

## Transmitting Knowledge: Implicit Negotiations in the Student-Teacher Relationship

Anne-Nelly Perret-Clermont

*My regular involvement as a psychologist with in-service teacher training programs has called my attention to teachers' often limited understanding of the complexity of the sociopsychological processes that mediate their actions. This is quite understandable and legitimate: the teachers' main role is not that of a psychologist interested in deciphering how people think and interact but that of an educator who has to make decisions and to act according to his or her best present understanding of pupils' needs and of his or her duty. But the drawback of this active position on the educational scene is that because of lack of time and methods to carry out observations and the need to rationalize or defend their choices, teachers run the risk of remaining anchored in oversimplified ideas about how learning functions and about their professional role. In the long run, this can have negative consequences for teachers' efficiency and responsibility when they make efforts to adjust their teaching strategies to changes in pupils, context, or knowledge.*

Psychologists have an easier time taking the role of outsider. They try to mirror the educational scenes that they observe in a way that allows teachers to situate their actions more consciously within their contexts: large webs of explicit determinants and implicit expectations that affect teacher conduct and student needs and attitudes. In my search in this chapter for a general understanding of learning and teaching as a psychosocial activity, I will be referring primarily to research that has been carried out by myself and my colleagues Nancy Bell, Michèle Grossen, Michel Nicolet, and Maria Luisa Schubauer-Leoni.

To begin with, I would like to introduce a very simple model of the teaching-learning process as a *triangular semantic field*. Then, using this simple

*Note:* The author would like to thank the Swiss National Research Foundation, whose research grant 10-1977-86 supported this work. She also extends her gratitude to Maria Luisa Schubauer-Leoni, joint author of this research project.

triangular model as if it were a “can opener” to look into the psychology of teaching-learning situations, I will consider the *bipolar social interaction* that mediates the cognitive activity of the student. Learners do not think or acquire knowledge alone but do so in a social venture in which they to some extent monitor the activity but at the same time are strongly dependent on the dynamics of the cognitive exchanges that take place around them (thus requiring us to depart from a purely individualistic conception of learning).

In observing learning, we come to grips with the often forgotten fact that *learning is always the learning of something* and that transfer of learned competence from one skill or area of knowledge to another is always weak. Hence, we cannot assess efficiency on a general level but must consider each specific content per se: we must ask in each case why it is taught and why it is learned. These become crucial questions if learning is seldom transferred from one context to another.

The cultural context and the institutional setting in which teaching takes place largely determine both the knowledge transmitted and the type of interactive relationship established between teacher and students and among students themselves. Schools establish norms of efficiency (mostly on the student side) and definitions of teachers' duties through the rules and regulations of the institution that fix the range of behaviors expected. Curricula, examination procedures, and other, less obvious factors, such as habits and group values, determine the teachers' and students' work. And more implicit elements, such as role expectations, aims, and a general idea of what knowledge is about and learning for, structure their sense of efficiency and responsibility.

### A Triangular Semantic Field

Our empirical research, done in experimental settings or directly in the classroom, draws attention to the importance of microsocial processes for successful transmission of knowledge in teacher-pupil interactions. The relationship between the teacher and the student and the interactions among students sustain cognitive development and learning. But there is a third pole to this teacher-student encounter: the object of knowledge that the teacher is supposed to transmit and the pupil is supposed to learn.

This knowledge exists independently of the present teacher-student relationship (as part of the school curriculum or cultural expectations) and partly structures the aim, the means, and the pace of the interaction (Voigt, 1989). Various institutional and cultural factors more or less explicitly define the nature, precise contents, and symbolic values of these elements of knowledge transmitted in school. Acquisition of knowledge is likely to increase competence, understanding, and mastery of the environment, but it also effects social status and self-image, according to the sociocultural context.

This brings us to an examination of the institutional setting of a didactic encounter. A classroom is a social environment that is structured according

to rules. It is part of a wider context (school, educational system, culture, and society) that also has norms and rules. All these elements constitute the background of the scene on which the teacher-pupil relationship is established and develops. But these determinants are not purely “external” to the individual learners or teachers. Their effects are mediated by the way in which these actors perceive and interpret them. More or less consciously, each partner has an active role in defining what is at stake in the school interaction. In general, teacher and students usually gear their communication to establish a common intersubjectivity that allows for some kind of common understanding of their task and hence for transmission of knowledge. But this is not always the case, as can be observed in disrupted classrooms or with school failures.

