CHAPTER 3

Teachers' Discourse to Promote Student Thinking and Learning

INTRODUCTION AND LEARNING OBJECTIVES

Teachers play a key role in promoting interactions among students and engaging them in the learning process, and cooperative learning is widely recognized as a pedagogical practice that can be employed in classrooms to stimulate students' interest in learning through their involvement with their peers. When children work cooperatively, they learn to give and receive information and develop new ideas and perspectives on how others think and communicate in socially appropriate ways. It is through interacting with others in reciprocal dialogues that children learn to use language differently to explain new ideas and realities and, in so doing, to construct new ways of thinking and feeling (Mercer, 1996). Cooperative learning provides opportunities for children to actively interact with others, negotiate new under-standings, and appropriate new and creative ways of thinking about topics under discussion (King, 1999). In effect, cooperative learning provides opportunities for children to coconstruct new knowledge in an environment that encourages them to test out their ideas free from the constraints of a wider class group.

When You Have Finished This Chapter You Will Know:

- How teachers' interactions with their students are shaped by the learning environment
- How teachers can use specific verbal strategies to scaffold and challenge students' thinking
- The different types of mediated learning strategies teachers use to promote understanding and learning in students
- How students model the dialogues that teachers use
- The constructivist theories that underpin students' learning in small groups

—— ❧ ——

Case Study 3.1

Teacher's Dialogue With a Small Group of Students

The teacher (T) and students (S) are examining a picture of a brass rubbing of some nobility who lived during medieval times.

T: See this area here? Let's have a go. I love the dresses, they're so ornate. Why do you reckon they would have had long dresses and all the gear on their head? (*T. challenges children to think of some reasons why people who lived in medieval times wore the clothes they did*)

S: Because of their religion.

T: It might have been because of their religion. (*T. validates and acknowledges student's response*) In some places they do cover their faces and everything, but I think there was another reason why they dressed up. (*T. probes for additional ideas*)

S: Some people cover their hair so nobody can see their hair—that's what they did.

T: It's their customs and religion, that's right. Have you got any other ideas why they got dressed up like this with their head covered and veils and . . . and the material looks really, really heavy, ornate . . . (*T. keeps probing for reasons*)

S: To impress

T: Yes, to impress their husbands maybe. Do you have any other ideas? (*T. continues to probe for reasons)*

S: Yes. Because it's very cold.

T: Yes, that's great. It can get very, very cold in England. (*T. acknowledges and validates student's response*)

S: My grandma told me my dad was born in England so I have a little bit of English blood.

T: If you have a look at the photo of them, you'll see them all dressed warmly. So when you look at the lady, she's dressed really warm. So in the cold she'd be lovely and warm. Now if she lived in a hot climate, what do you think would happen? (*T. challenges children to try to make links between the information they have been reading about and what they know from previous work*)

S: She'd be hot. She's get all sweaty and sticky.

T: I wonder if you can think of what might be different if she decided to live here? What do you think might be different? How would it be different? (*T. challenges children to think metacognitively about how the types of clothes may have been different*)

—— ❧ ——

Case Study 3.1 provides an extract of a short interaction between a teacher and a small group of children who are examining a picture of a brass rubbing of a group of medieval nobles and the clothes they wore. This activity is part of a medieval theme the children are investigating in their social studies program.

In this extract, the teacher (T) challenges the students (S) to think of some reasons why the individuals depicted in the brass rubbing would be wearing the clothes they are (Turn 1). When one of the students suggests a reason, she acknowledges and validates that attempt while continuing to probe for additional ideas or reasons (Turns 3, 5, and 7). When another reason is given, she acknowledges and validates that effort also (Turn 9), but continues by challenging the children to try to make links between what they know about their own climate and the clothing these medieval people in Europe wore. Finally, she builds on the children's responses to try to get them to think metacognitively about how the situation may be different and why it would be different in the Australian context.

Questions that encourage children to make links between previous understandings and current learning help them to learn to monitor and regulate their understanding of the material and their ability to extend their learning by going beyond that material to construct new knowledge (King, 2002). Throughout this dialogue, the teacher continues to challenge the children's thinking while encouraging and supporting their endeavors: "Yes, that's great" (Turn 9) was made with enthusiasm and emotion so the student clearly understood that she appreciated the response provided.

TEACHERS' DISCOURSE DURING WHOLE-CLASS, SMALL-GROUP, AND COOPERATIVE LEARNING

In many ways, the teacher's discourse depicted in Case Study 3.1 is typical of that used by teachers in classrooms where cooperative learning has been implemented. This discourse is quite different from that used by teachers during whole-class teaching or small-group learning.

Whole-Class Versus Cooperative Learning

Hertz-Lazarowitz and Shachar (1990) investigated the difference in 27 elementary teachers' discourse as they alternatively implemented *whole-class instruction* and cooperative learning in their classrooms. The authors noted that during cooperative learning the teachers used language that was more friendly, encouraging, and supportive of their students' learning than during whole-class teaching when their language was more authoritarian and impersonal and

where they spent more time directing, questioning, and disciplining their students. The difference in the discourse was so marked that Hertz-Lazarowitz and Shachar argued that when teachers established cooperative learning where they had to deal with a number of small groups rather than one large one, they became engaged in a complex process of linguistic change that affected how they interacted with their students. This observation was particularly interesting given that all the teachers had participated in extensive professional development on how to establish groups for cooperative learning in their classrooms.

Small-Group Versus Cooperative Learning

In a follow-up study that built on the Hertz-Lazarowitz and Shachar (1990) study, Gillies (2006) investigated whether there were differences between the discourses of teachers who implemented cooperative learning as opposed to *small-group learning* in their classrooms. This distinction in how students are grouped is important because small-group learning has many of the characteristics of whole-class learning where children are not linked interdependently around a goal but often work individually to achieve their own goals. This is in contrast to cooperative learning, where children are interdependently linked so they must work together to achieve the group's goal, participate in group discussions, share resources, and learn to resolve disagreements democratically.

The Gillies study involved 26 teachers and 303 students in Grades 8–10 from four high schools in Brisbane, Australia. All participating teachers agreed to embed cooperative learning pedagogy into a unit of work once a term for three school terms. Audiotapes of the teachers' and students' discourses were collected during these lessons, transcribed, and analyzed. The results showed that when teachers used cooperative learning, 18.2% of their talk involved *mediated-learning behaviors* or behaviors designed to promote thinking and foster learning in students; 20.5% involved asking open and short questions, although the open questions were more designed to elicit an expected response; and 6.3% of their talk was directed at disciplining the students. In contrast, when teachers implemented group-work only, 12.5% of their talk involved mediated learning behaviors, 13.7% questioning, and 12.9% disciplining.

