

Vision - Potential

Vision Within Every Instructor – Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

Number 7 , September 1997

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[1] **A New School Year**

September has arrived and a new academic year has begun to unfold. Times for picnics, golf, fishing, visiting, etc. are now scheduled around classes, grading, studying, writing, meetings, and so forth. We enter the semester refreshed from the (all too short) summer and invigorated with the challenges, prospects, and opportunities to help students develop their problem solving capabilities, expand their thinking, and enhance their maturity. The Fall semester is surely the “Spring” of the academic

* Supported by the EXXON Education Foundation and the U.S. Military Academy.

year, buds of potential and the excitement of learning are in the air.

Our many accomplishments last year in establishing our College Algebra Reform Program were noticed and well received by several funding agencies. Last year each school active in the Consortium experimented with or expanded their previous use of technology (calculators, computers), writing assignments, and small group activities. Some schools began building interdisciplinary bridges by surveying and interviewing colleagues in other departments with regards to their use or need of College Algebra. Our activities convinced the EXXON Education Foundation to renew our funding for this year with a 100% increase. Based on our work last year and our potential for developing a national model for College Algebra Reform, Project INTERMATH and the Brown Foundation have provided us with curriculum development and workshop funds.

Last year’s work provides a solid basis for this year’s growth. The goals for this year include

1. Developing student growth models;
2. Developing interdisciplinary cooperation to improve the College Algebra program. This includes
 - a. Completing the surveying and interviewing of colleagues in other disciplines;

- b. Developing and assigning ILAPs (Interdisciplinary Lively Application Projects)
- 3. Assigning small group in-class activities and out-of-class projects.
- 4. Expanding the use of technology and writing assignments;
- 5. Developing a draft of a Contemporary College Algebra text.

The success of any reform movement is primarily measured in the change in attitudes and expectations of the instructors as well as the students. Thus developing and focusing on student growth models is central to our reform movement. A growth model is a short list of student skills to be developed during the course, e.g., communication, use of technology. The development of such a model could be aided by asking (and answering) questions of the type “In what areas do I want my students to grow as a result of my course?” Each College Algebra instructor is strongly encouraged to develop a student growth model for his or her students and to share this model with the students repeatedly throughout the semester. Let us think of our Student Growth Model as our New (academic) Year’s Resolutions as well as a promise to our students.

[2] Enhancing the Mathematics Learning Environment Using Bulletin Boards

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Four years ago I realized that bulletin boards in some of the rooms that I taught in had not been completely changed in more than ten years. A few items advertising tutors in mathematics and physics had been tacked over other items that were very old. No mathematical or educational content

was on the walls of most of the classrooms. I realized that there was an opportunity to educate students using the resources of student work, pictures, and other educational materials.

I launched the project by announcing that each class will be responsible for a bulletin board in the Dr. J. Don Boney Building, Third Floor. The students were told to work in small groups, and to design the bulletin boards to inspire their fellow students and to create awareness of the excellent work they were capable of producing.

Since the beginning of the project, students have designed bulletin boards with content on calculus reform, algebra reform, magic squares, images of spirographs, cat faces, flowers using Theorist and DERIVE, and pictures, with captions, of students making presentations at the board and of their doing group work in class. There was a display showing Calculus students using the TI-92, TI-82, and CBLs during the spring of 1997.

After my trips to conferences such as the National Association of Mathematicians (NAM) Mathfest, and the Mathematical Association of America Winter Meetings, I usually post pictures with essays, poetry and captions to capture the essence of the meetings. Displays of African American mathematicians at the NAM Teaching Excellence and Research Conference at Tuskegee, the first HCC-Central College 3 day Calculus Reform Workshop, and Dr. Llayron L. Clarkson Algebra seminar at Texas Southern University were done at a centrally located bulletin board near the elevators where many students browse and wait.

Now that HCC Central Mathematics Department has the resources for establishing web pages, I have extended the bulletin board project to the Internet. The Internet has expanded the awareness of my students. I have instructional and personal web sites. A direct consequence of student involvement and enthusiasm about bulletin boards was naturally extended to participation in the establishment of web sites.

The bulletin board project is now a component

of our web site project. with links to other schools, organizations and topics such as Texas Southern University, National Association of Mathematicians, National Science Foundation, Mathematics in Nature, History of Mathematics, Educational Testing Service, and other hyperlinks.

