Culture in the Mathematics Classroom - Fall 2010
Cultural Inquiry Process: One Student at a Time
Project Description and Grading Rubric

Quality mathematics teaching requires teachers to know their students well, both in terms of their mathematics knowledge and in terms of their participation patterns, interests, culture, and life experiences. In this project, you will engage in a process of cultural inquiry, meant to support you in broadening your understanding of one of your students in an effort to maximize their success. This project follows the cultural inquiry process outlined in our course reading (Jacob et al.); please refer to that article again for additional guidance as needed. Please also use the Cultural Inquiry Process (CIP) website as a resource: http://classweb.gmu.edu/cip/s/so/sou/sou-ind.htm. It provides additional explanation of the steps of the cultural inquiry process and provides additional examples.

Process Overview

There are seven steps in the CIP process, which are described in more detail below. The steps walk you through selecting focus student(s), gathering information on those students, designing an intervention, and evaluating that intervention. With each step, you will gather data and then reflect on how that information informs your understanding of the student or students about which you are learning. This reflection process will often involve writing "memos" as writing is a powerful tool with which to explore, analyze, and synthesize your thinking. In addition, these memos will facilitate your writing of the final report, which will be the outcome of this project.

The CIP process is a form of action research. I have included some resources for you to learn more about the processes involved in action research. However, the most important resources are those related to your focus student(s), so when time is a consideration (which it almost always is), do less academic reading and more field research.

There is a lot of detail in each step. This detail is not to unnecessarily burden you, but to provide you with guidance and support throughout the process. You will also be encouraged to discuss the process during class. *Please see the Timeline for important due dates.*

Note: In appropriate places, I have given references to your *Action Research* book by Geoffrey Mills so that you can get more information about research methods. I reference this book with *Mills, 2007, pp. xx*.

Quick Links
Timeline
Step 1 – Select focus student(s)
Step 2 – Summarize what you know about the focus student(s)
Step 3 – Consider cultural influences; develop research question
Step 4 – Gather more information
Step 5 – Design an intervention
Step 6 – Evaluate the intervention
Step 7 – Write the final report
Grading Rubric

Timeline

Date   Due

Sept. 27   Draft of your CIP report for steps 1-3. This includes a description of your focus
            student(s), what your puzzlement is, the possible cultural influences, and your
            research question.

Oct. 11   Draft of your CIP report for steps 4 and 5. This includes what information you
            gathered and your data analysis. It also includes a description of your planned
            intervention.

Oct. 25   The final CIP report.

The Steps

Step 1: Select focus student(s) and identify puzzlements

The first step in your CIP study is to identify "puzzlements" about students that you have in your
practice and to select one or more as the general focus for your study. We recommend that you
select one, unless you have a compelling reason to select more than one.

Background on "puzzlements"

Over time, you and other educators have developed knowledge that informs your practice. As
long as you encounter the same kinds of people, situations and problems, your "knowing-in-
practice tends to become increasingly tacit, spontaneous, and automatic" (Schön, 1983, p.
60).When you encounter new people, situations or problems that do not match your previous
ways of thinking, three possibilities exist: you may ignore the surprise, force it into existing
categories, or use it as an opportunity to reflect and explore new categories or points of view
(Schön, 1983). The Cultural Inquiry Process (CIP) is designed to help you take the third route--to
reflect on and explore surprises from cultural points of view.

In the CIP, student performance (i.e., behaviors or attitudes) that you do not understand (i.e., that
is a "surprise") is called a "puzzlement." The term "puzzlement" is used to shift the focus from
the "student as problem" to your need to understand more about what you find puzzling, i.e., it
focuses on the fact that something puzzles you. Your puzzlement can leave you feeling
"positive," "neutral," or "negative" about students' performance. The new behavior, attitudes, or
situations that do not match your previous ways of thinking and that prompted your puzzlement
are considered "puzzling situations."

**To explore a puzzlement through the CIP, you do not need to know in advance that it has
cultural influences**. By treating a puzzlement as an *opportunity* to explore cultural influences on
a student's or students' performance in educational settings, you increase the likelihood of
developing appropriate interventions.

