

Chapter 7

The Converse Structure of Communicative Classrooms

Daiyo Sawada

The two stories in Part III may be of particular interest to those who have so far concluded that there are many effective ways to bring communicative activities into the classroom (Part I) and that these activities do enhance mathematics learning in ways that are unique to these activities (Part II) and also to those who may be ambivalent about whether or not their own teaching style is compatible with a communicative approach.

More specifically, if as you consider how that communicative nature of your teaching can be enhanced you get the nagging feeling that teaching mathematics communicatively is not simply a matter of adding communicative activities to your repertoire, then the two stories in this chapter and the contrasts between them are for you.

"Where am I going to get the time for all this language activity during math class?" I shall answer this question (and others as well) by contrasting the structure of traditional classrooms with what I call communicative classrooms by telling two stories.

Telling the Stories

Here are my two stories told in brief form:

The Traditional Classroom Story

What, When, How, Why, Who, Where

The Communicative Classroom Story

Where, Who, Why, How, When, What

I did say these versions were brief! Nevertheless, several interesting points emerge immediately. For example, the communicative

story reverses the traditional one; the communicative story is the *converse* of the traditional. However, the stories are equivalent in the following ways:

1. Both are the same length.
2. There is a one-to-one correspondence between the story elements. In this sense, each story has the same "cardinality."
3. As "sets," each story contains not only the same number of elements but also exactly the same elements, and as such they are not only equivalent but also identical.

From the perspective of set theory, these two stories are identical, and contrasting or comparing them would be pointless. However, from a topological perspective, these stories are not equivalent. For example, in the traditional story When comes after What, but in the communicative story When comes after How. The topological connections are different. Although we do not normally think of classrooms in topological terms, topological relations in the communicative story, such as "betweenness," "proximity," "closure," "neighborhood" (and should we add "community"?), are very appropriate in considering communication.

To discuss these topological notions without sounding too technical, let me transform the word *set*. From the point of view of sets there is little to talk about. If we transform *set* into *setting* however, we have a very topological-like word—a setting is like a neighborhood and a neighborhood is a supportive context for communication and community. Now if we transform *setting* into its

use in drama, then we have a very supportive setting for telling a story. Consider the brief stories above as settings for telling stories about classrooms. These settings could even be considered topological versions of story structures.

Retelling the Stories

I will retell each story using the brief version story structures. Because the drama metaphor seems appropriate to this setting, I will cast the stories in dialogue form.

Cast

You (a teacher at Atrebla Elementary School)

Me (author of this chapter)

Setting

Staff room

Scene I Setting the Scene

You: Can I get you a cup of coffee?

Me: Could you? Black, please. [settling into a comfortable chesterfield]

You: Thanks for taking the time to come to Atrebla. When you said you could come anytime, I didn't think it would be this afternoon.

Me: Usually it takes us longer, but you caught me just before lunch; besides, Atrebla is just an hour and a half out of Edmonton, and I wanted to catch you while you were still reading this monograph.

I'll begin by retelling the traditional classroom story and follow up with the communicative classroom story.

Scene II Retelling the Traditional Classroom Story

Me: The traditional classroom story begins with the What, the *what to teach*.

You: You mean the curriculum?

Me: Yes, the content objectives determined by Alberta Education and laid out in five basic curricular strands.

You: Yeah, I know: problem solving, numeration, operations, geometry, measurement and data management. If we know what's good for us, we had better cover the curriculum.

Me: You make an important point which underscores why the What comes first. Coming first, it means that the curriculum has priority. The traditional story begins with What, with the curriculum, with Alberta Education. These are taken as givens.

You: This is like problems structured with "the Given" and "the Required." We start with the Given.

Me: It seems obvious, doesn't it?

You: Almost common sense. Let's add the When.

Me: By bringing in When at this point, we sequence the What with respect to time.

You: You mean we make a scope and sequence chart!

