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ABSTRACT

Using three instances from elementary school teaching experience, the paper examines the ways in which subject matter knowledge influences pedagogical thinking. It is proposed that subject matter knowledge creates two major problems for teachers. First, it results in an explosion of the curricular landscape, for if teachers know subject matter well, the curricular territory expands. This expansion includes a blurring of the boundaries between different school subjects. Second, subject matter knowledge is a necessary but not sufficient condition for creating powerful instructional representations. Teachers, therefore, need pedagogical content knowledge as well as knowledge of their subject matters. (Author/DB)

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Series No. 24

MASTODONS, MAPS, AND MICHIGAN: EXPLORING UNCHARTED TERRITORY WHILE TEACHING ELEMENTARY SCHOOL SOCIAL STUDIES

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Center for the Learning and Teaching of Elementary Subjects

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College of Education

Michigan State University

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Abstract

Using three instances of her elementary school teaching, Wilson examines the ways in which subject matter knowledge influences her pedagogical thinking. She proposes that subject matter knowledge creates two major problems for teachers. First, it results in an explosion of the curricular landscape, for if a teacher knows her subject matter well, the curricular territory expands. This expansion includes a blurring of the boundaries between different school subjects. Second, Wilson claims that subject matter knowledge a necessary but not sufficient condition for creating powerful instructional representations. Teachers, therefore, need pedagogical content knowledge as well as knowledge of their subject matters.

MASTODONS, MAPS, AND MICHIGAN: EXPLORING UNCHARTED TERRITORY WHILE TEACHING ELEMENTARY SCHOOL SOCIAL STUDIES[1]

Suzanne M. Wilson[2]

> The educator's part in the enterprise of education is to furnish the environment which stimulates responses and directs the learner's course. In last analysis, *all* that the educator can do is modify stimuli so that response will as surely as is possible result in the formation of desirable intellectual and emotional dispositions. . . . Studies of the subject matter of the curriculum have intimately to do with this business of supplying an environment. (Dewey, 1916/1966, pp. 180-181)
>
> The educator is responsible for a knowledge of individuals and a knowledge of subject-matter that will enable activities to be selected. (1938/1963, p. 56)

Taking Dewey's charge to heart, I began teaching a third-grade social studies class this year. I did so because I wanted to examine the relationships between one's knowledge of the subject matter and one's ability to teach elementary school. Having considered the knowledge required for accomplished secondary school history teaching (Wilson, 1988, 1989; Wilson & Wineburg, 1988; Wineburg & Wilson, 1988, in press), I was interested in investigating the role of subject matter knowledge in elementary school teaching. Coupled with a concern for the lack of substance in the elementary school social studies curriculum (Brophy, 1990; Crabtree, 1989), I decided to create a curriculum that would engage students in the idea work of social studies by using the subject matters of the social studies--history, anthropology, and geography, for example--to supply a Deweyian educative environment. While implementing said curriculum, I would examine the role my knowledge of those subject matters had on my pedagogy.

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[1] Paper presented in April 1990 at the annual meeting of the American Educational Research Association, Boston, MA.

[2] Suzanne Wilson, assistant professor of teacher education at Michigan State University, is a senior researcher with the Center for the Learning and Teaching of Elementary Subjects. The conceptualization of this paper benefited from conversations that the author had with Sue McMahon early on in her teaching. Deborah Ball's comments and criticism, as always, were helpful and thoughtful. Finally, the author wishes to thank Carol Yerkes who graciously lets her borrow her classroom each day.

Although I was an experienced high school teacher and teacher educator, I began the year with little knowledge of elementary school teaching. In some ways, then, my knowledge of subject matter and corresponding lack of knowledge about children and elementary school pedagogy, management, and culture made me something of an unusual natural experiment: I was a case of someone learning to teach elementary school with virtually only one kind of knowledge--knowledge of the content to be taught. Oftentimes new teachers do begin their careers with little knowledge, but their strengths are not often in the subject matters they are to teach (cf. Ball, 1988; Ball & McDiarmid, 1990; Grossman, Wilson, & Shulman, 1989).

As a novice teacher, my success has been sporadic. It is difficult to manage 29 students who are not used to having the intellectual freedom to select and study their own questions. Students are baffled by my question, "Why is that so?" for they are seldom asked to explain themselves. Unwilling to use traditional methods of disciplining students, I rely on my ability to ask the right questions and capture their attention and interest. Since this is the first year I've tried to teach, I don't do this well or consistently. As I reflect on the role that my knowledge of the subject matter plays in my teaching--or attempts to teach--I see its role as essential but insufficient.

In this paper I explore two ways in which my subject matter knowledge has figured--problematically--into my teaching. First, I discuss the ways in which my knowledge of the subject matter expands the curricular territory I can choose to explore with my students. Second, I discuss the ways in which subject matter knowledge leaves me ill-prepared to identify the compelling questions to ask 10-year-olds. I use as text for these discussions three extended vignettes from my teaching.

Problem 1: If You Know the Subject Matter Well, the Curricular Possibilities Explode

Recently we have begun working on the history of Michigan, for we are about to write a book about Lansing and Michigan. I decided that we would begin the unit by thinking about what Michigan must have been like before the Indians. I did this because my students already knew about Indians and I have found that I can hook them more easily if I start our explorations with conversations about things they know little about but might be able to connect to other things they already know about. In the case of prehistoric Michigan, I anticipated that many of them would want to talk about dinosaurs.