These results showed that when teachers implemented cooperative learning, they engaged in nearly 50% more mediated learning and questioning behaviors and recorded fewer than half the disciplinary comments of those teachers who used group work only. These findings provide strong support for the Hertz-Lazarowitz and Shachar (1990) study that found when teachers implement cooperative learning, it changes the way they interact with their students.

Moreover, like Hertz-Lazarowitz and Shachar, Gillies (2006) found that the teachers' manner was more personal and friendly as they interacted with the students during their cooperative learning activities. Comments such as: "You're really thinking hard about that. That's great," "I like the way you're looking at both points of view before you're making your decisions," and "Jason, that's a really imaginative word that you've used to describe that scenario" are typical of the types of personal and friendly discourses the teachers used.

Communication Skills and Cooperative Learning

Given that the research clearly indicates that teachers' discourse is affected by the organizational structure of the classroom so that when cooperative learning is implemented, teachers use more mediated learning interactions or language designed to promote thinking and foster learning, Gillies (2004a) investigated whether teachers could be trained to use specific communication skills to enhance children's thinking and learning during cooperative group work.

This study (Gillies, 2004b) involved 30 elementary teachers and 826 students drawn from 11 schools across Brisbane. All the teachers participated in a 2-day workshop designed to introduce them to the key components of cooperative learning (i.e., positive interdependence of task/goal, individual accountability, promotive interaction, the interpersonal and small-group skills, and group processing) and how to embed these components in their classroom curriculum. In addition, half the teachers were trained in those communication skills that are designed to challenge children's thinking and scaffold their learning. Examples of these communication skills are seen in the box on page 66.

Although all the teachers were trained to embed the key components of cooperative learning into their classroom curriculum, the results of this study (Gillies, 2004a) showed that the teachers who had been taught specific communication skills to promote thinking and to scaffold children's learning engaged in more mediated learning behaviors (12.0% for the communications skills group vs. 7.6% for the cooperative group) and asked more questions (39.7% for the communications group vs. 21.2% for the cooperative group) than those teachers who did not receive the communication skills training. Moreover, while the teachers who had been trained in specific communication skills still asked questions that tended to elicit short-answer responses, Turner et al. (2002) argue that these types of questions can be effective if used in combination with instructional *scaffolding* or, as occurred in this study, mediated learning (i.e., those verbal behaviors designed to challenge children's thinking and scaffold their learning).

Communication Skills Teachers Were Trained to Use

Types of Communication Skills	Examples of Skills
Probing and clarifying issues	• *Can you tell us a bit more about what you found out when you investigated that issue further?* • *Have you thought about using this information to help you work through that dilemma?*
Acknowledging and validating	• *That's a really great effort. You've worked hard to put that information together.* • *I like that word. It creates a sense of mystery about the plot.*
Confronting discrepancies and clarifying options	• *You seem to be saying . . . but I notice you've actually got something different here. I wonder how you reconcile the anomaly.* • *I'm not sure I understand what you mean by that. Perhaps you can explain it more clearly to the group?*
Tentatively offering suggestions	• *I wonder if you've thought about doing it like this?* • *Perhaps you could try it to see what happens?* • *Have you thought about . . . ?*

It appeared that by training teachers explicitly to use the communication skills outlined above, they learned to think about how to interrogate students' thinking and learning, and this, in turn, helped them to monitor their own mediated learning behaviors—what they should say and how they should say it. Interestingly, the teachers who participated in the communications skills training were four times less likely to have to discipline students as they worked in their groups than the teachers who did not participate in this training. It may be that when teachers use discourse that clearly demonstrates interest in what students are doing, students, in turn, are more likely to remain engaged with the task at hand.

Types of Mediated Learning

In order to provide a clearer picture of the different types of mediated learning behaviors the teachers used, Gillies and Boyle (2006) analyzed transcripts of the teachers' discourse as they interacted with the children. The mediated learning behaviors they identified were designed to challenge children's understandings, encourage their thinking, and help them to connect their ideas to previous learning. Moreover, the teachers were observed to work at making

these connections by encouraging the children to cooperate and to discuss ideas together and by setting tasks that required the children to draw on their prior knowledge and understandings. Examples of the mediated learning behaviors the teachers used are outlined below.

Types and Examples of Mediated Learning Behaviors Used by the Teachers

Mediated Learning	Examples
1. Questions basic information to challenge children's thinking	*Tell me a little bit more about the characters in the story.*
2. Challenges children to provide reasons	*So tell us a bit more about how you solved that problem.*
3. Metacognitive: thinking about thinking	*How do you find out what else you might still need to consider?*
4. Confronts discrepancies to highlight inconsistencies in thinking	*I hear you saying this . . . but now you've said . . . I'm not sure I understand your position.*
5. Prompts student by pointing to potential help	*I think I'd check that out again, because sometimes there are other possibilities (i.e., answers) you'll need to consider too.*
6. Prompts student to focus on issue	*You'll need to look at those issues and identify the one to focus on.*
7. Tentatively questions to provide another perspective for consideration	*Have you thought about . . . as a way of dealing with that topic?*
8. Asks open question	*What do you think you'll do now? How do you think that may help?*
9. Scaffolds connections between information, ideas.	*Remember what we discussed yesterday about the indigenous people who lived . . .? Think about what we're discussing now . . . Can you see any similarities and differences?*
10. Validates and acknowledges students' efforts	*You've thought very carefully about how you responded to that topic. There are some really imaginative ideas there. That's great.*

Pedagogical Practices That Promote Thinking

In follow-up interviews with the teachers who had participated in the communication skills training, all commented that they believed it was important that children are taught to think both cognitively and metacognitively if they are to become proficient at problem solving and learning. Moreover, they believed that they did this by actively challenging the children to justify their opinions and by encouraging children to reflect on what they knew and what they still needed to know. By challenging the children to justify their reasons and make them explicit, the teachers were promoting high-level processing of information and thinking (King, 1999). Furthermore, when children have to do this publicly (albeit in the small group), they learn to sharpen their own understandings and to express their ideas in ways that others can understand and will accept as well reasoned and valid. In so doing, they contribute to the development of their own and others' understanding and learning (Rojas-Drummond & Mercer, 2003).