Me: Yeah! In curriculum jargon, What and When together make a scope and sequence chart. It's not surprising that this chart has been the dominant storyline of all program development in school mathematics—program development can't be done without one.

You: I hope you're not going say that communicative classrooms won't need scope and sequence charts!

Me: You're already anticipating! But that will come later in the flow and won't determine the storyline as it does here.

You: I'm just making a mental note to come back to this point. Let's bring in the How. This seems to me to be the nuts and bolts of teaching.

Me: Once the scope and sequence chart is taken as a given (the What and When), then the next step is to tell teachers in some detail how to implement this chart on a day-to-day (lesson-to-lesson) basis (the How or How to).

You: If the What and When are *curriculum development*, then the How is *curriculum implementation*.

Me: Exactly. Some people call it *instruction*.

You: "I want something (the What) I can use (the How) on Monday morning (When)." I hear teachers saying this every time they go to an inservice session or a conference. If they don't get that, they feel it's a waste of time. I know I'm getting ahead of myself again, but are you going to say that teachers in communicative classrooms will want something different?

Me: You be the judge of that when we get there.

You: You know if the What, When and How are curriculum and instruction, then the Why has got to be rather redundant.

Me: You're right. In the traditional story the Why is generally taken for granted or presumed to be the responsibility of the program of studies or textbook writers. If a student asks "Why are we learning this?", the standard response is that it is needed for next year's work. In other words, the answer to this Why question is already taken to be given in the scope and sequence chart (the What and When)—the Why is reduced to the What and When. In this sense, the What and When have the greatest priority, powerful enough to account for Why.

You: But this kind of answer to a Why question is inadequate. To me, Why questions ask for something deeper than sequence. I'm making a mental note of how this will be different in communicative classrooms because then the answer will have to be given in terms of the Who and Where. Am I correct?

Me: Structurally you have to be, but there may be more to it than structure. If we tell a story backwards, maybe it is not just a reversal but as well a change in the nature of the story. For example, if in a detective story the conclusion is already revealed as the story begins, that story will be quite different from one that doesn't reveal who did it until the very end. We need a literary theorist!

You: I don't think literary theorists are interested in backwards stories, and maybe

curriculum theorists aren't interested in backwards pedagogy either! [chuckle, chuckle]

Me: I don't think curriculum theorists are interested in a backwards pedagogy, but maybe, just maybe, teachers might be and maybe children might be even more interested!

You: You're getting me interested. Let's add the Who. I'm particularly interested because of my early childhood background.

Me: Great. So now we have What, When, How, Why and Who.

You: Do you mind if I do a little anticipating? I think the Who like the Why is going to be reduced to the four Ws that come before it. Am I right?

Me: May I answer with a question? What led you to your prediction?

You: Well, I'm just continuing the pattern of the Why being reduced to the When of the What. Second, I was thinking of individualizing instruction as a way of trying to overcome differences among children—we individualize as a way of dealing with their uniqueness, and in this sense the Who is reduced to a How.

Me: You're saying that in the traditional approach we teachers aren't so much interested in children for *who* they are but rather as some differences, mainly psychological, that need to be accommodated through individualizing instruction (the How)?

You: It's my early childhood bias showing through again, but I think that children are interesting because of who they are and that who they are isn't simply something to deal with through some diagnostic procedure. Our society is dominated enough by technology, the "how to" so to speak. As teachers, we don't need to reduce children to a particular sequence of instructional treatments.

Me: That's even more interesting! Now you're saying that the problem of Who is reduced to a problem of How to teach What When.

You: You could say that. And that brings us to the Where.

Me: Yes, the What, When, How, Why, Who and Where.

You: Now I see the pattern. The Where, like the Who and Why that come just before it, is just the continuation of the storyline determined by the priority accorded to the What, When and How in that order. The Where in this story is literally anywhere. The Where is just a place where the Who are often placed into five rows of desks to be taught the What. The classroom is the ubiquitous Where, and I guess all classrooms are pretty much the same—just places for the other Ws to happen.

