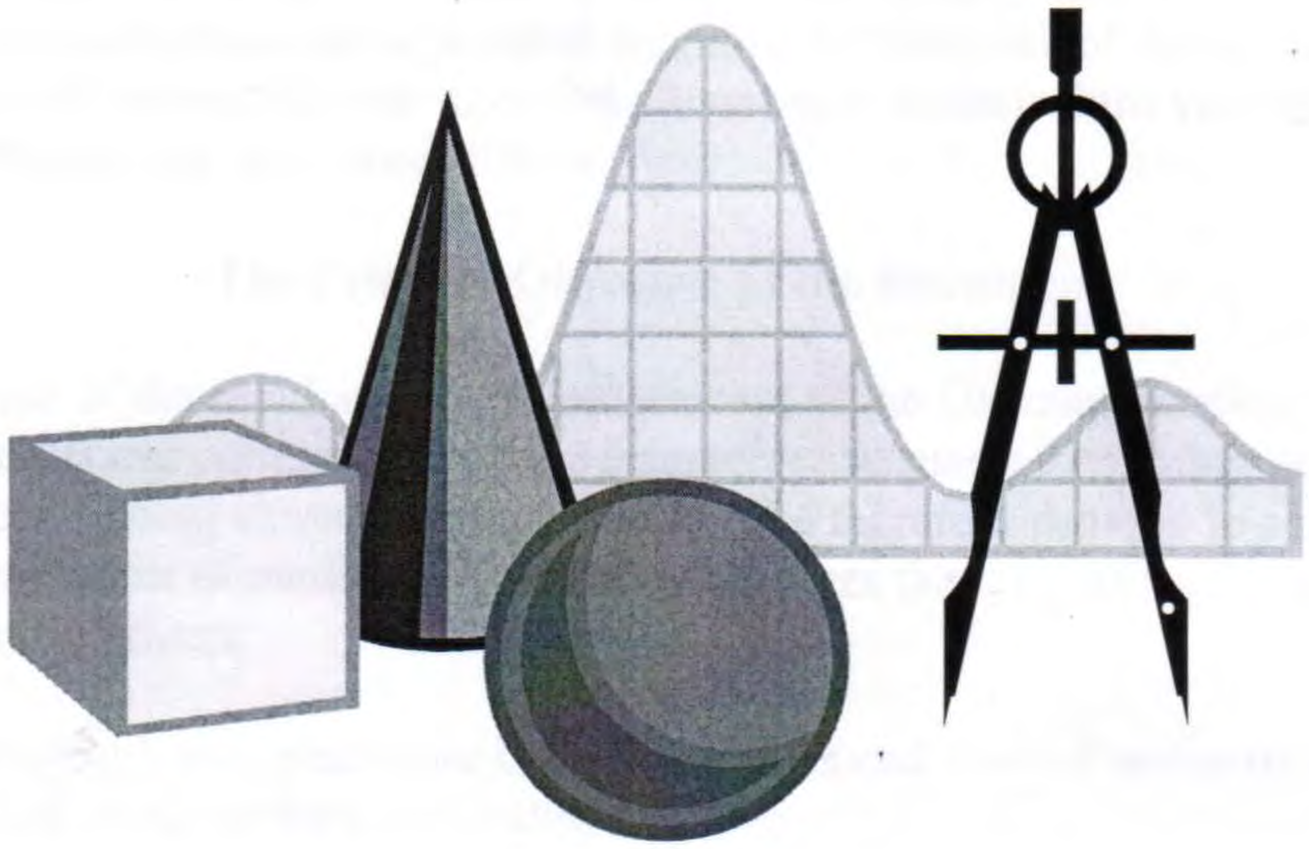
Some Procedures, Methodologies and Strategies on the Successful Implementation of Quantitative Reasoning Mathematics Courses



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Brief Historical Overview

A few years ago AMATYC mandated in its "Crossroads" Document that all two year colleges should offer a course in Quantitative reasoning.

Professors Klement Teixira and Frederick Reece at the Borough of Manhattan Community College addressed the mandate in 2005 and proceeded with a two phase plan. Phase one would be handing the college's administrative requirements for course implementation, and phase two addressed the more difficult task of filling the classes. The effort proved successful with three QR classes now in their third year still running. The methodologies and procedures follow.

