

044 UG-08

(Form 1-ENH, Rev. 2007)

## PROJECT SUMMARY

Name of Institution (Include Branch/Campus and School or Division)  
**Southeastern Louisiana University**

Address (Include Department)  
**Department of Mathematics, SLU 10687, Hammond, LA 70402**

Principal Investigator(s)  
**Rebecca Muller & Timothy Hudson**

Title of Project  
**Enhancing Learning in Introductory Math Courses**

Abstract (DO NOT EXCEED 250 WORDS)\*

Success in the introductory mathematics courses has historically been an obstacle to the improvement of retention and graduation rates at Southeastern. Currently, five of the top ten courses with the highest failure/withdrawal rates are mathematics courses. This proposal seeks to provide a solution to this problem.

The use of *MyMathLab* (a Pearson Publishing product) to enhance learning in beginning algebra, intermediate algebra, college algebra and precalculus has been documented through National Center for Academic Transformation R2R (Roadmap to Redesign) projects, which have been implemented at many campuses across the country since 2004. The course software provides interactive, guided, homework problems and practice tests; online tutorials and assessment tools; and student progress tracking. We plan to provide Southeastern students with the same opportunity for success by using this software in designated computer labs set aside for this purpose. In each of the proposed courses, students will be required to attend two hours in assigned classes for lecture and two flexible hours in the computer lab for interactive learning sessions. Computers in the lab will only have access to the *MyMathLab* software, and students will be monitored to ensure they are working on math problems. Instructors will be available to work with students individually in the lab, targeting specific problem areas.

Southeastern has funded one laboratory with 40-workstations to pilot the redesign in Spring 2008. This Board of Regents grant would allow the expansion of the project beyond its pilot stage – to impact more students in more courses.

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# NARRATIVE AND BIBLIOGRAPHY

## *a. The Current Situation*

### *a.1 Institutional Description*

Southeastern Louisiana University is the third largest university in Louisiana, offering 65 undergraduate and graduate degree programs. Its overall mission is to lead the educational, economic, and cultural development of southeast Louisiana. The University's educational programs are based on vital and evolving curricula that address emerging regional, national, and international priorities. Southeastern has experienced a steady enrollment of 15,000-16,000 students, with about one-third designated as freshmen. The Department of Mathematics services an average of 5500 students per semester, most of these fulfilling the six-hour mathematics requirement of all students. For most students, this six-hour requirement entails taking a college algebra course followed by a course in either trigonometry, business calculus, or statistics, depending on the student's major. Faculty in the Department of Mathematics are either in the professorial ranks (36%) or are listed as instructors (64%), with most of the entry-level courses being taught exclusively by instructors.

### *a.2 Rationale for Project*

On a national level, ACT College Readiness Benchmark Scores have been empirically derived based on the actual performance of students in college. The benchmark for success in college algebra has been determined to be a score of 22 on the math portion of the ACT. (ACT, 2005, p.3) According to Southeastern's Fall 2006 Freshman Cohort statistics, 67.9% of this freshman group did not meet the benchmark. Unfortunately, the ACT prediction is substantiated at Southeastern as five of the top ten courses at Southeastern with the least number of successful completions are math courses. Nine of the top ten are courses in the College of Science & Technology. In particular, the success rate (as judged by a grade of A, B, or C) in college algebra is usually around 40%, and the withdrawal rate hovers around 25%. Thus, this course has historically been an impediment in students' progress to graduation.

One of the major complaints of math faculty has been that students in the introductory courses do not complete the assigned homework and do not ask questions in class. For the most part, they have been conditioned to passively write down the mathematics they see being done by the instructor of the course, but they are not mentally engaged in the activity. All math instructors assign homework each time a new topic is taught; however, grading homework by hand is a daunting task for instructors who regularly teach five classes of 35-40 students each semester. Even the ones with the best of intentions cannot keep up with the paperwork. If homework is collected, it invariably must be graded for completeness, not correctness. This serves the purpose of indicating to students that homework is important, but does not help the student who performs all of the homework incorrectly (in fact, he may never even know he is practicing mistakes), and it does not account for the number of students who devise a way around doing the actual work themselves. As quoted in a National Center for Public Policy and Higher Education Policy Alert paper from June 2005, "Students learn math by doing math, not by listening to someone talk about doing math." (Twigg 1, p. 5)

The first two strategic priorities listed in the University's strategic plan, Vision 2010, are (1) to provide competitive educational opportunities that attract diverse well-prepared students who progress and graduate and (2) to provide relevant curricula and an intellectually stimulating environment. To this end, the Department of Mathematics has been considering the results from universities taking part in The National Center for Academic Transformation (NCAT) Math Redesign Program. This Roadmap to Redesign (R2R) program has concentrated its mathematics efforts on introductory-level math courses. Most notably, the efforts taking place at Louisiana State University in Baton Rouge, only 45 minutes away from the Southeastern campus, have been impressive. Eighty percent of students who earn a participation grade of 70% or higher in the redesigned course end up with a grade of A, B, or C. Students enrolled in LSU's college algebra course attend lecture for one hour weekly and work independently in the LSU Math Computer Lab for a required three hours weekly. More specific results of their successful implementation of redesign using the R2R model have been documented in the Mathematical Association of America *FOCUS* magazine. (Smolinsky, p.34)

Course redesign enhances the quality of learning by moving students to an active learning environment, where they spend time working rather than watching mathematics. While in the computer lab, students are restricted in their computer access to *MyMathLab*, a Pearson Publishing online software specific to their math textbook. *MyMathLab* provides interactive, guided, homework problems and practice tests, online tutorials and assessments (quizzes and tests), and student progress tracking. Instructors and other math tutors are able to give guidance to students in the lab, concentrating on the skills and concepts that present difficulties to each student individually. Students must work the problems on their own, but they are provided with on-demand support and feedback.