Me: Aren't you being a little harsh? Is the Where that trivial in the traditional story? It is the last of the Ws and therefore the least in importance, but will just anyplace do?

You: I think I'm justified in being extreme. I don't recall much from the methods courses I took at university, but I do vividly remember one day when the prof asked if any of us could remember where we were the last time we divided fractions. No one could remember the details, but we all knew it was in school. We don't use school math for much outside the classroom. When did you last factor polynomials? I bet it was in math class. The Where has become so irrelevant that it makes what is learned disconnected from anything else.

Me: Maybe that is why school mathematics is so often criticized as having little to do with the so-called real world. Despite recent emphasis on real-world problems, children still have difficulty making applications to real situations. If we keep ignoring the Where, any approach trying to relate mathematics to the real world can only be superficial.

You: With that statement, I am sure we have arrived at the backwards sequence which begins with the Where. But, first things first—your coffee mug is empty!

Scene III The Communicative Classroom Story

Me: Yes, the communicative story begins with Where one learns rather than with

What one is to learn. It begins with the setting, much as novels often do. There has never been a story that wasn't set in a particular place. Indeed, without a place, a story is essentially meaningless and cannot be told. A story always happens somewhere, and that particular somewhere sets the tone, sets the context for what happens. In communicative classrooms, the context is more important than the text.

You: Two months ago, I would have said hogwash! How can context be more important than text? But I attended a language experience workshop recently and kept hearing that meaning resides in the context, that meaning is between the lines rather than on the lines. Are you saying it's the same in math?

Me: Precisely, if I may use such an inappropriate word. Traditionally, with priority on the What, meaning was thought to reside dominantly in the text, in the words themselves, rather than the context. The new language-learning philosophy is a severe critique of this tradition.

You: But we need more than a critique. Teachers need more than talk about context or place. How exactly does one go about setting up a place?

Me: You used the word How.

You: Yeah, I guess I'm getting a bit ahead of the story, but I'm concerned because I don't know of any resources that I could use to set up my classroom as a particular place. I know about material on classroom environments, but most of that is theory. For example, I don't know of any math or commercially available programs that start with place.

Me: If you're right, it shows that the communicative story really hasn't been told in math classrooms.

You: So how does one establish the communicative story structure in the classroom as a way of teaching mathematics? How does one go about establishing a place? What kind of place is it?

Me: Suppose you were to put on an old trench coat, one that smelled as crumpled

as it looked, and were to walk into your classroom peering here and there and muttering as you hovered close to a window, "There don't appear to be any footprints here," and were to examine the doorknob carefully and whisper, "There don't appear to be any fingerprints here," and were to look inquisitively at the class and ask, "Who do you think I am?" and suppose, as the hands shot up, you were to continue examining the door and exclaim, "Yes, this lock has been tampered with!" and then, as you pulled out a magnifying glass to take a closer look, you were to notice that nearly all of the students were now waving their hands wildly and shouting exuberantly, "I know, I know!"; suppose, to prolong the ambience, you looked up and uttered the complete innanity, "Let me give you a clue; I am not a dentist," well, the students would be standing up dying to blurt out what they know; the classroom would be a sea of excitement. Finally, if you were to look at a student who rarely volunteered to answer anything in class and say, "_____, who do you think I am?"; he or she would be shouting "A detective!" before you were finished. All the hands would come down somewhat disappointed at not having been asked. Perhaps one boy would still have his hand up and you would think to yourself somewhat apprehensively, "Maybe I haven't been able to set the scene authentically enough. _____ doesn't think I'm a detective." So you would say, "Yes, _____?" And he would say, "I think you're a spy!"

You: It sounds too real.

Me: That's rather perceptive of you. Two years ago in a Grade 3 class, it's exactly what I did. I'm just retelling the story.

You: Tell me some more.

Me: Sure. Can I tell it as a dialogue?

You: Why not? It would be in keeping with "communication."