Tips for identifying and presenting puzzlement(s)

- Select a puzzlement that is important (either to you or more broadly)--for example, a recurring issue. This will make the effort involved in the CIP seem more worthwhile.
- Similar patterns of performance across individuals in a group are likely to have cultural influences.
- Lack of success by any student or group of students should create a puzzlement for you.
- State your puzzlement in a neutral manner, i.e., without value-laden words (good, bad, etc.) and without explicit or implicit judgments. For example: "I am puzzled by girls' attitudes toward mathematics;" or "I want to understand more about John's behavior in school."

Suggestions for writing

You might write one or more memos to help you consider possible puzzlements to explore in your CIP study. You might first list several puzzlements you have. Then for each puzzlement, you might briefly describe the puzzlement, discuss your thoughts and assumptions about the puzzlement, and explore why it is important for you personally and in relation to broader issues.

You might draft the beginning of your CIP study report after you have selected a puzzlement as your focus. To do that you might describe your puzzlement and its context using neutral language. You might also include a "vignette," or concrete description of a particular incident that exemplifies your puzzlement.

Step 2: What is already known?

The purpose of this step is for you to collect and summarize existing information that is easily available in order to begin describing and understanding the focus student(s) and their context(s). Some suggestions follow:

- Summarize what you know and have observed about the student or group and the context. Information about the student or group could include a description of their performance or behavior in your class and other contexts. Information about the context could include reflections on your own gender, social class and cultural background; cultural context of the school; peer influences or interactions; and contexts of the student and their family.

- Summarize other information currently available to you about the student or group and context. School records and other educators' experiences with the student or group may provide useful information about the student or group.

Other questions to consider (this is not an exhaustive list):

a. What do you know about their academic record?
b. What do you know about their abilities in mathematics? What are their strengths? What are their weaknesses?

    c. What do you know about how they participate in groups?
    d. What do you know about their social circle – who are their friends inside and outside of school, what do they like to do for hobbies?
    e. What do you know about the students' family?
    f. What do you know about what the student views as important to him/her?

Suggestions for writing

You might write a memo for each source of existing information, describing what you found and exploring how that information might be useful in understanding your puzzlement.

You might draft this section of your final report by drawing on your memos to summarize what you know about your focus student(s) and their context(s) and your preliminary thoughts about influences on your puzzlement.

Step 3: Considering Alternatives

The purpose of this step is twofold: to consider carefully a range of *possible* cultural influences on your puzzlement and then to select one or more of them that you think are *likely* to be influencing your puzzlement (based, in part, on the information you identified in Step 2, and on previous theory and research). The cultural influence(s) you select become, in effect, your research question(s).

Cultural influences and CIP questions

To help you consider systematically a wide range of possible cultural influences on your puzzlement, I have organized them through "CIP questions," which are linked below. *Carefully consider all of the cultural influences discussed in the following CIP questions and subquestions before you decide which cultural influence(s) to examine in your study*. You can move easily through all the CIP questions and their subquestions by starting with question 3.1 below and then following the "Consider next question" link at the bottom of each page.

Complete List of CIP Step 3 Questions and Subquestions

3.1   How might your beliefs or values, or those of other educators, be contributing to the puzzling situation?

3.2   How might aspects of the school's culture(s) be contributing to the puzzling situation?

      3.2.1   How might competition be contributing to the puzzling situation?

      3.2.2   How might tracking or ability-grouping be contributing to the puzzling situation?

      3.2.3   How might instructional programs for English language learners be contributing to the puzzling situation?

3.3   How might cultural mismatches be contributing to the puzzling situation?

      3.3.1   How might mismatches between a student's or group's interaction patterns and those of the school be contributing to the puzzling situation?

      3.3.2   How might mismatches between a student's or group's home culture(s) and the school curriculum content be contributing to the puzzling situation?

      3.3.3   How might mismatches between a student's or group's preferred learning approaches and classroom processes be contributing to the puzzling situation?

