CASE METHODS AND TEACHER CHANGE: SHIFTING AUTHORITY TO BUILD AUTONOMY

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This study investigates how math case methods support teachers' professional development by shifting their perception of authority from external to internal and collective sources. The primary data include transcripts of case discussions and interviews, as well as math assessments of teachers. The findings demonstrate that case discussions provide opportunities for (1) realizing that capability and wisdom exist within the group, (2) developing a critical stance, and (3) developing stronger, more refined content and pedagogical content knowledge. Teachers that capitalize on these opportunities have a richer sense of their own autonomy.

Lisa freely admits that she was a "drill and kill" teacher, never straying far from the basics in the sixth grade text book. She blamed her lack of confidence on her weak mathematical background saying, "I never learned it when I was in school."

Lisa joined case discussions at the insistence of her fellow teachers, three of whom had participated in case discussions the year before. She rarely contributed to the early discussions. When she finally ventured into the conversations, she asked questions that others might have been reluctant to ask, such as, "I'm like the kid [in the case], I don't understand why 100% isn't 100", or "Why doesn't the teacher just tell them how to do it?".

Lisa's confidence and trust grew with each discussion. She began to tap her fellow teachers as resources for new ideas and materials. Instead of skipping percent this year, as she had always done previously, she did a six-week unit using the text as a guide supplemented by "real-world" problems and manipulatives. She prepared her unit collaboratively with Elena a sixth grade bilingual teacher. She even admitted to her students that she did not learn percent until she was an adult.

Lisa experienced dramatic changes in her beliefs and teaching practices, but there were no specific beliefs, approaches, or materials explicitly advocated by the case discussion program, nor was there an expectation of change stated as a program goal. As the designers of the case discussion program we ask the question: What invoked Lisa, and other teachers in her case discussion group, to initiate change?

The language used to discuss professional development, reform, or teacher empowerment often holds an implicit presumption that the developing, reforming, and empowering is done by someone other than teachers themselves. At one extreme, programs may actually predicate their goals on the assumption that teachers are resistant to change and must be prompted by accountability or top-down expectations. Other programs recognize teachers as professionals, but still require them to implement reforms that others think are best for them. Even change itself is viewed as something imposed on teachers. As Richardson points out, a critical feature in the literature on teacher change is that change, research based or otherwise, is defined as "teachers doing something that others are suggesting they do" (Richardson, 1990, p. 11). We propose that programs based on these assumptions may have unintended, and possibly undesirable, consequences. That is, they may be "disempowering for teachers, simply because [they] provide an external source of legitimation for change" (Kemmis, 1987, p. 82).

Lee Shulman (1986) first advocated adapting case methods from other professions to education. For the past six years, we have studied the use of cases as a professional development tool. We use cases written by classroom teachers, as stimuli for discussion. One of our primary goals has been to help teachers recognize themselves as their own change agents, both within the program and in their day to day experiences as teachers.

To begin, let us explain what we mean by a case. A case can be either framed as "an instance of exemplary practice" or it can carry "no presumption that the case itself illustrates either exemplary or ineffective practice" (Merseth, 1991 p. 2). Our cases follow the latter model (Barnett, Goldenstein, and Jackson, in press). They are narratives designed to promote discussion of significant issues, portray a

variety of teaching strategies and philosophies, and highlight the complexity, rationality, and flaws in student thinking. They were written by fourth through eighth grade teachers about the surprises, perplexing situations and dilemmas encountered while teaching rational numbers.

The structure of case discussions is designed to maximize teacher direction and control. The discussions are lead by a facilitator whose role is to ask teachers to clarify and elaborate their ideas, justify their positions, and critically examine alternative perspectives. Teachers frame the issues to be discussed, decide where the discussion should start, and assess the process and content of the discussion. The aim is for discussion groups to experience a gradual shift from predominately facilitator-guided discussion to more teacher-guided discussion, and ultimately for the teachers themselves to become their own facilitators.

