

MATHEMATICS IN THE SUN

ANNUAL RETREAT



SEPTEMBER 9-10, 2005

CENTRAL FLORIDA COMMUNITY COLLEGE, OCALA, FLORIDA

COLLEGE ALGEBRA: REDEFINING AND REDESIGNING

REPORT

Norma M. Agras, Miami Dade College
nagras@mdc.edu
Coordinator, Retreat 2005

Michael Jamieson, Central Florida
Community College
jamiesom@cf.edu
Host and On-Site Coordinator, Retreat 2005

Martha Goshaw, Seminole Community College
GoshawM@scc-fl.edu
President, Florida Two Year College
Mathematics Association;
Discussion Facilitator,
Teaching Strategies and Assessment,
Retreat 2005

Robert Kimball, Wake Technical
Community College
rob_kimball@waketech.edu
Southeast Region Vice-President,
American Mathematical Association
of Two Year Colleges;
Discussion Facilitator, Curriculum,
Retreat 2005

Sharon Griggs, St. Petersburg College
griggs.sharon@scollege.edu
Treasurer, Florida Two Year College
Mathematics Association;
Registration, Retreat 2005

John Salak, Tallahassee Community College
Tccmathguy@aol.com
Discussion Facilitator, Developmental
Mathematics Plan, Retreat 2005

*Mathematics in the Sun is an Activity of the
Florida Two-Year College Mathematics Association*

Foreword

In September 2005, faculty and administrators from around the State of Florida gathered for the annual Mathematics in the Sun Retreat on the campus of Central Florida Community College in Ocala. In spite of problems caused by Hurricane Katrina and with Hurricane Ophelia churning menacingly in the nearby Atlantic, these seventy educators joined to discuss one of the most problematic and controversial courses in the mathematics curriculum: College Algebra.

On Friday morning, many of these educators participated in a discussion session, led by Martha Goshaw and John Salak, on the status of the state wide implementation of the Developmental Mathematics Plan. On Friday afternoon, they enjoyed the opportunity to share ideas on the designing of a College Algebra course that would meet the needs of students based on their majors and programs, on the needs of mathematics and its partner disciplines, and on the needs of society and the workplace. Two focus groups were held, one on Curriculum, and one on Teaching Strategies and Assessment. Additionally, on Friday and Saturday, the participants enjoyed various workshops and talks on College Algebra and other related topics.

This document consists of recommendations that were made in the discussion of the Developmental Mathematics Plan, and in the College Algebra focus groups, as well as general comments regarding this retreat and preliminary plans for the next one.

Part I. Report from Discussion of the Developmental Mathematics Plan as submitted by John Salak

I presented the plan for the MAT 1033 revision that we are implementing at Tallahassee Community College. This semester, the mathematics faculty from the Academic Support Division and from the Science/ Mathematics Division are having weekly meetings to discuss how I should plan the MAT 1033 “revised” course. I have been given 100 percent release time for the upcoming Spring semester, and will be compiling the committee's recommendations into the new course. It is still not clear when the first pilot courses will run; most likely in fall 2006.

For a while, we will be running pilot sections of the revised course, as well as sections of the existing MAT 1033. TCC is also in the process of deciding how to train full-time and adjunct faculty on how to approach the revised course when ALL sections of the course are switched to the revised. This will occur over time, and at this time it is still not totally clear how the training will take place. It might involve my being given more release time to plan and/or facilitate the necessary training.

There was good discussion and there were many comments from people in the audience; however, so many of the people were not part of the original discussion of the Developmental Plan that they were quite in the dark as to what the plan even was. Martha Goshaw and I both tried to provide that history, but a few of them were still not on board. Those who were on board listened, encouraged, and want to be kept abreast of developments. I did tell the group that, of course, the Developmental Plan was NOT going to be used in its exact form throughout the state. Each college needs to use the parts of it that would work for that college – for its programs and its students. That was a significant suggestion. Additionally, based on one participant’s comments, there might be problems with the existing placement of students. This existing placement process might need revision as well.