3.4   How might students' experiences and meanings be contributing to the puzzling situation?

      3.4.1   How might influences on students from outside school be contributing to the puzzling situation?

      3.4.2   How might imbalances in power or economic opportunities, and peer group response to those imbalances, be contributing to the puzzling situation?

3.5   How might individual students' cultural "negotiations" be contributing to the puzzling situation?

      3.5.1   How might individual students' negotiations of home, peer, and school cultures be contributing to the puzzling situation?

      3.5.2   How might individual students' negotiations of their cultural identities be contributing to the puzzling situation?

Selecting one or more cultural influence as the research question(s) for your CIP study

From your reading about cultural influences (from the CIP questions in Step 3 and other resources), identify one or more cultural influences that you think may be relevant to your puzzlement. The cultural influence(s) you select become the basis for your research question(s).

The CIP questions provide a format that you can follow in stating your research question(s). However, you may want to adapt the CIP questions in Step 3 slightly to fit your particular study. For example, CIP Step 3.2 asks "How might the school's culture(s) be contributing to the puzzling situation?" Scott Seifried in his CIP study of middle school choir classes might have rephrased his research question related to Step 3.2 as "How might the culture of the GT program, in which most of my eighth grade music students participate, influence their expectations and behavior in my choir class?"

Role of cultural influences

The cultural influence you select for your research question should be viewed as the *starting point* for your explorations. You might find that as you gather information one or more other cultural influences are helpful in understanding the puzzlement you are investigating. If this occurs, you can then shift your efforts to collecting information related to the new influence(s). (See Scott Seifried's CIP study for an example of someone who gradually refined his questions as he carried out his CIP study.)

Because cultural influences are a starting point, you might wonder about exploring your puzzlement with a totally "open" stance, i.e., without using any cultural influence in your research question. However, this is not really possible. We all bring (usually hidden) assumptions to our investigations. Beginning with one or more cultural influences in mind helps by *explicitly* identifying a cultural influence or influences that you want to use as a starting point.

Using other resources

Theory and research conducted by others (whether cited in the CIP Web site or not) can be useful to you as you are considering possible cultural influences on your puzzlement. While theory and studies conducted by others cannot tell you *exactly* what cultural influences are relevant to your puzzlement, they can often provide some useful clues or suggestions. Research examining cultural influences on students or school subjects *similar* to the focus of your puzzlement can help you identify cultural influences that previous researchers have found relevant. Moreover, research on students or school subjects *different* from the focus of your puzzlement can also provide ideas for possible cultural influences related to your puzzlement because similar cultural processes occur across a range of students and school subjects.

The Resources section of the CIP site provides links to many potentially useful references and Web sites; you can identify others by searching library catalogs and the Web. The Tutorial on Using Resources in the CIP provides general suggestions in the Overview. The Tutorial also provides two other aids: it examines a sample CIP study to see how one educator used other resources in her study, and it presents suggestions and a template for using resources in your own CIP study.

Once you have selected one or more CIP question to guide your study, *it is important that you read beyond the discussion presented on the CIP Web site in order to develop a deeper understanding of the cultural influence(s) you will examine*. Reading sources cited on the CIP Web site for the cultural influence you selected is an obvious place to begin. These sources will help you deepen your understanding of the cultural influence(s) you selected, which will allow you to conduct a more useful study.

Suggestions for writing

Memos can be a useful tool in this CIP step to help you explore possible cultural influences on your puzzlement. For example, you could write a memo as you read through the CIP Step 3 pages to explore how the various cultural influences discussed might be influencing your

puzzlement. To do this you might first state your puzzlement, then for each of the substeps in CIP Step 3, you might list the influence discussed and your thoughts about whether this might be influencing your puzzlement--creating a "log" of your thoughts about each possible influence. You could add further thoughts as you reflect on possible influences in order to decide which to examine in your study.

Once you have decided on which cultural influence(s) you want to examine, you might draft this section of your report. First, state the cultural influence(s) you have selected to examine. Then, for each cultural influence selected, briefly discuss why you think that cultural influence is a *likely* influence on your puzzlement--drawing on information you collected in Step 2 as well as information from previous theory or research for support.