### A Bipolar Social Interaction

Various purely individualistic models of cognitive development consider the growth of the mind as the result of individual competencies or experiences and underestimate the role of social factors, cultural structures, and symbols and meanings. Departing from these models are different lines of research, inspired by the pioneer works of authors as different as George Herbert Mead, Lev Semenovich Vygotsky, and Jean Piaget, that converge in calling attention to the importance of *microsocial processes* in the development of cognitive competence in children.

In our own research, we have had the opportunity to observe the importance of peer interactions. We have centered our attention in particular on the role of sociocognitive conflicts that are likely to take place when two or more people who are trying to resolve the same task confront their different judgments. Even when they are both wrong, the fact of having to decenter from their own initial perspective and take into account the other's is likely to cause them to reorganize their understanding (Perret-Clermont, 1980). Many other authors have explored the role of peer interactions in fostering cognitive growth and learning (Miller and Brownell, 1975; Botvin and Murray, 1975; Rubtsov, 1981; Rogoff and Tudge, forthcoming; Glachan and Light, 1982; Doise and Mugny, 1984; Martin, 1985; Perret-Clermont and Nicolet, 1988; Azmitia, 1988). Close observations of peer interactions reveal different elements that contribute to learning efficiency and in particular the great importance of fine regulations of dialogue that make possible processes such as imitation, confrontation, joint action, and other sociocognitive operations that enlarge the child's reasoning activity. These fine regulations of communication are no less necessary in teaching than in dialogues.

Of course, such opportunities for finely geared sociocognitive interactions do not occur only among peers. They can also take place within the teacher-student relationship. The danger of this is that the asymmetrical nature of such interactions is likely to lead to behaviors such as compliance, unreflective imitation, and dependence on the teacher's expectations, thus

rendering autonomous cognitive activity less likely. On the other hand, it has been observed that in many adult-child interactions, adults know how to monitor the learners' attention and to accompany them in their cognitive "ventures," helping them to accomplish tasks in which they would not have succeeded on their own (see Chapter Thirteen). Children have an active role in this monitored learning experience: asking questions, seeking help, exploring the adult's expectations, testing their responses, and looking for verbal or nonverbal confirmation (see, for example, Forman and Cazden, 1985; Nelson-Le Gall, 1985; Grossen, 1988; Wertsch, 1978, 1985; Rogoff, 1990; Brossard, 1990; Perret-Clermont, Perret, and Bell, 1991).

Another microsocial process that has received attention lately is teachers' subtle use of routines (Edwards and Mercer, 1987; Voigt, 1989; Cestari, forthcoming). Of course, these routines are likely to be oriented more toward procedural "right-answer" competence than toward principled explanation. But in fact, these routines serve at the same time as mnemonic tools allowing for quick availability of behavioral algorithms and as a means of regulating the flow of discourse between the teacher and the students (see Chapter Fourteen).

A series of implicit and explicit norms structure the encounter and make communication and consequently transmission of knowledge possible. Implicit "communicative contracts" (Rommetveit, 1974, 1979) permit the progressive establishment of a common intersubjectivity (Grossen, 1988). Specific constraints bear on these "communicative contracts" in the school situation, transforming them into "didactic contracts" (Schubauer-Leoni, 1986a, 1986b, and 1988; Brousseau, 1988). Wider socialization practices also define, often unconsciously, the "rules of the game" in the classroom during the transmission of information and skills.

The development of cognitive competence in children is also dependent on the accessibility of symbolic means in regard to cognitive endeavours (Rubtsov, 1989; Carraher, Carraher, and Schliemann, 1988; Carraher, 1989). Other interpersonal factors play a part in these transactions of individuals involved in cognitive tasks, including sympathy, identification, and the search for recognition. These cognitive processes always take place within specific social contexts with identifiable people addressing specific tasks and using specific language or symbolic means. Research on social marking (Doise and Mugny, 1984; Rijsman, 1988; Gilly, 1989) has shown the importance of norms that are activated in the interactive situation: they affect the meaning that the subjects attribute to the task and, as a consequence, the cognitive competence that they actualize. Symbolic means that are available to students (because they have been taught in school or transmitted by the social milieu) are not always perceived as relevant by the students in contexts other than those in which they have learned them (Carraher, Carraher, and Schliemann, 1988; Perret-Clermont, Schubauer-Leoni, and Grossen, 1990). This problem of the weak transfer of learned competence from one context to another leads us into the discussion of the role of specific knowledge in the development of cognitive competence.