On the first day, our discussions started rather typically. I asked students what they thought Michigan must have been like before Indians lived here. Their answers varied. Brian thought that there would have been dinosaurs. When I asked him why, he said that he read that there were dinosaurs in California and they drank out of the Pacific Ocean, so there were probably dinosaurs here. Alice thought that there might have been swamps and forests. Joseph--smirking--suggested that there were unicorns, tongue in cheek; Arthur jumped in quickly, taking advantage of the fact that Joseph had interjected humor and silliness, and guessed that there were leprechauns. Katharine--forever the scholar--brought the conversation back to a serious level by suggesting that woolly mammoths lived in Michigan because they had furry coats and liked to live in cold places.

Next I had students read aloud from a book about the history of Michigan in which the author explains that there were woolly mammoths, mastodons, wild hogs, oxen, and giant beavers. Lacking familiarity with either mammoths or mastodons, several students raced to the bookcase to get dictionaries and encyclopedias to find out about these animals.

Meanwhile, I asked the students where these beasts were now, since one doesn't encounter any of them on the streets of Lansing. Matthew explained that as people moved into the state, the animals moved away--into forests and swamps where it was safer and less populated. With her most serious face on, Alice hypothesized that the mammoths disappeared because of the cars. When I probed, she explained that when Oldsmobiles began being produced in Lansing, they would hit mammoths in the street and kill them. Jeremy disagreed, claiming that there were no cars in Michigan when there were mammoths. "No," he explained, "people drove carriages then."

Matthew then said that most of the animals were extinct, having left long ago. We had a discussion about the reasons why animals might have died off. My students had lots of hypotheses: Katharine thought it might have something to do with changes in environment and temperature. Jeremy was convinced that it was man's greed for the ivory tusks of the mammoths. Matthew thought that maybe it was because man feared the big and dangerous beasts. And Katharine volunteered several additional reasons: In cold climates, people needed warm clothes: What better cloth than the fur of woolly mammoths? And, besides, they could use the meat for food.

We were then interrupted by Devon and Amy who had been searching for an explanation of "mastodon." Class ended with a reading from the encyclopedia about mastodons and we traced their migration on a map of the world from Egypt to Asia, Europe, Africa, and eventually to North America.

What I was trying to do in this lesson was launch the class into an exploration of the history of Michigan. I began class with a simple notion: Perhaps a discussion of Michigan should start in prehistoric times. After all, students all too often assume that human beings have always been around and that nothing of any import happened prior to the cowboys and Indians (these two groups come as an inseparable pair). My strategy involved commonplace pedagogy: Ask students to tell you what they already know. This allows them to get engaged in the discussion from the

outset while I get a sense of where their minds are about these ideas. After brainstorming, I then planned to move on to the use of a secondary source for new information that would be read--and then discussed--by the class.

My image of the curricular landscape had three major loci: wildlife, climate, and vegetation (see Figure 1). I believed if students could imagine what prehistoric Michigan looked like, what animals wandered the land, and what the climate was, they would know enough to trace patterns of climate, wildlife, and vegetation and the subsequent changes in these over time. My plan involved having students generate possibilities for what they believed Michigan might look like and then to move on to readings from a book in which there was more information about prehistoric Michigan.

But my landscape exploded in our first discussion (see Figure 2). Most students knew nothing about mastodons and mammoths, for Katharine was the only one who had read about them at home. Matthew wanted to know whether mammoths were mean, and Jeremy wanted to talk about how we could find out. When we traced the migration of the beasts from Egypt to the Americas, it became clear that students had questions about other continents--they had never studied about Africa and Asia, for example. They wanted to know about the temperature of those places since Katharine had suggested that the woolly mammoths lived in Michigan because it was cold. How could this be the reason if they originally came from Egypt? What's more, she had hypothesized that one of the reasons they had died off was because they were forced into areas where it was "too hot" and they couldn't survive with their furry coats. Was she right or wrong?

Then there was the exchange with Alice and Jeremy in which both of them had telescoped history and placed carriages and cars and mammoths in Lansing's streets. It doesn't surprise me that my students have difficulty placing the pieces of history we study into their appropriate time frame: The folklore of elementary social studies teaching is that kids cannot learn history because they have trouble with the concept of time (Crabtree, 1989). But, even if this is true, social studies curricula in elementary schools exacerbate the problem by marching students through a muddle of names, events, and times that have little obvious order and no sense of magnitude. I'm actually

