

**COLORADO STATE UNIVERSITY-PUEBLO**  
**College of Education, Engineering & Professional Studies**  
**Department of Teacher Education**

**ED 417: Mathematics Curriculum and Instruction**, 2 credits

12:30–2:20, Wednesday, LW 316

Dr. Jenny A. Piazza

Fall 2008

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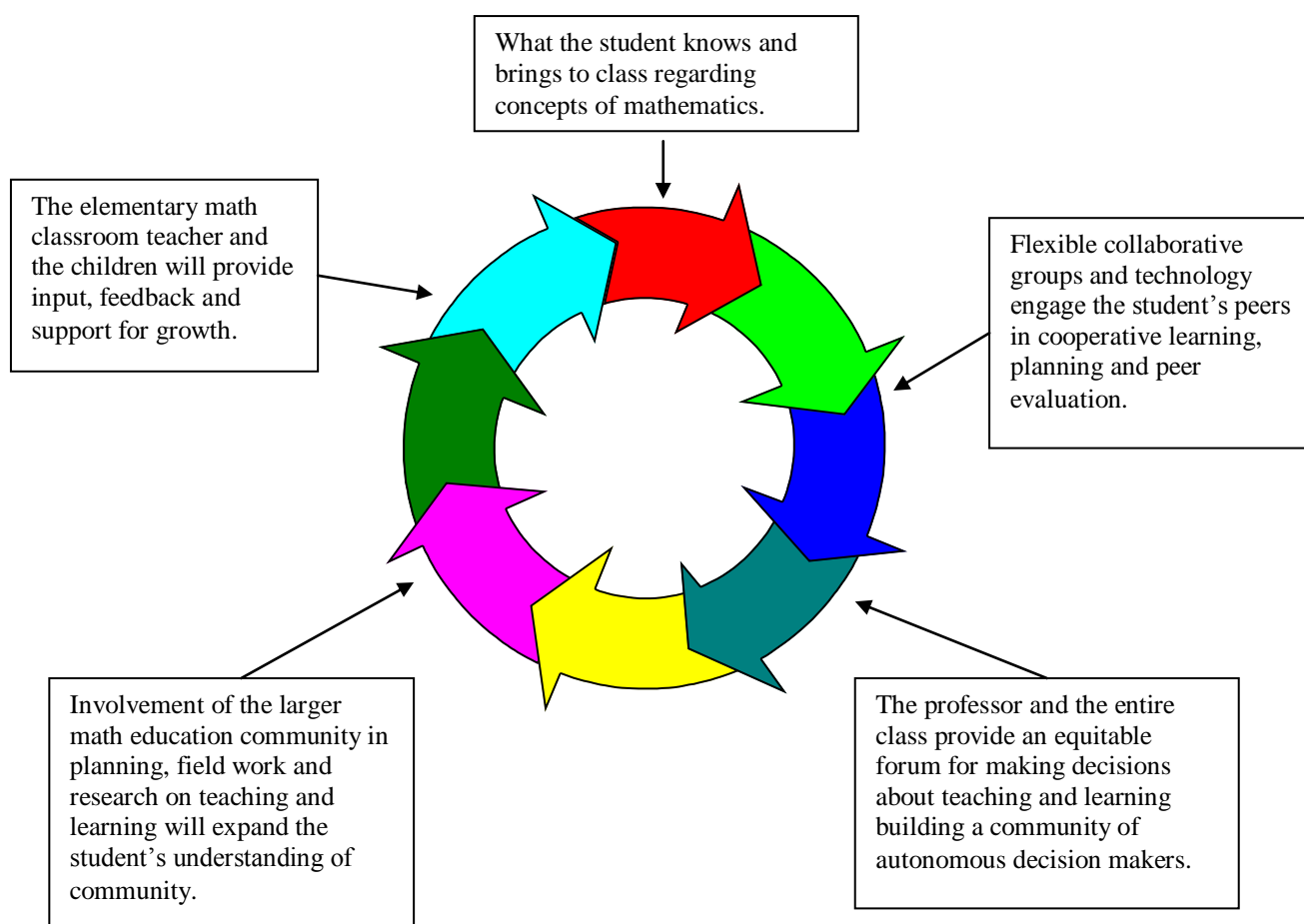
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W 2:30-4:30