### The Third Pole: Knowledge

Knowledge is accumulated experience, structured according to cultural or scientific traditions, recorded with symbolic means in material forms. It exists prior to the encounter in which a teacher attempts to transmit it to a student. *Learning is always the learning of something*: specific information, a skill, or an object of knowledge. In conceiving of cognitive development, psychologists very often forget the *content*, reducing it to the structure (sometimes even to the logical structure) of its growth. But content is important: when it varies, so do the epistemological difficulties. Learning different contents is learning different cultural meanings.

The elements of knowledge that are transmitted in schools are determined by larger institutional, cultural, and ideological factors. Explicitly or implicitly, they fix the nature and symbolic value of curriculum contents. In schools, different objects of knowledge have different "reputations," such as being more or less "difficult," "important," or "fundamental." Different naïve systems of explanations of success and failure and various theories of learning seem to coexist (Bell, forthcoming).

The same objects of knowledge can have quite different meanings for teachers and students. This is a function of the usually very different life experiences of these two partners. First, because their past experiences such as training, social background, and professional or practical use of knowledge are so different, the universes of reference for teachers and students are not even similar. Second, their social identities are different. Hence, what is at stake during the transmission of knowledge is likely to be perceived differently by the teacher and the learner. It might, for instance, concern gender identity (particularly in regard to learning mathematics or technical skills), ethnic identity (in regard to second-language learning), or sociopolitical experience (in regard to the study of history). Third, the social roles of teacher and learner imply different attitudes toward knowledge (Schubauer-Leoni, 1986a, 1986b; Schubauer-Leoni, Perret-Clermont, and Grossen, 1992). In some cases, the transmission of knowledge as a one-way process is overemphasized in schools, which induces the identification of knowledge with social status and power and elicits defensive patterns of behavior to hide ignorance and to avoid negative evaluations of social position and role. Finally, the short-term and long-term goals of teachers and students in the school situation are different. Their investments in successful communication are based on different motivational grounds. For teachers, these may include a search for professional quality or recognition and the need to complete the curriculum by the end of the school year. For pupils, they may be a desire to get good grades, to compete with peers, or to avoid appearing overly concerned with school matters; intrinsic interest in school subjects; or fear of punishment by parents in case of school failure.

The transmission of knowledge implies the process of decontextualization and recontextualization. Taking the mathematical notion of "set" as an example, we can illustrate the process by which this object of knowledge

is transformed (see Perret-Clermont, Brun, Conne, and Schubauer-Leoni, 1981). Set theory as elaborated by mathematicians becomes in the hands of curriculum experts (who are influenced by other social agents and other subject experts) the notion of “set” as an “object of the scholastic curriculum.” This decontextualized object is then transformed by teacher trainers into the notion of “set” as an “object to be taught,” which in turn becomes the “object of a lesson” or exercise within the classroom. Hence, when the object “set” finally reaches the child, its nature might be somewhat different from its original one within the field of mathematics. The child in turn recontextualizes this notion of “set” as an “object to be learned” within the logics of all the other learning strategies that he or she develops in school.

At the end of this process, it is not surprising when psychologists discover that there is little in common between the use that the child can make of his or her own understanding of what a “set” is and its original meaning. However, the transmission of knowledge is not only a descending process, a progressive “degradation” of “pure” knowledge to “deformed” scholastic material. It can also be an ascending process whereby teacher and student, involved in well-chosen cognitive activities, progressively appropriate the cultural tools that are available. Yet researchers have not sufficiently described how this appropriation can be made possible through relevant school activities that respect pupils’ cognitive strategies (Perret, 1985; Woods, 1989).

