more success in fall passage. The high numbers of students taking Math 99 in spring terms shows the movement of students from success at Math 98 into Math 99.

The second chart shows the retention rates for students in remediation vs. those not required to take developmental math. In the most recent cohorts, students enrolled in Math 99 only (not needing Math 98) are retaining at rates higher than non-remediating students. This may be an

indication of students in the program gaining academic confidence and connection to the institution through the faculty. This point is emphasized in the last chart where Math 99 students are graduating at higher rates than the non-remediation students.

Pass rates in Math 98 & 99 for Fall 2005 - Spring 2014

	Math 98		Math 99	
	# Students	Pass Rate	# Students	Pass Rate
2005 Fall	282	84%	28	93%
2006 Spring	47	45%	217	90%
2006 Fall	297	70%	37	89%
2007 Spring	75	51%	206	89%
2007 Fall	374	82%	84	93%
2008 Spring	61	54%	287	89%
2008 Fall	415	81%	145	96%
2009 Spring			330	88%
2009 Fall	407	91%	158	92%
2010 Spring			303	85%
2010 Fall	350	93%	165	98%
2011 Spring			264	93%
2011 Fall	329	88%	158	97%
2012 Spring			224	92%
2012 Fall	220	78%	132	98%
2013 Spring			196	83%
2013 Fall	190	84%	109	96%
2014 Spring			157	83%

Retention Rates for Students in Math 98/99 vs. Students Not Requiring Remediation

	Math 98		**Math 99 only**		**No Math Remediation**	
	Cohort	**Retention Rate**	**Cohort**	**Retention Rate**	**Cohort**	**Retention Rate**
Fall 2006	270	67%	1	100%	263	63%
Fall 2007	340	65%	51	75%	355	68%
Fall 2008	381	70%	60	73%	472	71%
Fall 2009	384	75%	67	72%	498	77%
Fall 2010	349	82%	78	76%	402	75%
Fall 2011	320	78%	57	86%	496	80%
Fall 2012	216	71%	129	85%	557	83%
Fall 2013	186	76%	104	87%	576	85%

Notes: Math 98: Enrolled (Success + Failure) in Math 98 in their matriculation term. "Math 99 only": Enrolled (Success + Failure) in Math 99 but excludes students also enrolled in Math 98 their matriculation term to avoid double-counting. No Math Remediation: not enrolled in either Math 98 or 99 in their matriculation term.

6-Year Grad Rates for Students in Math 98/99 vs. Students Not Requiring Remediation

	Math 98		**Math 99 only**		**No Math Remediation**	
	Cohort	**Retention Rate**	**Cohort**	**Grad**	**Cohort**	**Grad Rate**
Fall 2006	270	40%	1	54%	263	39%
Fall 2007	340	39%	51	55%	355	41%
Fall 2008	381	46%	60	53%	472	45%

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Appendix A

Exhibit 1 – List of all entities participating in the application.

- California State University, Monterey Bay, Seaside, CA

Exhibit 2 (page ii) – Letter from Dr. Eduardo M. Ochoa, President, California State University, Monterey Bay.

CALIFORNIA STATE UNIVERSITY
Monterey Bay
OFFICE OF THE PRESIDENT

100 Campus Center
Seaside, CA 93955-8001
831-582-3532
Fax 831-582-3540
csumb.edu

December 18, 2014

Award for Innovation Selection Committee
California Department of Finance
Education Systems Unit – Innovation Awards
915 L Street, 7th Floor
Sacramento, CA 95814

RE: Support for California State University, Monterey Bay's Application 2 for an Award for Innovation in Higher Education 2015

Dear Committee:

As President of California State University, Monterey Bay (CSUMB), I would like to express my full support of this application for the Innovation Award in Higher Education.

There is a continuing need for students entering the CSU to engage in remedial mathematics. Campuses face the twin challenges of improving student success while at the same time doing so in an effective and efficient manner. Even more efficiency would be gained by reducing the numbers of students entering college with remedial math needs.

The innovative Mathematics @ CSUMB program described in this application has developed over time into an integrated approach encompassing the entire educational spectrum starting with K-12 pre-college programs and progressing to Early Start and remedial math courses. High school teachers have worked with CSUMB faculty to learn how to integrate innovative PC tablet technology into their classrooms. A similar technological approach in remedial classes at CSUMB has created fiscal efficiencies through class sizes of 60-90 while at the same time resulting in impressively high success rates. The program has already been recognized by awards from both Hewlett Packard and the CSU Chancellor's Office.

The success of this program supports the vision of the institution by serving the historically economically and educationally disadvantaged populations through innovative use of technology to enhance and enrich the learning experience.

