FD·01

MA102 INTRODUCTORY ALGEBRA

Fall 2001

MWF 10:00 – 10:50am E201

INSTRUCTOR: DR. CHOCK WONG

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Office Hours: MTWRF 11:00–11:55am, T 2:00–3:00pm.

Course Description: Introductory algebra: Real numbers with basic properties, polynomials and factoring, rational expressions, simple radicals (square roots and cube roots), linear equations and inequalities, lines and graphing, systems of linear equations, and applications of equations. This course prepares the student for MA103, College Algebra.

Textbook: Beginning Algebra (fitfh edition). By R. David Gustatson & Peter D. Frisk. *Brooks/cole Publishing Company.*

Topics to Cover Chapter 1 to Chapter 8 of the textbook will be covered. The main topics are:

(1) Concepts and properties of the real number system. (Ch1)
(2) Linear equations and inequalities, some applications. (Ch2)
(3) Systems of linear equations: The rextangular coordinate system and line graphing; solving linear systems by graphing, by substitution, and by addition. (Ch3)
(4) Polynomials: arithmetic; factoring. (Ch4, Ch5)
(5) Rational expressionsand equations. (Ch6)
(6) Square roots and cube roots: their arithmetic. (Ch7)
(7) Lines on the plane and equations of lines. (Ch8)
(8) Optional: Quadratic equations. (Ch9)

Homework: For each section being covered, a certain amount of *odd numbered problems* will be assigned as your daily exercises. Although they are "on-your-own" assignments (**need not turn in**), you should try your best to work out most of these problems so that you could keep up with the progress of the course. You may be called to present your solutions to the class (writing on the board) in a later day, and you will see similar problems appearing in the weekly quizzes or exams.

Quizzes and Exams:

(1) Quizzes will be given at least once each week, and they will be given in the first 15 minutes of class meetings. NO makeup quiz is allowed in general, except a missing is due to illness (with doctor's notes) or school sport events (with a memo from sport director).

(2) Two Midterm Exams will be given: **Exam 1**, to cover Chapter 1 to 4, on Week 6; and **Exam 2**, to cover Chapter 5 to 7, on Week 11.

(3) The Final Exam will be accumulated.

Grading:

Class Participation:	10% of the total
QUIZZES:	30% of the total
Midterm Exams:	30% of the total
FINAL EXAM:	30% of the total

Mathematics In the Light of a Mission Statement

"There are no mistakes. There are only embellished opportunities."[1]

Background

Traditionally the goal in teaching mathematics has been to have the students learn the mathematics. This goal satisfies the immediate: the student passes to accumulate another requirement towards a degree. Although conclusive, the goal is not encompassing. It does not bespeak of the richness of mathematics nor the immense interrelations mathematics has with life. Since the rich connectedness is missing in the traditional goal, a more comprehensive one is for mathematics to be an essential and vital piece of the bigger mosaic.

How can this be accomplished? How can mathematics be taught so that every student does more than just learn math for a grade? How can the teaching of mathematics be re-aligned so that all students take their gleaned knowledge out to the community and actually share it with the rest of the world? What re-ordering could be done to produce a well-rounded student who is not just a grade passer, but more importantly, is the knowledge giver?

As in all striving for excellence, the question "Can it be done?" is not considered. The premise here is that it can.

Reasons

One of several strategies involved in mathematical problem solving is to 'change the conceptual mode'[2]. What does this mean? Essentially, it means translating the difficult, complex problem into a different yet related, simplified one. As an underlying tenet to the classroom teaching of mathematics, this strategy, while promoting successful learning of the subject, contributes to the whole student.

As a facet of the classroom, conceptual mode change produces perceptual changes throughout. The tenet not only eases initial adjustments of classroom individuals to each other, but also facilitates subsequent adapting over the term. This tenet helps transform the collection of individual personalities into a unified entity. The class develops an overall personality. Now individual success becomes *the class* goal.