Me: Okay. I'll use "S" for the students. This was not my own classroom; I was collaborating with the teacher on a problem-solving project. The children didn't know me at all.

S: Are you a real detective?

Me: I can't really tell you too much. I can show you my card.

[I had made a special ID card on the computer. All it had on it was "D. Sawada, TPD". The teacher had introduced me as Dr. Sawada so the card at least was consistent with what she had said.]

S: What's the TPD?

Me: I really can't reveal that.

[The students accepted this. Such acceptance was part of setting the scene: Detectives can't be totally open about their work. The answer was Tokyo Police Department but, because I wanted a tone of mystery to hover within the room, I chose not to reveal this at that point. Instead I asked:]

When do detectives do most of their work?

S: At night.

Me: Why at night?

S: Because that's when crimes are committed.

Me: Sounds reasonable. Detectives have to be good at detecting at night when it's too dark to see well. If it is really really dark, how can a detective see?

S: With a flashlight.

Me: That's an idea.

S: But if you use a flashlight, you will be a sitting duck!

Me: You've got a point there.

S: Maybe you could use your hands and feel your way.

Me: Yes, you could use your hands to "see"! A terrific idea. Guess what I have in these bags?

[I had selected two identical copies of each of six different solids (wooden prisms, cone, ellipsoids and so on) and had placed one of each pair in individual cloth bags. I placed the other six solids on the table at the front of the room and asked:]

In each bag is one of these [pointing to the blocks], but you can't see which one with your eyes.

S: But we could see it with our hands!

Me: What do you mean you can “see” with your hands?

S: We can feel it with our hands.

[Each student came up and felt a bag, then selected one of the solids on the table and pulled the solid out of the bag to verify his or her vision. I could continue this story, but perhaps I’ve said enough to set the scene.]

You: I see that in setting the place you also smuggled in some geometry.

Me: Yes, but the kids weren’t thinking particularly about the geometry even though they were learning about it. At that point the geometry wasn’t important. Setting the scene was important—establishing the Where. Over the next few lessons, the classroom was transformed into a detective agency with each student a detective. At the end of my lesson, I congratulated the students for being able to “see” with their hands and for having the promise of becoming real detectives.

You: Sorry for being skeptical, but did all the children succeed in seeing with their hands?

Me: I was surprised as well, particularly because three of the children were special education students mainstreamed for mathematics. Children are pretty good at seeing with their hands.

You: I can see how a detective agency would be a particular place where children could learn mathematics. Detectives solve mysteries; in math class, students solve problems. Solving cases and solving problems aren’t very different. Being a detective and being a problem solver are quite compatible.

Me: A detective agency is just one such place. Many other places could be used in a classroom as well, for example, a collectors’ club where children are collecting hockey cards, sea shells, postcards, whatever they collect or a trading post, space station, firehall and so on.

You: Each setting lays out a place: a toy factory, a detective agency, a firehall, a collectors’ club, a press room, a trading post, a

space lab, an animal farm. These are places (the Wheres) where mathematics (the What) occurs in real ways, or should I say natural ways?

Me: Places where mathematics occurs in culturally meaningful ways. The What (mathematics) arises naturally in a contextually meaningful way. For example, at a toy factory, toys have to be packaged and shipped. How do you package toys? Do you box them in three rows of four or two rows of five? And what if you stack these boxes into crates? How do you arrange the boxes in crates? How many boxes in a layer? How many layers in a crate? And how should we stack the crates on the truck? How many boxes can a truck hold? Mathematics galore, and it all arises in real form in the toy factory.

You: You’re using the word *natural* or *naturally* as if the classroom, when set up as a detective agency or toy factory, is a natural setting in school. Certainly, it isn’t “real”; it is by no means a real detective agency. I could even say that it’s contrived. It has to be. Detective agencies don’t exist naturally in schools!