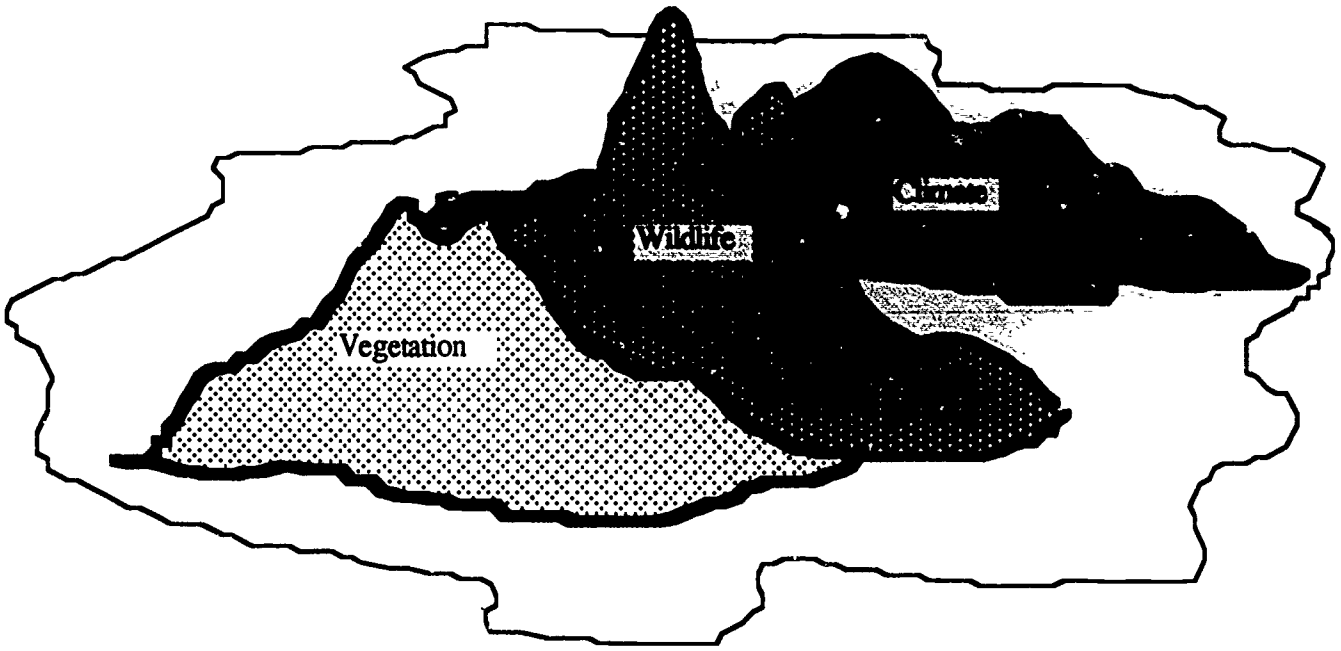

Figure 1. My initial conception of the curricular territory of prehistoric Michigan.

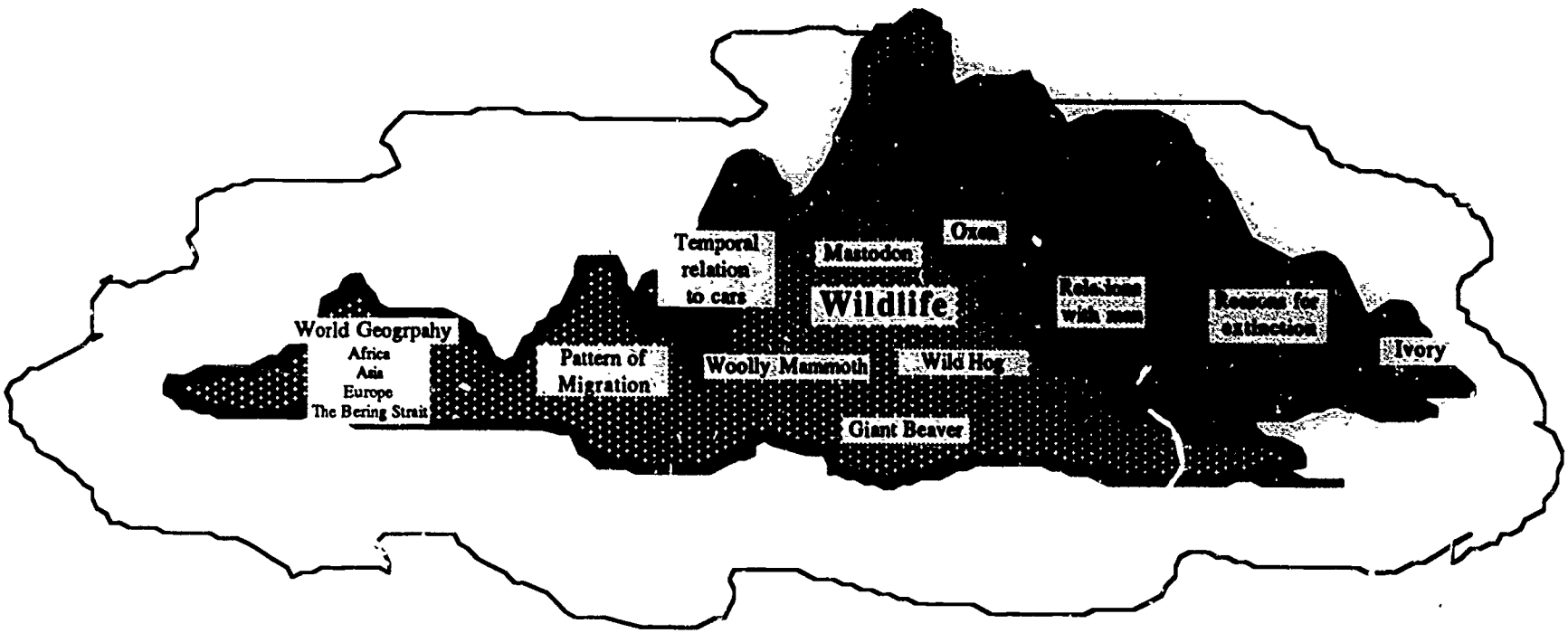

Figure 2. The curricular territory of wildlife after the first class discussion.

not so worried about my students developing precise senses of temporal order, but I do think Alice and Jeremy need to understand that man-made transportation followed the extinction of these beasts.