and by appointment

**COURSE RELATIONSHIP TO THE CONCEPTUAL FRAMEWORK FOR TEACHER EDUCATION**



**COURSE PHILOSOPHY**

My goal in this course is to enable prospective elementary teachers to make autonomous decisions regarding equitable mathematics curriculum and instruction. A constructivist philosophy will inform the instruction of this course. That is, students will be provided opportunities in which to construct their ideas about mathematics curriculum and instruction: cognitive theories of development, methodology, curriculum, materials, equity and content. An inquiry approach, which involves active participation and reflection, will be required to promote the growth and development of equitable elementary mathematics teachers. Student projects have been designed to facilitate this process. A classroom community of learners will be established with dyads, small group exercises involving reading and writing, curriculum and lesson planning and peer teaching. Individual student goals and needs will be attended to through the individualized experiences of reflection, critical thinking, dialogue, dyads, reading and writing about current issues, and field

experience. In addition, individual needs will be met through an examination of a personal philosophy of elementary mathematics education and resulting implications for educational practice.

### PREREQUISITES

- Math 360 & 361 with a grade of C or better
- Admission to the Teacher Education Program, in good standing

### LICENSURE AREA

- Elementary Education

### CATALOG DESCRIPTION

The scope and sequence of elementary mathematics curriculum, instruction and assessment are examined through the NCTM standards and their impact on mathematics education. Field experience required (30 hours).

### TEXTS AND MATERIALS

#### Required

- Martin, Hope (2000). *Multiple intelligences and standards-based mathematics*. Arlington, IL: SkyLight Professional Development. ISBN: 1-57517-185-6
- Ashlock, Robert B. (2005). *Error patterns in computation*, 9<sup>th</sup> ed. Prentice Hall. ISBN: 0131198866
- Chapin, S. H., O'Connor, C. & Anderson, N. C. (2003). *Classroom discussions: Using math talk to help students learn, grades 1-6*. Sausalito, CA: Math Solutions Publication. ISBN: 0-941355-53-5

#### Optional

- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics. NCTM Standards also from <http://nctm.org>
- Start with Manipulatives Kit. Found on: <http://www.etacuisenaire.com/catalog/product?deptId=&prodId=011369> Item No. INP40660

### INTERNET SITES FOR STANDARDS AND CONTENT AREA INFORMATION

- Colorado State Department: <http://www.cde.state.co.us>
- National Council of Teachers of Mathematics: <http://www.nctm.org>
- CSU-PUEBLO Teacher Education Program: <http://ceeps.colostate-pueblo.edu/tep/>

### RECOMMENDED MEMBERSHIP

It is recommended you join the National Council of Teachers of Mathematics or another professional organization that promotes your growth and development in mathematics education (the website for information on a membership is above in the internet sites). Be sure to tell them you want a **student** membership. Most professional memberships send materials and journals that will help in your development as a teacher and in this class. The NCTM journal for elementary teachers is filled with excellent activities and is worth the money you pay to join the organization! The Teacher Education Program also has a professional education organization called the Teacher Education Association that you may want to join as well.

### STYLE OF TEACHING

hands-on activities, inquiry, problem solving, cooperative learning groups, discussion, dialogue, dyads, observation, case studies, field experiences, reflection and presentations which encourage participant autonomy, practices promoting disequilibrium leading to assimilation and accommodation

### COURSE REQUIREMENTS & POLICIES

1. **Professionalism: Attendance and Participation.** You are beginning your professional courses leading to your chosen career. Class attendance is important in that it allows the opportunity to participate in dialogue that is crucial to the learning process. The sharing of thoughts and experiences and the reflection on what others share is an important aspect to the construction of knowledge. Small group collaboration will support this learning process. It is inherent in professionalism that you are concerned with becoming the best teacher you can become. Your attendance, promptness to class, attention, cooperation, collaboration, and active participation are necessary to facilitate this process. In order to receive an "A" grade, you must have the highest level of professionalism as described here. If you are unable to attend class, it is your responsibility to find out what you have missed. **Tardies are determined if you are not here when your name is called for attendance. Tardies and early departures will count as one absence. If you are absent (or have the equivalent of an absence as described above) three times, you will be dropped from the course.**

2. **Readings.** Read assigned text **prior** to class.
3. **Projects and Late Assignments.** Projects should be long enough to adequately cover the topic and/or task. **ALL** work should be **typed (word-processed), double-spaced**. Keep an original copy for your file and submit a copy to me. It is assumed that projects will be submitted by class time on the due date. Projects will be considered late if they are not handed in **during class time** on the date indicated on the class schedule or by me. Projects receive Credit or No Credit. **Projects receiving No Credit may be resubmitted no later than one week after being returned to you. Repeated revisions of the same project, or revisions required of most projects, will result in a lower grade assigned.** **NO** late projects can be accepted after the date(s) listed on the tentative class schedule: that is no late projects accepted the last week of class or finals week. Please do not request exceptions to the above requirements; this makes for an uncomfortable situation with me and is unfair to other class members. Remember, professionalism is the key.

