Vision - Potential

Vision Within Every Instructor - Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*
Number 100, November 2010

Contents

- -

[1] 100 and Still Going

This issue is Number 100 of the *Vision - Potential* Newsletter (*Vision* in each instructor, *Potential* in each student). The Newsletter began in October 1996 as the voice of a consortium of HBCU's to reform their college algebra programs. That consortium evolved into day's national movement to refocus college algebra. The growth and impact of the movement can be seen in three distinct areas:

(1) In the late 1990s there were no college algebra offerings on national programs. Today, AMAYTC, NAM, and the MAA offer minicourses, contributed paper sessions, panel sessions, reunions, etc. at their national meetings.

(2) Refocusing college algebra, although initially shunned, was the major initiative of the MAA's CUPM Subcommittee on Curriculum Renewal Across the First Two Years (CRAFTY) for the years 2003-9.

(3) Traditional texts have adopted several of the Movement's earlier initiatives, e.g., elementary data analysis, regression, small group projects, use of technology, modeling "real-life" situations, interpreting graphs, etc. Exercise sets in many traditional texts now contain realistic application problems, although they are still far out numbered by skill exercises.

* Supported by the U.S. Military Academy.

The following quote is taken from Della Bell's (Texas Southern University) lead article ("Our Vision") in the first issue of our Newsletter.

"Greetings. Welcome to the First Edition of the *Newsletter of the HBCU College Algebra Reform Project*. We approach the twenty-first century with several visions, many of which can become a reality through our efforts to 'reform' college algebra. Among our visions are:

1. **Students** 'empowered' with necessary mathematical knowledge, confidence, and skills, enabling them to continue in more advanced mathematics or quantitatively based courses, to get degrees in these areas, and to be successful in mathematics-dependent careers;

2. A **curriculum** that changes *from* one of symbolic manipulation, skill building and emphasis on mechanics and memorization of algebraic techniques *to* one that emphasizes variables and functions, data based interdisciplinary applications that are relevant and meaningful, and more and better use of technology;

3. **Energized and enthusiastic teachers with high expectations**, who are using multiple approaches, teaching and learn-

ing with technology, accomplishing learning objectives using exercises, small group activities, and projects connecting mathematical ideas within the discipline and across disciplines, using a variety of assessment methods, and discussing issues, questions, and ideas with colleagues;

4. **Students** who are actively involved in learning algebra through individual and group activities which involve mathematical modeling, who are solving problems arising from a variety of disciplines, and using computers and calculators to generate numerical examples, graph data points, and, conjecture and reason about mathematics;

5. **Small class sizes."**

Della's complete article, as well as past Newsletters can be found on our website: www.contemporarycollegealgebra.org.

The Movement continues to grow while spawning similar movements in both precalculus and developmental courses. The "glass is more than half-full" and the water is rising.

[2] Developmental Mathematics

(Part 2)

Donna Stallings
Lincoln University

What did I really want my students to know? What does a grade of A in this class really mean? These are the questions with which I began my redesign. I realized that many of my semester exams were in no way similar to the final exam. My assigned homework did not always introduce nor review concepts that were on the exams. It was as if I was teaching and testing something totally different.

I started by designing goals for our developmental mathematics courses. I shared these with another faculty member as she began to redesign our college algebra course. This is what we came up with:

Step 1: Goals:

1. To provide opportunities for students to become mathematically literate using reading, writing, and speaking.

2. To provide opportunities for students to make connections between data and its significance in a real world setting.

3. To provide opportunities for students to display and interpret information in multiple formats.

4. To provide opportunities for students to understand and perform mathematics using appropriate technology.

5. To provide opportunities for students to improve their attitude toward mathematics by engaging students in meaningful mathematical experiences.

6. To provide opportunities for students to work in collaborative and cooperative settings.

Step 2: Based on the redesign workshop at West Point, we came up with a few objectives for each goal and then subsequently some assessments.

Objective for Goal 1:

1. Students will present answers in complete sentences using proper mathematical language.

2. Students will make class presentations after completing activities, homework, and group and individual projects.

3. Students will be able to read environmental print and subsequently provide a written and oral summary.

4. Students will participate in daily discussions about mathematics.

Assessment

1. Write a mathematical autobiography

2. Post a response to the weekly discussion question, post a response to a classmates post, and post a final response to any comments about the original weekly post.