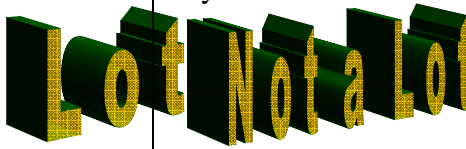
Part II. Recommendations for College Algebra Curriculum as Submitted by Robert Kimball

The following were the criteria established in the Curriculum Focus Group for inclusion of any topic:

- Importance in understanding or coping in society
- Importance in the workplace and applications of mathematics found therein
- Importance for future work in mathematics or applied mathematics
- Importance in understanding what mathematics is about

The following table illustrates both the questions that were asked, and the content as developed by the various focus groups in redesigning College Algebra

College Algebra: Content Focus Group Recommendations

(1) Describe the majors that students in College Algebra intend to pursue			
	History Social Sciences Bio & related Education Health Business Service	Education (Math) Engineering Physical sciences	
			
(2) Describe the technology that students in College Algebra are likely to use once they are out of school.			
	PCs (spreadsheets)	Software specific to their profession	Calculator
(3) Describe the content that is best suited for students in the majors listed in (1). Also include the content that is necessary for students to be contributing members of society. (4) Describe the broad skills faculty should help develop as they teach students in college algebra.			
	Applications Modeling (trends) Functions Terminology Families of Functions (linear, exponential, logistic, quadratic, power) Rates of Change Quantitative Literacy	Communication Problem Solving Critical Thinking Making Connections Understanding Process	Pre req: Algebraic skills Geometric facts and formulas Some statistics
(5) Describe the technology that faculty should use in College Algebra to teach the content in (3) and develop the broad skills in (4) while keeping mind your answer to (2).			
	The technology that helps students understand concepts and ideas and is available. Look at numerical, graphical and symbolic	Spreadsheets Techn. For Classroom Assessment Internet (ways to promote HW by doing it online & grading it)	Balance!

***Part III. Recommendations for College Algebra Teaching Strategies and Assessment
as Submitted by Martha Goshaw***

What is the purpose of College Algebra?

- To gain and develop analytical thinking skills
- To develop critical thinking
- Problem solving
- To prepare for future math and science classes
- To serve a General Education purpose
- To introduce the historical significance of mathematics
- To allow students to do things they haven't done before in an algebra class

What teaching strategies do you use in College Algebra that have been successful?

Why were they successful?

- Have students work a group problem at the board.
- Assign a preliminary discovery activity – individual or group.
- Do projects.
- Provide bonus activities that are taken from real life situations.
- Incorporate activities that include writing – i.e., how would you solve a cubic equation?
- Use simulations to introduce a topic.

All participants agreed that those strategies that were most successful were ones that got students actively involved.

How is technology incorporated into a College Algebra class?

- Graphing calculator use to demonstrate connections and to introduce or enhance topics
- Excel spreadsheets
- My Math Lab and other software made available by publishers
- Interactive tutorials provided by textbook companies
- Textbooks online
- Online quizzing

How can communication skills (reading, writing, and speaking) be incorporated into a College Algebra class?

- Ask students to read problems aloud.
- Have students describe how they would solve a problem, rather than actually solving it.
- Have students describe or write about a mathematical process.

The Ideal College Algebra Course Should:

- Incorporate technology as appropriate to introduce, develop, or enhance a topic
- Stress communication: reading, writing, and speaking
- Make use of outside experiments, using internet sources and faculty from other departments as necessary
- Include a cooperative learning component, such as group quizzes, group board work, group projects.

College Algebra via Distance Delivery

Most of the participants said that their campus delivered College Algebra in some form via Distance Education, some completely online and some as hybrid courses. Most used WebCT. Successful components of these courses included the Discussion Forums as a way to encourage a sense of community and providing ways for students to participate in group work.

What about preparation and training of adjuncts who teach College Algebra?

All participants agreed that we must invest in our adjuncts. Several ideas were:

- Sharing sessions between full time and adjunct faculty
- Training sessions for adjuncts on technology, collaborative learning, and other areas as needed
- Providing mentors

Part IV. Concerns Raised by Attendees; Faculty Development Needs

At this year's Retreat, faculty expressed concern regarding various facets of this redesigned College Algebra course, particularly group work and group grades. One participant inquired regarding the process for creating student groups. A concern was raised regarding individuals earning a grade based on group work. Some expressed the need for professional development on student-centered instruction. The concern that was raised regarding a developmental course that would prepare students for this redesigned College Algebra was easily addressed with the existence of the Developmental Mathematics Plan which provides a seamless transition into this College Algebra.