Scaffolding was another important pedagogical practice that the teachers reported using to promote children's thinking and learning. Teachers reported doing this by prompting children to consider different issues and perspectives or by modeling problem-solving strategies. The following comments were made by teachers who recognized the importance of modeling problem solving to their students:

"You've got to be on the ball all the time and making every effort to model how it's done. I find modeling is very helpful as it gives the kids an idea of what they need to do."

"I find if I model it for them—talk them through the steps, then they have a go and then I phase out . . . they seem to get the gist of what they need to do."

The teachers further reported that scaffolding also included making connections between information and ideas while all the time validating and acknowledging children's efforts. The following are examples of how teachers reported scaffolding connections to help encourage the children to think more comprehensively about the issues:

"Remember what we discussed yesterday. We were talking about making sure that we had an understanding of . . . (key issues). Well, today you need to have a look at how they compare to what you discuss today (key issues on a related topic)."

"You could consider what he's had to say (group member) and consider his ideas along with what others have suggested. Put them together and you might come up with a fabulous idea." (*Teacher helping children understand how they could coconstruct new understandings from considering different ideas or information*)

Helping students to link previous understandings to current information is critically important if they are to be able to analyze and integrate different ideas and go beyond prescribed material to coconstruct new knowledge (King, 1999). The process involved is complex as it requires students to engage in critical thinking, problem solving, and decision making (King, 2002). These are processes that teachers can actively facilitate through their *dialogic exchanges* with students during cooperative learning. Case Study 3.2 provides an example of a class teacher challenging a group's thinking during a cooperative small group task.

Case Study 3.2

An Exchange Between a Teacher and One of the Small Groups in Her Fifth-Grade Class

The teacher (T) is challenging the children to think about how they might deal with the problem below.

Background: Students(s) are required to come up with a solution to a problem where a car has gone over the edge of the cliff and they are first to arrive on the scene. They are required to develop a plan of action and represent their plan (e.g., a sequence of pictures), which they will then discuss with the larger class group.

T: Now you've got to decide how she's going to get them out of this mess, because she's the only one who is conscious.

S: They could be dead, I think.

T: Yes, but we don't know that so we assume they're not. So if it were you and you saw two people in the front who looked as though they were asleep, what do you think you might do? (*T. prompts students to think of the actions they might take*)

S: I would, if it were a busy road, I would go up and call out.

T: True, but is there something you might do before that? (*T. challenging students to think of how they might sequence their responses*)

S: Try and wake them up. See if they're conscious.

T: Yes, see if they were conscious or if they were dead. If they weren't dead, what could you do next that could help them? . . . Think about that TV show the other day where we saw how the emergency people rescue people who get into difficult situations. (*T. scaffolds connections between information*)

S: Go up to the road and stop some cars. Get them to help you. Call the police, the ambulance.

T: They might be hurt or uncomfortable in some way. What would you do? Can you see what you would do if they were hurt? And that it was someone who was near and dear to you? (*T. probes the students to see if they can think of an immediate response*)

S: Check out whether they're alive. Their pulse.

S: Check their breathing, blood pressure.

T: Yes, that's part of it. I don't know about blood pressure. What else is obvious? (*T. scaffolds links between the different pieces of information provided in the scenario*)

S: I know if you're alive your tongue would still be pink but if you're dead your tongue would be relaxed.

T: But if you were lying unconscious and I wasn't sure whether you were dead or not, what could I do? What else do you think you would do? (*T. challenges students to think of response*)

S: Shake you gently.

T: Little things like that to see if you were dead or alive, and then if they were alive, what could you do that might help them? Think about what you know here. (*T. scaffolds links between information*)

S: Make sure they can breathe . . . that their mouth isn't blocked up with blood.

T: Make sure they're not vomiting in their mouth or something. Is there anything else you'd do? (*T. probes students to think of other responses*)

S: If they were dead their tongue would be black because all the blood goes to it.

T: But if they were not dead and you could get them to come around what would you do next? (*Pause*) Well, what do you normally give people if they've been hurt or upset? (*T. scaffolds links between previous information and its relevance to the current situation*)

S: Comfort.

T: Yes, that's important. How do you do that? What might you say? (*T. probes students to identify a response*)

S: Say you'll be OK. Keep telling them you'll help.

T: What else do you think these people would need? (*T. challenges students to consider other responses*)

S: Water.

T: Water, right! What else could you check out? Most cars carry these. (*T. prompts students*)

S: First aid kit.

T: Most modern cars these days carry one. So perhaps that's how you should start out. And once you know they're OK she could go off and get help, but if they were dead that's a different scenario, isn't it? Can you imagine how you'd react if they were dead? What would you do? What would you think? So you've got to decide if they're dead or alive. (*T. challenges students to think metacognitively*)

In Case Study 3.2, the teacher demonstrates a number of mediated learning behaviors that promote thinking in students. These include prompting (Turns 3, 9, 26), probing (Turns 9, 18), and challenging (Turns 5, 14, 24) the students to think of possible responses to the road accident scenario. The teacher also scaffolds links between information (Turns 7, 12, 16, 20), and she encourages them to think metacognitively (Turn 28) when dealing with the problem at hand. When these mediated learning behaviors that promote thinking are taught explicitly, students learn to take these behaviors on board and model them in their small-group discussions with each other (Gillies & Boyle, 2005).

To illustrate what the students were doing in their groups, an extract from a continuous discussion that occurred in one of the small groups in the above teacher's classroom is presented in Case Study 3.3. This extract lasted only a few minutes, and it occurred after the dialogue reported above.

Case Study 3.3

A Discussion Among Students in a Small Group

The students (S) are discussing how they would solve the problem of a car that has gone over a cliff and they are the first to arrive on the scene.

S: OK, what do you think she (person in the car) did? (*S. challenges others to think of a response*).

S: She punched out the back window, climbed out and up to the rocks . . . she had to get away and get help.

S: If she went on to the road, what about the people in the car?

S: That's right. (*S. acknowledges and validates other's idea*) They could die.

S: What do you think you would do, Jason? (*S. challenges group members to suggest a response*)

S: I'd get help . . . go to the shop and phone the police and ambulance.

S: Yeah, but they could be badly injured and they'd die in the meantime. . . .