I'm not even sure that this is a major misunderstanding. It may be that they were simply trying to connect what they have been doing in their small groups with this new conversation. Both children had been learning about the history of the car in Lansing for the past week as part of this unit. The day before they had discovered that early cars had been called horseless carriages. That carriages preceded cars as forms of transportation was news to these investigators, and they were proud of their new knowledge. It is quite possible that their contributions to this discussion were simply genuine attempts to weave together disparate pieces of their new social studies knowledge together in some coherent, all inclusive narrative. My students, like Becker's (1932/1969) Mr. Everyman, might simply be in search of meaning:

> There is lodged in Mr. Everyman's mind a mass of unrelated and related information and misinformation, of impressions and images, out of which he somehow manages, undeliberately for the most part, to fashion a history, a patterned picture of remembered things said and done in past times and distant places. It is not possible, it is not essential, that this picture should be complete or completely true; it is essential that it should be useful to Mr. Everyman. . . . Not that Mr. Everyman wishes or intends to deceive himself or others. Mr. Everyman has a wholesome respect for cold, hard facts, never suspecting how malleable they are, how easy it is to coax and cajole them; but he necessarily takes the facts as they come to him. (p. 15)

Another possibility raised by our conversation concerns extinct animals and the interactions between people and animals as territories are explored and settled. Students had lots of good ideas about why certain animals became extinct but I am sure that a conversation across the class about their beliefs about extinct animals would surface as many inappropriate ideas as appropriate ones. When we travel forward in time and discuss the first settlers in Biddle City (Lansing's first name), I'll need for them to imagine a landscape full of forests and swamps, wolves, and snakes. It might make more sense to them if they understand what and when wildlife roamed the territory that was to become Lansing.

The curricular possibilities raised as I listen to my students talk do not end with these topics, though, for I have other concerns. In our small-group work, students have been doing research

about Michigan and will be reporting back to the large group about what they have learned about Indians, cars, careers, businesses, parks and zoos, and schools. Many of the groups have fallen into the habit of copying sentences and paragraphs directly from the texts they are using. We've discussed this in class; it's no surprise that my students think they should copy the texts since the authors of those books "say it best." But we've also had conversations about how to treat texts and the biases that are inherent in them. We've talked about how authors tell different stories depending on their knowledge, background, and perspective. And while we read *this* book, I am also thinking about whether, where, and when I might want to revisit these conversations by asking students about the text and the validity of the author's claims. Furthermore, because interpretation is so central to history, I am wondering when and how to interject questions about the difference between facts and interpretations in this text.

All of these possibilities are raised in a single 30-minute period. What happens over the course of a week is mind-boggling and I struggle with how to make decisions about what trails will be the most productive, fruitful, or interesting to blaze. Part of my dilemma stems from my commitment to treat students as collaborators in this educational excursion, allowing their interests and questions to figure prominently in what we learn, how we learn it, and when. But my students' interests are not sufficient help in navigating the enormous territory I hear and see when I listen to their talk. As a teacher, I'm not just another member of a walking tour; instead, I'm both guide and ambassador (Lampert, 1989). As a guide, I help students navigate difficult trails; as an ambassador, I invite them to consider subject matter possibilities that are relevant to their interests but unknown to them as naive explorers. This dual commitment--to students and their ideas and to the subject matter--presents me with curricular dilemmas that, armed with subject matter knowledge alone, I am unable to smoothly and gracefully wend my way through.

One way that rich knowledge of the subject matter expands the curricular territory is the inclusion of other subject matters. As I consider what to do with my students and our conversation about prehistoric Michigan, mammoths, and mastodons, animal extinction, and the relation between people and the environment, I am constantly asking myself these questions: What

"counts" as social studies? Do migration patterns of mammoths count? Do discussions of climate and how patterns of climate have changed count? In any day's conversation, myriad subject matters appear: mathematics when we learn about maps and surveys, literature when we study some historical periods, language arts whenever I use reading and writing as tools for helping students learn or look at what they know, and science when we talk about geography. I use an example from the first unit of the year to illustrate:

> During the first unit of the year, our work as a class focused on writing a book about the classroom and the school. Different activities involved surveying the school population for basic demographic information, for example, age and ethnic groups, drawing maps of the classroom, interviewing teachers, and writing autobiographies.
>
> Three weeks of the unit were spent working with maps. By the end of the year, I hope that my students will be able to interpret and use maps in meaningful ways. Rather than show them a map and teach them how to use the scale and key, I decided to start our work on maps by having students construct a map of the classroom. I chose this approach because I know nothing about how students make sense of maps and I wanted to get inside their minds. I also chose this approach because I guessed that children can learn how to use maps and their scales without understanding much about what those maps represent.
>
> On the first day of our map work, I told the class that we were going to draw maps in our notebooks. The notebooks I've provided them for working on social studies are filled with graph paper, and I began class by asking students how we might use that graph paper in drawing our maps. Several students noticed that the floor of the classroom was made of linoleum tiles and that the graph paper had corresponding squares. As a class, we counted the number of squares from the back wall to the front wall (50) and from the right wall to the left wall (40). Several students suggested that we could count 50 and 40 squares respectively on the notebook paper and draw a box for the classroom.
>
> Still in a large group, I asked my students what kinds of objects they would want to include in a map of the classroom. They suggested we include their desks, the flagpole, the teacher's desk, the bookcases, the chalkboards, the rugs, the bathrooms. After we made a list on the board, I let them work on their maps for three days. During that time, I walked around the room and helped students as they worked.
>
> Three days passed. Having looked at what my students were doing in their n ebooks, I knew that the maps varied in quality and development. Some students had barely sketched out the location of the bathrooms, others had drawn pictures of the students, still others had counted the tiles on the floor in an attempt to locate the desks and chairs and rugs. Hugh hadn't done a thing but play with rulers, stick erasers up his nostrils, and hang around Mark.
>
> In an attempt to gauge where the group was in their thinking about maps, I decided to have a class discussion, starting with the question, "What makes drawing a map hard?" Several students talked about trying to locate objects, others talked about not having enough room, many said nothing at all. The discussion fell flat, not surprisingly, since the students who had drawn pictures of the classroom--not maps--didn't find anything difficult about the making of a map. My question, intended to elicit students' thinking together over the construction of maps, didn't work. I left class feeling distraught. Where was I going with all this map stuff?