Since its inception, this program has also relied on teachers to be involved in decision making and control at a broader level. Teachers serve as advisory board members, help coordinate and plan the logistics of the program, write and revise cases based on field testing results, and contribute to the design of the research component. They are now taking leadership roles by learning to facilitate case discussions.

We believe that the structure of the case discussions and the design of the case discussion program itself helps shift teachers' perceptions of authority from external sources to internal and collective sources. However, our observations indicate that something more fundamental also contributes to the changes in ways that teachers are thinking about their roles, both within the discussion group and with their colleagues and students outside of the discussion group. This study identifies and describes other aspects of case discussions that influence the ways teachers perceive their own authority and establish autonomy as individuals and as a group.

THE STUDY

This study is part of an on-going research program at Far West Laboratory which examines the effects of case writing and case discussion participation on teacher knowledge, beliefs, and practices (Barnett and Tyson, 1993; Barnett and Sather, 1992; Barnett, 1991; Shulman, 1990, 1991, 1992). The purpose of this study was to learn more about the nature of case discussions as stimuli to professional growth. Specifically, this is an interpretative study (Erickson, 1986) addressing the following question:

Research Question

How do case discussions contribute to a shift in locus of authority and to the development of individual and group autonomy?

Data Collection

This study is based on many sources of data collected over a period of two years from 20 teachers who participated in case discussions for 1 or 2 years. The discussions were generally held once a month after school, for a total of 30 hours during each school year. Our data include the following:

1) videotapes and/or audio-tapes of all case discussions, as well as transcriptions of these tapes
2) videotapes of three teachers' reflections about their own teaching shown on videotape
3) pre-assessments and post-assessments of teachers' understanding of rational numbers (for 20 teachers)
4) structured oral interviews, each lasting 45 minutes to 1 hour (for 20 teachers)
5) researchers' notes from all case discussions.

This report will focus primarily on a subset of the data collected from a case discussion group formed by seven teachers. We targeted this group because they were all from the same school site and could experience collegial opportunities outside of the case discussion group. This school serves a high concentration of underprivileged students and ethnic minorities, and includes a large Latino population and many Asian immigrants who have limited English proficiency. The teachers are also a diverse group, representing a range of teaching experience (from 2 years to more than twenty), professional development exposure (from none to extensive), and grade levels (from fourth to sixth).

Findings and Discussion

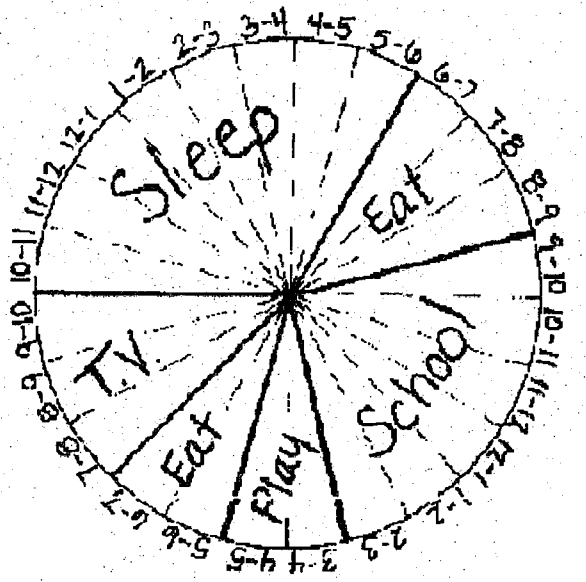
To investigate the ways that case discussions contribute to a shift in locus of authority and to the development of individual and group autonomy, we analyzed transcripts from case discussions and interviews with teachers. We looked for ways that autonomy and authority changed over the course of the year and considered what aspects of the case discussions might be responsible for these changes. From this analysis, we determined three ways that case discussions contribute to teachers' perceptions of their own authority and thus build autonomy. Case discussions provide opportunities to:

- realize that capability and wisdom exists within the group
- develop a critical stance
- develop stronger and more refined content and pedagogical content knowledge bases.