S: They could be badly injured and need help?

S: Yeah, but isn't it better to get help first . . . get the ambulance and the police to come and help them. . . . Like we saw before (*referring to TV program about a car accident*). (*S. links information*)

S: You'd have to go and check them out and see if they're dead or alive . . . you'd have to go down and do that (*referring to climbing down the hill*).

S: But that could waste time, I think you'd be better trying to get help . . . go to the nearest shop and phone the police and ambulance.

S: Yeah, but they could die in the meantime, bleed to death . . . there could be a fire, the car could explode.

S: OK, let's make a decision here. What do you want to do first? (*S. challenges others to make a decision*)

S: You'd need to go down the hill and check them out. If there were two of us, one could go and get help and the other could go down the gully.

S: Yeah, he's right. (*S. acknowledges and validates other's idea*)

❦

The students' dialogue demonstrates that they modeled many of the types of mediated learning behaviors that their teacher had used as she interacted with the groups. For example, they challenged each other's opinions (Turns 1, 5, 13), acknowledged each other's points (Turn 4, 15), and attempted to link new information to previous understandings (Turn 9). Moreover, they did this in an environment that was task oriented and open to others' ideas and suggestions.

It was interesting to hear the students modeling many of the mediated learning behaviors that their teacher used to scaffold learning and challenge understanding, particularly given that they, unlike their teacher, had not been trained to use communication skills to challenge thinking and promote learning. It can only be assumed that they relied on the cooperative group context and their teacher's discourse to understand the relevance of these skills to their learning

needs. Gillies and Boyle (2005) found that students were successful at scaffolding and challenging each other's learning during small-group work if their teachers first modeled these behaviors in their interactions with their students. It seems that when students work in cooperative small groups where they feel supported and free to try out new ways of thinking and talking, they need only a minimum of encouragement to model some of the mediated learning behaviors they have heard their teachers use.

In order to illustrate how teachers interact with older students to challenge their thinking, scaffold their learning, and encourage them to make links between different bodies of knowledge and cognitive understandings, the following scenario of a Grade 11 teacher interacting with a small group of students in her class is presented (Case Study 3.4). The students have been working on a science unit that has included some detailed cases on genetic abnormalities in humans. Concurrently, the students have been exposed to some of the ethical and moral dilemmas doctors and scientists confront as they deal with life-and-death decisions relating to different genetic abnormalities in humans. The students have also been studying codes of ethical practice to help them understand the principles that underpins these codes.

— ❧ —

Case Study 3.4

An Exchange Between an Eleventh-Grade Teacher and a Small Group of Students

They are discussing what they would do if they were confronted with the decision of aborting a 24-week-old fetus that had been diagnosed with Down syndrome.

Background: The students have information on this genetic abnormality, including information on how this type of genetic abnormality occurs, the types of tests that are used to screen and diagnose this condition in an unborn child, and the long-term quality of life prospects for a child with Down syndrome.

S: How reliable is amniocentesis? Is it really reliable?
S: It's pretty reliable. It's more reliable than the different screening tests we read about. You know the ones they do when they check the mother's blood.

T: You probably need to just check that out again and make sure you're clear on that issue because it sounds as if it's going to be pretty important for your discussion (*T. prompts students on a key issue to consider*).

S: I would need to be pretty sure that the test was reliable before I'd consider aborting it.

S: I agree, although . . . but if the test was reliable I'd be inclined to abort. It wouldn't be fair to bring up a child that didn't have a fair chance at life, a child that was mentally retarded.

T: I wonder if you're considering that from your perspective. I wonder if these children might think differently? (*T. challenges students to consider another perspective to the issue*)

S: OK. We seem to have a couple of different perspectives that we need to consider if we're going to make a decision. Like. Jessie [student] thinks that she'd need to be clear that the test was reliable but you (*pointing to another student*) think that even if it was reliable, you'd still abort 'cause it wouldn't be fair to not have a good quality life.

S: Yes, but there's also the ethical issue of aborting a fetus that is fully human. Have you seen pictures of fetuses at this stage of their development? They look like small babies.

S: That's true. This is really quite complicated. I'm not sure I'd want to make that decision.

S: The family thinks she should abort. They're worried about whether they can support such a child.

S: Yep! Surely things can't be that bad. You know you'd get a lot of support from agencies. There's Down syndrome help groups. I've seen them on the Web and there's special schools for these children.

T: These are important points, and you need to consider them carefully. (*T. acknowledges and validates students' points*) Have you thought about the doctor's position and how he stands ethically? (*T. scaffolds links between different pieces of information provided in the scenario)*

S: Yes, that's important. He's bound by a code of professional practice and he may not want to be involved in an abortion.

T: I wonder if there are other pieces of information you may need to bring together to help inform your discussion? (*T. prompts students to consider linking information*)

S: Well there's also the mother's health. If she doesn't want the baby, she shouldn't be expected to have it, especially if it's mentally handicapped.

T: That's an issue. (*T. acknowledges student's issue*) I wonder if there are other issues that you might need to consider about the mother's health? (*T. prompts the students to consider other health issues*)

S: Well, there's also the issue of if she aborts, she may not be able to have another child. Sometimes, women can be left sterile after abortions.

T: Yes, that's true. (*T. acknowledges student's point*) How are you doing with the information you have? Is there anything else you need to consider? (*T. encourages the group to think metacognitively—to think about their thinking*)

Although the students in the scenario in Case Study 3.5 are more sophisticated in the way they talk and how they consider the issues, the teacher still uses a number of mediated learning behaviors to extend their thinking on the topic. These include prompting (Turns 3, 14, & 16), challenging (Turn 6), and scaffolding (Turn 12), as well as encouraging the students to think metacognitively (Turn 18) to ensure that they have considered whether there is any additional information they may need to include. While the teacher's role in mediating the students' discussion is more subtle than the role of the teacher with the younger children (Case Study 3.2), she nevertheless is quite active in prompting, challenging, and scaffolding students' thinking to help broaden their perspectives on the dilemma at hand. This is important because without the teacher actively monitoring the discussion, the students could end up with a less-than-informed or a limited perspective on the factors that affect the dilemma.