Conceptual mode change deepens connections made by the student with the subject matter itself. Because the individual feels part of a whole, this integration fosters strength, encouraging the individual to strive and achieve more. Achievement, in turn, leads to more successes for the individual within the discipline.

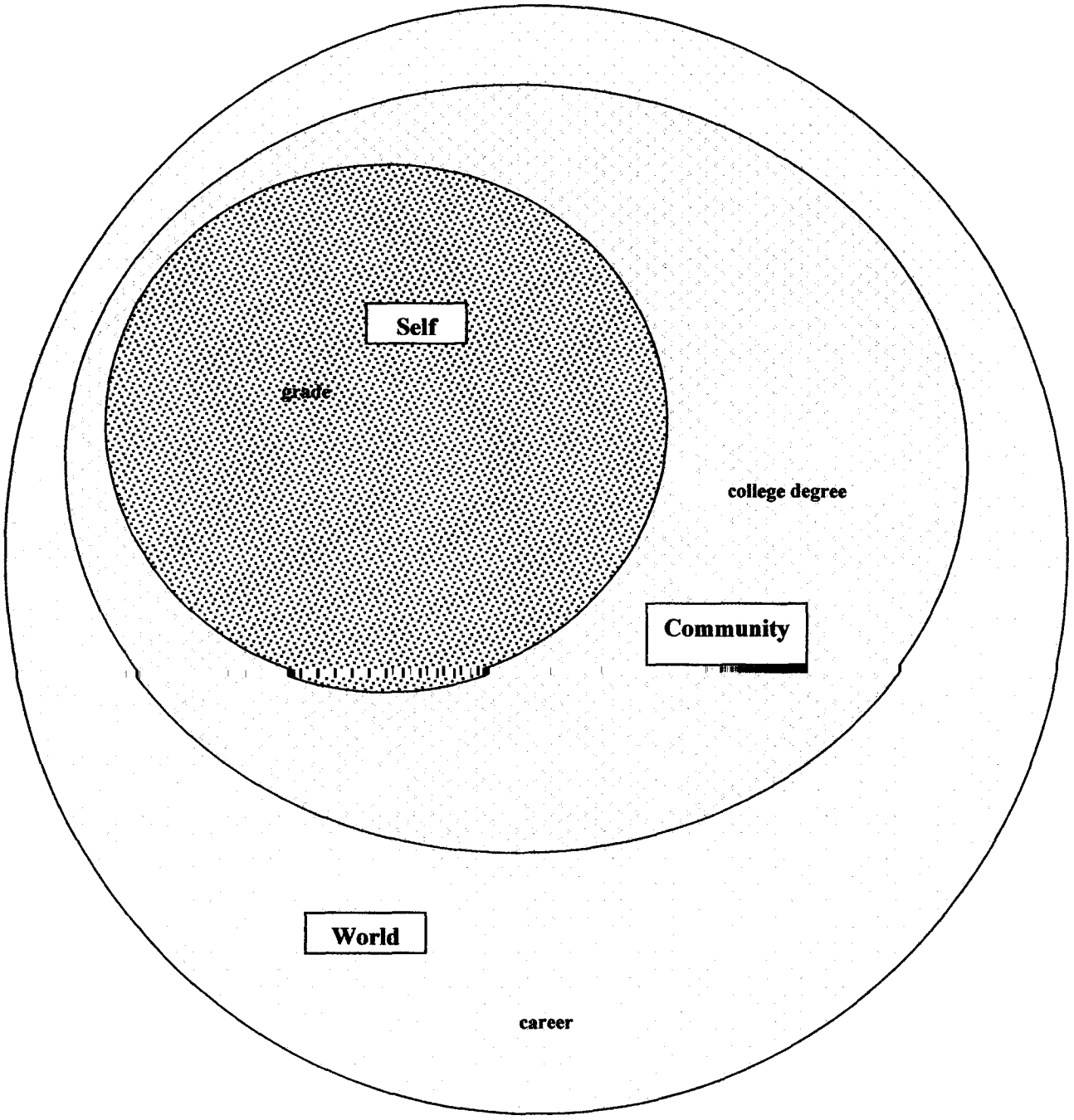
Conceptual mode change furthers associations made by the individual between the mathematics and the other disciplines. Because the class has diverse interests, these interests become portals for viewing mathematics as a means to an end. The usefulness of this 'new tool' aids the students' understanding of the mathematics itself, its applications to real life, and its relevancy.