**Projects include:**

- Professionalism in Class and Field Experience
  - Project A - Math Autobiography
  - Project B - Online Discussions
  - Project C - Field Experience
    - C.1). Field Experience Application Forms (professor)
    - C.2). Lesson Plan and Presentation
    - C.3). Cooperating Teacher Evaluations
    - C.4). Field Experience Activity Log
    - C.5). Field Experience Research-Based Log
  - Project D – Team Presentation
  - Project E – Class Bulletin Board
  - Project F - Class Activities
  - Project G - Changes in Thinking (no late projects)
4. **Field Experience.** You are required to complete a 30-hour field experience with this class. **You need to complete a field experience placement form and turn it in to me for your TEP files by WEEK #3 of class. Failure to do this will result in 1/2 a letter grade drop. Lateness or unexcused absences** in Field Experience cannot be tolerated - the teacher and students in the school are counting on your reliable and prompt attendance. One unexcused absence will result in the drop of a whole letter grade in the class. Two unexcused absences will result in removal from the field experience with no opportunity to be placed in another classroom. Removal will be reported to the Department of Teacher Education. An **excused absence** is one in which an unforeseen and unpredicted emergency results in absence or tardiness. Excused absences will be treated much as they would for educators in the public schools: illness (with verification), deaths in the family, a car accident, etc. To be an excused absence, the student must call and leave a message with both the cooperating teacher and me.
5. **Writing Requirements.** In assignments, standard English usage is required. Please proof all work you submit. Students who want assistance in this area are encouraged to use the services of the Writing Lab and/or to discuss their questions, problems, and/or concerns with me. Papers with significant language errors (spelling, punctuation, usage, or form) may be returned to you without credit. If so, the expectation is that you will seek the assistance of the writing center, make the appropriate corrections and resubmit the paper or project for credit.
6. **Civility.** Learning is facilitated when **all** members of the community act in a respectful and civil manner to each other. The following types of behavior are not professional, and will result in feedback from the professor. If continued, they will result in a request to withdraw you from the course, with this information sent to the Department of Teacher Education and Speech Communications:
- name-calling, including the use of personal or racial epithets;
  - negative, offensive comments about the work of peers, children, etc.;
  - explosive, angry confrontational behavior that appears harassing, violent or threatening. This may be either verbal or non-verbal;
  - rude speech or non-verbal behavior which interferes with others' learning, for example, repeated speaking while others (peers or the professor) have the floor to talk, making distracting or other non-verbal expressions that are unprofessional (e.g., making faces in response to peers' comments); and/or
  - inappropriate care of the environment, including destruction of the university's or other's property.

7. **Plagiarism.** Honesty is an essential characteristic of all educators. Please reference all ideas and information you receive from others, printed materials, and the internet. Failing to do so will result in a grade of “no credit” for the assignment, with no opportunity to redo. Examples of plagiarism may include turning in an assignment (or part of an assignment) completed by someone else or copied from published or printed materials or the internet, or turning in the same assignment (e.g., a lesson plan) in more than one class.
8. **Extra Credit.** Because the course grade is an evaluation of proficiency on the competencies described in the syllabus, extra credit will not be accepted for this course.
9. **Course Forms.** Many course forms can be found on the university Blackboard site for this course. Access this site at <http://blackboard.colostate-pueblo.edu>.
10. **Blackboard.** Blackboard is a university program utilizing the internet. It is your responsibility to logon to Blackboard and check the announcements in a continuous and timely manner. I will place announcements on Blackboard throughout the week and you are accountable for reading these. If you need assistance with using Blackboard or setting up an account, please contact x2002 as soon as possible. The site address is <http://blackboard.colostate-pueblo.edu>.
11. **Videotape of Lesson Presentation.** All students are required to demonstrate competency in a variety of standards in order to be admitted to student teaching. You will need to videotape your lesson presentation for mathematics to include in your program portfolio to demonstrate these competencies. Videotape equipment may be checked out from the Curriculum Lab or you may use your own. You need not turn this tape into me.