Consider some of the following statistics regarding Southeastern students:

- Southeastern's enrollment statistics in Fall 2006 indicate an overall minority enrollment of 20.5% and a freshman cohort minority percentage of 22.5%.
- 78% of undergraduates receive some type of financial aid, with 48% of all undergraduates receiving PELL grants (given exclusively to low-income students).
- The percentage of undergraduates of age 25 or older is 18.1%.
- In the 2006 Entering Freshmen Survey, 29% stated that they were first-generation college students (neither parent attended college).
- Of those freshmen entering Southeastern in Fall 2005, 33.8% of those were not retained to Fall 2006.

What these numbers indicate is that Southeastern's enrollment includes a large component of at-risk students – underserved students with minority status, from low-income households, non-traditional students with families who are challenged by competing time commitments, and first-generation college goers who are not as familiar with the mechanics or culture of higher education. In a report examining the impact of redesign techniques on the success of adult students, students of color, and low-income students, evidence shows that students in the redesigned math courses had significantly higher scores than traditional students on a common final exam, had higher A-B grades based on comparable examinations and assignments, had lower D-F percentages, experienced a greater chance of success (grades of A, B, or C in the redesigned course – 80%, same grades prior to redesign – 44%), and outperformed traditional students in subsequent math courses. (Twigg 2, p.7-8)

Southeastern Louisiana University's Department of Mathematics wants to enhance learning in its introductory math courses by implementing a redesign of its courses using the R2R model.

**a.3     Impact on Existing Resources**

Rebecca Muller, Instructor in the Department of Mathematics and PI for this grant, is currently working on preparing for a pilot of this type of redesign to be implemented at Southeastern in the Spring Semester of 2008. She has been given full release in Fall 2007 (i) to oversee the renovation and outfitting of a classroom from science lab to computer lab and (ii) to prepare the Southeastern college algebra course curriculum, in a two-hour lecture/two-hour computer lab format. Ten sections of College Algebra will be taught in this format by four instructors and one professor in Spring 2008. (Adaptations to the LSU model in the ratio of hours in lecture versus hours in lab have been made in reaction to progress reports and recommendations of several other redesign universities nationwide and in recognition of the number of non-traditional Southeastern students; the overall average undergraduate age at Southeastern of 22.4 years means a longer time away from previous math instruction.) Funding of \$150,000 has been set aside by the University to pursue this first phase of the redesign. This first math computer lab will have 40 computer workstations and will be available for student use 32 hours weekly. Ten sections of College Algebra will comprise the pilot, and this group will be used to analyze what is necessary to ensure learning with the adapted model. Additionally, logistical issues such as what is needed in terms of open lab hours and how to address timing issues with testing can be addressed.

A 40-computer lab is a good first step in the redesign initiative. The pilot will enable faculty in the Math Department to make modifications and fine-tune the process. However, the funding of this grant is needed to enable the full implementation of the redesign to serve more students in more sections and in additional math courses.

**b.       *The Enhancement Plan***

**b.1     Project Goals and Objectives**

1. To increase the success rates in Intermediate Math (judged by the grade of P), College Algebra, and Precalculus (judged by grades of A, B, or C).
2. To increase the success rates in the follow-up courses to College Algebra and Precalculus due to an increased skill and knowledge base of students who have successfully completed courses using *MyMathLab*.
3. To positively affect the retention and graduation rates at Southeastern Louisiana University through higher success in the introductory mathematics courses.

## b.2 Work Plan of Proposed Project

There are three major parts to the work plan for the proposed project, focusing on equipment, scheduling, and curriculum. The equipment portion involves renovating space to accommodate a large computer lab (including wiring and security measures), ordering the equipment (furniture and technology), and setting up the lab once the equipment arrives. The scheduling portion involves making informed decisions on the best times for offering sections, on the best times for the lab to be open to students, and on the best ways to staff the labs with faculty and student tutors. To do this, the Spring 2008 pilot data will be analyzed. As for curriculum, much of the work required to organize the college algebra curriculum will have been accomplished during the pilot phase. This process will need to be repeated with the addition of intermediate algebra and precalculus. A schedule for implementation is given in the following chart.

