

Linked Courses
The Logistics and Implementation of a Linked College Algebra and Web-Based Lab

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Historically, our College Algebra, Math 1111, has earned the reputation on our campus as the “most dropped and failed” course on campus. Even though our D/W/F rate is no different than the national average, students seem to dread the M word. Faced with the new semester requirement of a “C” in College Algebra paired with either a two or three day contact week, our mathematics faculty decided to implement a College Algebra lab, Math 0091, as a co-requisite course. This lab was designed to meet one day a week for 50 minutes in order to supplement the course by working either problems that students request or working from a standard set of lab exercises. Initially, the Learning Support Faculty at Georgia Southern were responsible for developing, implementing, and teaching these labs. In order to remove the pressure of performance, a form of pass/fail grading system was used. Grades were given as follows: S for successfully completing College Algebra as well as attending 80% of the Math 0091 classes; U for unsuccessfully completing College Algebra but attending the required number of classes in Math 0091; and a punitive grade of F for students who did not attend the Math 0091 regardless of their performance in their algebra class. All students who made less than a “C” in College Algebra were required to enroll in the lab during any subsequent semester that they were repeating this course.

As designed, the Learning Support faculty taught these labs as 1 hour per lab counting in their course load. Quickly problems emerged. Since students were placed in the labs randomly, one lab could contain students from as many as 7-10 different teachers. Students were not all in the same place in the course causing lab instructors the unnecessary stress of trying to address too many topics in one 50-minute period. Calculator issues arose when it became apparent that some teachers did not want the students to use calculators while others used these tools heavily in their classes. Back to the drawing board, a necessary evolution took place. Math 0091 became directly linked to only one Math 1111 class. In most cases, the Learning Support Faculty taught both the Math 1111 and the 0091 creating in some sense a “double jeopardy” effect for the students. This solution did appear to be successful for most.

In the Fall 2001, Georgia Southern University decided to dissolve the Learning Support Department and replace it with the Academic Success Center (ASC). In the process of reassigning faculty, 7 full time mathematics faculty were transferred from Learning Support to the Department of Mathematics and Computer Science. Only 3 full time

mathematics faculty remained in the newly formed ASC. The ASC retained responsibility for designing and teaching Math 0091 with only 4 faculty members. By the Spring of 2002, the ASC realized that this responsibility was quickly dominating the time of their faculty to the point that other duties were not being fulfilled properly. At this point, the ASC administration requested that the Department of Mathematics and Computer Science begin to assume the management and staffing of this course. Our department was already short of faculty to cover the necessary class schedule. Each fall temporary instructors had been recruited to fill positions teaching Math 1111 in order to cover classes sufficiently. The load of Math 0091 was too much for the department. In addition, the burden of this lab appeared to be directed at the former Learning Support Math faculty. As you can imagine, a very volatile situation began on a negative note and seemed to be following this direction very quickly.

The math faculty were faced with the problem of "How do we best serve College Algebra students who needed this lab without stretching the faculty resources available?" Web-based tutorials seemed to be a solution for all concerned. The computer labs were available. Web-CT was being used in other classes so students were already positively impacted by the capabilities of this technology. The administration was very supportive of use of technology as support vehicle for student learning. A perfect partnership loomed on the horizon. The administration furnished summer funding for 2 faculty members from the math department to develop the modules for this Web-CT lab and agreed to allow 6 pilot Math 0091 classes to incorporate the computer component. Our goal was to deliver the support for learning mathematics through a computer lab in a way that would either equal or surpass the success rate of the former classroom environment. Since our goal was also to eliminate the stress on faculty, instructors of these pilot labs would serve as facilitators only and not as tutors or teachers of math. The labs met once a week. Students worked on modules that contained a pre-test, tutorials, and a post-test for each section covered in the text. They were allowed access to these modules outside of class from any computer with internet access. Our requirements for the course were: Students must complete 80% of the modules by the end of the semester and attend 80% of the classes. This pilot was initiated this Fall 2002 and is presently in its maiden voyage.