Step 4: Gather and analyze relevant information as needed.

Having selected one or more research questions about cultural influences in Step 3, your purpose in Step 4 is to understand cultural influences on your focus student(s) and, in particular, whether and how the cultural influences in your research question(s) seem to be useful in understanding your puzzlement. Your answer will help you decide what interventions to try in Step 5.

Careful attention to research methods used to collect and analyze information is important because the methods you use affect the quality of the information you gather. You want high quality information to be the basis for your understanding of your puzzlement, for developing your intervention(s) in Step 5, and for convincing others of the validity of your work.

Gathering information

Before beginning to gather information, it is useful to consider *multiple* methods of data collection. Every method of data collection has some limitations; using data collected through different methods helps compensate for the different limitations. Using multiple methods of data collection is sometimes discussed as "triangulation" of data (*Mills, 2007, pp. 56-57, 86*) offers a brief discussion and examples of triangulation using multiple methods of data collection. Because you are exploring cultural issues, a general principle for gathering information is to take a "learner" stance, i.e., that of one seeking to learn about others' perspectives and experiences. *This includes considering how your own beliefs, values, assumptions, and biases may influence what you hear and how you interpret it*. Open-ended data gathering provides more opportunity to understand other perspectives. Standard methods for gathering open-ended information are:

- Open-ended interviews

  Informal interviews (conversations) can be viewed as a subset of open-ended interviews. Informal interviews are often spontaneous and can be part of your daily interactions with the participants in your study. Be sure to write at least "shorthand notes" from your informal interviews as soon as possible after they occur, and later the same day expand these brief notes into more formal notes that summarize the informal interviews.

For more information see *Mills, 2007, pp. 62-65, Informal Ethnographic Interview*.

- Participant observations

  For more information see *Mills, 2007, pp. 57-61, Experiencing Through Direct Observation*.

- Journals

  For more information see *Mills, 2007, pp. 69-70, Journals*.

Analyzing the information gathered

Analyzing and reflecting on the information you gather should occur *before* data collection has ended because this allows your preliminary findings to guide your subsequent data collection. A useful way to conduct preliminary analysis is to write about the information you are collecting. This could include short thoughts, comments, or questions written in brackets while you expand on your observation notes or transcribe interviews. You could also write memos that summarize parts of your data or themes within it. For more information on data analysis, see *Mills, 2007, Chapter 6*.

Once the information has been gathered and prepared, it is useful to identify patterns in the information that occur within and across various sources of information. *It is important to think about the patterns in relation to the cultural influence(s) you identified for your research question(s)*. What does the information gathered indicate about possible cultural influences on the puzzlement? (Answers to this question should provide a basis for developing interventions in CIP Step 5.) When you have a sense of patterns *within* categories, you should also look for patterns *across* categories. It is useful to write memos that summarize the patterns that you have found. As discussed below, it is important to identify examples (for example, quotes from interviews or descriptions from observations) as evidence for the patterns you have found.

It is important to remember that the purpose of your data analysis in general is to *understand* the cultural influences on your puzzlement, and that your purpose in particular is to decide whether the cultural influences you thought might be relevant, i.e., the research question(s) you selected, seem to be influencing your puzzlement. This involves focusing on the cultural influence(s) you selected but also remaining open to the possibility that something else is a more important influence on your puzzlement. *Thus, it is important to conscientiously look for disconfirming evidence or evidence of alternative explanations, as well as evidence that supports the importance of the cultural influence you originally decided to examine.*

Suggestions for writing

Work on CIP Step 4 contributes to three important components of your final report: a discussion of how you gathered and analyzed your information (sometimes labeled the "methods" section of a report), the presentation of what you found as a result of your analysis, and your conclusions about the cultural or social influences on your puzzlement (which form the base for your interventions in Step 5).

Reporting how you gathered and analyzed your information can occur as a separate section of your report or be "woven" into it. In either case it is important to convey clearly to the reader the kind of information you collected, from whom, and how extensive it is. It often is useful to include your interview questions, other data collection "instruments," and a list of your analysis categories in appendices.