Because this teacher has good rapport with her students, they respond well to her interest in their discussion and her efforts to extend their thinking. For example, the response that was given after the teacher had challenged the children at Turn 6—*I wonder if you're considering that from your perspective. I wonder if these children might think differently?*—immediately triggered the following response in the student at Turn 7, indicating that she has grasped the importance of considering additional perspectives: *OK. We seem to have a couple of different perspectives that we need to consider if we're going to make a decision. Like. Jessie (student) thinks that she'd need to be clear that the test was reliable but you (pointing to another student) think that even if it was reliable, you'd still abort 'cause it wouldn't be fair to not have a good quality life.*

A similar response occurs after the teacher has asked the group to consider the doctor's position and how he stands ethically (Turn 12) when the student acknowledges the importance of the suggestion by stating: *Yes, that's important. He's bound by a code of professional practice and he may not want to be involved in an abortion.* In short, the teacher's probing, challenging, and scaffolding influenced the students' responses and thinking.

The following extract (Case Study 3.5) is presented to illustrate what the students discussed after the teacher moved on to another group. The dialogue represents only a few minutes of this group's discussion, which occurred directly after the dialogue reported above.

— ❧ —

Case Study 3.5

A Group Discussion Among Eleventh-Grade Students

They are discussing whether they would or would not consider aborting a fetus with Down syndrome.

S: OK, let's see what we've got so far. We know Down syndrome means that the child will be mentally retarded and this will affect the quality of its life. Some of us think she should have an abortion but some say no. The family wants her to abort but the doctor has an ethical dilemma to confront. Is that how you see it?

S: Yes. (*all students agree*)

S: We seem to be thinking about everyone else in this discussion but I wonder how the girl feels. Perhaps we need to think about her for a minute? (*S. tentatively proposes that the group considers another perspective*)

S: Sure, you're quire right. We haven't thought about her much at all. (*S. acknowledges and validates this suggestion*)

S: How do you see her situation? (*S. asks open question to elicit a clearer perspective on the issue*)

S: I really think this is very difficult because she's probably experiencing a lot of pressure from all sides. She's also got to consider what she wants too. Not just what everybody else wants.

S: Sure. You're right. (*S. validates another's point*)

S: How do we get round this, folks? (*S. challenges the group to think of solutions to the dilemma*)

S: I'm not sure we're going to be able to do that. I mean, it looks as though it's irresolvable.

S: Yes, but this is an issue that many people deal with every day. I'm not sure we can say we can't deal with it?

S: Is it better to try to think of some suggestions that have already come up and then we can look at them and try and work out what to do? (*S. challenges group to link information to work out a solution*)

— ❧ —

It is interesting to observe how the students modeled many of the mediated learning behaviors that their teacher had used in their interactions with each other. While this would not have occurred solely from this brief interaction with their teacher, it was typical of the types of *dialogic exchanges* this teacher

03-Gillies-45194.qxd 2/20/2007 1:14 PM Page 77

had with other groups in the room where she used a number of mediated learning behaviors to help students focus more clearly on the issue, consider different perspectives, and link relevant information to the issue under discussion to help obtain a better understanding of the dilemma. This teacher, like the teacher depicted previously, working with the Grade 5 students, had also been trained in the communication skills designed to challenge students' thinking and scaffold their learning; however, the students had not been trained to use these skills, so it can only be assumed that these students also saw the relevance of these skills to their own group context and emulated their teacher's dialogic exchanges in their interactions with each other. Certainly, Gillies and Boyle (2005) observed that this is what younger students did with a minimum of encouragement. It appears that when students work collectively in groups, and they are motivated to do so, they will engage in more facilitative interactions with their peers as they work on solving the problem at hand (Johnson, 2003).

Other Ways of Challenging Students' Thinking and Facilitating Interactions

Bloom's Taxonomy (1956) has traditionally been used by many teachers to develop questions that stimulate children's thinking in progressively more challenging ways. Questions posed range from those that tap basic recall through to those that require more evaluative responses. In class situations, teachers often try to ask questions that not only test recall and comprehension but also aim to stimulate higher-level thinking, such as those that challenge students to analyze, synthesize, and evaluate information. The following are examples of a series of questions a teacher may ask to help students think more deeply about information, in this case, weather systems:

1. Knowledge: List . . . (three types of weather systems)

2. Comprehension: What. . . . (damage could occur if our school was in the path of a tornado)?

3. Application: Using the information you've collected about a tornado, make a brochure to alert people to the precautions they should take if a tornado approaches.

4. Analysis: Compare two types of weather systems . . .

5. Synthesis: Design a house that would remain standing if a hurricane hit.

6. Evaluation: A powerful hurricane is threatening your home and you have to be evacuated. You can take only six of your belongings. What would you save and why?

The above questions tend to be hierarchical because they are ordered from simple to complex and from concrete to abstract. While this approach to stimulating students' thinking has been used extensively in schools, this is not the only way students can be helped to think and understand. Wiggins (1998) proposes that there is no one way of demonstrating *understanding* because understanding is multidimensional, encompassing very different interpretations of meaning. According to Wiggins, there are five overlapping yet separate aspects of understanding that need to be uncovered through schooling. These aspects derive from the different meanings attached to the word *understanding* and include being able to do the following:

1. Explain (This includes the ability to provide sophisticated explanations and interpretation of events)

2. Apply (This includes knowing how to apply knowledge effectively in different situations)

3. Take perspective (This includes being able to see things from multiple vantage points)

4. Empathize (This includes the ability to get inside another person's feelings and frame of reference)

5. Reflect (This includes knowing ourselves and understanding our prejudices)

These aspects of understanding are not hierarchical as in a *taxonomy* and are often developed simultaneously as students learn to uncover rich understandings of the material being presented or concepts being explored. Interestingly, teachers often use Bloom's taxonomy and Wiggin's approach to uncovering meaning to stimulate students' thinking and maximize their understandings—critically important for facilitating interactions.

CREATING THE LEARNING ENVIRONMENT

Research reports on the importance of creating learning environments where students feel safe, are able to participate, and can contribute to group discussions without fear of ridicule or mockery from their peers. When students believe they can contribute and are valued by others, they are more likely to feel motivated to continue to participate and stay engaged with the task. Moreover, the sense of "group" that students develop as a result of their cooperative learning experiences helps to foster a strong sense of social cohesion whereby members care about one another and will help each other learn (Slavin, 1996).

