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STATUS AND METHODS OF OBSERVATION OF CLASSROOM PRACTICES:
PIECES OF DISCUSSION FROM THE EXAMPLE OF THE COREM[1]

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Analysis based on the report of
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Summary: The paper poses pieces of discussion about the status and the methods of the observation of classroom practice. The verb "to observe" don't easily account for the complexity of the activity really embedded in. Many levels are included: this of the scientific question which always controls the kind of observation to make; this of the ethical question provided from the particular nature of the subject of the study. We'll develop few aspects of these questions considering the way how they have structured the creation and the management of an experience of observation of mathematics teaching, in a school situated in the region of Bordeaux, in France: the COREM.

Keywords: Observation, teaching practices, methodology, epistemology, COREM

1. The misuse of "observation"

Whether they are oriented to praxeological issues, or focused on construction of critical knowledge, researches on classroom practice aim, at the end, the improvement of the conditions of teaching and learning. On that point, they can be compared with researches realized in natural sciences: it's by the observation of universe all around him that humans understand and "harness" the facts. But this comparison may not lead to forgot that the study of natural facts is different from the study of human and social facts, that, for example, observation of atoms is not equivalent to observation of classroom practice. It's not the place here to have a long discussion about the kind of the differences between natural sciences and humans-social ones (Dilthey 1992). We could simply note that, in the observation of classroom practice, the subject of the study has got significant particularities for the research.

[1] « Centre d'Observation et de Recherches sur l'Enseignement des Mathématiques » (Centre of Observation and Research on Mathematics Teaching).

[2] We would thank here D. Greslard and M.-H. Salin, for the contribution of their paper to our text (see, Salin and Greslard 1998). Both have been actors of the device of the COREM. The first one, D. Greslard, as teacher and then, principal of the school. The second, as researcher and then responsible of the scientific centre. Our text is widely based on their contribution. We'll directly refer to it through the paper.

For beginning, in the observation of classroom practice, the subject of the study deals with persons (teachers, pupils…) who have got consciousness and emotions. Next, this subject concerns practices which are characterized by irreversibility and non reproducibility and which logics are specific to the activities where actors are embedded (Bourdieu 1980). These logics are not directly « visible » for the researcher. These few elements allow us to pose that "classroom practices" can not be observed in the same way of "stones" or "ants". By a consequence, even if the actual interest for the observation in educational research must be useful for the development of the field, we have to keep attentive to a possible risk of confusion about the role of the researcher in education, who can't be considered as a sort of entomologist who observes natural functioning of classroom practice.
This comment doesn't invite us to give up studying this practice. As noted by Robert Solow – cited in the famous text of "The thick description" of Clifford Geertz – this renunciation would mean that "as environment will never be totally disinfected, as well operate in the sewers" (Geertz 1998, p. 104). On the contrary, saying that the observation of classroom practice can't aspire to the status of natural observation lead us to question about the kind of objectivation of teaching phenomena that can be made by the researcher in education, and about the methodological implications for observation. That's we'll do in the next parts of the text, through the presentation of a concrete device of observation of classroom practice: the Center of Observation and Research on Mathematical Teaching (COREM).
Indeed, we have chosen to axe the paper on the presentation of few aspects of this complex and original device. We think that it could allow us to give more sense to methodological and ethical principles (which are put in practice in the COREM) than just a theoretical discourse could do. After a brief presentation of the COREM, we'll centre the analysis on three important aspects of the observation of classroom practice: the influence of the scientific question on the observation (part III), the rules of collaboration between teachers and researchers (part IV), and the type of "subject" which is really "observe" in research (part V).

2. The COREM: a brief presentation

The COREM has been created in 1973, by the Institute of Research on Mathematics Teaching of the University of Bordeaux[3], and in particular at the instigation of Guy Brousseau working at the elaboration of the Theory of Didactical Situations (Brousseau 1998). The COREM stopped in 1999. This device has been created in order to:

- conduct researches essential to the development of scientific knowledge about the phenomena of mathematics teaching;
- conceive and to study new teaching situations which increase students' learning;
- develop the setting up of knowledge for pre-service mathematics teacher education.