<i>Date</i>	<i>Task</i>	<i>Person responsible</i>	<i>Evaluation</i>
May 2008	After award of grant, set up budget. Contact vendors for official quotes.	R. Muller	Compare with itemized equipment list in grant budget.
June 2008	Upgrade electrical circuits for large lab. Renovate room as needed.	Physical Plant	Standard building inspection
June 2008	Prepare purchase requisitions and order equipment and software.	R. Muller, T. Hudson	Compare with itemized equipment list in grant budget.
June 2008	Analyze data from piloted sections. Use feedback to make adjustments as needed.	R. Muller	Compare process used in pilot with update
June/August 2008	Prepare <i>MyMathLab</i> online courses for delivery. Prepare syllabi for class meetings.	R. Muller	Math Departmental Committee review
August/October 2008	Equipment delivery and lab setup (including furniture, technology, and security)	Delivery and installation by shipper	Inspection by PI and Academic Affairs office
September 2008	Inform students of changes in course delivery	R. Muller, T. Hudson	Southeastern webpage notice (main page and Math Dept page)
September 2008	Scheduling of lab sections for Spring 2009	T. Hudson	Completion of Spring 2009 schedule with labs
October – November 2008	In-service workshop(s) for math faculty who will deliver lab courses	R. Muller, T. Hudson with assistance from instructors of pilot	Survey of training participants
Spring 2009	Begin delivery of redesigned courses	Math Department Faculty	Observe and report pros and cons.
Post Spring 2009	Continue redesign with feedback from data, faculty and students	R. Muller, T. Hudson	Document and report findings.

The redesign is envisioned as a work in progress; continuous feedback and response will be the hallmark of its implementation at Southeastern. Although we are drawing on the experiences at other universities for our initial plan of action, we recognize that each university is different in terms of students and faculty. A variety of methods will be used to evaluate the effectiveness of the project on Southeastern's campus.

First and foremost, data on student success will be used to determine whether the redesign is working. Southeastern has recently implemented reporting of student progress for introductory level classes at mid-term (including all targeted courses in this grant). A comparison between grades at mid-term for the traditionally taught courses to the grades in redesigned courses will give us a means to assess the project early in the implementation phase. Initial surveys of students can also help us to make changes towards improvement, as needed. These surveys can easily be administered in *MyMathLab*. At the end of each semester, we will evaluate grades to see whether we have reached our first objective – that of increasing the success rate in these courses. Appropriate statistical analysis will determine whether any observed changes are significant. Our goal would be a success rate of at least 70%, where success is defined as a grade of A, B, or C.

Although success in the immediate course at hand is important, we want to ensure that true learning is taking place. Conventional wisdom leads us to believe that if students are more successful in their first courses (using the new delivery system), then they will have learned more and, therefore, will be more successful in the subsequent math courses they attempt (regardless of how the subsequent courses are delivered). To judge whether that holds true in this case, tracking of students into their next math courses will yield data that can be statistically evaluated to see if success breeds success. Comparisons will be made to current success in subsequent courses, with the goal of an increase of at least 15%.

Retention rates will also be examined to determine whether any increase in the retention of first-year students can be observed once the project is underway. Ultimately, the University wants to see an increase in the graduation rate. Southeastern has determined that failure in college algebra is a serious impediment to a student's progression towards graduation. As math courses have historically been the downfall of many first-year students, success in this one endeavor should increase the prospect of success in a student's overall college experience. Making inroads in mathematical achievement should make a positive impact in these statistics, and data will be analyzed in the years to come to determine whether this contention is valid.

b.3 Evidence of Potential to Achieve Recognized Eminence at the Regional, National, or International Level Commensurate with Degree Offerings and/or Functions

Redesign in introductory mathematics classes is becoming more and more prevalent nationwide. To remain current with technological advancements in the delivery of mathematics instruction, Southeastern Louisiana University is embracing this proposal. At the end of October, Rebecca Muller will attend a Course Redesign Workshop in Tucson, Arizona, co-sponsored by Pearson Education and NCAT. The workshop will feature NCAT's research-based course redesign methodology developed in partnership with more than fifty diverse two- and four-year



institutions. During the workshop, Ms. Muller will be able to network with educators who have successfully implemented course redesigns and with representatives from NCAT.

In January, the Department of Mathematics is applying to NCAT to take part in the second round of the C2R Program (Colleagues Committed to Redesign). If selected to participate, Southeastern Louisiana University will sponsor a four-person math disciplinary team to meet with NCAT staff and Redesign Scholars at a series of disciplinary institutes. The institutes will introduce the teams to the NCAT methodology, share strategies and techniques for successful course redesign, and help in the development of plans for course redesigns. The team will then share the experiences and lessons learned through our own redesign with the larger higher education community at a national dissemination conference sponsored by the Redesign Alliance. Applications to the program will be judged on the basis of how well they meet NCAT's readiness criteria, and Southeastern's math initiative is a good fit with the criteria listed. The goal of this NCAT initiative is "to create a national resource for the higher education community that will enable and support new learning and stimulate new initiatives leading to the transformation of educational practice nationally." (NCAT, 2005) Southeastern is in a good position to be an integral part of this national resource.

#### b.4 Impact on Curriculum and Instruction

The proposed redesign will have a major impact on Southeastern's math curriculum and instruction. The project will allow math instructors to change the climate of learning in introductory math courses. Instruction will expand beyond the lecture, where information is simply given to the student, to more individualized instruction that can be accomplished either via electronic tutorials or through one-on-one instruction in the lab. The online software can be accessed at home or at the lab, but lab attendance is very important to the success of the program; it ensures that students will complete assignments and it encourages students to seek help through an on-demand support system. *MyMathLab* software is designed to support verbal, visual, and discovery-based learning styles. Students will receive credit for attendance in the laboratory, with a minimum of two hours per week required.