CSUMB, its administration, faculty, and staff are committed to this program and to its innovative approaches that can serve as a catalyst for future advances across this campus

Sincerely,

Eduardo M. Ochoa
President

Our Model and Methods

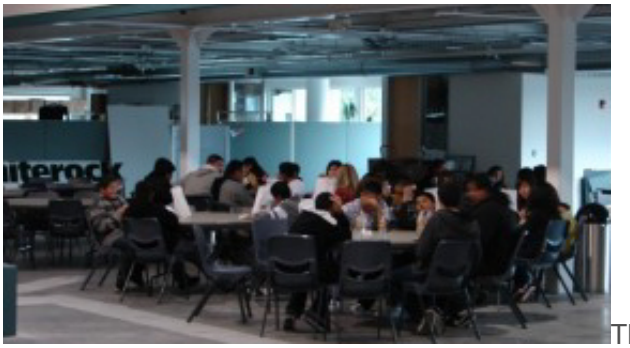
The Importance of Middle School Math

Recent research shows that middle school is a critical time for mastering core math skills, especially in algebra. Students who do well in algebra will have the confidence to take advanced math and science courses in high school and continue on to college.

- California students are struggling to learn math required for college admission.
- College students who want to major in science or engineering need algebra proficiency.
- Statistics show that 80 percent of California community college students require remedial math and 50 percent of high school students admitted to California State Universities require remedial math.

The Algebra Academy Model

1. ### Summer Immersion Course



The Algebra Academy brings together college mathematics faculty, middle school students and teachers for intensive immersion in algebra. During a week-long intensive study course, students devote six days of their school vacation to 40 hours of mathematics. Mornings are spent learning core topics and working on problems individually and in small groups. Afternoons are filled with challenging math game activities followed by problem solving sessions, review and individual tutoring by teaching assistants and instructors. Classes include inspiring presentations from young professionals who use math in their jobs. One afternoon all students take a field trip to a local university campus to help them envision their own possibilities after high school. On the final day, families are invited to celebrate graduation with their students.

2. ## Math Clubs and Field Trips

Once the school year begins, students are helped to form Algebra Academy Math Clubs in their home schools. These clubs feature lunchtime or after-school meetings where teachers help students sustain math interest with entertaining games of strategy, and spatial awareness. Tutoring helps students prepare for tests and competitions, and field trips to college campuses build student interest in attending college. Club activities culminate in student-led Math Festivals held in the spring.

Click here for more information on Math Festivals.

3. ## Ongoing Encouragement and Follow-up

While in high school, university admissions counselors and Graniterock representatives follow up with Academy graduates to remind and encourage them to stay on track for college and continue to take the challenging mathematics courses that will qualify them for the best universities. These high school students are also encouraged to volunteer to help with current Algebra Academy programs. This gives them a great opportunity for community service and makes them role models for younger students.

Program Goals

- Improve students ability to understand, use and evaluate quantitative information.
- Prepare students for success in high school mathematics and readiness for college.
- Support a culture of mathematics excellence among students in partner schools.

Program Methods

- Give teachers new tools for algebra teaching success.
- Provide students and parents opportunities to see and meet college faculty and campuses.
- Increase collaboration between local school districts, business and collegiate partners.
- Expose students to the professional world and potential career opportunities.
- Implement fun, active, problem based and cooperative learning methods.
- Mentor Math Clubs in partner schools.

Algebra Academy © 2014 All Rights Reserved.

WordPress Themes

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Harbor High hosts first Algebra Bridge Academy to help bring kids up to speed on equations and formulas

Shmuel Thaler/Sentinel Harbor High's multipurpose room is filled with students getting prepared for upcoming math classes at the school's Algebra Bridge Program on Thursday.

By SHANNA MCCORD - Santa Cruz Sentinel

Posted: 08/10/12, 12:00 AM PDT |

0 Comments

SANTA CRUZ - Instead of shooting paint-ball guns with friends or loafing at home, 15-year-old Nash McQuaide has spent a chunk of summer break hunkered down trying to solve algebraic equations.

McQuaide, who will be a sophomore at Harbor High School in the fall, bombed the second semester of Algebra I last year. He showed up at the Algebra Bridge Academy in July to make up the units, but shortly discovered with some extra help and encouragement he actually enjoys working through the computations.

"Everything started to click here. Before I was horrible," Nash said. "Now I can solve equations in my head. This isn't as bad as I thought it would be."

McQuaide is one of about 62 students participating in the Algebra Bridge Academy taught by renowned CSU Monterey Bay math professor Hongde Hu, who has received several national awards for improving math scores of struggling students.

Hu also teaches an annual algebra academy each January to Pajaro Valley eighth-graders through a program established by Granite Rock Co. Inc.