In summarizing the research on the benefits of cooperative learning to psycho-
logical health, Johnson and F. Johnson (2003) noted that cooperativeness, or the
willingness to work with others, is positively related to a number of indices of
psychological health, such as emotional maturity, well-adjusted social relations,
strong personal identity, ability to cope with adversity, social competencies, and
basic trust in and optimism about people. Johnson and Johnson reported that this
occurred because, when students make an effort to cooperate, they realize that
they are accepted by their peers, know that they have contributed to their own and
others' success, and have learned to perceive themselves and others in more real-
istic and complementary ways (i.e., each individual has unique abilities).

In a study of junior high school students' experiences of cooperative learn-
ing, Gillies (2004b) found that students in cooperative groups demonstrated
more care and concern for each other and were more willing to promote each
other's learning and accept responsibility for each other's achievements than
students who worked in small groups only (i.e., groups that have not been
taught cooperative learning). These attitudes help to build a sense of group iden-
tity, promote prosocial norms among members, and create an environment con-
ducive to learning. It is this sense of collective agency where members believe
they can work together to produce desired effects that is highly motivational, as
it contributes to group members' sense of autonomy or control over their own
learning (Bandura, 2001; Goddard, Hoy, & Woolfolk Hoy, 2004).

Practical Activity

Ways of Creating a Cooperative Learning Environment

Elementary School

★ Use good verbal encouragement or language that lets students know that they
  are being heard. For example, "Mm!, Ah!, Sure, I see, Yes."
★ Use nonverbal body language that communicates a willingness to listen to
  students. For example, appropriate eye contact and body posture that is open
  and nonthreatening.
★ Use open questions with a pause to allow students time to process the ques-
  tion and respond. For example, "What do you think might have happened
  if . . . ?"; "Where do you think the characters were intending to go . . . ?";
  "How were the . . . ?." Pausing after the question is very important as it

(Continued)

(Continued)

allows students time to reflect on what was asked and cognitively reorganize their thoughts to generate a possible response.

★ Use empathic listening and speaking skills to communicate an understanding of a student's thoughts or feelings about an issue. For example, "It sounds as if you've had a rough time . . ."; "How did you feel when that happened to you?"; "I can see that you're looking exhausted from it all."

★ The use of humor is a good stress and tension reliever, and it allows students to see their teacher in another light. Paradoxical techniques are particularly funny as children often like the humor conveyed by saying the opposite of what is meant. For example, "We don't need to worry about having lunch. We can all live on fresh air." This comment may be made (in a very friendly way) to encourage children to be a little quicker in getting themselves out for lunch.

★ Discuss clearly with the students their rights and responsibilities as members of the group or small team. The format in the box below is provided as a guide to stimulate discussion. Teachers can do this exercise as part of a brainstorming activity where they help the students to identify the rights and reciprocal responsibilities that each has as a member of the group. Students are often very forthright in identifying their rights as class members and can often very readily list them; however, getting them to identify reciprocal responsibilities is often difficult. It is important that students recognize that while they have rights as individuals in the classroom, they also have responsibilities to themselves and to each other as members of a learning community.

Rights and Responsibilities of Members of a Group

Rights to Learn	Responsibilities in Learning
1. I have a right to learn.	1. I have a responsibility to help others learn.
2. I have a right to contribute.	2. I have a responsibility to help others contribute.
3. I have a right to receive respect.	3. I have a responsibility to respect others.
4. I have a right to be safe.	4. I have a responsibility to help others feel safe.
5. I have the right to be able to do the best I can.	5. I have a responsibility to help others produce the best they can.

★ Ensure that the classroom is well lit and the general physical layout is open, friendly, and stress free. Posters on the walls can often act as stress relievers and promote discussion on topical issues such as key sports figures, current movies, key cartoon characters, and so on. When rooms are decorated in this way, students often feel more relaxed and able to enjoy their surroundings.

Middle School and High School

★ Create an environment that enables students to move around different work stations so they can access information, seek help, and produce individual and group products with ease. For example, access to the Internet may be critical for searching for information and downloading relevant materials. If students are working in groups, they need room to move freely around other groups as they seek help from others. They also need access to tables or floor space where they can lay out their work and prepare their group's report.

★ Negotiate expectations for group and classroom behaviors before students begin working in their groups. If this is done in a consultative and friendly manner, students are more likely to respond positively to any negotiated rules or parameters for behavior. Having students identify the types of behaviors they would expect from others is one way of helping students to generate their own list of behaviors they expect to see others demonstrate. Generating their own list of behaviors is more likely to promote ownership of them and a sense of responsibility to practice them.

★ Taking a personal interest in students by asking about their weekend or their favorite game is one way of helping to build connections and letting students know that their teachers are interested in them as individuals. Language used during these exchanges is often very relaxed and friendly and enables students to see another side of their teacher. Be prepared to share some of your own thoughts, as teachers, with your students so they can understand what your position or your opinion may be on topics of mutual interest (e.g., sports, movies, books).

★ Organize some icebreaking activities so students can get to know each other before they begin to work more formally together. This is particularly important for adolescents, who are often very sensitive about how they are likely to be perceived by their peers. Such icebreaking activities may include: finding out three things about a person in your group and then introducing that person to the wider class; completing a limerick from the first stimulus line; and identifying and discussing your funniest experience.

(Continued)

(Continued)

★ Organize to hold debates between groups on topical and humorous subjects. Ensure that speakers understand that what is being discussed is to be presented in a lighthearted manner. Have the remaining groups identify key aspects of the presentation that they liked and discuss these at the end of the debate. The teacher would need to help students highlight aspects of the debate that fulfilled the goal of the debate—to have fun. This type of exercise enables a teacher to demonstrate many of the mediated learning behaviors discussed above, such as acknowledging and validating students' efforts, challenging their perspectives, scaffolding their learning, and helping them to connect ideas and think metacognitively.

BRINGING IT ALL TOGETHER: UNDERSTANDING THE RESEARCH

There is no doubt that students learn by interacting with more competent others in their environment. Parents play a key role in helping very young children to learn and to communicate their needs. As children grow and develop, others such as teachers and peers play a key role in their learning and development. Through social engagement with others, children learn new ways of talking and of constructing meaning from their experiences. This process of constructing meaning on how children learn can be explained from two perspectives—personal and social constructivism.