The Primary Objective of the Document

Perhaps because of the rapid and continued success of the QR mathematics implementation at our college, we received numerous requests from other mathematics departments concerning strategies and methods. We therefore decided to construct, if possible, a general set of methodologies and procedures that any college could feasibly employ in similar efforts.

At best, the strategies we present are broad guidelines and must of necessity be adjusted to suit individual needs of various institutions.

Phase One: Administrative Requirements for Course Implementation

Professor Teixeira formed and chaired a brief committee that carried out the necessary paperwork and he brought it to the faculty council for approval. Having completed the administrative phase the more serious student enrollment task was next.

Phase Two: How to attract students to the QR courses.

The Immediate Problems

1. Quantitative Reasoning Mathematics was a relative unknown to both students and faculty.
2. We were in the summer term and therefore were unable to reach the full student body to inform them about the course.
3. The course was not yet printed in the student's schedule of classes, so no student knew the QR course even existed.
4. The textbook arena for QR mathematics was relatively small and hard to get.

Our Solution for the Student

1. We distributed flyers to students that described the course, AMATYC mandate, prerequisites, credit value, schedule, instructor's names and why students should consider taking the class.
2. We flooded the in-house TV monitors with the flyer information.
3. We personally enlisted the counseling department's aid in the effort because they oversee and advise large numbers of the student body.
4. We put the course information on the BMCC Website and established a way to register on-line.
5. Flyers were distributed to the summer students enrolled in the in the prerequisite math courses MAT 012 and MAT 051 as well as to their instructors, because those classes are the direct feed-in to the QR course, MAT 160.
6. During the fall registration we left packages of the flyers at the tables and distributed them ourselves during our registration hours of duty.

Our Solution for the Faculty

1. We held informal information sessions for interested faculty and staff of other department as well as for those of the mathematics department.
2. We worked closely with our TIPS office to clarity and establish articulation agreements with other colleges concerning transfer credit.
3. We instructed students in the feed-in classes MAT 012 and MAT 051 to pass the flyer to one other student not in the feeder classes. We hoped to gain multiple exposures via this endeavor.
4. Informal talks about the QR course was delivered to the other non-feeder classes we taught, but in which the students had the prerequisites for QR.
5. Other colleges already offering QR were investigated concerning topics and syllabi so we could fashion ours similarly with a mind toward uniformity of QR instruction.
6. Lastly, but quite importantly we decided to change the order of topics on the gathered syllabi: we put financial mathematics first. Knowing that many students know little about financial mathematics, yet they generally have credit cards, student loans both government and private, etc., we felt they could benefit. The result was incredible: they responded with high enthusiasm.

The Recruitment Outcome

Our solution to other problems proved successful, culminating in three overtallied QR classes totaling ninety (90) students. The three QR classes; one taught by Professor Teixiera and two by Professor Reese constituted the first such classes at BMCC in the fall of 2005.

Enrollment has continued unabated for the three classes up to the present fall 2007 semester addressing about one hundred ten (110) students! Judging by student response, attendance, readiness to participate, retention, and grades, the courses are a success and some student's testimonies are furnished in video clips shown at this AMATYC conference.

Some Important General Observations

1. The actual mathematics of QR is not deep, generally not much above elementary algebra, but it requires a wide range of different kinds of mathematics and their applications to effectively teach it.
2. Many QR students seem to have combinations of average/low mathematical skills and various levels of "math phobia" and/or dislike. Hence, the selected QR instructors must be those types sensitive to those kinds of concerns: mathematical competency is not enough.
3. It is important to steadily and consistently demonstrate how the problems and exercises relate and will futuristically relate to daily life experiences. Real examples from banks, credit unions, corporations, lotteries, credit cards, retails and endowments seemed to always go over big.
4. Since a Liberal Arts education does not mean vocational education, we infused general, somewhat theoretical approaches at the ends of many topics to demonstrate broader aspects of mathematics. For example, we often gave a financial optimization problem such as choosing the best mix of stocks, bonds, compound interest and say certificates of deposits without actually investing. Models were made and theoretical arguments were done on the models to produce alternative solutions from which to select. However, no theoretical modeling was done until we were certain they could handle the concrete methods.

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