He says programs such as the Algebra Academy are important in turning the tide on the 80 percent of community college students who require remedial math. Hu says 50 percent of California State University students need remedial math classes when they arrive after high school.

The academy at Harbor High is a four-week program initiated this summer in which students study, practice and get tested on algebra for six hours each day. The academy ends next week.

The program packs a year's worth of algebra into a month.

Students pick up the material better than they do during the school year, Hu says, because they work in groups and receive constant one-on-one guidance from the six or so teachers and volunteers walking around the room.

They take plenty of breaks, which Hu says helps concentration levels.

There's no homework, however, quizzes are given every day. There will be a final exam next week. Those who pass can move on to geometry.

"We want them to do math with confidence," Hu said. "The ones who have confidence do it longer. That's one of the beauties of confidence."

Long algebra equations and formulas - jumbled with numbers and letters - were confusing for Gaby Perez, 15, who also failed second semester last year, until attending the academy.

Everything is starting to make sense, and Perez says she's ready for geometry in the fall.

"I'm understanding why this equals that and how to check it to make sure it's right," she said. "I'm learning that there's different methods to get an answer. There's not just one way to get an answer."

Harbor High math teacher Rick Barlow said some students don't do well in algebra because they're scared of numbers.

"What holds them back isn't their ability," Barlow said. "It's their perception of math."

The academy includes several Branciforte and Shoreline middle school students who hope to skip algebra as freshmen and go straight to geometry.

Starting geometry as a freshman allows a student to advance to calculus by their senior year, which is preferred by the more prestigious colleges.

The $25,000 algebra academy was paid for by Harbor High and the Santa Cruz Education Foundation.

Follow Sentinel reporter Shanna McCord on Twitter @scnewsmom

Appendix D

Fran Horvath <fhorvath@csumb.edu>

Fwd: Meet with you at IHEP

1 message

Hongde Hu <hhu@csumb.edu> Fri, Jan 9, 2015 at 11:38 AM
To: Fran Horvath <fhorvath@csumb.edu>, Hongde Hu <hhu@csumb.edu>

Leech Tribal College in Minnesota interested in Our Math Remediation

---------- Forwarded message ----------
From: **Kim Dickson** <kidickson@students.lltc.edu>
Date: Fri, Aug 5, 2011 at 7:56 AM
Subject: Meet with you at IHEP
To: "hhu@csumb.edu" <hhu@csumb.edu>

Dear Hongde-

Hi, I am Kim Dickson from the Leech Lake Tribal College in Minnesota. I meet with you briefly at the IHEP convention in Atlanta last week and talked to you about your math tutoring program and the success that you have been having with it. I was unable to meet with you later during the convention because of our busy schedule, but I was wondering if you could send me some information on your program. It sounded very intriguing and I would like to see if there some things that I would be able to implement into our small Learning Center that would help with our Math students.

Thank you for your time, and it was very nice meeting you.

Kim

--
Hongde Hu, Ph.D.
Math Dept Chair
California State University-Monterey Bay
100 Campus Center
Seaside, CA 93955
831-582-3851

Fran Horvath <fhorvath@csumb.edu>

Fwd: remedial math at CSUMB

1 message

Hongde Hu <hhu@csumb.edu> Fri, Jan 9, 2015 at 11:29 AM
To: Fran Horvath <fhorvath@csumb.edu>, Hongde Hu <hhu@csumb.edu>

e-mail from Pasadena City College about their interest in our MATH remediation Model.

---------- Forwarded message ----------
From: **Ann Davis** <AXDAVIS@pasadena.edu>
Date: Thu, Sep 29, 2011 at 3:57 PM
Subject: remedial math at CSUMB
To: "hhu@csumb.edu" <hhu@csumb.edu>

Dear Dr. Hu,

I am a math professor at Pasadena City College. We here are in the midst of searching for ways to improve our remedial math courses' success rates. I was looking at your website and noticed an article that referenced your outstanding 92% success rates. I called the math office and was referred to Alicia Walter. I spoke with her today and she was very helpful in explaining the basics of your program. I would like to talk to you further. Could you email me your availability so that I can call you?