#### An Encounter in an Institutional Setting

Schools are social institutions with legal foundations, roles, and norms defining the nature of the professional tasks of their agents, the time and location of activities, and the contents of lessons and examinations. These elements contribute to the definition of expectations, behaviors, values, and judgments made by teachers as well as students during their interactions. In school settings, individuals develop self-perceptions (Robinson and Tayler, 1989) and social representations of the teaching-learning process. They draw on the ideological discourse that the institution makes available to interpret their successes and failures and construct their perceptions of the school universe and of what knowledge is about (Bell and Perret-Clermont, 1985; Bell, Perret-Clermont, and Baker, 1989; Bell and Schubauer-Leoni, forthcoming). These institutional determinants are not necessarily always the same ones. Woods (1989), for instance, illustrates how changes in group relationships within a school activity can affect both teachers’ and pupils’ procedures for obtaining information. Carraher’s (1989) considerations of in-school and out-of-school mathematical activities indicate the importance of goals in structuring meaning and scaffolding problem-solving strategies and suggest a reconsideration of the goals of daily school activities.

Within the school institution, pupils and teachers interact according to more or less tacit social “contracts” that define their respective social roles, the form of their encounters, and the content of their communication. Observations of teacher-child interactions, even during short periods of time

(Schubauer-Leoni, 1986b), reveal that these social contracts are not static. They are monitored by the teacher and evolve to include progressively new elements within the “object to be taught.” I will give a simple example: In the beginning of the school year, a mathematics teacher is quite likely to teach pupils that it is impossible to subtract a larger number from a smaller one (for example, the arithmetic statement  $5 - 8$  is an impermissible problem at that age). But later in the year, when the teacher introduces negative numbers, this rule will have to be replaced by one that renders possible such calculations. This example is a rather obvious one, but more subtle and more tacit unconscious changes in the didactic contract can be seen operating within the communication patterns of teachers and students. It is as if these patterns were means to establish a progressively common understanding, starting from the different universes of reference of the knower and the learner to reach gradually shared cognition (Edwards and Mercer, 1987; see also Chapter Nineteen in this volume).

#### Each Encounter as a New Event

The above-mentioned macro- and microdeterminants figure as the background of the sociocultural and institutional scene in which teacher-student encounters take place. They also tell us something of the grammar (communication contracts, scripts, routines, role distribution, ideological discourses, explicit and implicit rules, and so on) governing the “drama” of their encounter. But this “play” is not completely written. Each teacher-student interaction in a classroom remains a new event, in which each partner has an active role and specific goals and attributes meaning according to his or her specific past experience and present understanding of the situation (including understanding of his or her partner’s actions and reactions). Each partner participates mostly unconsciously and implicitly in the definition of the task and of what is at stake in the interaction. It is a two-way process, often underestimated as such. However, it becomes easily observable when, for example, we ask children to role play teacher-pupil interactions (Schubauer-Leoni, 1986a, 1986b; Perret-Clermont, Schubauer-Leoni, and Grossen, 1990).

The teaching endeavour is a difficult one. It resembles the research process insofar as it consists in *making known the unknown*. How can this be achieved in a relationship in which, by definition, the learner does not know what the teacher is talking about? How can the learner then appropriate the teacher’s knowledge? Communication skills and ability to participate in the regulation of the interaction are very important here. It is only the final mutual adjustment by interlocutors that allows for the progressive development of joint attention to the same objects, the establishment of a common use of terms, and the adequate handing over of information. Knowledge is transmitted through different kinds of negotiation in this interpersonal process between the learner and the knower. I offer here a few observations of such classroom interactions in Switzerland to illustrate these assertions.

It is a common practice in our local secondary schools for teachers to incompletely formulate their ideas and sentences, asking their pupils to complete them. They believe that in doing so, they not only attract the students' attention and make the lesson more vivid but also can check the students' understanding. Yet sometimes this discourse modality gets so distorted that lessons look like a missing-words test. They are not the hoped-for Socratic maieutic experience!

In a biology lab session, a teacher wanted her secondary school students to observe a cell under the microscope and to recognize the membrane. She had drawn a cell on the blackboard and pointed out the membrane in the drawing. Yet under the microscope, none of the students managed to recognize the membrane. They kept questioning the teacher, who finally exclaimed, "Yes, indeed, in nature, the membrane is not labeled with Chinese ink!" In this case, the discourse partners had an obvious difficulty finding the common reference of their discourse. It was only when the teacher had the idea of resorting to a special pointer that allowed her to indicate the membrane under the microscope that the students managed to enter into her discourse about the constituents of the cell.

In another biology lesson with young secondary school pupils, a teacher was trying to make the children understand the ecological notion of "cycle." After more than an hour, one child finally understood what the teacher was aiming at through the suggested discovery activity and said, "Oh, you want it to form a circle!" This pupil's remark showed that she had understood the type of graphic abstraction that the teacher wanted her to use to model the ecological process that he had in mind. However, it is not clear that the pupil understood the meaning of this model. She may simply have guessed the "trick" that satisfied the teacher.