As we have progressed through this semester, we encountered the usual problems associated with implementing any computer based lab: sometimes the computer doesn't work right; sometimes the tutorial website is shutdown for some unknown reason; or sometimes the modules don't quite match where the students are in the class at lab time. But all these were minor and easily addressed. The easiest component of this pilot was convincing the students about this new venture. Students realized this was a pilot and were excited about the concept.

Trying to gauge any success in this endeavor must rely on the response of the students. In order to gather information about their attitude towards this computer approach, we administered a survey to the students during their lab class. The results pleased and surprised us:

- 88% agreed that the modules reflected the material in the course;
- 72% agreed that using the computer modules aiding in learning the material;
- 60% agreed that using the computer modules gave them more confidence in learning mathematics;
- 72% agreed that the lab had been a positive experience;
- 52% agreed that the lab helped them get to know others in their class and form study groups;
- 60% stated that they used the WebCT and the tutorials outside of the lab; and
- 60% believed that this lab format should be required for any student who had trouble with College Algebra.

Student's comments were very supportive and insightful. They answered to "What do you like best about the lab?" the following:

- We got to review what we did in class;
- Working through the examples step by step really helped me;
- I liked the opportunity to see how well I knew the material;
- I liked working individually and at my own pace; and
- It provided me a new way to study. The on-line quizzes are great!

Of course, not all were as enthusiastic and some related their favorite part of the lab was that it only met once a week for 50 minutes. One student stated, "There's not much I liked about the lab at all". But these comments were rare. Students also responded to "What do you like least about the lab?" with comments like:

- There is nothing that I don't like (the response of the majority);
- The teacher did not interact with us enough;
- A computer can only do so much;
- Sometimes the modules are hard to maneuver; and
- The limited attempts and deadlines pushed me to finish too quickly.

When asked about improvements to the lab, the students showed their creative nature in their replies:

- Give more help from the teacher;
- Have more time in lab and less time in the classroom;
- Allow access to all quizzes before a test; and
- Add some games to make it more fun.

Overall students were positive in their responses and supportive of our efforts to provide an alternative form of support to their learning of mathematics.

There were 4 faculty involved in teaching the Math 0091 this semester. Of these, 3 were interviewed about their experience. All three related how pleasant the experience had been and expressed assurance that this lab was indeed successful. They enjoyed the personal interaction with the students. Even though the students requested more “professional” interaction, the teachers believed that the students gained a different relationship with them and this relationship would encourage their performance in the algebra class. Each teacher expressed an appreciation for the work that others did in preparing the modules and especially liked that the responsibility for designing and maintenance of the modules was not theirs. All found the lab a good experience and believed that this form of lab should be available not only for the students who have been unsuccessful in math in the past but to all students who are presently enrolled in the course. Some concerns were raised about the inability to answer math related questions. Due to the design purpose of this pilot, it was important for faculty to model the expertise and abilities of a student assistant if our future goal is to be a reality. One teacher expressed her concern over the loss of the “teachable moment” during lab. But overall, all agreed that the positives completely outweighed the negatives.

As we look to the future for possibilities of expanding our pilot, we are deeply committed to allowing access to this format to all students via WebCT as well as maintaining the requirement for unsuccessful students to enroll in the lab. We believe that these labs can be staffed by student assistants and thus alleviate the stress on our faculty. In addition, we believe that one person can serve as administrator of the lab component in order to update, revise, and oversee the curriculum involved. We also believe that consideration of available web support should be considered in future textbook choices for College Algebra.

In conclusion, we found a positive solution to a negative situation through collaboration and creative exploration of available technology. Our goal was met to encourage a positive motivation factor for our students in learning math as well as managing wisely the available facilities and faculty time. We also found that there is definitely a “fun factor” that can influence student attitudes in mathematics. This “fun factor” spills over to us also. Have we been successful? 60% of our students state “this computer lab should be a requirement for students who have trouble in Math 1111.” When have you heard students say something should be a requirement? Yes, we were successful and we had fun!