## GRADING

Your grade will be based on your professionalism (as determined by criteria stated in syllabus) and on project completion. Each project will be graded either “credit” or “no credit.” The project part of your grade will depend on the number of projects you complete for credit, demonstrating consistency and breadth of knowledge of course content. The projects required for an A, B, and C are outlined in the following sections. **There is no penalty for receiving “no credit” on a project; however, continuous revision of the same project, and/or revisions required of most projects, will result in a lower grade assigned.** A project may be continually revised until credit is received. You have 1 week after you receive a paper back to revise and resubmit it. **NO** revised projects can be accepted one week past the date in which the project was returned to you. Projects will receive “credit” by adhering to the Assessment Criteria listed below, the expectations stated in the Description of Projects, and demonstrating competence of the standards and benchmarks for the course. It is also expected that you will complete this course with **Academic Integrity** as defined in the CSU-PUEBLO Bulletin.

### ASSESSMENT CRITERIA:

All course work will be assessed on the following as they relate to the course focus/benchmarks:

- organization
- clarity of thoughts
- consistency of thought
- reflection of course content
- thoughtful assimilation/accommodation with evidence of conceptual connections and understanding of content
- effort
- interest in the learning process
- confidence and commitment
- professional presentation
- cooperation and participation

**All projects will be assessed based on the above criteria and the stated requirements in the description of projects.** The purpose of the projects is to provide you with the opportunity to do independent, cooperative, and collaborative group work that is relevant to the construction of elementary mathematics knowledge. The purpose of the “credit”/“no credit” policy is to allow you to meet the standards necessary to become a good teacher, while offering you the time you may need to master the standards. I encourage you to take risks and present personally relevant and meaningful projects, and to be creative in doing them, rather than being primarily concerned with pleasing me.

## GRADE ASSIGNMENTS

You may select which grade you want to work for by completing the required projects for that grade. Please do not submit projects for a higher grade if your intent is to work for the lower grade. "Extra credits" will not be considered when assigning a grade of B or C. Likewise, if any project is omitted from the A or B that is required for the C, a letter grade of D will be assigned. This will occur regardless of all other projects completed. (For example, a lesson presentation is required for A, B, and C grade assignments. If a lesson presentation is not completed and all other "A" projects are completed, a letter grade of D must be assigned because the requirements for the A, B, and C have not been met.

**To earn a grade of A**, you must demonstrate the **highest** level of class attendance, attention, participation, cooperation, preparation, and professionalism, which means that you consistently and often contribute constructive comments and questions that expand and enrich our online and class discussions. In addition, submitted projects must be of the highest scholarly level for undergraduate study, which means that your work has met or exceeded Evaluative Criteria (a-j). If it is not at the highest level, it will be returned for resubmission until credit is received. To earn a grade of A, the following are required at the highest level of undergraduate study:

- Professionalism in Class and Field Experience
- Project A - Math Autobiography
- Project B - Online Discussions
  - B.1). Lead Team—Review 4 resources; more than one type, i.e. internet, book, video, etc.
  - B.2). Peer Reactions—Respond to 5 topics
- Project C - Field Experience
  - C.1). Field Experience Application Forms (professor)
  - C.2). Lesson Plan and Presentation (1)
  - C.3). Cooperating Teacher Evaluations (lesson presentation evaluation-1; final-1)
  - C.4). Field Experience Activity Log (each week)
  - C.5). Field Experience Research-Based Log (8)
- Project D – Team Presentation
- Project E – Class Bulletin Board—(group presentation and 1 individual activity)
- Project F - Class Activities- In order to receive credit for class activities, you must be in class and complete **ALL** the activities. If you were not here, there are no make-ups. Examples of activities include a Math Autobiography, Math Game, Literature Connections; Problem Solving Write-ups, Hands-on Activity Presentations, etc.
- Project G - Changes in Thinking (no late projects)

**To earn a grade of B**, you must demonstrate a **high** level of class attendance, attention, participation, cooperation, preparation, and professionalism, which means that you occasionally contribute constructive comments and questions that expand and enrich our online and class discussions. In addition, submitted projects must be at a high scholarly level for undergraduate study, which means that your work has met and moderately reflected Evaluative Criteria (a-j). If it is not at a high level, it will be returned for resubmission until credit is received. To earn a grade of B, the following are required at a high level of undergraduate study:

- Professionalism in Class and Field Experience
- Project A - Math Autobiography
- Project B - Online Discussions
  - B.1). Lead Team—Review 3 resources; more than one type, i.e. internet, book, video, etc.
  - B.2). Peer Reactions—Respond to 3 topics
- Project C - Field Experience (30 hours per semester)
  - C.1). Field Experience Application Forms (professor)
  - C.2). Lesson Plan and Presentation (1)
  - C.3). Cooperating Teacher Evaluations (lesson presentation evaluation-1; final-1)
  - C.4). Field Experience Activity Log (each week)
  - C.5). Field Experience Research-Based Log (6)
- Project D – Team Presentation
- Project E – Class Bulletin Board—(group presentation)
- Project F - Class Activities- In order to receive credit for class activities, you must be in class. You may not miss more than **two** of the activities. If you were not here, there are no make-ups. Examples of activities include a Math Autobiography, Math Game, Literature Connections; Problem Solving Write-ups, Hands-on Activity Presentations, etc.
- Project G - Changes in Thinking (no late projects)

**To earn a grade of C**, you must demonstrate an **average** level of class attendance, attention, participation, cooperation, preparation, and professionalism, which means that you seldom contribute constructive comments and questions that expand and enrich our online and class discussions. In addition, submitted projects are at an average scholarly level for undergraduate study, which means that your work has not met one or more of the Evaluative Criteria (a-j). If it is not at an average level, it will be returned for resubmission until credit is received. To earn a grade of C, the following are required at an average level of undergraduate study:

- Professionalism in Class and Field Experience
- Project B - Online Discussions
  - B.1). Lead Team—Review 2 resources; more than one type, i.e. internet, book, video, etc.
  - B.2). Peer Reactions—Respond to 2 topics
- Project C - Field Experience (30 hours per semester)
  - C.1). Field Experience Application Forms (professor)
  - C.2). Lesson Plan and Presentation (1)
  - C.3). Cooperating Teacher Evaluations (lesson presentation evaluation-1; final-1)
  - C.4). Field Experience Activity Log (each week)
  - C.5). Field Experience Research-Based Log (4)
- Project F - Class Activities- In order to receive credit for class activities, you must be in class. You may not miss more than **two** of the activities. If you were not here, there are no make-ups. Examples of activities include a Math Autobiography, Math Game, Literature Connections; Problem Solving Write-ups, Hands-on Activity Presentations, etc.
- Project G - Changes in Thinking (no late projects)

**To earn a grade of D or F**, professionalism and project work, which is less than what is stated above, will earn a **D or F grade**. D equates to the failure to complete required projects of at least a C grade or better. F equates to the failure to complete essential projects to achieve success in the class, for example, not finding a field experience placement until several weeks into the semester, not completing the math game and teaching in the classroom or not completing the field experience in a timely manner.

**DROPPING THE COURSE.** Please see the university drop regulations in the CSU-PUEBLO catalog.

**INCOMPLETE GRADES.** A grade of **incomplete** will only be assigned if a student and the professor have agreed upon the grade before the end of the last week of classes and will not be assigned merely because work may be incomplete. **Extraordinary** circumstances such as excused illness or death in the family must have occurred for an incomplete to be considered. In all cases, if an incomplete is granted, it is the responsibility of the student to submit a timeline of due dates for all incomplete assignments. Failing to meet such timelines will result in “no credit” on those assignments. A grade of incomplete cannot result in an “A” grade.

**ADA ACCOMMODATIONS:** *ADA Accommodations:* This University abides by the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, which stipulates that no student shall be denied the benefits of an education “solely by reason of a handicap.” If you have a documented disability that may affect your work in this class and for which you may require accommodations, please see the Disability Resource Coordinator as soon as possible to arrange accommodations. In order to receive accommodations, you must be registered with and provide documentation of your disability to, the Disability Services Office, which is located in the Psychology Building, Room 232.

## **COURSE FOCUS**

Upon completion of all course activities, each student will meet the following benchmarks. Items that are in boldface are important benchmarks for admission to student teaching and will be evaluated in the student’s portfolio.