### **Teachers' Responsibility, Students' "Work Sites," and Efficiency**

Further understanding of the microsocal processes that render learning activity possible is likely to bring us to a reconsideration of the pupils' "work site" and what is meant by "effectiveness and responsibility" in the transmission of knowledge. A "work site" has material components; for instance, the pupils' tools for discovering information, stocking it, and checking its memorization and the symbolic tools and languages available to deal with these elements. The "work site" has social components as well: partners, such as teachers or peers with whom different kinds of help seeking or collaborative or interactive relationships can be established; norms that define within which boundaries the students can modify the flow of the interaction according to their needs; and so on.

Further research will inform us on how children understand what they are meant to do as pupils and what the meaning of pupils' activities are in the eyes of the teachers, the parents, and the pupils themselves. When chil-

dren change schools or even only change teachers, these implicit expectations become more obvious: the child has to rediscover what he or she is supposed to listen to, to memorize, to write down, to illustrate, to search for, and finally to "learn." And even this last term has different meanings for different teachers, ranging from automatic retrieval to understanding or even to active, creative use of the object of knowledge that has been learned. Each teacher has his or her own representations of the prerequisites to what is being taught. How do students manage to adjust when in fact they are missing those prerequisites or working on other premises? Observing the kinds of questions asked by teachers, the type of thinking that they require from their students, the manner in which they deal with errors, the types of feedback given to students (for instance, on production, on meaning, or on learning strategies), and the effects of these practices on students' identities and metareflections will inform us of the different modes of socialization to the world of knowledge that students go through in school.

Students' main goal is not always knowledge per se, as we know from observation of classroom interactions and interviews with students outside the classroom. Nor do students regularly expect school to provide them with a sense of fulfillment (Robinson and Tayler, 1989). In fact, within this institutional context, they often experience the pain of rating low in social comparison and of failing and fear the disastrous consequences that their behavior might create for their school career. It is not obvious that through school tasks students really taste "genuine understanding" as a source of intellectual satisfaction. Often, their cognitive activity has the primary goal of succeeding at the given task (and earning a good grade) rather than responding to a serious cognitive question. Their self-perception, their school identity, and their image in their parents' eyes are at stake and are often emotionally more important to the student than cognitive mastery of the task itself. It also seems to us that the right to gain pleasure in study and inquiry, the right to master information, is not so easily recognized in the daily practice of schooling, especially for "lower-stream" students.

### **Emotional Costs**

Even when social and emotional conditions are such that learners and teachers can concentrate their attention on problem solving, developing mastery skills, searching for information, and developing models to account for phenomena, these cognitive activities are not always painless. Indeed, if thinking extends our mastery of the environment, learning also confronts us with the limits of our actions and thoughts and with the reality of insurmountable events such as thunderstorms, earthquakes, diseases, and death. Under which psychological conditions can one be motivated to face the pain of limits? When does one take the risk to become aware of certain facts that are unpleasant for cultural, ideological, or personal reasons? When do individuals or groups accept their ignorance and wish to learn? And what do they learn, and why?

The pain of facing reality or marveling at new discoveries, the fear of repression or the search for prestige, defense of one's own identity or cultural enrichment of one's understanding—these are all partly contradictory aspects of learning. They are often simultaneously present in a given school situation but appear differently to different pupils. Teachers have to take these elements into account if they want to succeed in transmitting knowledge.

But why do teachers want to transmit knowledge? Do they know why they want children to learn? Is this really their aim, or are they engaged, more than they believe, in self-reproduction, in social role adjustment, and in defensive attitudes to protect their knowledge and status? More fundamentally, why has humanity developed symbolic tools to memorize experience and to gear relationships within social communities? The answers to these questions are multiple. They belong both to the individual and to the cultural tradition and are worth asking, not only to better understand the psychosocial processes that mediate teaching and learning but also to deepen the sense of responsibility among individuals and groups who can learn from history and culture in our joint venture on a common planet.