Me: Believe it or not, I concur. I concur not just to sound positive but also because there is something very artificial about school and, more importantly, something very artificial about mathematics. Both require an attitude of “let’s pretend.” Schooling is just one big “let’s pretend”—we take kids out of their daily life and force them to come to school from 8:30 a.m. to 4:00 p.m. five days a week. What they encounter in school is one big “if”: If all that we do in school is valid and important, then it will be useful for students sometime in the future. Often, however, this usefulness doesn’t happen and schools are then criticized for being irrelevant or out of touch with reality.

You: It strikes me that what you are calling the “if” is simply the curriculum or the What and When of traditional schooling.

Me: Precisely, and when the “if” is found wanting, we don’t question the traditional classroom structure, we merely fiddle with

the What and When. *Vision for the Nineties* is a good example of such change.

Mathematics is also one big "if." The "if" part is usually called "the premise(s)" and the "then" part, the "conclusion." Even the advice we may give students in problem solving takes on this form: "First determine what is given (the "if"), then try to connect this to what's required (the conclusion)." Mathematics is one big if-then sequence written large (axioms giving rise to theorems). We might say that mathematics is the Land of If. A very contrived Land of If because any "if" is okay as long as it leads to interesting results. So a great mathematician is one who can contrive powerful "ifs."

You: If I understand what you're saying, then in the communicative classroom, places such as the toy factory are also Lands of If.

Me: And each needs to be a powerful Land of If to generate natural, rich mathematical results. Each is highly contrived. As a teacher, I would encourage students to participate fully in setting up this contrivance. This is the important point: Once the contrivance is set up, what happens within the context is the creation of mathematics in ways natural to the contrivance.

You: Actually in any walk of life, business, politics or schooling, whatever context we set up will also be somehow contrived; otherwise, we would not have to set it up. But within this contrivance, within this game, some natural things can happen; things that are natural to our game.

Me: I like your metaphor of a game. It is much like playing a game and, if you are going to be a good player, you must understand the rules well. It would be even better if you could participate in designing the rules, in designing the game. Then not only would you understand the game better but also you would probably be a good player as well.

You: But if mathematics is in the game or the place, how do we get it out?

Me: Why don't we consider that when we get to the How part of the story.

You: Let me raise a different concern. I have seen early drafts of the new 1994 Program

of Studies for mathematics, and there is a strong emphasis on integration, continuity and real-world connections as well as the use of manipulatives. These concerns were problematic in the traditional approach, and the new Program of Studies is placing a priority on them again (or perhaps still). What seems so exciting to me about starting the communicative story with Where is that by doing so many of these problems disappear.

Me: Is that right?

You: Sure. Consider integration. We talk about integrating math with science or language with social studies and so on. We do it by integrating the What, the content. We look for common themes or topics. In contrast to this, if we focus first on Where, we find the content already integrated in situ, in the "if." For example, in a trading post setting, social studies and mathematics would be there together as would language arts. Literally no integration of subjects needs to be done. The subjects are already together in the setting, like a topological network of relations.

Me: So the priority on Where/Who brings forth integration as a topological network? How about another example?

You: We spent only a few minutes talking about the toy factory, but I can already see how the kids are going to get right in there as if they were operating a toy factory themselves, deciding what to construct, how many to construct, how to package the goods, how to market them, how to prepare advertising and receive orders, what quantities to ship, how to receive and reply to complaints, how to fill out order slips and on and on. The language arts and social studies are already there.

Me: If you're right, then the problem of integration is just an artifact of having begun with the What and then having developed and packaged each What or subject matter separately, so separately that integration is now seen as a big problem. We shouldn't lose sight of the fact that this problem is a product of the traditional classroom story.

You: The same holds true for continuity with and connection to the real world. It's already in the context of this situation. It's only in the text that the What is separated from reality. In settings like a space lab, trading post or animal farm, ongoing experiences are situated in real-world settings, contrived though these may be at first.

Me: That's enough of extolling the virtues of Where. Let's bring in the Who.

You: With this integration and continuity, I expect it will be difficult to separate the Who from the Where.