There are many possible ways of presenting the results of your analysis. Several common approaches are discussed below. As you think about how to organize this section of your report, consider which structure "fits" your findings best and which will most clearly convey your results and conclusions to your readers.

- Pattern organization

  In pattern organization the major sections are the major patterns that you have found in your data. If you use this structure, think carefully about how best to order the patterns so as to present a clear "story" to the reader.

- Narrowing or expanding focus

  With this approach the report moves either from "broad" topics to "narrow" topics (for example, from a discussion of the local community, to an overview of peers groups in the community, to a particular peer group), or from narrow topics to broad topics.

- By source of information

  In this approach the major organizing principle is the kind of information collected. Thus, there might be sections on observations, interviews, and a survey. This may be useful if the different kinds of data offer significantly different kinds of insights; a subsequent section should then discuss these differences and how you make sense of them.

As you draft your final report it is also important to pay careful attention to providing adequate evidence to support any assertions you make. Direct quotes from interviews, summaries of survey responses, and descriptions from observations notes are examples of such evidence.

The final component of Step 4 involves sharing your conclusions about the cultural influences on your puzzlement. This is where, based on the evidence and arguments presented in your "results" section and on other research you have cited, you tell the reader what cultural influences you think are useful in understanding your puzzlement. The reader should be able to see clearly the links between the results of your analysis and your conclusions. Similarly, there should be clear links between these conclusions and the interventions you develop and implement in CIP Step 5.

Step 5: Develop and implement intervention(s) as needed.

In Step 4 you collected and analyzed information related to your puzzlement and have drawn some conclusions about cultural influences on your puzzlement. You are now ready in Step 5 to develop and implement interventions based on these data and conclusions.

As you develop intervention(s) remember that they should be related to the cultural influences you found to be relevant to your puzzlement. Keeping this point in mind, you can consider a wide range of possible interventions, such as the following:

- Instructional strategies
- Student-centered strategies
- Curriculum
- Educator-student interactions
- Classroom culture
- Peer interactions in the classroom and school
- School culture or organization
- Home/school connections
- Parent or community involvement in classroom or school
- Community interventions

For some general guidance about developing and implementing action plans, see *Mills, 2007, Chapter 7*. The following linked pages provide ideas for gathering information related to each of the top level CIP questions listed in Step 3. At the end of these pages there are links for the subquestions (i.e., 5.2.1, 5.2.2, etc).

5.1   Your beliefs or values, or those of other educators seem to be contributing to the puzzlement.

5.2   The school's culture(s) seem to be contributing to the puzzlement.

5.3   Mismatches between a student's or group's culture(s) and the school's culture(s) seem to be contributing to the puzzlement.

5.4   Students' experiences and meanings seem to be contributing to the puzzlement.

5.5   Individual students' cultural "negotiations" seem to be contributing to the puzzlement.

Suggestions for writing

Memos can help you think about possible interventions related to the cultural influence(s) you found to be relevant to your puzzlement. For example, you might begin a memo by compiling notes about interventions ideas that previous research has used or shown to be effective in addressing the cultural influence(s) you identified as influencing your puzzlement. (You might list these under headings based on the bulleted list of possible interventions presented above.) You could then expand the memo by thinking about these possible interventions in relation to your own educational setting. You might write additional memos to plan your the implementation of the intervention(s) you decide to try.

As you draft the section of your report about how you developed and implemented your intervention(s), you could report how you decided which intervention(s) to do and discuss how

they are related to the cultural influences you found to be influencing your puzzlement. Citing previous research or theory that linked the intervention and cultural influence is useful.

Step 6: Monitor the process and results of intervention(s).

Having developed and implemented your intervention(s) in Step 5, you need to monitor both the *process* of implementation and the *results* of your efforts.

It is important to monitor the *process* of your intervention(s) to make sure that it is implemented as you intended, or if not, that you know what alterations were made.