1. To construct knowledge of mathematics (2.6)
  - examine current forces and trends (**6.1, 6.4**)
  - analyze the underlying theoretical and philosophical positions and their implications in regard to equitable teacher decisions (**6.2, 6.3, 6.4**)
  - examine the current research and its implications (**6.4**)
  - demonstrate an understanding of elementary mathematics content
  - examine issues of diversity and equity and the implications for mathematics teaching (**3.2, 3.7, 6.2, 6.4**)
  - demonstrate a synthesis of constructed knowledge
  - demonstrate mathematical problem solving, communications, connections, reasoning and modeling
  - examine mathematics content area literacy dispositions (**6.3, 6.4**)
  - **demonstrate an awareness of instructional strategies that address equity issues** (3.2, 3.3, 3.6, 3.8, 3.9, 5.2, 6.4)
  - **develop a personal mathematics education philosophy based in sound research** (6.2, 6.3, 6.4)

2. To construct pedagogical (theoretical ideas about how to teach) thoughtfulness (2.6)
  - **construct mathematics pedagogy based on the best professional knowledge** (3.1, 3.3, 3.6, 3.8, 3.9, 6.4)
  - demonstrate professional autonomous mathematics decision making
  - **engage in reflective practices which demonstrate professional knowledge** (6.6, 6.8)
3. To construct curricular connections (2.6)
  - examine mathematics curriculum and instruction and its connections to other subject areas (2.1, 3.2, 5.3)
  - **demonstrate mathematical content connections and cross curricular connections** (2.10a, 3.2, 5.3)
  - **demonstrate an understanding of equity issues and their connections to teaching practices** (2.10b, 3.3, 3.4, 3.6, 3.8, 3.9, 5.8)
  - integrate technology as an instructional aid and as a valuable text resource for students (6.5)
4. To construct a mathematics education knowledge base
  - **apply instructional techniques of content area literacy in mathematics instruction** (2.1a, 2.2, 2.3, 2.4g, h)
  - **demonstrate an ability to construct lessons in mathematics which include strategies that support the NCTM Standards** (2.6, 2.7, 2.8, 2.9, 2.10a-f)
  - **demonstrate awareness of strengths and weaknesses of several formal and informal assessments used to measure mathematical power and incorporates multiple methods to ensure validity and reliability** (4.1, 4.2)
  - **determine factors which influence mathematical power (the six principles for school mathematics, process levels, text factors, reader factors, teacher factors, Piagetian stages of logico-mathematical development, contextual factors, etc) and utilizes these factors during instruction** (2.6, 2.7, 2.8, 2.9, 2.10a-f)
  - **integrate the NCTM process standards throughout every mathematics lesson**
  - **recognize and apply the Colorado and national mathematics standards** (2.2, 2.7, 2.9, 4.1)
5. To construct schema for planning and organizing mathematics instruction (2.6, 2.7)
  - **demonstrate use of the processes of mathematics: problem solving, communication, reasoning, connections, representation or modeling** (5.5, 2.8)
  - **demonstrate awareness and use of children's and young adult's literature as a strategy for learning content knowledge** (5.3)
  - **demonstrate the use of the process levels (concrete to abstract) in planning instruction that is developmentally appropriate** (2.10a-b)
  - demonstrate use of a variety of assessment techniques, including ongoing assessment (4.1, 4.2, 4.3, 4.7)
  - **plans lessons, centers, and games in which the assessment matches the standards and benchmarks** (4.1)
6. To construct a learning community which enhances learning
  - utilize the personal learning communities established in class to support personal growth and development in mathematics education (3.2, 3.4, 3.5, 3.6, 3.7)
  - **apply the techniques of cooperative learning to establish learning communities for children and/or young adults** (5.1c)
  - demonstrate the use of cooperative and academic tasks in cooperative group work (5.1c)
  - modify teaching based on the feedback of others (4.8)
  - **apply a variety of scaffolds to support the growth and development of a variety of learner needs** (3.13)
7. To utilize a variety of professional resources, including ones own research, to improve the quality of student learning (6.4, 6.5, 6.6, 6.7, 8.10)
  - locate information relevant to educational issues and research questions through database searches utilizing the internet (including ERIC) (5.11, 6.7)
  - locate effective lesson plans, activities, and web-based resources to teach mathematics in the elementary classroom (5.11, 6.7)
  - access websites of national and state organizations, as well as their links, and use sites to gain information (6.7)
  - demonstrate use of technology resources in presentations, lesson planning, projects and research (4.9, 5.10, 6.5)