Thanks,

Dr. Ann Davis

Pasadena City College Math Division

--
Hongde Hu, Ph.D.
Math Dept Chair
California State University-Monterey Bay
100 Campus Center
Seaside, CA 93955
831-582-3851

Fran Horvath <fhorvath@csumb.edu>

Fwd: interest in your Leap Frogging Mathematics

1 message

Hongde Hu <hhu@csumb.edu> Fri, Jan 9, 2015 at 11:41 AM
To: Fran Horvath <fhorvath@csumb.edu>, Hongde Hu <hhu@csumb.edu>

MaryNount College interested in our work
---------- Forwarded message ----------
From: **John Alexander** <jalexander@marymountpv.edu>
Date: Sat, Feb 12, 2011 at 9:38 PM
Subject: interest in your Leap Frogging Mathematics
To: "hhu@csumb.edu" <hhu@csumb.edu>

Hello Professor Hu,
I was curious about your leap frogging math program. I'm the chair of math and science at a small liberal arts college in LA and we are currently looking for alternative ways to teach and present math as part of a review of our program. Is there a particular program you use on the tablet PCs? Do you find a higher success rate for these students? Do you have any further details on how this is working? I would love to hear more about your program.
Thanks
John Alexander

John Alexander, PhD
Assistant Professor Physical Sciences
Chair of Math and Science Division
Marymount College
jalexander@marymountpv.edu<mailto:jalexander@marymountpv.edu>
310-303-7634

--
Hongde Hu, Ph.D.
Math Dept Chair
California State University-Monterey Bay
100 Campus Center
Seaside, CA 93955
831-582-3851

Arlene Krebs, Director, Technology Development
California State University, Monterey Bay
Wireless Education & Technology Center
100 Campus Center
Seaside, CA 93955

Proposal Title: **Leapfrogging Mathematics in the Early Start Program**

Dear Arlene,

Congratulations! The 2010 HP EdTech Innovators Awards grant application that you submitted to HP on behalf of California State University, Monterey Bay has been selected for funding!

Your institution is one of 10 educational institutions across the globe that have been selected by HP to receive this grant in 2010. Only 4% of the received proposals were funded, making your institution part of an elite cohort dedicated to enhancing math and science education through the innovations that are possible at the intersection of teaching, learning, and technology. This award of cash and technology is valued at more than $40,000.

You are receiving this email because you were identified as the project lead for the team of educators participating on this grant project. We have also copied the other email addresses included in your application, but please do forward this message to any team members we may have missed.

This communication contains critical information about your grant, so please read it carefully and save it for future reference. Topics include:

1. Checklist of Immediate Actions
2. Receiving Email & Who to Contact
3. About the Equipment, Software, & Services Components of Your Award
4. About your Horizon Project Navigator Membership
5. Your Conference Invitation
6. Special Invitation: Digital Storytelling Webinar from the NMC
7. Publicity About Your Grant Award
8. Grant Recipient Commitments
9. Travel and Accommodation Limitations and Requirements

Again, congratulations! We appreciate your strong commitment to education, to innovation, and to transforming learning. All of us are proud of what you have achieved and wish you much continued success.

Sincerely,

Jim Vanides
Program Manager
HP Global Social Investment

Larry Johnson
Chief Executive Officer
The New Media Consortium

Fran Horvath <fhorvath@csumb.edu>

Fwd: Promising Award 2014-15 Notifications

1 message

Hongde Hu <hhu@csumb.edu> Fri, Jan 9, 2015 at 10:55 AM
To: Fran Horvath <fhorvath@csumb.edu>, Hongde Hu <hhu@csumb.edu>

MATH Program received grant award from the CSU for the promising practice of bottleneck courses in 2014-15

---------- Forwarded message ----------
From: **Cota, Leo** <lcota@calstate.edu>
Date: Fri, Jul 18, 2014 at 12:28 PM
Subject: Promising Award 2014-15 Notifications
To: "emochoa@csumb.edu" <emochoa@csumb.edu>, "birwin@csumb.edu" <birwin@csumb.edu>
Cc: "kroney@csumb.edu" <kroney@csumb.edu>, Ronnie Higgs <rhiggs@csumb.edu>, "cwang@csumb.edu" <cwang@csumb.edu>, "Hanley, Gerry" <ghanley@calstate.edu>, "Perkins, Kara" <kperkins@calstate.edu>

Dear CSU Monterey Bay,

Attached is the Promising Award Memo along with the Funding Agreement for 2014-15. This letter serves as the go-ahead to start work. Funds will be transferred via CPO in August (80%), but projects should not wait for the money to arrive before they begin work.