It is important to monitor the *results* of your interventions to see if they had the desired effects and to see if they had any unintended consequences. The "desired effects" will probably be related to your original (or reformulated) puzzlement. However, be sure to be open to seeing other, "surprise" results. Try to monitor a student's or a group's performance or behavior over time, rather than taking just a brief snapshot at one point in time. You might think about how you could involve others in helping monitor the results of your interventions. Also, consider asking the focus student or group about their experience related to your intervention(s).

Suggestions for writing

Memos can play similar roles in this CIP step as they did during data collection and analysis in CIP Step 4. They can be used to document and think about how you implemented the intervention(s), information you collect to monitor the effects of your intervention(s), and your analysis of that information. You might want to reread the discussion of memos in Step 4 at this point.

Most readers of your final report will want to know both what you did in your intervention (i.e., the process) and what the results of your efforts were. You could have separate sections for these topics or you could weave them together. The second strategy might be particularly useful if you have more than one intervention and want to discuss the results of each intervention separately.

In presenting the results of your interventions, you will need to clearly convey how you gathered and analyzed information to determine your results, what you found as a result of your analysis, and your conclusions about the effects of your intervention(s). Be sure to present evidence to support your conclusions in a clear and convincing manner. Many of the same issues discussed about writing in Step 4 apply again and you may find it useful to reread that section.

Step 7: Write a report of your CIP study.

Although not all action research projects result in written reports, writing a report is an important step in the Cultural Inquiry Process (CIP) for several reasons. First, writing is a form of thinking. By writing about your CIP study, you are thinking about it in new ways, which should lead to new understandings and new forms of practice. Second, a written record of your study means that you can easily refer back later to this work for your own use. Third, by writing about your study you are able to share the results of your efforts more widely with other educators and

researchers. If you have followed the suggestions for writing provided with the previous CIP steps, you should be in good shape for putting together a report of your CIP study

In addition to the sections you've previously drafted, it is also important to think and share your thoughts about the "so what?" questions:

- What have you learned from your CIP study?
- What are the implications of your CIP study for your practice and your school or larger professional community?
- How does what you found link to conversations in the literature? In what ways does your CIP study reinforce, challenge, or add new knowledge?
- What do you see as possible "next steps" to your study?

In pulling together the drafts from the previous CIP steps and your thoughts about "so what" into a final report, several issues require your careful attention:

- Read across the sections reporting on the CIP steps to make sure that the reader will see a clear and coherent "story" across the sections related to your puzzlement and cultural influences on it.
- Examine the organization and style for consistency across the sections.
- Re-examine your discussion of Steps 4 and 6 to make sure that you have provided adequate evidence to support your conclusions.

The many examples of CIP Studies on this web site may give you some ideas for crafting your report. See *Mills, 2007, Chapter 8* for some suggestions about writing your report. If you are interested in sharing your work beyond your classmates and instructor, see *Mills, 2007, Chapter 9* for some ideas and suggestions.

See the Grading Rubric on the next page.

Grading Rubric

In your write up, please address the following.

Objectives	Unacceptable	Acceptable	Exemplary
Puzzlements Described the puzzlement in detail. Includes description of initial thoughts or assumptions about child. Includes rationale for why puzzlement is important.	0 points	6 points	7 points
The Student Summarizes what is known at outset about the student and his/her context(s).	0 points	6 points	7 points
Cultural Influence(s) States research question. Describes which cultural influences were examined and why (and how) those are likely to influence the puzzlement.	0 points	6 points	7 points
Data Analysis Describes how you analyzed and gathered your data.	0 points	6 points	7 points
Intervention Describes intervention, including how it was selected, developed, and implemented. Describes how intervention relates to cultural influences.	0 points	6 points	7 points
Results Discusses whether the intervention was effective. Includes at least two forms of evidence to support claim.	0 points	6 points	8 points
So what? Reflection comments upon so what questions. (a) What have you learned from your CIP study? (b) What are the implications of your CIP study for your teaching? (c) For your school and the larger professional community? (d) What do you see as possible 'next steps' to your study?	0 points	6 points	7 points
Total Points (out of 50)			