3. Submit a written report after each completed class project.

4. Write a summary that compares the quantitative relationship of at least three points on a graph

5. Identify each variable of a graph or table and present findings.

6. Identify points on a graph or in a table and discuss its meaning with respect to the problem.

Objective for Goal 2:

1. Students will use environmental print to make connections to mathematical concepts.

Assessment

1. Use the internet to collect and analyze data.

2. Use data from a newspaper or magazine to make inferences.

3. Use credit card advertisements to analyze credit plans and provide a best choice.

4. Use book and internet based maps to analyze suggested travel plans and identify the best route.

5. Use time lines to create autobiographies of their lives.

This is just a brief look at some proposed goals, objectives, and activities, but each is designed to include family or personal backgrounds of individual students,the community, peers, and the university. Including student perspectives allow students to get involved and become a part of the mathematics. I hope they will begin to see the reality of math as they conduct interviews, collect data, make observations, share their ideas with others in the class, and volunteer in local schools, libraries and community centers.

Other ideas:
Use the university census. Choose a section of the data and have students in developmental mathematics create tables and graphs that describe the data. (I use data about the number of incoming freshman who enter and fail developmental mathematics to begin a discussion about ways the university can improve itself to curb this trend.) Use the data to create tables of whole numbers, then fractions and percentages. I use this activity to teach and reinforce proportions as we convert fractions to decimals and then to percents and degrees before creating circle graphs that must be drawn by hand using a protractor and compass.

We read articles from the newspaper and then go out and interview fellow classmates to see if they agree or disagree. This activity requires they involve others and then write a letter to the administration making suggestions that affect developmental mathematics students.

Ask your local student paper if they will consider allowing your developmental class to submit articles or fun mathematics activities. Students love to see their work in print. This is one way they communicate with the entire university and begin to feel more valued.

Have students create new ways to learn concepts. Many of them have great ideas as they are the ones who have had trouble learning what many of us consider elementary concepts. Some have learned some really neat ways to "break down" the abstract ideas. Allow them to share their ideas with an elementary teachers class.

References and bibliography for this article can be obtained by contacting Donna Stallings [stalling@lincolnu.edu]

[3] A Shaky Story

(Copied from *The Heart of Mathematics, an invitation to effective thinking* by Edward . Burger and Michael Starbird)

Stacy and Sam Smyth were known for throwing a heck of a good party. At one of their wild gatherings, five couples were present (this included the Smyths, of course). The

attendees were cordial and some even shook hands with other guests.

Although we have no idea who shook hands with whom, we do know that no one shook hands with themselves and no one shook hands with his or her spouse. Given these facts, a guest might not shake anyone's hands or might shake as many as eight other people's hands. At midnight, Sam Smyth gathered the crowd and asked the nine other people how many hands they had shaken.

Much to Sam's amazement, each person gave a different answer. That is, someone didn't shake any hands, someone else shook one hand, someone else shook two hands, someone else shook three hands, and so forth, down to the last person, who shook eight hands. Given this outcome, determine the exact number of hands Sam's wife, Stacy Smyth, shook.

[4] Diabetes in Virginia

The following table shows the number of persons in Virginia diagnosed with diabetes during the time period 2001 to 2008. Form a scatterplot showing this data, create a trend line, and then answer the questions. Source: Center for Disease Control and Prevention.

Year	**# Cases**	**Year**	**#Cases**
2001	330	2005	406
2002	356	2006	429
2003	380	2007	455
2004	398	2008	469

1. How did you determine your trend line?
2. What is the slope of your trend line?
3. What does the slope mean in the context of the problem?
4. What is the percent change in the number of diagnosed cases over the time period?
5. Predict, based on your trend line, the number of persons diagnosed with diabetes in 2009.

[5] Notices

1. Jennifer Beecher is the McGraw-Hill Representative for Contemporary College Algebra 563.584.6323, [jennifer_beecher@mcgraw-hill.com]

2. Joint Mathematics Meetings, New Orleans, LA, January 6-9, 2011

3. **Reunion for Those Interested in Refocusing College Algebra**

   Joint Mathematics Meetings, New Orleans, LA

   Friday, January 7, 5:30 p.m. – 7:30 p.m., Grand Chateau, Sheraton Hotel

   Organizer: Don Small, US Military Academy, Sponsor: CRAFTY

4. A copy of the White Paper synthesizing the recommendations on Standards and Assessments in K-12 Mathematics from the CBMS Forum last October is posted on the CBMS website at http://www.cbmsweb.org/Forum 2/CBMS Forum White paper.pdf.

5. Deadline for contributions to the January Newsletter is January 1, 2011. Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Queries, announcements, etc. are welcomed.

6. To subscribe to this Newsletter, write to Don Small, Department of Mathematics, U.S. Military Academy, West Point, NY 10996 or contact him via e-mail at don-small@usma.edu.