If you accept the proposed funding allocation and the terms and conditions of the Promising Practices program, please submit the ***Promising Practices Agreement*** form electronically by August 1, 2014. If you would like to discuss the funding allocation, please contact Kara Perkins (kperkins@calstate.edu) to set up a 30-minute call to discuss your budget**.**

Thank you,

Leo Cota

Program Manager, Bottlenecks and Student Success Initiatives

CSU Office of the Chancellor

(562) 951-4797

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Shirlene Campbell, Dean's Budget Analyst
College of Science, Media Arts, and Technology
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Hongde Hu, Ph.D.
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2 attachments

Promising Practices Program Funding Agreement with Form 2014-15.pdf
305K

Promising Practices Award Memo 14-15 Monterey Bay.pdf
49K

Appendix F: CSUMB Vision Statement: http://about.csumb.edu/vision-statement

California State University, Monterey Bay (CSUMB) is envisioned as a comprehensive state university which values service through high quality education. The campus will be distinctive in serving the diverse people of California, especially the working class and historically undereducated and low-income populations. It will feature an enriched living and learning environment and year-round operation. The identity of the university will be framed by substantive commitment to multilingual, multicultural, gender-equitable learning. The university will be a collaborative, intellectual community distinguished by partnerships with existing institutions both public and private, cooperative agreements which enable students, faculty, and staff to cross institutional boundaries for innovative instruction, broadly defined scholarly and creative activity, and coordinated community service.

The university will invest in preparation for the future through integrated and experimental use of technologies as resources to people, catalysts for learning, and providers of increased access and enriched quality learning. The curriculum of CSUMB will be student and society centered and of sufficient breadth and depth to meet statewide and regional needs, specifically those involving both inner-city and isolated rural populations, and needs relevant to communities in the immediate Tri-County region (Monterey, Santa Cruz, and San Benito). The programs of instruction will strive for distinction, building on regional assets in developing specialty clusters in such areas as: the sciences (marine, atmospheric, and environmental); visual and performing arts and related humanities; languages, cultures, and international studies; education; business; studies of human behavior, information, and communication, within broad curricular areas; and professional study.

The university will develop a culture of innovation in its overall conceptual design and organization, and will utilize new and varied pedagogical and instructional approaches including distance learning. Institutional programs will value and cultivate creative and productive talents of students, faculty, and staff, and seek ways to contribute to the economy of the state, the wellbeing of our communities, and the quality of life and development of its students, faculty, and service areas.

The education programs at CSUMB will:

- Integrate the sciences, the arts and humanities, liberal studies, and professional training;
- Integrate modern learning technology and pedagogy to create liberal education adequate for the contemporary world;
- Integrate work and learning, service and reflection;
- Recognize the importance of global interdependence;
- Invest in languages and cross-cultural competence;
- Emphasize those topics most central to the local area's economy and ecology, and California's long-term needs;
- Offer a multicultural, gender-equitable, intergenerational, and accessible residential learning environment.

The university will provide a new model of organizing, managing, and financing higher education:

- The university will be integrated with other institutions, essentially collaborative in its orientation, and active in seeking partnerships across institutional boundaries. It will develop and implement various arrangements for sharing courses, curriculum, faculty, students, and facilities with other institutions.
- The organizational structure of the university will reflect a belief in the importance of each administrative staff and faculty member, working to integrate the university community across "staff" and "faculty" lines.
- The financial aid system will emphasize a fundamental commitment to equity and access.
- The budget and financial systems, including student fees, will provide for efficient and effective operation of the university.
- University governance will be exercised with a substantial amount of autonomy and independence within a very broad CSU systemwide policy context.
- Accountability will emphasize careful evaluation and assessment of results and outcomes.

Our vision of the goals of California State University, Monterey Bay includes: a model pluralistic academic community where all learn and teach one another in an atmosphere of mutual respect and pursuit of excellence; a faculty and staff motivated to excel in their respective fields as well as to contribute to the broadly defined university environment. Our graduates will have an understanding of interdependence and global competence, distinctive technical and educational skills, the experience and abilities to contribute to California's high quality work force, the critical thinking abilities to be productive citizens, and the social responsibility and skills to be community builders. CSUMB will dynamically link the past, present, and future by responding to historical and changing conditions, experimenting with strategies which increase access, improve quality, and lower costs through education in a distinctive CSU environment. University students and personnel will attempt analytically and creatively to meet critical state and regional needs, and to provide California with responsible and creative leadership for the global 21st century.

~ September 27, 1994

Op-Ed: Grants extend CSUMB's reach into local schools - Cal State Monterey Bay

Posted on Nov 21, 2014 Recommend Twitter

The following op-ed was published on Nov. 21, 2014, by The Salinas Californian.

Grants extend CSUMB's reach into local schools

A recent report by the advocacy group Children Now gave Monterey County low marks in several measures of education and child care.

While we should never ascribe too much importance to a single ranking, it is true that the overall education level in our county lags behind state averages. One piece of good news is that, on Election Day, voters in three county school districts again showed their willingness to invest in education, approving bond issues in Salinas, Pacific Grove and Gonzales.

And, for our part, Cal State Monterey Bay is committed to playing an active role in bringing all stakeholders together to address these issues. Toward that end, we have established a College of Education, which will increase our capability both to collaborate with local districts and to educate more of the teachers they will need in the future.