To illustrate how teachers' individual and collective autonomy is influenced by these different aspects of case discussions, we have constructed a narrative that includes excerpts from one case discussion. This discussion was selected because it contains several vivid examples that illustrate our findings. It took place February, 12, 1992 and was the fifth case discussion for this group. We realize that by summarizing data and condensing events we may misrepresent the conversation among teachers, but we have tried to preserve the essence of the discussion.

SIX HOURS ISN'T ONE SIXTH OF A DAY: EXCERPTS AND COMMENTARY FROM A CASE DISCUSSION

In this case the teacher-author writes about a lesson in which she asked her students to make circle graphs representing the amount of time they spend on activities during a day. The circles given to the students were divided into 24 parts, one part for each hour of the day. The case included a circle graph that one of her students drew. The teacher asked the students to name the fractional part of the graph that was spent conducting each activity.

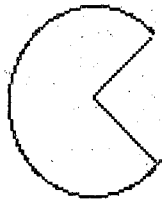


Teachers in the discussion group raised several issues with regard to this case. One of the issues discussed was why students in the case had difficulty seeing that the section of the graph representing time spent in "school" was one fourth of a day. Sue argued that it is "much more visible" (p.2) to start with a circle divided into fourths and figure how out many twenty-fourths it represents than to see one-fourth imbedded in a circle "presubdivided" into twenty-fourths. ("Presubdivided" was a term coined by this group and used frequently in their case discussions.) After some discussion, most teachers agreed with Sue, even though the idea seemed counterintuitive at first.

The case discussion participants also speculated that maybe students couldn't name the one-fourth because they were accustomed to the text book rule of counting the number of equal parts to determine the denominator, and the number of shaded parts to determine the numerator of a fraction. If students focused on the unequal sized parts representing time spent on the different activities, they would be unable to name the fraction based on the textbook rule that they had learned.

This prompted Sue to question whether or not unequal parts could even represent fractions. According to a definition she had been using, the parts had to be equal or it wasn't a fraction. This began a serious debate. Sue went to her classroom to get some examples from a resource book she had been using with her students.

Returning to the group, Sue described how she had shown her students different drawings and asked them to determine if the drawing represented a fraction and what fraction it represented, based on the definition from the book. The drawings were not the usual textbook drawings of circles and rectangles, and one drawing in particular (shown below) stimulated a spirited debate among her students (transcript 2/12/92, pp. 7-8).



Some students claimed that the drawing represented three-fourths, some that it represented three-thirds, and others that it wasn't a fraction at all, but a whole. Sue reported that she had accepted all of these answers because the students were able to defend their answers based on a three-part definition that she had presented earlier to the class.

In response to Sue's "classroom case", Nancy and Jim discussed whether or not Sue should "allow" her students to consider this drawing as a whole, even though her students had justified their assertion saying that it was a "whole PacMan."

Nancy: I'd let them go ahead and see it as a whole with a part missing, but I would be really happy when they saw the PacMan shape as the whole. Therefore, they're getting themselves out of that rut saying the whole has to be the circle.

Jim: I have a problem with the directions of this thing and maybe it's because I'm simpleminded, but I want my students, to get something firmly fixed in their mind which is this visual sense of what fractions might be. What I'm afraid of is if I've led them through this, their original visual sense that this represents three-quarters of something is going to be confused by a lot of these things that will leave them less intuitively able to solve problems than they were beforehand. I don't think very many of them are going to be the brilliant intellects that will be able to apply a definition and a procedure and so on to a new problem and come out with a creative answer.

Facilitator: So what would you recommend?

Jim: Well I would recommend staying away from irregular shapes, giving them a variety of regular shapes divided into fractions or relatively regular numbers, not giving them these ambiguous things.

Sue: But somehow we want them to get the concept of the one, and that's all my discussion was.

Jim: But I would not show students [irregular shapes] at this point, except for a handful, like the PacMan one.

Sue: Maybe it does depend upon the level of the student, but I feel that at some point it's good to get them out of that thinking that the one square is the whole, the one circle is the whole, or the one long strip.