Content knowledge will be assessed using three different formats – homework, quizzes, and exams. Homework problems allow for feedback on each problem, with tutorials available online. Quizzes do not have the tutorials available while the student works the problems, but they can be taken multiple times. They serve as a good "in-between" assessment between homework and exams. "Quizzes also provide powerful formative feedback for faculty members. Faculty can quickly detect areas where students are not grasping key concepts, thereby enabling timely corrective intervention." (Twigg 1, p.10) Exams will also be given in the laboratory, with days set aside for testing purposes. Students will not have access to tutorials on exams.

One point needs to be made regarding the technology and the instruction. We do not believe that it is the technology itself that will make the difference. Instead, it is the fact that students are required to work many math problems, to engage in active learning, and are given prompt and continual feedback that will change the outcomes.

#### b.5 Impact on Quality of Students

Problems with student retention and progress towards graduation have already been mentioned. When prospective students consider colleges and universities, those types of statistics do not impress or attract students of high quality. Southeastern is actively attempting to rectify these problems, and the math initiative on campus is an important part of this attempt. Once students choose to attend Southeastern, success in mathematics will lead to success in other disciplines dependent on mathematical aptitude – essentially in all of the other departments in the College of Science and Technology. The University will be able to recruit more and better students in science and technology fields, students who typically have taken more college-preparatory courses in high school and who are better prepared overall for the rigor of the more technical majors.

#### b.6 Impact on Faculty Development

The use of technology in the mathematics classroom is not a new concept. Southeastern faculty have been using graphing calculators as instructional tools for years. However, other than that, most instruction in the math classroom looks the same as it did 50 years ago – lecturing at a chalkboard with students diligently copying what is written on the board. The student of today, though, has become accustomed to multi-tasking with many technological tools at hand. Today's students are not being as successful with traditional methods of delivery of information. "By transferring the tasks of content delivery, student assessment, and grading to a powerful suite of course management tools, *MyMathLab* enables faculty to spend more time with students." (Speckler, p.2) An increase in one-to-one instruction should lead to a higher quality of learning.

At Southeastern, introductory math courses are usually taught by instructors, several of whom are new to campus or are part-time. With the online software, students are on a more level playing field, with access to online instruction which can supplement in-class instruction, regardless of who is their assigned teacher. Faculty involved in the redesign will be given in-service training on the software and on the structure of the course – lecture and lab. The small number of instructors involved in the pilot will serve as our mentor group when the project expands.

#### b.7 Performance Measures

Several performance measures will be used to determine the success of the project, with feedback and results used to impact instruction. The Department of Mathematics will administer surveys to both students and faculty involved in the redesign. Data on success in courses using the labs will be monitored on an ongoing basis, with adaptations made as needed along the way. The project is not static and is, in no way, complete once labs have been set up and implementation has begun.

Success will be determined when we see the expected increases in grades posted by participating students in lab-based and subsequent courses, in retention of students, and in graduation rates.

c. ***Equipment***

c.1 **Equipment Request**

All equipment requested is needed to give Southeastern the capacity to serve students in all sections of several of our introductory level courses using the redesign model endorsed by the National Center for Academic Transformation and employed by over 50 colleges and universities nationwide. This equipment will allow for the setup of a 100-workstation lab and security for said lab.

<i>Quantity</i>	<i>Item</i>	<i>Cost Each</i>	<i>Cost Total</i>
75	Student Computers: Dell Optiplex 745 Ultra Small Form (1.0 GB RAM) with 19" Flat Panel Monitors	\$809.55	\$60,716.25
75	All-in-One System Desk Stand Dell SFF	\$79.00	\$ 5,925.00
105	Haworth M221-1042 Chairs for students and faculty Vendor: Gulf South Business Systems State Contract #406853	\$281.20	\$29,526.00
100	Hon Student Education Workstations (ED2448G.G3.P.P) with Wire Management Panels (EDWM48.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$150.52	\$15,052.00
100	Security Cabling: Kensington MicroSaver Security Cable	\$29.99	\$ 2,999.00
1	Administrative Computer Dell Optiplex 745 Ultra Small Form (2.0 GB RAM) with 19" Flat Panel Monitor	\$895.19	\$ 895.19
1	Hon Administrative Desk, 38000 Series (38251.G3.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$287.03	\$ 287.03
1	Hon Administrative Credenza, 38000 Series (38852.G3.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$329.51	\$ 329.51
1	All Digital 4 color Hi-Res IR Nightvision Camera System with Nuvico DVR (#4CDDC360)	\$1,764.00	\$ 1,764.00
1	Audible Security Alarm On-site with Remote Alert to Southeastern Police Dept if tripped. Monitoring included.	\$1,000.00	\$1,000.00
<b><i>TOTAL BoR REQUEST</i></b>			<b>\$118,493.98</b>

### ***Institutional Match***

<i>Quantity</i>	<i>Item</i>	<i>Cost Each</i>	<i>Cost Total</i>
25	Student Computers: Dell Optiplex 745 Ultra Small Form (1.0 GB RAM) with 19" Flat Panel Monitors	\$809.55	\$20,238.75
25	All-in-One System Desk Stand Dell SFF	\$79.00	\$ 1,975.00
<b><i>Total Institutional Match</i></b>			\$22,213.75

#### **c.2     Equipment on Hand for Project**

The course redesign of college algebra is being piloted in Spring 2008. To prepare for this pilot, a science lab is being completely remodeled to create a dedicated mathematics lab. This math lab will contain 40 computer workstations connected to *MyMathLab* via the internet. The 100-computer workstation lab in the current request will expand the capacities of the Math Department to allow for full implementation of the redesign.