CSUMB recently received two Department of Education grants to support our efforts to work with local schools and to enhance our teacher preparation programs.

CSUMB will receive $2.1 million per year for six years and $1.4 million in year seven through a GEAR UP grant. The money will go toward helping more than 3,500 middle school students in San Ardo, San Lucas, Greenfield, King City, Salinas and Seaside become more college-ready.

The program, which is also supported by matching funds from the various communities, puts personnel in the schools to supplement advising, tutoring and student support programs. By working with cohorts of seventh- and eighth-grade students as they move through the system, GEAR UP seeks to improve their college prospects and to make a lasting change in the cultures of the partner schools.

Good schools need an ongoing supply of good teachers. In response to state funding cuts during the Great Recession, California school districts often had to lay off teachers with the least seniority. Many prospective teachers got the message; enrollment in teaching programs fell statewide. An older workforce and a shortfall of new teachers create an impending teacher shortage.

CSUMB's teacher training efforts will be enhanced by a five-year $8.6 million Teacher Quality Partnership Grant from the Department of Education. Working with our colleagues at Cal Poly San Luis Obispo, we will recruit, train and support new teachers primarily in the STEM fields – science, technology, engineering and math.

Our university is also pleased to be working with the Monterey County Office of Education to implement Positive Behavioral Interventions and Support under a $2.6 million grant awarded to MCOE. The PBIS grant seeks to help teachers move away from ineffective traditional discipline methods and toward more recognition and praise of positive behaviors.

The Cal State system educates more than half of the teachers who now work in California classrooms, and also supports a strong educational research agenda. Our education deans have agreed upon four key elements that go into building a successful schools:

• Using data to guide decision-making;
• Having high expectations of every student;
• Establishing robust professional learning communities in each school;
• No sacred cows -- everything is up for discussion.

As we have met with local teachers and administrators around the area, we have been impressed with their interest in positive collaboration and their openness to new efforts to improve our schools.

Meanwhile, CSUMB is also working with key stakeholders in launching the Bright Futures initiative, a community partnership of local education, social service, business and philanthropic groups to support an improved cradle-to-career educational pipeline.

Our initiative will be based on a model adopted by more than 100 communities across the country. In Monterey County, we want to ensure that every child is prepared for school and is supported inside and outside the classroom; that every student succeeds in school, enrolls in some form of postsecondary education, graduates, and enters a career.

As the Children Now report makes clear, there are a long list of factors that go into helping our children succeed. Our effort to do better will require various initiatives over a number of years, and progress will not happen overnight.

But can you think of a more important task to undertake, or a better legacy to create, over the next decade?

MONTEREY PENINSULA CHAMBER OF COMMERCE

WORKFORCE READINESS SURVEY

In June 2013, the Monterey Peninsula Chamber of Commerce (MPCC) Education Committee conducted a survey aimed at gathering employer views on workforce readiness at the entry level, willingness of employers to participate in workforce preparation, and identification of professional development needs.

Introduction

Employers are constantly faced with the challenge of finding and retaining personnel who have the requisite skills to be successful in the workplace. While some specific training for jobs at the start of a job is expected, employers seek applicants who already have skills in certain areas. At the same time, educational institutions are charged with preparing students for lives in the workforce. There is a natural intersection of interest between those seeking employees and those preparing them to identify what skills are useful and how to best ensure that students attain these skills.

The Monterey Peninsula Chamber of Commerce formed an Education Committee to ensure consistent and focused attention on the education needs of businesses in the region. The committee provides a venue for businesses and educational institutions to engage on ways to increase useful interaction between the two groups.

The Education Committee determined to design and conduct a survey of local businesses in order to identify the skills deemed necessary for entry-level workers. In addition, the survey sought to identify ways in which businesses might more directly engage in supporting the educational process.

Education Committee Mission

Promoting links between educators and employers - for productivity and prosperity

Methodology

The survey was designed by Education Committee members over several months, going through several drafts before being approved. The survey instrument is available from MPCC upon request. The survey was sent to all MPCC members as well as other local chambers. The following chambers participated in the survey:

- Carmel
- Carmel Valley
- Castroville
- Gonzales
- Greenfield
- King City
- MPCC
- Moss Landing
- Pacific Grove
- Salinas Valley
- Soledad

Additionally, the survey was sent to members of the Workforce Investment Board and the Monterey County Business Council.

Results

A total of 78 respondents from a variety of industry sectors responded to the survey. This represents an extremely low return rate since chamber members number in the hundreds, however, as will be noted in the discussion section, results are similar to those recorded in other, larger surveys.