It is highly recommended that colleges and universities in the State of Florida invest in faculty development that will assist faculty in embracing and teaching this College Algebra. Faculty development is needed in the areas of student-centered instruction, collaborative learning, assessment, and to a lesser degree appropriate use of technology and problem-based curriculum. Faculty present generally were users of technology and were more concerned with achieving a balance between the use of technology and the use of mental and paper and pencil manipulations.

Final Notes from Norma Agras

Faculty around our state are voicing the same concerns of others around the nation with regard to the inadequate mathematics preparation of our students, including those who are exiting our existing courses. With the redesigning of College Algebra and its pre-requisite developmental course, we hope to deepen students' understanding of algebra, and to provide them with the ability and confidence to solve problems. These redesigned courses represent a change in culture in which students must exercise perseverance and apply logical reasoning, using the tools of technology as appropriate, in exploring mathematics and solving non-trivial problems. A good knowledge of symbol manipulation and solving equations in the context of problem-solving attained in the pre-requisite course leads to exploratory learning and even more significant problem solving, modeling and elementary work on functions in College Algebra.

The need for a citizenship with a strong quantitative foundation has never been greater. The level of quantitative literacy and the knowledge of algebra that we hope to impart in our redesigned developmental programs, and extend and refine in this redesigned College Algebra, should serve the students of the State of Florida as a foundation for future work in mathematics and in mathematics-dependent fields. Additionally, students completing these courses should have the logical reasoning skills necessary for informed citizenship and for the workplace.

It is noteworthy that the recommendations made by those attending this Retreat model the Standards of the American Mathematical Association of Two Year Colleges and concur with the recommendations on College Algebra from the Committee on the Undergraduate Program in Mathematics of the Mathematical Association of America.

Final Comments; Planning for Next Retreat from Martha Goshaw, FTYCMA President

The retreat went quite well with about 70 participants over the two days and lots of good discussion. It seems that Florida's dream of College Algebra matches the recommendations of AMATYC and of the MAA, which was awesome. We (FTYCMA) now have about seven new life members and a total membership of 167. 'Way to go! Michael Jamieson and his faculty were terrific hosts and the facility was great. Our thanks go to our wonderful host institution, Central Florida Community College!

With regard to next year's retreat, CFCC has offered to host it again. The best dates would be the last week-end of September or one of the first two week-ends in October. Please let me know your preference. Michael Jamieson will check with the availability of the college facilities on those dates. Possible topics for that retreat:

- 1) continuing discussion of college algebra;
- 2) online courses (quality control, fostering group participation and sense of community, using technology, etc);
- 3) workshops on Excel and other technologies (e.g. Graph);
- 4) assessment and placement (e.g. making sure that students are placed correctly).

It seemed that online had the most interest, but what do you think? Norma Agras will be retiring in another year so we MUST have someone to work with her on this one so that she can pass the duties to that person. Byron Dyce, our incoming President, and I discussed the possibility that our Vice President for Programs position (which right now is just a liaison to MAA for the February meeting) could take on this responsibility.

We strongly encouraged those attending the Retreat to submit proposals to speak in February at the Joint Meeting of MAA/Florida and FTYCMA. Besides John Salak at Tallahassee Community College, there were three others who mentioned implementation of various facets of the Developmental Mathematics Plan. I asked those people to submit a paragraph to me so that it could appear in the newsletter and on the website. John could do the same for the project at TCC. We also need ideas for the Friday morning workshop at the February Joint Meeting. Steve Grosteffon of Santa Fe Community College did two marvelous presentations, one on graphing in Excel and one on graphing in Graph, that were well attended and well received. Several asked him to do a workshop on the Excel in February. What do you think about that for a morning workshop? Or should we stay focused on Developmental/College Algebra?

I need your input so that we can make decisions and move forward. Please respond to me GoshawM@scc-fl.edu with your thoughts on:

1. dates for the 2006 fall retreat
2. topic for the 2006 fall retreat
3. names of a co-retreat coordinator to work with Norma and then take over
4. topic for the Friday Joint Meeting workshop

Please encourage faculty on your campus to submit proposals for February. I would love to see the program top heavy with community college people! Don Ransford needs to let us know the deadline for the next FTYCMA newsletter.

See you at the next FTYCMA event!