Accutrack tracking software is being purchased for this pilot, with a multiple location license. This software is used to keep track of the times that students are in the lab working on math. The card swipe system keeps accurate time records for each entrance and exit of students from the lab and, with the purchase of multiple ID readers, will be able to be used in the new larger lab facility also.

#### **c.3     Equipment Housing and Maintenance**

The University is committed to math redesign and has guaranteed a facility to house the new lab when approved. Equipment will be fully housed within this facility which can be locked when not in use. Additionally, we are including components to securely lock all computer workstations in place for daytime safety. Math faculty and/or a graduate student assistant will be in the lab during all open hours. DVR cameras with infrared nightvision will be installed in the lab and will record to thirty days of lab usage before re-recording. A monitored alarm system with motion-detection for after-hours use will alert campus police if tripped. It will also include an audible alarm on-site to dissuade intruders. The security equipment will be maintained by the monitoring service.

Maintenance of the computer equipment will be managed by Southeastern Basic Computer Services. The computer workstations being purchased also include a three-year service agreement.

#### **d.     *Faculty and Staff Expertise***

Rebecca Muller, PI and Project Director, has over 22 years of experience teaching mathematics in higher education. She recently served as Freshman Coordinator for the Southeastern Department of Mathematics for a period of four years, where she was in charge of coordinating syllabi, pacing guides, and final exam assessments for introductory mathematics courses. For the past twelve years, she has been PI on five separate multi-year professional development projects

for in-service math teachers through LaSIP and LaCEPT grants. In the most recent of those grants, she offered year-long online professional development in mathematics content for math teachers of grades 7-12 in Regions II and VIII of the state. Ms. Muller was co-PI with Dr. Elizabeth Gray on the project *Conceptual Learning in a Mathematics Laboratory Environment* (LEQSF (1999-2000)-ENH-UG-22). She has been a leader in the Department for pre-service teacher candidate courses, including the co-authoring of a text currently used for one of our courses. She has been designated a "Certified Distance Educator" and received training through a program at the Distance Education Center at Texas A&M. For several years she taught courses in college algebra and business calculus that included a one-third internet instructional component of her own design. She is currently completely in charge of preparing the room, ordering the equipment, and preparing the curriculum for the pilot redesign of college algebra using *MyMathLab* this coming spring semester. Additionally, Ms. Muller will train and supervise the other faculty who will be involved in the redesign.

For the past twenty-one years, Timothy D. Hudson has taught mathematics at a number of institutions of higher learning, including Texas A&M University, the University of Waterloo, East Carolina University, and Southeastern Louisiana University. He completed his doctorate at Texas A&M University, with a research specialty in nonselfadjoint operator algebras. After a two-year post-doctoral fellowship at the University of Waterloo in Ontario, Canada, he joined the faculty at East Carolina University. While on the faculty at East Carolina, he published thirteen papers in international research journals, mainly dealing with the ideal structure of nonselfadjoint operator algebras, and gave over thirty research talks at conferences in the United States, Canada, Great Britain, and Greece. He directed the master's thesis research of three graduate students, and was named as the Department's outstanding teacher during the period 1997-2003. He has received grant funding from the National Science Foundation to support his research into the structure of limit algebras. In addition, Hudson has served as a mathematical consultant on several NSF grants to the University of North Carolina System between 1998 and 2005 designed to improve teacher education in the North Carolina public schools. These grants supported the design of mathematics content courses targeted towards K-12 mathematics educators, intended to strengthen their skills and give these future teachers the appropriate mathematical knowledge in order for them to succeed in the classroom. Hudson has a considerable background with curricular development, serving as the East Carolina University Curriculum Committee for 2002-2005, and the chair of the College Curriculum Committee for the period 1999-2005. He also served as the Associate Chair of the Mathematics Department for 2000-2005. Hudson has served as the Head of the Mathematics Department at Southeastern Louisiana University since 2005.

***e. Economic and/or Cultural Development and Impact***

***e.1 Relationships with Industrial/Institutional Sponsors***

Currently, the Department of Mathematics provides support to area high schools who are interested in giving dual enrollment opportunities to their students. Introductory level math courses are taught by high school teachers in their school settings using the curricular materials and structure of math courses offered on the college campus. A Southeastern liaison offers in-service training to teachers in the high schools to help them understand what will be expected of

their students involved in this program. To earn credit in a course, a student must pass a single final exam with at least a 70% average. The results have not been as successful as we would like, with only about 10% of those participating high school students receiving credit.