In practical terms, the COREM was a school composed of 4 kindergarten classes and 10 elementary classes. Pupils came from the school sector (heterogeneous population). The syllabus was in accordance with official instructions. Teachers were volunteers. They didn't need any particular training. They just had to feel concerned by the researches led in the school. Indeed, the COREM necessitated a high degree of collaboration and mutual confidence between teachers and researchers.
At the COREM, two sorts of data were built:

[3] In french, it is called the « IREM » (Institut de Recherche sur l'Enseignement des Mathématiques).

a) qualitative and quantitative data about mathematics teaching at the elementary school: during more of 25 years, pupils works, preparations of teaching sequences, evaluations and results were collected. The quantity of data could make possible the reconstruction of pupils' route through their mathematical education.
b) data about classroom practice thanks to a high quantity of observations: on one part, observations of lessons in which teachers carried out researchers' plans about teaching situations (what we call "didactical engineering", Brousseau 1986); on an other part, observations aiming the identification and the explanation of didactical phenomena about "ordinary" teaching.

That is this importance of observations of classroom practice which led us to explore in more details the way they were conducted.

3. Observations are guided by scientific questions

As Brousseau remarks[4], at the COREM the observation of classroom practices was not considered on a passive way. The "passive observation" is an illusion, for two reasons at least. First, it is useless to think that the researcher presence in classroom doesn't alter, *per se*, the situation he observes. Even after a period of familiarization during which people in the class may leave their "Sunday closes", the observer keeps being one of the elements of the situation he wants to study. The "objectivation of objectifying position", as Bourdieu says (2000), proves to be the unique valid issue to accomplish reliable observations. Secondly, and that may be the most important point, what we observe in classroom practices is less a "total situation" (in the words of Austin 1970), in which these practices take place, than some significant aspects of this situation regarding specific scientific questions and theoretical frameworks. For example, a study about the functions of ostensive in teaching (Salin 2001), could not lead to the same kind of observation than a study of didactical interactions (Sarrazy 2001), or a study about the modes of regulation of didactical heterogeneities (Chopin 2007). Nonetheless, it is the same teaching sequence which could be "observed" in these three cases.

In the device of the COREM, the preparation of observation took into account this aspect. Observation aimed to allow the researcher to answer a list of questions he wondered about the characteristics of the situation. He tried to answer from the identification of the effect of the situation (waited or not) during the lessons, then, as Margolinas (1992) explains, coming back to the a priori analysis of the situation. Thus, the researcher used to conduct the observations regarding these questions. The device for observations generally required the participation of few observers with whom the development of the lesson to come was detailed so as to inform them of precise details for the collect of data. The lessons were also filmed by persons who were informed of the aims of the observation.

In a word, at the COREM, observation was, above all, guided by the kind of data we had to construct to answer a scientific question.

[4] In the paper he proposes for the Topic Study Group 24, titled « Conditions for observation of classroom practices ».

4. Observations require collaboration between teachers and researchers[5]

Another constraint influences the methods of observation. It is linked with the fact that classroom practices are, at the first plan, the product of teachers and pupil's action, embedded in teaching and learning activity. At the COREM, the question of relations between teachers and researchers during the observation was largely taken into account.

4. 1. At the COREM, le roles of teachers and researchers were well separated

First of all, relations between teachers and researchers were well separated. The teacher was not a researcher. This assertion doesn't mean that the potential of creativity and understanding of teachers was not asked for (it was mostly the contrary). It just specifies the institutional position of each one in order to avoid some unwanted effects linked with a confusion of roles. Few examples of thus effects were identified by the COREM members:

- The researcher doesn't progress in his ability to conceive situations because the teacher does it instead of him. Regarding the experience and the expertise of teachers at the COREM, this case occurred several times.
- The teacher contests the validity of researcher's work without knowing the reasons neither the aims of this latter.
- Denise Greslard (see Salin and Greslard 1998), teacher and then principal of the school, have been personally confronted with this kind of situation. After 25 years of collaboration with researchers, after having acquired experience in observing and analysing classroom practices, she used to take part, as principal, into all the observations. After one of those observations, during the analysis following the lesson observed, she underlined insistently several "breaches" in the situation preparation. Her colleague (the teacher) and the researcher felt offended by her remarks. The first one felt a sort of "betrayal" from the one who would have been allied to her, facing the researcher. The researcher, for his part, felt offended too because of a sort of "usurpation" of his status.