Frequency analyses were conducted on the data – the full data set is available upon request for all respondents and for MPCC members only. The following presents some of the highlights of the data analysis:

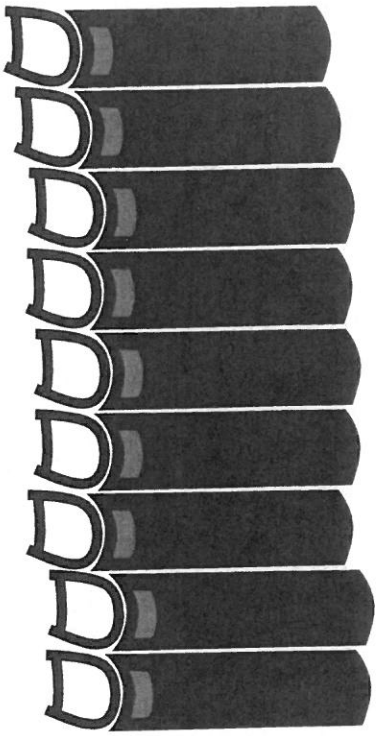
- 82% of all respondents and 87% of MPCC respondents connect local education to economic vitality.
- 69% of all respondents see local education as very important in their ability to hire qualified employees.
- 53% of all respondents and 62% of MPCC respondents indicate that 50% or more of their workforce is locally educated.
- A high school education is the level most frequently identified with entry-level workers with 2-year and 4-year college education lower and roughly equal.
- 81% of respondents are either not satisfied or only somewhat satisfied with the readiness of locally educated entry level participants.

High Tech Skills are Less Important
Areas that regional businesses indicated were less important include the highly technical:

42%	Ability to speak Spanish
36%	Understanding of global business issues
33%	Powerpoint
22%	Social media
18%	Presentation skills
14%	Excel/spreadsheets
13%	Creativity

Basic & Soft Skills Lead

Survey recipients were asked to identify those entry-level skills most important to their business as well as those which are most lacking in applicants. Basic skills (writing, math) were identified as important but also key to success at the entry level are the "soft" skills of customer service, critical and independent thinking, and the abilities to follow instructions and to focus.



Areas where skills are seen as lacking in entry-level applicants (percentage of respondents selecting this option):

15%	Written communication
14%	Good customer service
14%	Critical thinking
12%	Independent thinking
12%	Ability to follow instructions
12%	Problem-solving skills
12%	Basic math
12%	Ability to plan, organize and prioritize work
10%	Ability to focus

Discussion

The Chamber might encourage business members to focus efforts more strongly in areas impacting high school students

As noted previously, the response rate on the survey was very low. While the number of survey respondents is only a small proportion of the employers in Monterey County, the results are validated in two recent national studies conducted on the same topics. A 2012 survey to which 704 employers nation-wide responded identified deficiencies in entry-level applicants in the areas of written and oral communication skills, adaptability and managing multiple priorities, and making decisions and problem-solving.[1] A similar 2013 study with 318 respondents highlighted critical thinking, complex problem-solving, written and oral communication, and applied knowledge in real-world settings as more important than a specific field of study.[2] The similarity of the results to the local survey indicates that educational issues facing local businesses are comparable to those across the country. In addition, the results of the national surveys did not point to a need for stronger technical skills, again supporting the current results.

[1] 2012. The Chronicle of Higher Education and American Public Media's Marketplace. The Role of Higher Education in Career Development: Employer Perceptions.

[2] 2013. The Association of American Colleges and Universities. It Takes More Than A Major: Employer Priorities for College Learning and Student Success.

The results showing interest on the part of regional businesses to get more actively involved with educational issues is encouraging. Clearly, a number of employers see actual experience, through internships, job shadowing and the like, to be of benefit to potential job applicants. At the same time, however, there is an interesting emphasis on college internships by the same respondents who indicated the majority of their entry-level workforce requires only a high school diploma or equivalent. The Chamber might encourage business members to focus efforts more strongly in areas impacting high school students (or younger).

What Can Businesses Do?

Survey recipients were asked to identify whether they had supported educational efforts in the past by type of activity and also whether they were interested in supporting these in the future.

Of MPCC business responding to the survey, 62% have supported education efforts in the past and want to continue or have an interest in supporting future efforts. The areas of greatest interest for participation by all respondents are (ranked from highest to lowest) are:

48.7%	College Internships
41.0%	Guest Speakers
35.9%	Job Shadowing
32.4%	Workshops
26.9%	Career Fairs
25.7%	Reading/Literacy
25.6%	Scholarships
24.6%	Mock Interview
22.8%	High School Internships

Of MPCC business responding to the survey, 62% have supported education efforts in the past and want to continue or have an interest in supporting future efforts

Conclusions

This survey marks an important first step by the MPCC to gain information directly from regional employers on the issue of education and the skill requirements which would result in a better pool of applicants (and presumably more successful hiring). While these results point to areas in which educators might focus, it also emphasizes the strong support businesses have for local educational institutions and hopefully will be only the beginning of dialog in this important area. Just as important for MPCC and other chambers, the survey demonstrates that members see education as an important area for continued work by the chambers of commerce.