Lisa: Maybe they're not ready for [irregular shapes]. Maybe if we worked to get 4th graders to understand the parts, then by the time we get to 6th grade we could take them farther. I see what Jim is saying. . . But they need to have some kind of understanding, and if they don't have that basic understanding, then how can they know what one-fourth is? Why is that a quarter? Because I'm the teacher?

The facilitator sensed that Elena was troubled and asked her to comment. Elena referred back to Jim's earlier statement that not very many of these kids are going to be "brilliant intellectuals." She was concerned about saying that "this is as far as these kids are going to go." As a Latina, teaching in a school with a high concentration of Latino students, and as one who is dedicated to addressing equity issues in the Latino community, this was salient for Elena. So she raised the issue for the group to consider. There was discomfort among the group members in talking about this issue. Jim reassured Elena that it was not his intention to underestimate the students' abilities. Nevertheless, the conversation prompted them to realize that this issue might need further attention. As a result they discussed the issue informally after the case discussion and decided to initiate case discussions about equity issues in the future.

The conversation turned back to a safer topic as everyone joined the deliberation about what represents a whole and what represents a fraction. They debated examples from Sue's resource book and referred back to examples from earlier cases. Although there was no clear consensus about the teaching implications, there was an awareness that something that looks like a part, might be considered a whole depending on the situation. For some teachers, using ambiguous examples with students was desirable, for others it was questionable.

Sue was clearly unsettled by this discussion. She was questioning the role of a definition, her uncritical use of the resource book, her colleagues' opinions, and her own understanding of fractions. Near the close, she reflected back on the case discussion.

Sue: I don't know how many times I've heard people say things, and I go wait a minute! I looked at this and I said oh boy, and I didn't look at it with a discerning eye. I questioned the circle [graph] myself, and it doesn't fit the definition. And I was telling Elena I'm the kind of person who has to plow through it [the resource book]. I accept it when it's written, and that's the way I'm going to go with it. p 21But right now I am getting a little anxiety. I'm pushed and pulled about it.

This discussion, like many others, closed with unsettled issues that continued to arise in subsequent discussions. It is clear from the complete transcript of this case discussion that the teachers had begun to rely on each other, rather than the facilitator or an external resource to frame, examine, and resolve issues. In the sections below, we will discuss how the substance of case discussions like this one contribute to an internalized sense of authority for individuals and the group. Although each aspect is discussed separately, they are likely interrelated.

CAPABILITY AND WISDOM WITHIN THE GROUP

Our analysis leads us to believe that case discussions can lead to a professional community among teachers by providing them with opportunities to realize and rely on the capability and wisdom of the group. As the discussions progress, they began to develop similar, though not identical, philosophies and values, a common language, a set of shared experiences, and mutual goals.

The professional community evidenced by the above case discussion and subsequent discussions was demonstrated in many ways. Teachers began to co-plan, test, and revise instructional units together. They talked to each other about content or methods that they didn't understand. They developed what Ingvarson and Laughran (1992) call a "mutual accountability", where they questioned and supported each other about issues such as expectations of students, curriculum articulation among different grade levels, and concerns about achievement tests.

DEVELOPING A CRITICAL STANCE

The model for discussing cases is designed to elicit thoughtful criticism. The facilitator challenges teachers — and the teachers challenge each other — to justify their responses, to examine both the desirable and undesirable consequences of recommendations, and to identify the constraints and limitations of different ideas. By becoming better informed of both sides of the issues, teachers decide for themselves based on their own experiences and situations.

In the beginning, the facilitator had to probe for critical analysis and ask for different perspectives. Through the course of the discussions, we found evidence that teachers developed an increasing predilection to offer critical analysis of the cases, of each other's comments, and of their own teaching. This process was not spontaneous for teachers, possibly because they needed to first develop an

environment of trust, were anxious to portray a "politically correct" position, or because they were uncomfortable with the authority role that criticism requires. As illustrated in the case discussion above, teachers had developed the trust within the group to expose their own teaching struggles for criticism and to confront delicate ethical issues.