Still in a large group, I started the next class with another question, "What is the difference between a map and a picture?" In the course of the ensuing lively discussion, my students informed me that maps had keys--instructions for what everything represented--but that pictures didn't have to have them. They also decided that maps had to help you find the exact location of objects; again, pictures weren't required to do so. There was some debate over whether or not pictures were colored and maps were not, but that hypothesis was dropped when someone noticed that the map of the world was colored.

We then looked at some of their products. I picked Mary's first, knowing that she had drawn her map with a scale. For each tile on the classroom floor, there was a square on her map. Holding up Mary's drawing, I asked, "Is this a map or a picture?" As is the case with most of our discussions, some people yelled "Picture!" others yelled, "Map!" "How can we decide?" I asked.

"Let's try to find something!" several students said at once.

"What should we try to find?"

"The rug," Sean suggested.

As a group, we counted the squares on the map and determined that we should be able to find the rug 15 linoleum tiles away from the front wall. Eileen counted the tiles and, sure enough, there was the rug. The class agreed. Mary had drawn a map. Then we considered Melissa's drawing. "Map or picture?" I asked. Again, I selected Melissa's on purpose--she had drawn hers freehand, and for a key she had drawn a picture of a house key. Melissa is a smart, but lazy student who has been testing my limits. I chose her picture because I thought that she, rather than being devastated by a decision that she had not drawn a map, would pick up the gauntlet and prove that she, too, could draw one.

We tested Melissa's map by trying to locate the bookcase. No luck. The class determined that her picture was not a map. With time left for one more discussion, we considered Ned's. Ned's depiction of the classroom was smaller than Mary's but my class was sure that it, too, was a map because they could find things. However, instead of being 50 by 40 squares, Ned's map was only 25 by 20 squares. "How can this be a map," I asked the class, "when he has 25 squares between the front and the back of the room and there are 50 tiles on the floor?" After a wandering discussion about whether or not Ned's picture was a map during which half the class seemed engaged and the other half otherwise occupied with rulers, pencils and notebooks, Katharine stood and stated, "If you divide 50 by 2, you get 25. I think he made every square two tiles instead of one." Ned nodded smugly. My heart smiled for I had witnessed the birth of the idea of scale.

But I also left the class understanding that third graders have a hard time with the concept of scale. Proportional reasoning is difficult for 10-year-olds, yet genuine understandings of scale require the ability to understand proportions. If I am trying to teach maps for understanding, perhaps I should continue this foray for a while, I thought. I decided to change my curricular path and explore the issue of scale with them in depth. So then we discussed how to make a map of the hallway. Several students thought that we could count the tiles, determine the length of one tile and multiply. "Why should we multiply?" I wondered out loud. No one knew. Unfortunately, several suggested that adding or subtracting might do just as well. Deciding to move forward without extended discussion of the reasonableness of using different mathematical tools, I sent Mary and Sean out into the hallway to count the tiles: They reported

back that there were 350. But my counters failed to tell the class--maybe because they didn't think it was important--that 250 of the tiles are 9-inch squares and 100 of them are 3-inch squares.

The next day we took a walk down the hall. "What do you notice about the floor?" I asked. "Oh, no!" five or six students groaned, "The tiles are smaller. We can't use the tiles!" Later that week we determined that the hallway was 2,500 inches long, never mind the debates we had about how to determine that number. In the course of the conversation, though, students often made seemingly random suggestions about the use of addition, division, multiplication, and subtraction. They seemed to have little sense of the differences between those operations. I admit to spending some time discussing how we might want to differentiate between operations so that we could use them purposefully. Someone asked me why we were doing math.

The next week I posed the question, "If our graph paper only has 50 squares on it, can we draw a map of the hallway on one page?" The students got into a heated debate about this. The argument started when Jolynn, who had minutes before dropped her box of markers on the floor with a large bang, jumped from her seat and said, "We can't draw a map of the whole school on one page. It would be too small. We couldn't find anything." Other students claimed we could draw a map of the hallway; in fact, we could draw a map of the whole school on a single page. Others told me we couldn't. Even after we talked about making each square on the graph paper represent 500 inches or a 100 inches or 50 inches, Pearl explained to me, "There are just too many squares in the school, we can't draw a map!"

Hugh, who was still playing with the rulers and erasers, whispered in my ear, "Count the 50s!" Since the classroom is 50 tiles long, I thought that Hugh was still thinking about the classroom map, not the hallway map--a hypothesis on my part fueled by his constant off-task behavior. Assuming that he wasn't paying attention, I asked him to explain. Well, he told me, if we know there are 50 squares in this class, all we have to do is count the number of classrooms in the hallway and we'll be able to determine the length of the hall.

The skill of map reading is heavily emphasized in social studies curricula, as are other skills such as reading graphs and tables of statistics. But these skills are seldom developed inside out, where students take raw data and try to create their own maps to read, their own graphs to interpret. Thus, instruction about maps and graphs is easily and regularly reduced to algorithms as teachers lead students through the "steps" of managing maps and skills: Decode the key, interpret the scale, read the axes. Interpreting maps or graphs does not involve considering how the data were collected, the problems the authors had in creating such representations, or the compromises they made in terms of what the important categories were.

What we fail to recognize as teachers, however, is that in offering students the logical products of inquiry--for example, maps and graphs--we fail to expose them to the histories of those products and the work that went into their construction. Dewey (1902/1956) calls these the

psychological aspects of knowing. Students who learn to decode scales by measuring inches on a map and translating them into miles, for example, may fail to recognize the fact that cartographers struggle with decisions about what scale to use, and that those decisions have implications for both how large the map is and what is represented on the map. Yet historians, when they use maps in their work, use maps as texts--not as unbiased representations of an area--texts created by men and women which represent particular biases and decisions, both technical and conceptual.