To request further information, please contact info@montereychamber.com or call 831-648-5350.

Math program earns Innovators Award - Cal State Monterey Bay

Posted on Jan 10, 2011 Recommend Twitter

CSUMB wins HP award

Math program selected as one of 10 exemplary projects worldwide

Cal State Monterey Bay has earned an EdTech Innovators Award from Hewlett Packard and the New Media Consortium. The award recognizes pioneers in education who are using technology in groundbreaking ways.

According to HP, CSUMB's project, "Leapfrogging Mathematics in the Early Start Program," stood out because it's a proven example of an educational project that uses technology in novel ways inside and outside the classroom.

The EdTech Innovators Award includes a technology grant of $40,000 and membership in a social network designed for educators. Only 10 winners were selected – 4 percent of applications – representing educational institutions in the U.S., India, Costa Rica, South Africa, Canada and Brazil.

The new grant allows high school math teachers and students to attend four weeks of math "boot camp" during the summer. The high school teachers will partner with CSUMB faculty members on new educational strategies using tablet PCs – personal computers equipped with touch screens – that address the needs of remedial math students.

The project's goals are to reduce the percentage of college freshmen who need remedial math from 60 percent to under 40 percent; to help high school teachers invigorate their courses and collaborate with college professors on curriculum; and to document the work so that it can be used on campuses across the country.

Leapfrogging Math is a new program, but it builds on CSUMB's successes in courses using tablet PC technology. Working with HP, the university has created a remedial math program that serves about 500 of its own freshmen each year. More than 92 percent of students are passing the two-semester course, compared to the national rate of just under 50 percent.

In recognition of the university's innovative work to integrate mobile technologies across the curriculum, HP has awarded four technology grants to CSUMB's Wireless Education and Technology Center since 2003.

Posted by Joan Weiner on Jan 10, 2011 - Log in to edit this page

in Staff/Faculty Story

Early Start & Remediation Course Pathways - Cal State Monterey Bay

Course pathways for completing Early Start/Remediation requirements for CSUMB students

If you are required to participate in Early Start, you must take a course in the Summer prior to the Fall semester. These are examples of how to complete these requirements. If you have any questions whatsoever, please do not hesitate to contact the Office of Admissions at 831-582-3738.

English Early Start Completion Pathways

	Summer 2013	Fall 2013	Spring 2014
Option # 1: Early Start Only English Experience	ESWRT 94: Introduction to Writing (1 unit)	WRIT 95: Integrated Reading & Writing (4 units)	**ready for college level English**
Option #2: Early Start & Full English Remediation Courses	ESWRT 95: Integrated Reading & Writing (4 units)	**ready for college level English**	

Math Early Start Competion Pathways

	Summer 2013	Fall 2013	Spring 2014
Option # 1: Early Start Only Math Experience	ESMAT 90: Pre-college mathematics (1 unit)	MATH 98: Mathematics Review 1 (4 units)	MATH 99: Mathematics Review 2 (4 units)
Option #2 Early Start & Remediation with Math Boot Camp	ESMAT 90 (Math Boot Camp): Mathematics Review (1 unit)	Math 99: Mathematics Review 2 (4 units)	**ready for college level Math**
Option #3 Early Start & Remediation with Math Boot Camp	ESMAT 90 (Math Boot Camp): Mathematics Review (1 unit)	**ready for college level Math**	

Posted by David Linnevers on Sep 05, 2012 - Log in to edit this page

What is Early Start?

The CSU System recently enacted a policy known as “Early Start” that requires incoming students who do not demonstrate readiness for college-level math and/or English to begin remediation during the summer before coming to any CSU. The goals of Early Start are to better prepare students in math and English before their first semester of college, which will improve their odds of completing a college degree.

Here are some of the basics of Early Start:

- Early Start is required for incoming students who have not fulfilled the Entry Level Math (ELM) and or English Placement Test (EPT) proficiency requirements.
- The program takes place the summer before the freshmen year.
- Upon admission, CSU campuses will inform students who are not exempt, how and where to sign up for Early Start.
- All admitted, confirmed students will be allowed to make a Smart Page selection in their Student Service Center; by making a selection you are letting us know where you plan on completing your mandatory Early Start requirement.
- Early Start math and English courses will be available at every CSU campus.
- Financial aid will be available for those who qualify and demonstrate need.

Posted by Jason Garrett on Apr 03, 2013 - Log in to edit this page