Me: In communicative classrooms, the nature of the Where—the nature of the place—is a context which is taken to be jointly created by students and teacher. Introductory teaching activities begin with scene setting in activities that draw upon students' experience with detective stories and television shows, such as "Rescue 911", "Star Trek" and so on, as a way of developing such a place in the classroom. Because the context is given by the students, it is automatically related to their experience. By starting with Where, relevance and meaningfulness are properties of the learning setting. Traditionally, by starting with What rather than with Where and Who, the problem of making the What meaningful and relevant was acute. We tried to "make" the activities interesting by making them colorful or fast paced and so on. In communicative classrooms, we incorporate interest by focusing first on a place developed out of children's everyday experiences whether those be watching detective movies on TV, reading mystery novels or reading about police work in newspapers. As this continues, the place becomes a community of children learning mathematics (the What).

You: So you're saying that a communicative classroom is as much a place created with and through children's experiences as it is a program?

Me: Yes, a place which as much as anything is created out of children's experience in the world, a place is where people are. That's why we begin with Where/Who so that the

classroom can become a particular kind of place that contextualizes the very learning that creates it. In constructing the place, children learn mathematics; or more generally, in constructing the context, they learn the text.

You: I like that last turn of phrase. It says it so compactly. But the communicative story isn't all context, is it? Children are also doing something in the classroom. How does this kind of doing differ from the usual activity in a normal classroom?

Me: That question moves us right into the Why. You've already put your finger on it in the way you asked the question: The activity in a *place* is quite different from the traditional activity in a math classroom. Consider the usual scenario where a student is given a task card perhaps with some manipulatives and is to do the activity. The activity could be done anywhere—at home, in a group with other children, alone at a desk, after school during detention. The place in which the activity is done is not stressed. What is stressed is that it is important to have activities of a concrete nature, as well as those involving the pictorial and symbolic modes. We are told over and over again to use manipulatives. This is the important principle.

You: How does context change the action?

Me: In communicative classrooms, I would spend a lot of time setting the scene—establishing the nature of the place. The classroom becomes a detective agency. Activity in the classroom is guided by the sheer fact that it happens in a detective agency. Children become detectives. Their actions are actions of detectives trying to solve cases. The actions of detectives are quite different from those of barbers or salespeople or principals. Questions such as "Why are you doing this?" or "Why is it important to do this?" are answerable within the detective frame. If a child asked, "Why do I need to write up this problem? I've already done it with the materials," the chief detective (perhaps the teacher) might say, "When a detective is solving a case, does she keep a

record? Why? Is it important to keep a record? Does she need to file a report?" The class might diverge into a discussion of what kind of files detectives keep on a case. What goes into the file? They could even visit the police station and observe not only what reports are routinely kept but also the particular format of the reports and what sort of information is gathered.

You: So there is activity that is indigenous to the place and its indigenousness makes the activity different from ordinary classroom activity?

Me: Precisely. Indigenous activity is quite the opposite of activity imposed from the outside in an arbitrary way. It is activity that arises naturally and appropriately in the place. In a collectors' club, the action of exchanging or trading would be indigenous as would be displaying and safekeeping. Activity indigenous to a trading post would include bartering, stockpiling, packing, visiting and so on.

You: I just thought of another example of a Why question that would be quite different. I like children to be careful and organized when they work, and I find it difficult to get children to appreciate why. One of my weaknesses is to become impatient when a student does sloppy work. Now instead of becoming irritated, I could simply ask, "Why do detectives need to be careful when they gather evidence?"

Me: An excellent example and, as detectives, children can generate answers to this question through discussion. However, trying to teach students to be careful or mindful of the need to be careful is like pulling teeth. Why should they care about being careful as long as they get the answer? In the context of a detective agency though, being careful is *endemic* to the place. Otherwise, the case may be tossed out of court on a technicality. Trying to *impose* carefulness can be next to impossible, yet in the traditional story, this is what we are often forced to do.

You: I suppose so. Returning to the trading post for a moment, setting an authentic scene for that would involve activities normally called social studies.