The same sort of unwanted effect, hobbling the success of researches led at the COREM, could be caused, on the contrary, by the researcher himself, taking the place of the teacher, or maintain too much "familiarity" (in an anthropologic sense) with teaching (Marchive 2005) during the lesson. One of the most fundamental principles of the device of COREM is that teachers keep masters of their class. The pedagogical mission of school has to be respected, before scientific interests of the research.

What is important, it is that, in the device of the COREM, all these "excesses" could be regulated by the organization of the modalities of communication between teachers and researchers, precisely by the intervention of a scientific responsible person, in charge of the mediation between all the parts of the collaborators to the project.

4.2. At the COREM, the relations between teachers and researchers are governed by rules

All teachers having worked at the COREM underline that the existence of a contract between them and researchers was very precious. This contract guaranteed to them to be able to preserve their teaching freedom, at least as well as if they were in an ordinary school. All the more, in the rules of functioning of the COREM, teachers were assured that, at the end, their professional position as teachers will be first recognized. Of course, this was the case only when the reasons for which teachers refused the researcher's propositions were legitimate.

[5] This part is especially based on Salin and Greslard contribution (1998).

Teachers were never left alone into their relations with researchers. They were grouped into teams of 3 teachers (for 2 classes). Even if just one of the three was teaching during the observations, the two others were implicated in preparation. The existence of such a contract and the vigilance of the institution mean that the persons who accept the unusual and difficult role to be at the centre of the situation observed are respected. By a consequence, teachers could more easily take the risk of research. This risk was known and accepted by the team of the observers and teachers, as shows the following example.
In this example, the researcher hasn't succeed in well formulating the aim of the observation, or the teacher hasn't well understood them (perhaps a little of both). By a consequence, the topic of the classroom work with pupil is modified. The teaching sequence deals with the notion of "measure", in a third grade class of elementary school. The project described by the researcher is: "To write the measurement of a strip of paper length aid of a "standard-strip", to compare the measurement writings of two strips made with different standards, and to find how to go from a writing to another, calculating or by manipulation." This project is a "communication game" (cf. the Theory of Didactical Situations by Brousseau 1986 1998). It is implemented as follows. Pupils are into groups. An half of the groups has at one's disposal a strip of length *A* and a standard *a*; the other half has got a strip of length *B* and a standard *b*. Each group will be, successively, in positions of "transmitter" and "receiver". The transmitter sends a written message indicating the length of his paper strip and joins his standard. The receiver compares the measurement sent with the one of his own paper strip and determines the longest strip. Next, transmitters and receivers confront their results.
The final phase aims pupils to clarify and confront their methods to compare the lengths. In the case described, that's not what happens. The analysis of the lesson allows explaining why:

- while pupils are trying to determine the longest strip, the teacher is moving threw the groups and, by questionings, clearly impose pupils to prove to him their assertions. Nevertheless, at this moment, pupils are still in an action phase. Doing what he does, the teachers "kill in egg" what should have had constitute the aim of the following debate.

- More over, at the moment of joining the pupils' responses, the teacher decides to write on the blackboard all the messages made by pupil, as pupils are reading them. This phase is so long that pupils are demotivated and that the debate fails.

The teacher knew that the researcher wanted to collect data about the pupils' strategies, but his interpretation of the research necessities has modified the content and the development of the sequence. If the "a priori analysis" had been better done, it could have shown, with the didactical variables, the variables concerning the teaching management. In the teacher-researcher's contract, it's the researcher who is in charge of such a task, even if he has to collaborate with the teacher.
Such events are unavoidable during the conceiving of a didactical engineering. Its treatment is included in the researches at the COREM. Indeed, what was very important for the teachers is that, on one part, these events could be explained into small groups of observers (joining teachers and researchers) during the "debriefing" following the observation, and that, on other part, such explanation could be done into non personal terms. That is the last point of the paper.