The use of *MyMathLab* for our entry-level courses on campus can be mimicked at the high school setting. This will ensure that the high school students are receiving the rigor of instruction necessary for their success in the dual enrollment program. *MyMathLab* can be used throughout the high schools semester in a similar manner as it will be used on campus, giving the high school students a much better chance at passing the course and helping them to earn college credit while still in high school. This will strengthen our relationship with the area high schools as more students will be willing to take part in the dual enrollment program.

#### **e.2     Promotion of Economic Development**

Too many students who begin college at Southeastern are failing to complete their college degrees. They will enter the workforce at the bottom of the employment grid. To be able to attract new industries to the state, we need to have an educated and capable workforce, one which is able to demonstrate an ability to compute and problem-solve. Mathematics is the cornerstone to making this a reality. We must have a mathematically-literate population if we are going to help the economic development of the State. For whatever reason, the majority of students at Southeastern are not coming to the University with a strong math background. The current instruction is not providing a remedy to this dilemma as stated previously, but the proposed redesign has shown significant improvement in the learning of mathematics nationwide. We can have that same impact here with the proposed redesign in our introductory math classes.

#### ***f.     Additional Funding Sources***

Southeastern is fully committed to the redesign project in math. A student technology fee grant of over \$22,000 was just approved for equipment and software to complement this BoR request. Southeastern also agrees to fund the tuition and fees for a graduate assistant who can help to staff the lab. On top of these amounts, Southeastern pledges \$50,000 to ensure the redesign has all of the resources needed to be successful.

#### ***g.     Previous Support Fund Awards***

LEQSF (1999-2000)-ENH-UG-22. \$49,123. Rebecca Muller was co-PI with Dr. Elizabeth Gray on the project *Conceptual Learning in a Mathematics Laboratory Environment*. The grant allowed Southeastern to set up a mathematics laboratory with manipulatives and technology to support classes that model best practices in K-12 classrooms for higher-level conceptual learning. Since that time, the University has funded another math lab of the same caliber to increase the capacity of the department to have this setting for *all* designated math classes for education majors. The previous grant is connected to the current one in that it illustrates Southeastern's commitment to improving the quality and effectiveness of faculty teaching by being forward-thinking in the reform of undergraduate education.

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**BOARD OF REGENTS SUPPORT FUND  
TRADITIONAL AND UNDERGRADUATE ENHANCEMENT, FY 2007-2008**

**Budget and Budget Justification Pages**

Directions: Each line item under the columns "Support Fund Money Requested," "Institutional Match," and "Private Sector/Other Match" must be itemized, fully explained, and justified **on a separate budget justification page(s)**. Attach additional justification pages as needed.

Title of Proposal: Enhancing Learning in Introductory Math Courses

Project Director(s): Rebecca Muller and Timothy Hudson

Institution(s) of Higher Education: Southeastern Louisiana University

**PROPOSED BUDGET:**

	Support Fund Money Requested	Institutional Match <sup>1</sup>	Private/Other Match <sup>2</sup>
A. Equipment <sup>3</sup>	\$118,556	\$22,225 (cash)	
B. Software	\$1,572	\$500 (cash)	
C. Supplies			
D. Shipping/handling	Included in Equipment	Included in Equipment	
E. Installation	Included in Equipment	Included in Equipment	
F. Personnel training			
G. Other			
1. Graduate student	\$6,750 (stipend)	\$3,600 (tuition)	
2. PI Summer Pay	\$10,027		
3. Math Initiative \$ – to be used as needed		\$50,000 (cash)	
H. Indirect costs	Not allowed	\$6,364	
I. Maintenance	Strongly discouraged		
J. Total costs (A-I)	\$136,905	\$82,689	

1 Stipulate whether in-cash or in-kind. The Board strongly encourages the sharing of costs for proposed projects. Applicants and institutional officials should note, however, that the employing institution will be required to honor the commitments made in the original proposal before any awards are made. Discounts for equipment purchases are not allowable as institutional match.

2 The budget page(s) must reflect and the budget justification pages must explain any external funds that are claimed in the proposal. External funds and their expenditure must be accounted for in the same manner as Support Fund money and institutional match.

3 Equipment. If applicable, itemize and describe briefly the proposed equipment and its intended use in the project. Include the name, model number, and manufacturer(s).

(TR and UG Enhancement Program Budget and Budget Justification, Rev. 8/2007)



**BOARD OF REGENTS SUPPORT FUND  
TRADITIONAL AND UNDERGRADUATE ENHANCEMENT, FY 2007-2008**

**Budget and Budget Justification Pages**

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(TR and UG Enhancement Program Budget and Budget Justification, Rev. 8/2007)

## Budget Narrative

This grant application is primarily an equipment request. A request for graduate student stipends and faculty summer pay is also included. The following table summarizes the planned expenditures.