Personal constructivism, originally proposed by Piaget (1950), involves the individual's reflecting on and organizing experiences to create order and adapt to the environment (Lisi & Golbeck, 1999). Personal constructivism emphasizes the intrapersonal dimensions of learning, and, in particular, the belief that knowledge is not transmitted directly from one individual to another, but rather is mediated through interacting with others. Exchanges that bring differing viewpoints into a child's awareness are likely to give rise to a state of cognitive conflict, because children have to keep their own points of view in mind while taking account of other incompatible perspectives. In this way, a state of disequilibrium is created that forces the child to *decenter* or consider the perspective of others in order to reduce the cognitive tension that has arisen.

When children disagree with others, two important realizations occur. First, they are forced to reexamine their own points of view and reassess their validity, and, second, they learn that they must justify their own points of view and communicate these clearly if these are to be accepted as valid. In so doing,

children reevaluate and restructure their own perspectives on the basis of new information and are strongly motivated to reconcile contradictions. The interaction with others is a trigger to social and cognitive change, although the change itself is achieved by the individual.

The sociocognitive conflict that arises when different cognitive approaches are undertaken for the same situation was illustrated in a series of studies by Doise and Mugny (1984) and Mugny and Doise (1978). Children who were not yet able to conserve spatially were required to reproduce a model village of several houses but with each house having a different orientation. As the children were not yet capable of the spatial transformations required to preserve the front/back and left/right relations, they produced an egocentric copy of the village. In order to demonstrate the superiority of collaborative performances over individual ones, the children were paired on this task, and one child was required to make front/back and left/right transformations (despite having been selected because of an inability to do so) in placing the houses while the other child was required only to make the 90° rotations (something that most children of this age can do). Thus, any misplacement of a village house by a child who was required to make the more difficult transformations (front/back and left/right) would have created a problem for the other child, because the correct answer would have been obvious. The misplacement of the house would have challenged the children to reevaluate their own performances, including the perspective of the other child.

Analyses of the children's responses indicated that two types of interactions occurred. One led to compliance when the child simply applied the solution the other gave. This is called a relational solution to the problem; the child places an emphasis on maintaining the personal relationship to the detriment of his or her cognitive growth (Doise, 1990). The other interaction led to sociocognitive conflict where children had to defend their own solutions while being required to consider other erroneous solutions at the same time. This situation caused consternation among those children who did not have the cognitive capabilities necessary to solve the problem but who were perturbed by the unacceptable solution proposed by the other children. While looking for a solution, these children tended to verbalize their strategy and the issues they faced and, in so doing, made progress toward resolving the problem.

These studies showed that the simultaneous confrontation of different perspectives leads to the integration of new cognitive structures (Doise, 1990). By structuring situations in which challenge occurs, children are confronted with cognitive schemas or ways of thinking that are contradictory to their own. In order to reestablish internal equilibrium, the child is forced to confront these contradictory ways of thinking and integrate them into more elaborate cognitive formulations (Mugny & Carugati, 1989).

Children who know the correct answer can still learn from those who, seeing the problem from different angles, offer incorrect solutions. The gains made during the paired performances (by the children who were challenged to reevaluate their answers) were structurally superior to those of the group members taken individually, and generalized to individual performances on posttests indicating that the children were able to think through their own solutions as well as those of their partner before deciding on a final response. The results were interpreted in terms of *cognitive conflict*. When children are confronted with a conflicting solution, even if incorrect, it may provide them with some dimensions of a progressive elaboration of a cognitive mechanism new to them (Doise & Mugny, 1984; Mugny & Doise, 1978). In effect, the perturbing feedback provided by interaction with others initiates a process of *intellectual reconstruction* in the child as he or she seeks to accommodate and assimilate new ideas and understandings. Although sociocognitive conflict is important, the main work of constructing new knowledge is done at the intra-individual level by the child through solitary reflection (Damon, 1984; McInerney & McInerney, 2002).

In contrast, *social constructivism* proposes that children are introduced to new patterns of thought when they engage in dialogues with others. Social constructivism, originally proposed by Vygotsky (1978), emphasizes the interpersonal dimensions of learning and, in particular, the role more competent adults or children play in helping the child gain mastery over the cultural tools and signs that are important to his or her cultural group. However, although the environment or the context provides the habits and forms these cultural behaviors take, it is the individual who is actively involved in mastering these cultural behaviors and acquiring them as his or her personal property.

Vygotsky (1978) maintained that interaction with others is critical for the development of higher cognitive functions in children. During these interactions, more capable and older others mediate the child's environment by focusing attention on relevant environmental information and providing the tools for solving problems (e.g., speech, memory strategies). In other words, children are introduced to new ways of thinking and patterns of thought when they engage in dialogues with more competent others. Eventually, after repeated exposure to these exchanges, the child's thinking and communication processes become internalized, and it is through this internalization of processes that skills are incorporated into the child's mental system. Hence, when two children enter into a peer relationship, it is not only the information that is internalized from interactions but also the fundamental cognitive processes that are implicit in the communication (Vygotsky, 1978).

Internalization occurs as a child learns to adjust his or her definition of a situation to accommodate a "situation definition" that those involved in the interaction share (Wertsch, 1984). Thus, as adults use speech and gestures that are tied to the definition of a situation that exists for children, children adjust their understanding of that situation to develop a common understanding of social reality. This process occurs through mediation when adults or more capable peers mediate the environment for children by supplying the culturally available tools of thought that children eventually internalize. Once internalization has occurred, the child retains the ability to reproduce these jointly produced cognitive performances, and the achievement becomes part of the child's actual capabilities rather than merely a potential skill that can be realized only through interaction (Damon & Phelps, 1989).

By studying the interaction patterns between mothers and their young children, Wertsch (1984) identified four levels through which children progress from other-regulation to self-regulation, beginning with the young child responding in a way that is not related to the task, followed by realizing there is some connection to the adult's speech and the task, accepting more responsibility for regulating his or her own activity and being able to respond to the demands of others, through to finally being able to perform the task without any strategic assistance from the adult. Wertsch argued that children are motivated to progress from one level to the next because of the need to establish and maintain coherence between their actions and the adult's speech.

Coherence is created by children's adjusting their understanding of situations so their understandings are consistent with their behaviors. The child follows the adult's directions and constructs an understanding of the relationship between speech, definition of the situation, and behavior. Thus, children may perform the task even though they may not understand what they are being asked to do. Wertsch (1979) found that adults use directions that children do not understand and then guide the children's responses. Cazden (1983) later observed that as the child's learning developed, the strategy or routine that was provided by the teacher was progressively altered and replaced by one that enhanced the learner's mastery of the complex behavior. Children learn to understand the task situation because they have performed it under the guidance of the adult (Rogoff, 1990). In a tutoring relationship, more-capable peers provide the speech, situation definition, and behavior that mediate or scaffold the child's understanding of the task. However, while more-capable others mediate or scaffold understanding of a task, it is the child who acts on this information to negotiate meaning and appropriate learning for him- or herself (Palincsar, 1998).