5. Observations which don't deals with persons, just with systems

One of the most important principles of the observation at the COREM is summarized by Guy Brousseau in a few words: "Beyond the contingency of the good or worse teacher's decisions,

we aim to establish those which are significant of the behaviour of "all" teachers. So we have to identify the conditions which explain those decisions through the constraints having had an effect on the teacher." (G. Brousseau 1995, p. 31). More than just a charitable principle, a sort of polite action toward the teachers, this aspect of the observations led at the COREM is essential to research, permitting to put in light the modalities of the functioning of teaching.
We'll just take a brief example. It deals with one of the most important concept of the Theory of Didactical Situations (TDS): the concept of "institutionalisation". In the beginning of the theory, this concept didn't exist. It is through observations of situations focused on the teaching of decimals numbers that this concept arose. Nadine Brousseau, who was teacher at the COREM during this period and who actively participated at the creation of this concept, relates this episode:
« During the first year of decimals, we have accomplished the four first lessons with sheets of paper. Guy [Brousseau], wanted to carry on with the teaching project, but I had noted that a lot of children had been "dropped". I refused to continue before "having taken stock with my pupils", as I could have done after a classic lesson not really successful.
Thus, the fifth lesson didn't be observed. So, I resumed the notions "studied", and I submitted exercises. Guy had yielded to my insistence, it was the rule! But he was suspicious: « *you want to do conditioning secretly?"*. He questioned me, he has better observed what happened with the children, he has finally found that my decision was justified: we need to "institutionalize" knowledge ["connaissances" in French], what was not planned at this period, and that what I have done." (N. Brousseau 1995, p. 25).
The concept of institutionalization is essential today in TDS. It is a rigorous concept defined as follows: "In institutionalisation, [the teacher] defines the possible relations between behaviours or "free" productions of the pupil, the cultural or scientific knowledge, and the didactical project: it allows a reading of those activities and gives them a status. […] Situations of institutionalization are those by which cognitive status of a "connaissance" [*we keep the French word*] or of a savoir [*idem*] are conventionally and explicitly set. The institutionalization is intern if a group sets freely its conventions, regarding to any process which makes of it a nearly isolated system. It is extern if it borrows its conventions from a culture: it is the most usual situation in the classical didactic" (Brousseau 1998).
In brief, if others modalities of observation had been chosen at the COREM, if, for example, all unplanned events or teachers' hesitations had been regarded as "errors caused by people" rather than necessities of the didactical system, it is no doubt that the concept of institutionalization could not have been integrated into the theory.

VI. Conclusion

We'll conclude regarding to this last point. The observations led at the COREM have always focused on processes, never on persons. This feature, which is visible in the details of the device of observation at the COREM we've just presented, is completely coherent with the specificity of the Theory of Didactical Situations (TDS). In his Montreal Conference, Guy Brousseau talked about the TDS as follows: "A situation is the whole of circumstances in which a person is, and of relations which link him or her with his or her milieu. By a consequence, taking as an object of studies the circumstances which command the diffusion and the acquisition of knowledge leads us to regard the situations."
In a word, in the TDS, theory of systems and its functioning, persons are not viewed differently as regarding to the position they have in this system. Nearly 10 years after the COREM has closed, this conclusion seems to us very important for recent researches on classroom practices.

It shows that status and methods of the observation are indubitably connected to the theoretical positioning of the researcher, and so, prevents us of the risk pointed in introduction of the "entomologist position of the observer". In particular the COREM experience in observing classroom practices could allow us improving the recent debate open in France about another important device dealing with the observation of classroom practices. This project, called "ViSA", aims the constitution of a bank of video data, showing teaching situations, accessible on internet[6]. It's no doubt that this project will be very useful to the development of researches on classroom practice, in France, in Europe, and maybe far away. For example, in a few time, it will permit to share nearly 400 films produced by the COREM during its 25 years of existence. Nevertheless, beside theses positive aspects, a high number of methodological and theoretical interrogations are open today about this ViSA project, for example about the question of the status of "pictures" made available by this device: under which methodological and theoretical conditions will they permit to "observe classroom practice". In our opinion, the pieces of discussion exposed in this text from the experience of the COREM seem to be able to deal with this kind of questions.

[6] The lector could refer for more details to: http://visa.inrp.fr/visa

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