As I try to help my students understand maps by working inside of maps--having them generate their own representations of the classroom and the school--I open up the possibilities that we tread into the other subjects that figure both into the creation of texts that historians and social scientists use as sources and into the methods they use for analyses. To do the work of cartography, my students must use their knowledge of mathematics. The lessons on map making were as much lessons on proportional reasoning as they were lessons on the methodologies of social science. And I often found myself talking about the differences between addition and multiplication, as well as methods for estimating size.

The discussions we're currently having about Michigan's changing patterns of climate and the migration history of mammoths are another example. Sometimes considered part and parcel of the elementary science curriculum, it is difficult for my students to construct a valid picture of prehistoric Michigan unless they understand some of the physical differences--past and present. If I chose to explore these things with them--with an eye toward developing their understandings of social studies and history--I'm unsure of the territory we wander into in another way: Have I crossed a border somewhere into scienceland or mathland? What sense do my students--whose days come in prepackaged chunks of highly differentiated school subjects--make of these meanderings?

But it is school subjects that sharply define boundaries and walls between curricular territories, not disciplines. Although scholars within a discipline have particular methods they use and questions they pursue, they borrow often from other fields. This is especially the case in history and the social sciences. So my decision to create a classroom with an eye toward the real work of

history and social sciences means that I actually make the boundaries between the curricular territories fuzzier. Just as historians draw on their knowledge of mathematics and statistics when interpreting some types of data, and their knowledge of science or literature or music or art, when they examine other types of data, my commitment to creating an educational environment which is based on the subject matter and my knowledge of the complexity of the subject matter makes my class seem more a mélange than a clearly delimited area of disciplinary study. Hawkins (1972/1974) advocates this blurring of lines in the case of mathematics teaching:

> I mean to define the mathematical domain in such a way that it does not *exclude* any situation of learning *merely* on the ground that the latter might also be described under social or scientific or aesthetic categories. I use the mathematical term "closure" as particularly apt--recognizing that as mathematicians use the word, it implies removing barriers, not building them. Ideally any concrete involvement of children, any relationship with the world around them in which they are caught up, will link up mathematics among other things and in that sense is part of its extended domain. (p. 114)

I don't mean to suggest here that the blurring of boundaries is a problem. Rather, I point to it only to reiterate how a rich knowledge of the subject matter and a commitment to creating a subject matter-rich classroom environment leads to an explosion of the curricular possibilities. This is especially true in the case of social studies which houses under its roof many subjects: anthropology, psychology, sociology, political science, economics, history. Moreover, these possibilities sometimes transcend the traditional boundaries between school subjects.

This discussion also points to the double-edged sword of my subject matter knowledge. While expanding the curricular territory I can explore with my class, that knowledge fails to supply all the answers I need to decide what paths to take, what mountains to climb, what vistas to leave unseen. Not all territory is equally ripe with opportunity for third graders. Lacking knowledge of the students--how far they can take their thinking, what their interests are, what is possible to do in one year's time--it is difficult for me to gauge when and where to guide our thinking. It is to this second problematic aspect of subject matter knowledge that I now turn.

Problem 2: Subject Matter Knowledge Alone Does Not Tell You What the Compelling Questions for Children Will Be

I have a very clear image of the kinds of things I want my students to think about and to understand. I want them to think critically about maps, about history, about books, about stories. I want them to see themselves as thinkers and explorers, people who can generate new understandings and who have a responsibility to be curious learners about the world arou. d them. I also know a great deal about the subject matters I introduce to students--an avid student of history, I have read with pleasure every book I can find on the history of Lansing and of Michigan. Moreover, through my reading of other histories, as well as essays on the doing of history and social science, I have learned a lot about the nature of historical work.

But knowing the subject matter well and being armed with goo. intentions, I am nevertheless unprepared to teach my students well. Recall the lessons on maps. Concerned that students were not paying attention to issues of dimensions, size, and space when instructed to create "maps" of the classroom, I tried to have a discussion by asking the question, "What makes drawing a map hard?" The conversation that followed was dead--students found the question boring, uninspiring, banal, even nonsensical. The next day when I asked them, "What is the difference between a picture and a map?" things were entirely different. The discussion was lively, and through the course of it, we managed to surface a very important idea--that of scale.

I struggle with this issue often for it is hard to find the compelling question to start a day's talk, a week's work, or a new unit. My third story offers another example of this struggle.

> After we completed our book about the school and their classroom, it was time for my students to learn about Lansing. My intention was to introduce them to the history and culture of the community of Lansing and eventually to nest that information in more general information about the state of Michigan (described in the first vignette).
>
> Having never really read a lot about Lansing or Michigan, I had spent the last several weeks reading books and articles about the capital and its state. Because I like stories of the past, I found much of the information intriguing and was looking forward to engaging students in similar excursions.
>
> But I was stuck on what to start our discussions with. I wanted to find a question that my students would treat as genuine and interesting. Often they get angry at my questions for they wonder why I ask them questions whose answers I already know. "Do you know the answer

to that question?" they ask. At times I do, and when I admit as much, they cry, "Well, then why are you asking us? Why not just tell us the answer?" Already saavy students of schooling, they have a point. But if I always tell them things I know, the environment will lose its exploratory qualities. Instead, the excursion will become more like a prepackaged guided tour than a genuinely collaborative enterprise--albeit somewhat structured and constrained--that remains open to interesting and informative sidetrips. Besides, I don't believe that they can all "know" the same things. Instead, I believe they each construct somewhat unique, although subject matter grounded conceptions of the ideas we explore. I don't discuss this with them--I just search for the right question. And one of the pressures I feel when I try to generate questions is posing them in ways that students will find intriguing and worth discussing--even if the teacher "knows" the answer.