<i>Quantity</i>	<i>Item</i>	<i>Cost Each</i>	<i>Cost Total</i>
	<b>A. EQUIPMENT</b>		
75	Student Computers: Dell Optiplex 745 Ultra Small Form (1.0 GB RAM) with 19" Flat Panel Monitors	\$810	\$60,750
75	All-in-One System Desk Stand Dell SFF	\$79	\$ 5,925
105	Haworth M221-1042 Chairs for students and faculty Vendor: Gulf South Business Systems State Contract #406853	\$281	\$29,505
100	Hon Student Education Workstations (ED2448G.G3.P.P) with Wire Management Panels (EDWM48.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$151	\$15,100
100	Security Cabling: Kensington MicroSaver Security Cable	\$30	\$ 3,000
1	Administrative Computer Dell Optiplex 745 Ultra Small Form (2.0 GB RAM) with 19" Flat Panel Monitor	\$895	\$ 895
1	Hon Administrative Desk, 38000 Series (38251.G3.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$287	\$ 287
1	Hon Administrative Credenza, 38000 Series (38852.G3.P) Vendor: The Hon Company % Louisiana School Equipment Company State Contract #405971	\$330	\$ 330
1	All Digital 4 color Hi-Res IR Nightvision Camera System with Nuvico DVR (#4CDDC360)	\$1,764	\$ 1,764
1	Audible Security Alarm On-site with Remote Alert to Southeastern Police Dept if tripped. Monitoring included.	\$1,000	\$1,000

	<b>B. SOFTWARE</b>		
76	Norton Anti-Virus Software	\$20	\$ 1,520
1	MS Office	\$52	\$ 52
	<b>G. OTHER</b>		
1	Graduate Student Stipend (Fall, Spr, Summer)	\$ 6,750	\$ 6,750
2/3	Salary for PI to order equipment, set up room and supervise installation	\$11,570	\$ 7,713
30%	Fringe		\$ 2,314
<b>TOTAL BoR REQUEST</b>			<b>\$136,905</b>

***Institutional Match***

<i>Quantity</i>	<i>Item</i>	<i>Cost Each</i>	<i>Cost Total</i>
	<b>A. EQUIPMENT</b>		
25	Student Computers: Dell Optiplex 745 Ultra Small Form (1.0 GB RAM) with 19" Flat Panel Monitors	\$810	\$20,250
25	All-in-One System Desk Stand Dell SFF	\$79	\$ 1,975
	<b>B. SOFTWARE</b>		
25	Norton Anti-Virus Software	\$20	\$ 500
	<b>G. OTHER</b>		
1	Graduate Student Tuition (Fall, Spr, Summer)	\$ 3,600	\$ 3,600
	Math Initiative Fund		\$50,000
	<b>H. INDIRECT COSTS</b>		
0.44	Indirect Costs (44% of Salary and Stipends)	\$14,463	\$ 6,364
<b>Total Institutional Match</b>			<b>\$82,689</b>

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and consultants and collaborators. Begin with the principal investigator/program director. Photocopy this page for each person.

Name  
Rebecca W. Muller

Position Title  
Instructor of Mathematics

EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.)

INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Louisiana State University, Baton Rouge, LA	B.S.	1979	Education Major: English Minor: Mathematics
Louisiana State University, Baton Rouge, LA	M.A.	1984	Mathematics

RESEARCH AND PROFESSIONAL EXPERIENCE: Starting with present position, list, in reverse chronological order, previous relevant employment, experience, and honors. Key personnel includes the principal investigator and any other individuals who participate in the development or execution of the project. Key personnel typically will include all individuals with doctoral or other professional degrees, but in some projects will include individuals at the masters or baccalaureate level provided they contribute in a substantive way to the development or execution of the project. Include present membership on any Federal Government public advisory committee. List, in reverse chronological order, the titles, all authors, and complete references to pertinent publications during the past five years and to representative earlier publications pertinent to this application. DO NOT EXCEED TWO PAGES.

### *Previous Relevant Employment*

1991–present Southeastern Louisiana University, Hammond, LA

- *Instructor of Mathematics*
- *Freshman Coordinator, Department of Mathematics 2002-2006*
- *PI and Project Director, Five LASIP/LA Gear Up Professional Development grants, 1996-2007.*
- *Certified Distance Educator, Center for Distance Education, Texas A&M.*

1985–1991 University of New Orleans, New Orleans, LA , *Instructor of Mathematics*

### *Recent Education Related Publications*

Video Tape Teaching Series – Videos and Scripts, for *College Algebra and Trigonometry*, Ratti and McWaters. Addison Wesley Publishers. April, June 2007.

Video Tape Teaching Series – Videos and Scripts, for *Thinking Mathematically*, Blitzer. Prentice-Hall Publishers. July, August 2006.

Video Tape Teaching Series – Videos and Scripts, for *Mathematics for Elementary School Teachers*, O'Daffer. Addison Wesley Publishers. August 2004.

Video Tape Teaching Series – Videos and Scripts, for *College Algebra*, Lial/Hornsby/Schneider. Addison Wesley Publishers. January 2004.

Video Tape Teaching Series – Videos and Scripts, for *Using and Understanding Mathematics – A Quantitative Reasoning Approach*, Bennett & Briggs. Addison Wesley Publishers. June 2001.

### *Recent Education Related Presentations*

R. Muller. *Interactive Mathematics in the High School*. Jefferson Parish Conference for Middle & Secondary Mathematics. 08/2006.

D. Gurney and R. Muller. *Moving from Reactive to Proactive Assessment*. Joint Mathematics Meeting, San Antonio, TX. 01/2006.