#### References

- Azmitia, M. "Peer Interaction and Problem Solving: When Are Two Heads Better Than One?" *Child Development*, 1988, 59, 87-89.
- Bell, N. "La construction sociale des explications" [The social construction of explanations]. Unpublished doctoral dissertation, University of Neuchâtel (Switzerland), forthcoming.
- Bell, N., and Perret-Clermont, A.-N. "The Socio-Psychological Impact of School Selection and Failure." *International Review of Applied Psychology*, 1985, 34, 149-160.
- Bell, N., Perret-Clermont, A.-N., and Baker, N. "La perception de la causalité sous-jacente à l'insertion scolaire chez les élèves en fin de scolarité obligatoire" [School leavers' perceptions of the causality of school career]. *Revue Suisse de Psychologie* [Swiss Journal of Psychology], 1989, 48 (3), 190-198.
- Bell, N., and Schubauer-Leoni, M. L. Research report, University of Geneva and University of Neuchâtel (Switzerland), forthcoming.
- Botvin, G. J., and Murray, F. B. "The Efficacy of Peer Modeling and Social Conflict in the Acquisition of Conservation." *Child Development*, 1975, 46, 796-799.
- Brossard, M. "Regards, interactions sociales et développement cognitif chez l'enfant de 6 à 10 ans dans des épreuves opératoires piagétienne" [Gazes, social interactions and cognitive development in six- to ten-year-old children in Piagetian operatory tests]. *Dossiers de Psychologie* [Papers in psychology], 1990, 39 (entire issue), University of Neuchâtel (Switzerland).
- Brousseau, G. "Le contrat didactique: Le milieu" [The didactic contract: The context]. *Recherches en didactique des mathématiques* [Research in mathematics teaching], 1988, 9 (3), 309-336.
- Carraher, T. N. "Negotiating the Results of Mathematical Computations." *International Journal of Educational Research*, 1989, 13 (6), 637-646.
- Carraher, T. N., Carraher, D. W., and Schliemann, A. D. *Na Vida Dez Na Escola Zero* [In life 100 percent, in school zero]. São Paulo, Brazil: Cortez, 1988.
- Cestari, M. L. Doctoral dissertation, forthcoming.
- Doise, W., and Mugny, G. *The Social Development of the Intellect*. Oxford, England: Pergamon Press, 1984.
- Edwards, D., and Mercer, N. *Common Knowledge: The Development of Understanding in the Classroom*. London: Methuen, 1987.
- Forman, E. A., and Cazden, C. B. "Exploring Vygotskian Perspectives in Education: The Cognitive Value of Peer Interaction." In J. V. Wertsch (ed.), *Culture, Communication and Cognition: Vygotskian Perspectives*. Cambridge, England: Cambridge University Press, 1985.
- Gilly, M. "The Psychosocial Mechanisms of Cognitive Constructions: Experimental Research and Teaching Perspectives." *International Journal of Educational Research*, 1989, 13 (6), 607-621.
- Glachan, M., and Light, P. "Peer Interaction and Learning: Can Two Mays Make a Right?" In G. Butterworth and P. Light (eds.), *Social Cognition: Studies of the Development of Understanding*. Brighton, England: Harvester Press, 1982.
- Grossen, M. *L'intersubjectivité en situation de test* [Intersubjectivity in testing situations]. Fribourg, Switzerland: Delval, 1988.
- Martin, L. "The Role of Social Interaction in Children's Problem Solving." *Quarterly Newsletter of the Laboratory for Comparative Human Cognition*, 1985, 7, 40-45.
- Miller, S. A., and Brownell, C. A. "Peers, Persuasion, and Piaget: Dyadic Interactions Between Conservers and Non Conservers." *Child Development*, 1975, 46, 992-997.
- Nelson-Le Gall, S. "Help-Seeking Behavior in Learning." In E. W. Gordon (ed.), *Review of Research in Education*. Vol. 12. Washington, D.C.: American Educational Research Association, 1985.
- Perret, J.-F. *L'écriture des nombres* [The writing of numbers]. Bern, Switzerland: Collection Exploration, Editions Peter Lang, 1985.
- Perret-Clermont, A.-N. *Social Interaction and Cognitive Development in Children*. London: Academic Press, 1980.
- Perret-Clermont, A.-N., Brun, J., Conne, F., and Schubauer-Leoni, M. L. "Décontextualisation, recontextualisation du savoir dans l'enseignement des mathématiques à de jeunes élèves" [Decontextualization, recontextualization of knowledge in the teaching of mathematics to young pupils]. *Interactions Didactiques* [Teaching interactions], 1981, 1 (entire issue).
- Perret-Clermont, A.-N., and Nicolet, M. (eds.). *Interagir et connaître* [Social interactions and knowledge]. Fribourg, Switzerland: Delval, 1988.
- Perret-Clermont, A.-N., Perret, J.-F., and Bell, N. "The Social Construction of Meaning and Cognitive Activity in Elementary School Children."