The first day of the unit, I introduced a question that appealed to their imaginations. I had been to China in the fall and they had had lots of questions about Taiwanese children and what they knew about Lansing. So I posed the following question: "If you had a best friend who lived in China and had never been to Lansing, how would you describe the city to him/her?"

My students were silent. "Why would we have a friend in China?" some asked. Others, trying to be good sports, couldn't think of anything to tell their hard-to-imagine friend: "Lansing is in Michigan" or "It's the capital" seemed the best thing they could do. Class seemed interminable as I struggled to pull information out of them about what they knew about Lansing, what they liked about Lansing, what they wanted to know about Lansing.

The truth of the matter is that my students don't think very much about Lansing, nor do they think they "know" very much about it. It is part of their everyday world, not part of what they know. The stuff one knows is learned in school, the stuff one lives doesn't count as knowledge. Nor do my students see themselves as learners and knowers. When I ask them for ideas--either about what they know or about what they want to know--they sincerely want to answer my questions but they can't. School for them isn't about exploring unknown territories in which math and science and social studies and literature can be used to answer questions that they themselves generate. Teachers and texts determine the ground to be explored. Unaware of their responsibilities and abilities to contribute to those decisions and confused by my green questions, they stare at me in confusion.

The next day I decided to introduce a question that might focus their attention on something that they had always taken for granted but never thought about.

"Why is Lansing the capital of Michigan?" I began.

"Because Michigan's a mitten," Susie remarked.

"And why is that the reason Lansing is the capital?"

"Cause it's kind of in the middle," Susie explained.

"And why is that important?" I asked.

"So everyone can get there," Dale volunteered.

Matthew burst out laughing, "It's not in the middle of the state," he said with disdain. "Haven't you ever looked at a map?"

Matthew was right: technically speaking, Lansing is not in the middle of the state. However, I wanted to validate Susie's contributions for they would be helpful in two conversations I

wanted to have with students in the following weeks. Lansing *is* near the middle of the state, if one discounts the Upper Peninsula, and this fact did figure into the decision to make Lansing the capital. But the story is more complicated than that. A gentleman named Seymour who, at the time of the state's decision concerning its permanent capital, owned land in the Lansing area, offered to donate free land to the state if the capital was built in that area. A state lawmaker named Kilbourne, in cahoots with Seymour, attempted to persuade his colleagues of the wisdom of such a decision by distributing to the legislature a bogus map that placed Lansing--literally--in the center of the Lower Peninsula. Knowing that Susie's comments would be doubly helpful when we discussed these events, I quickly said:

"We're just making guesses right now, Matthew. Anything goes. Later we'll find out which of our guesses were right. Any other reasons why Lansing might be the capital?" I continued.

The discussion continued for the full class period, with students generating a host of conjectures about the reasons why Lansing was the capital. Engaged throughout the discussion, I had managed to ask them a question that they wanted to know the answer to. Even though they had all lived in the capital for most of their lives, they had no idea why Lansing was the capital.

For the next two weeks we discussed several of the multiple reasons why Lansing became the capital of Michigan. I told them that Detroit used to be the capital but it was very close to Canada where the French lived. A conversation ensued in which they arrived at the conclusion that keeping the capital so close to the French might have put the state in danger. On another day I asked them what other cities in the state had important buildings in them. "Jackson has the prison," Arthur told me. "The hospital's in Ann Arbor," suggested Natalie. When we talked about the fact that Ann Arbor got the university and Jackson got the prison, they decided that it was only fair that another city get the capital. We also discussed the reasons why people in the Midwest tried to place the state capitals near the center of the state. Finally, we talked about Seymour and his "generous" offer to the state. My students concluded, through a very long discussion, that he may have done so for more than altruistic reasons. Knowing full well that he could then sell off the rest of his land to the people who wanted to live near the capital, this gentlemen had plans for making lots of money.

Finally, I asked my students to write letters to Governor Greeley (the governor at the time the state legislature was trying to decide on Michigan's permanent capital), convincing him that Lansing should be the site of the capital. I did this to see how well my students could integrate the many reasons we had discussed into a single account of why Lansing became the capital. After they explained to me that it was rather silly for them to be writing letters to a "dead guy," the students wrote their own versions of why Lansing became the capital. Katharine's serves as an example:[3]

Dear Governor Greeley:

How are you doing? Well the reason I'm wrighting is to tell you I think the capitail sould be Lansing. If you look at it this way if the capitail is in Detroit the French could come over and try to take over Michigan. But if the capital is in Lansing it would take longer for them to come and people would probely spot them before they get their. Another thing is Lansing is close to the middle and not many other citys and towns are. One more thing Ann Arbor has a University and Jackson has a jail. I hope you are considering the **FREE** land you

[3] Katherine's letter appears here as an unaltered reproduction of her text.

can get if you build it in Lansing and that Detroit has a great populacion allready and Lansing isn't relly big so if you put the capitail there people will want to come to Michigan and see the new city and capaitl. I hope you consider this,

Sincerly,

Katharine Mane

Katharine's account of the reasons why Lansing should be the capital of Michigan is considerably more sophisticated than that offered my students in a book written for children about the history of Lansing. Those authors, unsure of what young children can understand, tell a simpler--and more boring--story: There was a lot of debate about whether Lansing should be the capital but they finally decided to put it there because it was in the middle of the state. Katharine's account suggests that my students are capable of complicated thinking and critical analysis. It remains unclear how or what Katharine understands about multiple causation in history and how the various factors she has integrated here interacted in contributing to the decision to make Lansing the capital. But the work that we did following my initial question: "Why is Lansing the capital?" was rich with substance. Each day students developed sophisticated arguments around various factors that continually surface in historical narratives, including the role played by avarice and greed, the influence of geography, and concerns for the equitable distribution of resources.