Framework

By the nature of the words themselves, 'conceptual mode change' means what the user chooses. The interpretation determines the implementation. The schematic below is one conceptual mode change. It represents the framework or background structure of a possible mode of teaching and learning mathematics.

The inner circle represents the student, or the instructor, or the class as a collective whole. The next circle is the immediate community in which the self sits such as in a classroom full of peers, or in a lab teaching or in the university again as another collective whole. Finally the world follows, equivalent to the outside community wherein the university resides in reality or even virtually, as on a server.

With conceptual mode change as a thread connecting the circles, input includes more than a grade as an outcome. Self-confidence, self esteem, and self-determination are just several among many perceived reasons and benefits gleaned from the questions: "Why change traditional teaching?", "Why take a math course?", "What relevancy does math have?", and finally, "What does the diagram and the words 'conceptual mode change' mean to you?"



From the Self as student, progression from 'grade', has 'college degree' in Community and 'career' in World. These outcomes are, of course, not all. In the light of a mission statement, the sum of the parts is greater than the whole. Again, the interpretation of the diagram and its thread when implemented results in the unexpected: 'ever expanding knowledge', 'big rewards for big risks', and 'spiritual growth' are just some of the actual descriptive responses, or 'returns'.

Assessment

The breakdown of course grading is a combination of traditional and nontraditional assessment. Grade evaluation consists of a **Midterm** and a **Final,** daily quizzes, weekly **summaries**, and a **project**. The distribution of grade weight to each aspect of assessment is determined by student discussion and approval within the parameters of academic constraints. Participation in class is rewarded as inducement but there is no separate grade because participation is expected to achieve learning. No curving of the overall course grade takes place.

In addition, due to university requirements, a pretest and a post-test are also administered. These, however, do not count towards grade fulfillment.

Purpose

The purpose of the weekly summaries is to incorporate writing across the curriculum, a bridge the students use to connect within the academic community. The summaries are typed and include original math problems as demonstration of what learning is acquired as well as what teaching occurred. The project is another bridge the students use to share their knowledge with the world. The project may consist of several possibilities that range from math tutoring as part of Service Learning to creating interactive mini math tutorials online.

To satisfy academic requirements traditional testing occurs with the Midterm and Final. Some more traditional testing is included in the daily quizzes given directly after a concept is taught. Usually, the instructor creates the quiz on the spot. Other quizzes originate from students themselves. This provides immediate feedback for both instructor and student. Not all quizzes are immediate nor are done by oneself without help from a partner. Most quizzes are graded immediately, but by peers rather than by the instructor.

Objectives

There are three major learning objectives:

1. To achieve mastery of the mathematical concepts involved
2. To gain proficiency in the application of these mathematical concepts
3. To acquire knowledge of the relevancy of the mathematics to self and to world

There are three major teaching objectives:

1. To realize successful student learning and accomplishment
2. To demonstrate teaching consistent with academic mission and goals
3. To actualize personal growth and achievement.

The pretest and posttest reflect the learning objectives in two ways: directly, by ten application problems, and, indirectly, by five attitudinal responses. The framework of the course reflects a modeling of the mission statement as well as classroom conduct in teaching and in learning.

The individual course syllabi and grading structures now follow.

Footnotes: [1] Quote from an interior designer in HGTV's program *Trading Spaces*
[2] The Nature of Mathematics, p. 7, textbook for Math 100