R. Muller. *Using the Internet in Mathematics*. NETT Conference. St. Tammany Center, Covington, LA. 06/2005.

R. Muller. *Teaching Mathematics Online*, National Council of Teachers of Mathematics Regional Meeting, New Orleans, LA. 11/2004.

R. Muller. *Professional Development Online*, The Links of LINC Statewide Conference, Baton Rouge, LA. 09/2004.

R. Muller. *Supplementing Instruction Using Web Pages*, LATM Annual Fall Conference, Baton Rouge, LA. 11/2003.

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and consultants and collaborators. Begin with the principal investigator/program director. Photocopy this page for each person.

Name Timothy D. Hudson	Position Title Professor & Head, Department of Mathematics
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EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.)

INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
University of Louisiana - Monroe, Monroe, LA	B.S.	1986	Major: Mathematics and Computer Science Minor: Music
Texas A&M University, College Station, TX	M.S.	1988	Mathematics & Statistics
Texas A&M University, College Station, TX	Ph.D.	1992	Mathematics

RESEARCH AND PROFESSIONAL EXPERIENCE: Starting with present position, list, in reverse chronological order, previous relevant employment, experience, and honors. Key personnel includes the principal investigator and any other individuals who participate in the development or execution of the project. Key personnel typically will include all individuals with doctoral or other professional degrees, but in some projects will include individuals at the masters or baccalaureate level provided they contribute in a substantive way to the development or execution of the project. Include present membership on any Federal Government public advisory committee. List, in reverse chronological order, the titles, all authors, and complete references to pertinent publications during the past five years and to representative earlier publications pertinent to this application. DO NOT EXCEED TWO PAGES.

### *Previous Relevant Employment*

2005–present Mathematics Department Head and Professor of Mathematics, Southeastern Louisiana University, Hammond, LA  
 2000–2005 Associate Department Chair/Coordinator, Department of Mathematics, East Carolina University, Greenville, NC  
 1994–2005 Associate/Assistant Professor, Department of Mathematics, East Carolina University, Greenville, NC  
 1992–1994 Postdoctoral Fellow, Department of Pure Mathematics, University of Waterloo, Waterloo, Ontario, Canada  
 1991–1992 Research Assistant, Texas A&M University, College Station, TX  
 1988–1991 Lecturer, Texas A&M University, College Station, TX  
 1986–1988 Graduate Teaching Assistant, Texas A&M University, College Station, TX

### *Related Publications*

- *On Square Roots of Non-invertible Matrices* (with J. R. Mayo), submitted for publication, 2005.
- *Norms of Inner Derivations of TAF Algebras* (with D. W. B. Somerset), **Indiana Mathematics Journal** (2001) 50, 1693-1704.
- *Algebraic Isomorphisms of Limit Algebras* (with A. P. Donsig and E. G. Katsoulis), **Transactions of the American Mathematical Society** 353 (2001), 1169-1182.
- *Meet Irreducible Ideals in Direct Limit Algebras* (with A. Donsig, A. Hopenwasser, M. Lamoureux, and B. Solel), **Mathematica Scandinavica** 87 (2000) 27-63.
- *Lie Ideals in Triangular Operator Algebras* (with L. W. Marcoux & A. Sourour), **Transactions of the American Mathematical Society** 350 (1998), 3321 – 3339.
- *Primitive Triangular UHF Algebras* (with E. G. Katsoulis), **Journal of Functional Analysis** 160 (1998), 1-27.
- *Norm-Closed Bimodules of Nest Algebras* (with K. R. Davidson & A. P. Donsig), **Journal of Operator Theory** 39 (1998), 59 – 87.
- *Radicals and Prime Ideals in Limit Subalgebras of AF Algebras*, **Quarterly Journal of Mathematics** 48 (1997), 213 – 233.
- *Extreme Points in Triangular UHF Algebras* (with E. G. Katsoulis & D. R. Larson), **Transactions of the American Mathematical Society** 349 (1997), 3391 – 3400.
- *On the Lattice of Ideals of Triangular AF Algebras* (with A. P. Donsig), **Journal of Functional Analysis** 138 (1996), 1 – 39.
- *Factorization of Positive Invertible Operators in AF Algebras* (with H. Huang), **Canadian Journal of Mathematics** 47 (1995), 421 – 435.

**CURRENT AND PENDING SUPPORT**  
(From ALL sources, including Board of Regents Support Fund)

The following information MUST be provided for each investigator and other senior personnel. Use additional sheets as necessary.

NAME OF INVESTIGATOR: Rebecca Muller

No current or pending support

Status of Support: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future	
Contract Number/Proposal Title:	
Source of Support:	
Award Amount (or Annual Rate): \$ _____	Period Covered: _____
Location of Activity:	
Person-Months or % of Effort Committed to the Project: <input type="checkbox"/> Cal Yr <input type="checkbox"/> Acad <input type="checkbox"/> Summ	

(Form 3, rev.2007)

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The following information MUST be provided for each investigator and other senior personnel. Use additional sheets as necessary.

NAME OF INVESTIGATOR: Timothy Hudson

No current or pending support

Status of Support: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future	
Contract Number/Proposal Title:	
Source of Support:	
Award Amount (or Annual Rate): \$	Period Covered:
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