Several factors contributed to my ability to navigate our passage through this new information. First, my students were able to participate in discussions about these ideas because they have concerns and experiences with greed, geography, and fairness. Second, they were willing to answer my questions and engage in these discussions because the question was interesting to them: *Why* was the city that they now lived in the capital of the state? Finding these questions and understanding that subtle differences between questions: "What makes drawing a map hard?" as opposed to "What's the difference between a map and a picture?" hold the key to capturing the interest of my students so that they become engaged in the idea work of social studies. My knowledge of the subject matter, while helpful in that I can look at the questions that have traditionally intrigued historians, is not sufficient. The world of children is different than that of historians and I must find ways to combine what I know historians like to think about with what I

am learning about the ways children think in order to find the interesting questions or the important activities. But note, that without the knowledge of the subject matter, I would be unable to hear in my students' comments, the seeds for explorations based in the content. I need subject matter knowledge to guide our explorations but the light it shines on the territory alone does not help guide me through the uncharted landscape that my students' interests, my concerns, and our discussions uncover.

Conclusion

I was compelled to begin this research because of the claim many educators and policymakers make that elementary teachers do not need the same kinds of subject matter knowledge that secondary school teachers need. Yet in my work learning to teach social studies, one thing remains perfectly clear: Subject matter knowledge is essential to elementary school teaching that engages students in the kinds of educative experiences envisioned by Dewey. This is not to suggest that elementary teachers--or secondary teachers for that matter--can or should know everything about the subject matters they introduce to students, for that would be impossible. However, in some essential ways, subject matter knowledge empowers teachers to help students learn.

First, knowing the subject matter allows me to hear what students say. Together with a disposition toward asking students why they say the things they do, my knowledge of the subject matter enhances my ability to hear their ideas. It is often not the case that children are less wise than adults, only less articulate. If I listen closely to students' stumbling remarks, I often hear the seeds of complex and sophisticated historical ideas. When Brian explained that we could not draw a map of the school and the playground on one page in our notebooks, I asked him why. Upon probing, it became clear that he was concerned about the loss of detail and the inability of the map to capture the curve of the hills in the playground. Brian, in many ways, was correct: The map we *could* draw of the school and its playground on one piece of paper in our notebooks would not be comparable in detail to the map of the class we could draw in the same space, nor the map we could construct of the entire school if we had more sophisticated measuring devices and knew

more about projectile geometry. Similarly, when Susie suggested that Lansing became the capital because it was in the middle of the state, and her classmates giggled because the map they saw did not place Lansing centrally, my knowledge of the subject matter allowed me to hear something in Susie's comments that could be built upon in future lessons.

Second, my knowledge of the subject matter allows me to engage my students in genuine social science and historical problems--how to construct maps, how to analyze data, how to interpret historical phenomena--in ways that most elementary school curricula ignore. There are no texts for children that present the history of Lansing in all its complexity--authors of children's books have assumed, I imagine, that children are either not interested in or incapable of understanding complicated notions like multiple causality in history or problems of projectile geometry in cartography. Yet my students exhibit a wide range of abilities when engaged in such work and are seldom bored by the problems I present them to solve. It is my own knowledge of the subject matter knowledge that arrays the possibilities of educative experiences for children, although it is an insufficient source of information for making decisions about which experiences are best suited to my students and my goals.

As Dewey (1963) notes in *Experience and Education*, the teacher is responsible for both knowledge of the subject matter and knowledge of the individuals taught. My subject matter knowledge allows me to do certain things, to open certain doors, to explore certain territory but it by itself is insufficient when I need help making decisions about where to go. With an eye clearly on the history of the school, or Lansing, or Michigan, and on the development of maps, tables, or biographies, I still wonder how much time I should spend on something. And my subject matter knowledge does not suggest what questions or problems my students will find most interesting. Although there are times when the history of historical ideas helps me anticipate the misconceptions or beliefs my students will have about particular problems, for example, that many students wouldn't understand that two-dimensional maps of three-dimensional space necessarily distort that which is being represented, there are many times when my knowledge of the subject matter does not help me predict what students will believe, for example, that Oldsmobiles are responsible for

the extinction of mammoths. The lack of research on students' thinking in the subject matters makes it more difficult for me, since little empirical work has been done on students' thought processes when they learn about such topics.

The territory of elementary social studies is expansive, and the possibilities for our meanderings have the potential for serious intellectual work. Yet my lack of knowledge concerning children and the sense they make of what we discuss leaves me unsure about what students will learn with me. Will our explorations through the school and maps, Michigan, and mammoths leave them feeling like we spent the year walking through a maze, never quite seeing the connections between prehistoric Michigan and cars, between multiplication and maps? As we explore complicated ideas from history and social science, like multiple causation and biases in interpretation, can I develop implicit intuitions in students about these concepts--notions that can be fleshed out and made explicit later? Or will students simply leave class just as confused as when they entered? My experiences suggest that my knowledge of the subject matter expands the opportunities I can offer my students. But I'll need to know many more things--about learners and learning, about contexts and curriculum--before I can smoothly navigate this heretofore uncharted territory.

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