- In L. B. Resnick, J. M. Levine, and S. D. Teasley (eds.), *Perspectives on Socially Shared Cognition*. Washington, D.C.: American Psychological Association, 1991.
- Perret-Clermont, A.-N., Schubauer-Leoni, M. L., and Grossen, M. *Le jeune enfant et l'explication* [The young child and explanation]. No. 7/8. Paris: National Center for Scientific Research, René Descartes University, 1990.
- Rijsman, J. B. "Partages et norme d'équité: Recherches sur le développement social de l'intelligence" [Sharing and norms of equity: experiments on the social development of intelligence]. In A.-N. Perret-Clermont and M. Nicolet (eds.), *Interagir et connaître* [Interaction and understanding]. Fribourg, Switzerland: Delval, 1988.
- Robinson, W. P., and Taylor, C. A. "Correlates of Low Academic Attainment in Three Countries." *International Journal of Educational Research*, 1989, 13 (5), 581-595.
- Rogoff, B. *Apprenticeship in Thinking: Cognitive Development in Social Context*. New York: Oxford University Press, 1990.
- Rogoff, B., and Tudge, J. "Peer Influences on Cognitive Development: Piagetian and Vygotskian Perspectives." In M. Bornstein and J. Bruner (eds.), *Interaction in Human Development*. Hillsdale, N.J.: Erlbaum, forthcoming.
- Rommetveit, R. *On Message Structure: A Framework for the Study of Language and Communication*, New York: Wiley, 1974.
- Rommetveit, R. "On Piagetian Cognitive Operations, Semantic Competence and Message Structure in Adult-Child Communication." In R. Blakar and R. Rommetveit (eds.), *Studies in Language and Thought and Verbal Communication*. London: Academic Press, 1979.
- Rubtsov, V. V. "The Role of Cooperation in the Development of Intelligence." *Soviet Psychology*, 1981, 19 (4), 41-62.
- Rubtsov, V. V. "Organization of Joint Actions as a Factor of Child Psychological Development." *International Journal of Educational Research*, 1989, 13 (6), 623-636.
- Schubauer-Leoni, M. L. "Le contrat didactique: Un cadre interprétatif pour comprendre les savoirs manifestés par les élèves en mathématiques" [The didactic contract: an interpretative framework to understand pupils' display of competence in mathematics]. *European Journal of Psychology of Education*, 1986a, 1, 139-153.
- Schubauer-Leoni, M. L. "Maître-élèves-savoir: Analyse psychosociale du jeu et des enjeux de la relation didactique" [Teacher-pupils-knowledge: a sociopsychological approach to the endeavors of the didactic relationship]. Unpublished doctoral dissertation, University of Geneva, 1966.
- Schubauer-Leoni, M. L. "Le contrat didactique dans une approche psychosociale des situations didactiques" [The didactic contract in a psychosocial approach to didactic situations]. *Interactions Didactiques* [Teaching Interactions], 1988, 8, 63-75.
- Schubauer-Leoni, M. L., Perret-Clermont, A. N., and Grossen, M. "The Construction of Adult-Child Intersubjectivity in Psychological Research and in School." In M. von Cranach, W. Doise, and G. Mugny (eds.), *Social Representations and the Social Bases of Knowledge*. Bern, Switzerland: Hans Huber Verlag, 1992.
- Voigt, J. "Social Functions of Routines and Consequences for Subject Matter Learning." *International Journal of Educational Research*, 1989, 13 (6), 647-656.
- Wertsch, J. V. "Adult-Child Interaction and the Roots of Metacognition." *Quarterly Newsletter of the Institute for Comparative Human Development*, 1978, 2, 15-18.
- Wertsch, J. V. (ed.). *Culture, Communication and Cognition: Vygotskian Perspectives*. Cambridge, Mass.: Cambridge University Press, 1985.
- Woods, P. "Opportunities to Learn and Teach: An Interdisciplinary Model." *International Journal of Educational Research*, 1989, 13 (6), 597-606.