CONTENT AND PEDAGOGICAL CONTENT KNOWLEDGE

In earlier studies we found that discussing a collection of cases in a relatively narrow domain of mathematics learning, such as rational numbers, enhances both teachers' content and associated pedagogical content knowledge bases (Barnett, 1991; Barnett & Sather, 1992). We do not think that the same results would have occurred in this study if teachers had not learned more about rational number teaching and learning from the cases. In the case discussion above, teachers struggle to understand the meaning of a fraction, the arbitrary nature of the whole, and how the mathematics might look from a student's point of view. With each discussion their understanding of rational numbers becomes deeper and more refined. This study suggests that strengthening content and content pedagogy may be essential in developing a sense of internal authority and autonomy. Stronger content and pedagogical content knowledge also appears to contribute to the development of a critical stance. If one's own knowledge is "shaky", how can one confidently analyze someone else's work or comments? It may also appears to increase risk-taking which is closely tied to autonomy.

CONCLUSIONS AND IMPLICATIONS

In this paper we presented an overview how the structure of the case discussion program allows teachers to take more ownership in their own professional growth. The subject of our investigation was how other, subtler aspects of the case discussions might have contributed to teachers' perceptions of authority and the development of autonomy. We identified three ways that this occurs: the realization that capability and wisdom exists within the group, the development of a critical stance, and the development of a stronger and more refined content and pedagogical content knowledge base.

We argue that in addition to changing the structure of a professional development program to offer more opportunities for teachers to be in charge, teachers need opportunities to enhance their pedagogical knowledge. We agree with the conclusions of Wilcox, Lanier, Schram, and Lappan (1992) that, "One of our biggest challenges may lie in how to develop in preservice [and inservice] teachers a disposition to ask critical questions—about curriculum, instructional practices, educational policies, testing, their own learning and that of others" In our view the development of professional judgment and teacher empowerment may depend on creating environments where teachers learn to become their own authorities, holding themselves mutually accountable and responsible for what occurs in their classrooms.

REFERENCES

Barnett, C. (1991). Building a case-based curriculum to enhance the pedagogical content knowledge of mathematics teachers. *Journal of Teacher Education, 42*(4), 263-272.

Barnett, C., Goldenstein, D., & Jackson, B. (1993) *Dilemmas of teaching: Math cases to promote inquiry, discussion, and reflection.* Unpublished manuscript.

Barnett, C. & Tyson, P. (1993, April). *Mathematics teaching cases as a catalyst for informed strategic inquiry.* Paper presented at the annual meeting of the American Education Research Association, Atlanta.

Barnett, C. & Sather, S. (1992, April). *Using case discussions to promote changes in beliefs among mathematics teachers.* Paper presented at the annual meeting of the American Education Research Association, San Francisco.

Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed.) (pp. 119-161). New York: Macmillan.

Ingvarson, L. & Loughran, J. (1992). Loose connections: The content of science teachers' work. The Science Education Professional Dvelopment Project.

Kemmis, S. (1987). Critical reflection. In M. F. Wideen & I. Andrews (Eds.), *Staff development for school improvement a focus on the teacher* (pp. 73 - 90). New York: The Falmer Press.

Merseth, K. (1991). *The case for cases in teacher education.* Washington, DC: American Association of Higher Education and the American Association of Colleges for Teacher Education.

Richardson, V. (1990). Significant and worthwhile change in teaching practice. *Educational Researcher, 19,* 10 - 18.

Shulman, J. (1992, April). *Tender feelings, hidden thoughts: Confronting bias, innocence, and racism through case discussions.* Paper presented at the annual meeting of the American Education Research Association, San Francisco.

Shulman, J. (1991). Revealing the mysteries of teacher-written cases: Opening the black box. *Journal of Teacher Education, 42*(4), 250-262.

Shulman, J. (1990). Now you see them, now you don't: Anonymity versus visibility in case studies of teachers. *Educational Researcher, 19*(6), 11-15.

Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher,15*(2), 4-14.

Wilcox S., Lanier, P., Schram, P., & Lappan, G. (1992). *Influencing Beginning Teachers' Practice in Mathematics Education: Confronting Constraints of Knowledge, Beliefs, and Context.* East Lansing, MI: The National Center for Research on Teacher Education.