In summary, there are two different perspectives on how children learn in interaction with others. The first perspective, personal constructivism, proposes that collaborative learning experiences can help participants to discover new knowledge and solutions by challenging their partial and incomplete perspectives on a problem. When children generate different cognitive approaches for the same problem, a state of sociocognitive conflict exists that forces children to decenter to consider the perspectives of others in order to restore equilibrium. By structuring situations in which cognitive conflict is likely to arise, Doise and Mugny (1984) and Mugny and Doise (1978) found children demonstrated different cognitive competencies that they could not perform individually. These changes could not be attributed to imitation, because the children were able to generalize them to other related tasks. Children at an intermediate level of mastery showed progress after interacting with a child of less skill. Thus, peer interactions work mostly to trigger a change, although they do not provide the substance of change. It appears that it is the opportunity to coordinate and coconstruct a solution from incomplete perspectives that is an important aspect of peer interactions and that contributes to cognitive growth.

Teachers promote cognitive growth in children when they use language that challenges their understandings, confronts discrepancies in their thinking, and requires them to them to justify their reasons (Gillies & Boyle, 2005, 2006; King, 1999). When teachers do this, the cognitive tension it creates in children forces them to revise and reconsider their own understandings, to reconcile contradictions, and, in so doing, to develop new understandings and learning.

The second perspective on how children learn, social constructivism, proposes that more-capable peers and adults mediate children's learning by providing language and strategies for problem solving. These skills are then incorporated into the children's mental systems where they become part of their own cognitive repertoire. More-capable peers also benefit from the interaction with others because they are challenged to restructure and reformulate their own knowledge in order to explain it to their less-able peers, which, in turn, facilitates cognitive growth.

Teachers foster cognitive growth in children when they create situations that give children the opportunity to interact with others where they learn to exchange ideas, model patterns of thinking and reasoning, and solve problems. King (1999) argues that as a result of these interactions, individuals learn new ways of thinking and talking and of constructing new understandings and negotiating meanings. Gillies (2004a) found that teachers model many of these patterns of thinking and reasoning when they prompt children to focus on issues, engage in questioning designed to suggest tentative alternatives, scaffold connections between information, and promote metacognitive thinking.

CHAPTER SUMMARY

The research on teachers' discourse suggests

- Teachers' discourse during cooperative learning is more personal and friendly and less authoritarian and impersonal than it is during whole-class instruction or unstructured small-group instruction.
- Teachers use more mediated learning behaviors during cooperative learning than during small-group instruction.
- Teachers' mediated learning behaviors are designed to challenge children's understanding and thinking and help them to connect ideas to previous learning.
- Mediated learning behaviors include: prompting, challenging, confronting, questioning, and scaffolding children's thinking and learning.
- Children model the mediated learning behaviors they hear their teachers use in their interactions with each other during cooperative learning.
- Personal and social constructivism helps to explain children's learning during cooperative learning.
- Personal constructivism occurs when children encounter ideas that are different from their own, and they are forced to examine these alternative ideas in order to reduce the cognitive tension they experience and reconcile these ideas with their own.
- Social constructivism occurs when children interact with others and are introduced to new ideas and new patterns of thought until eventually, after repeated exchanges, these ideas and patterns of thought are internalized.

ACTIVITIES

1. Role-Play:

   - Divide into triads.
   - One person talks, one person listens, and the last person observes.
   - Discuss an event/topic of interest for a few minutes.
   - The observer notes the behaviors and interactions that facilitate the discussion.
   - The triad debriefs and members share their perceptions of the discussion.
   - Rotate so each person has a chance to be the observer.
   - Identify the skills and behaviors that facilitated and inhibited the interaction. List those skills and behaviors and be prepared to discuss them with the larger class.

2. Arrange to visit an elementary classroom where the teacher uses coopera-
tive learning. See if you can make a note of the following types of
discourse as they are used: asking open questions, prompting children to
think of possible solutions, challenging children to think about issues, and
scaffolding information to help children's understanding. Write down one
example of each type of interaction. How did these different types of dis-
course facilitate or inhibit the interaction between teacher and students?

3. Observe a small group of elementary students as they work cooperatively
together. Make a note of the following ways they might help each other:
provide detailed help to others in the group, respond to a child's request
for assistance, challenge each other, and acknowledge other's ideas or
efforts. Write down an example of each type of interaction.

4. Arrange to interview a high school teacher who uses cooperative
learning. In particular, ask for examples of how he or she might try to
facilitate students' learning. How does the teacher commence the coop-
erative activity? What types of directions or instruction are given to the
students? What does the teacher say to students to facilitate their under-
standing of issues? Are these comments directive or more circumspect?
How do the students react to the comments? See if you can identify how
these comments match what the research says about the types of dis-
courses teachers use when they implement cooperative learning in their
classrooms. What are the similarities and the differences?

5. Arrange to interview a small group of high school students who have
had experience with cooperative learning. Ask the students about their
interactions with their teachers. For example, do the teachers direct the
students or do they make suggestions about how to deal with a problem?
Give an example of what teachers might say. What do teachers do if they
see something that is glaringly incorrect? Do they draw it to students'
attention and suggest they correct it or do they just suggest that students
may need to look at that again? How do the students interact with each
other in their group? See if the students can give examples of what they
might do when something needs correcting, some additional work needs
to be done, someone is not pulling his or her weight, or they need to sort
out a disagreement. See how the students' responses match the ways
students may interact with each other if they have seen appropriate mod-
eling from their teachers.

SUGGESTIONS FOR FURTHER READING

Gillies, R. (2005). The effects of communication training on teachers' and students' verbal behaviors during cooperative learning. *International Journal of Educational Research, 41,* 257–279.

Gillies, R., & Boyle, M. (2006). Ten Australian elementary teachers' discourse and reported pedagogical practices during cooperative learning. *Elementary Journal, 106*(5), 429–451.

King, A. (2002). Structuring peer interaction to promote high-level cognitive processing. *Theory Into Practice, 41,* 33–40.