Me: And language arts as well, particularly stories of early settlements such as Fort Macleod, Fort Saskatchewan or Fort Edmonton and of communication between the Chief Factor and the Hudson's Bay Company and with the trappers too.

You: This would be integration that would happen as an integral part of setting up the *place* and running it. In fact, it is in the running of the place that the *How* of the story takes place. If the class were to become a space lab, there would be a natural integration with science. It could get exciting, particularly from the kids' viewpoint!

Me: I think all this leads naturally into the *How*. In communicative classrooms, *How* is not so much a question of how to teach as it is of how to be a detective or a fire fighter or a space traveller. The *How* is guided by the *Where*, *Who* and *Why*. In a strong sense, questions of *How* become questions of *learning* moreso those of *teaching*. The teacher becomes a learner along with the students as both participate in running the place. Moreover, these questions of how to learn find their answers in actions and activity endemic to the place. Criteria of what is appropriate are already in place. Authority alone is never appropriate. Ask "What would a detective do now?" rather than say "Here is the right way to do it. Now do it carefully."

You: It finally seems clear to me that in doing the *How* (running the place) the students learn the *What*, the mathematics content embedded in the place.

Me: That's the hope. In communicative classrooms, the content (mathematics) is learned by doing things (the *How*) that come naturally in the place (the *Where*). Mathematics is not so much taught as it arises in the place through the actions and activities that occur there. What occurs there is *theirs* (the students').

You: You used the word *hope*, but when it comes to covering the curriculum, hope isn't enough.

Me: Your point is well taken. Just because the *What* occurs last in the sequence doesn't

mean that it has no priority. Alberta Education and parents would hang us out to dry if we were to ignore or belittle the What. Nevertheless, in communicative classrooms covering the curriculum doesn't happen because the teacher teaches each and every objective. It happens because the selection of places provides a set of situations in which mathematics (the What) is encountered in contextually meaningful ways as an activity that solves problems arising in such settings. In planning the selection of places, we would have to ensure that all of the curriculum objectives would be covered in situ.

You: I would love to see someone develop a set of settings or places that would cover the curriculum at each grade level. That would be invaluable if ever I were to live out the communicative story in my classroom.

Me: Why don't you and I develop such a set of resources? Do you think other teachers would be interested?

You: It would be the equivalent to what traditional teachers are looking for when they go to conferences, as I mentioned earlier. When communicative teachers go to conferences, they would be interested in such resources.

I have to get back to my classroom now. I have a sub there now, but I want to see the students off. There goes the bell. Perhaps we can finish these stories another time. Actually, I think I could almost finish this one myself! Still, could you leave me with a parting summary?

Me: I'll give it my best shot in 50 words or less. In communicative classrooms, the Where and Who jointly become the medium (place) in which and through which the What is learned. We don't begin by teaching the What and then try to be sure all students are paying attention and staying on

task. Rather, with the help of students, we begin to build a place in which the What will arise spontaneously, and to be on task is simply to do what is appropriate in such a place. Because each student is an original settler and creator of the place, appropriateness is something indigenous to their understanding.

Let me leave the following chart with you—it says it in less than 50 words:

Traditional	
What	(Program of Studies)
When	(scope and sequence chart)
How	(instruction)
Why	(fits scope and sequence)
Who	(children)
Where	(classroom)
<hr/>	
Communicative	
Where	(a place)
Who	(people in the place)
Why	(appropriate to the place)
How	(indigenous action)
When	(as it happens)
What	(mathematical literacy as well as the Program of Studies)

You: One sequence is very top-down, and the other is very bottom-up. Communication thrives in a natural way only if it supports itself from the bottom up.

If you are interested in developing resources for constructing places so that the communicative story can be lived in each mathematics classroom in Alberta, contact Daiyo Sawada, 11211 23A Avenue, Edmonton T6J 5C5; phone (403) 436-4797 (res.) or (403) 492-0562 (bus.).