I consider the bulletin board project a success because both I and my students have become competent to establish bulletin boards on the Internet. In fact, you can share our success by visiting my web site at [Http://198.64.21.135](http://198.64.21.135). In conclusion, if students and teachers start with what they have, the chances are they will be inspired to extend their efforts to integrate technology into the teaching of mathematics and creating mathematics awareness using the World Wide Web.

[3] College Algebra Activity

The purpose of this activity is to engage the students in a “hands-on” activity to generate data, develop a model (based on the data) in order to answer a given question, and then to discuss the results.

This in-class small group activity (3-4 students/group) will take 30-45 minutes of class time. A ball (e.g., tennis) and a meter or yard stick are needed for each group.

There are 3 phases to this activity

1. (Experiment-10 minutes) Each group drops their ball and measures the height of the rebound. They repeat this experiment at least 3 more times and average the results. (The objective is to determine the average height their ball rebounds on the first bounce.)
2. (Analysis-10 minutes) Using the results of Phase 1, each group models the rebound height for their ball. That is, they define a function which will tell them how high their ball bounces on the n th bounce when dropped from a given height. (Let n denote the number of the bounce,

$b(n)$ = the height of the n th bounce, and $b(0)$ = the height from which the ball is dropped.)

3. (Discussion-10 minutes) Class discussion. Ask one or two groups to explain to the class what they did. Encourage questions to provoke discussions. A few suggestions are:
 - a. Why did you conduct the first experiment 3 or more times? (Wouldn't once have been enough?) Bring out the importance of averaging results in order to minimize the effect of a “bad” reading.
 - b. How did you obtain your formula? How did or can you verify the reasonableness of your formula? (For example, do the measurements of the second and third bounces agree with your analytical results?)
 - c. What could be done to improve the accuracy of your experimental results?
 - d. What factors affect the height of the rebound of a ball?

Class interest might be increased if you check with a tennis coach and a basketball coach to find out the range of rebounds for tennis and basketballs, respectively, and then relay that information to the class.

[4] Lobster Harvest in 1995

Last month (August 1997) Jon Gibson, spokesperson for the National Marine Services, wrote in the Bangor Daily News

New England harvested 71.4 million pounds of lobster worth \$242.2 million in 1996, a 13% increase since 1995. But lobstermen (and lobsterwomen) only caught 1.4 million more pounds of lobster, showing a significant increase in the cost per pound.

Tasks:

- a Determine the price per pound of lobster in 1995 and 1996. Describe your thinking process.
- b Determine the increase and the percent increase in cost (per pound) of lobster from 1995 to 1996.

The same article also stated

Revenues from commercial fisheries from Maine to Virginia last year (1996) totaled \$939.9 million, down 4%, or \$43 million, compared with 1995.

Determine the 1995 revenue from commercial fisheries from Maine to Virginia.

[5] Writing Assignment

The graph of an equation in the variables x and y is a straight line. Therefore a system of two equations in x and y can be represented graphically by two straight lines. Write a brief paragraph to answer or explain the following questions or statements (examples are always appropriate).

- a. The solution of a system of two equations in x and y are the coordinates of the point of intersection of their respective lines.
- b. Because two parallel straight lines do not intersect, it is possible to have a system of two equations in x and y that do not have a solution.
- c. Because two parallel lines may coincide, a system of two equations in x and y may have infinitely many solutions.
- d. What can be said about the solution possibilities for a system of three equations in x and y .

[6]

Retreat

The second Retreat of the HBCU College Algebra Reform Consortium will be held October 2-4, 1997 at Wiley College in Marshall, Texas. The focus of this Retreat will be on the use of small group projects in general and the use of Interdisciplinary Lively Application Projects (ILAPs) in particular. Student Growth models will also be discussed.

All of the Consortium instructors of College Algebra are encouraged to attend (bring your TI-82 graphing calculator). All expenses incurred in attending the Retreat will be covered by a grant from the EXXON Education Foundation.

[7]

Notices

- a. CONGRATULATIONS to **Dr. Della Bell** for being appointed Chair of Texas Southern University's Department of Mathematics. Della's appointment was based in part on a preference vote for Department Chair taken by the Department in which Della received the largest number of votes.
- b. Congratulations to **Dr. Evelyn Brown**. Evelyn completed her doctoral degree at the University of Southern Mississippi last summer in Educational Administration, Supervision and Research with a minor in Mathematics Education.
- c. The Deadline for contributions to our October Newsletter is

Friday, October 10, 1997.

Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Quick Questions, CBL activities, announcements, and so on are all welcomed. Please send material to Dr. Della Bell, Chair, Dept. of Mathematics, Texas Southern University, 3100 Cleburne St., Houston, TX 77004.