

Interpretative Classroom Research in Primary Mathematics Education Some Preliminary Remarks

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This issue deals with five studies on the development of domain specific theories of teaching and learning in primary mathematics education. They pursue different theoretical interests based on different theoretical assumptions. In their methodology, however, they are all bound to the *interpretative* paradigm and are focused on an empirically grounded contribution to the development of a *contextual* theory. Instead of attempting to unfold a common integral theory based on the following five articles, which in a certain sense would be a futile attempt to surmount the carefully drawn confines of each presented *contextual* theory, in these preliminary remarks I will rather explicate the relationship between some methodological assumptions of interpretative classroom research and the contextualization of their theoretical considerations.

I will begin with some remarks about the methodological base of interpretative research. It is reconstructive in a double sense:

- According to this paradigm, somehow recorded social situations are *reconstructed* with regard to situationally emerging aspects.
- Inevitably this interpretive achievement contains some intuitive and common-sense based assumptions about the analysed strip of social reality. In order to control these aspects of the interpretative activity one usually reflects on this ongoing process, which implies a *reconstructive* perspective in a second sense.

(See Bohnsack 1993). As for this second meaning, research reports usually contain only a few remarks. Methodologically, however, this second aspect is essential with respect to the validity of the produced theoretical gain. In order to control this second aspect one usually creates a research design in which the interpretations of different cases are compared with respect to their orienta-

tion and to their plausibilities for the construction of novel elements of the theory.

The comparison of interpretations from different episodes, scenes or cases is considered to be a central activity within the interpretative paradigm (Glaser & Strauss 1967; Strauss & Corbin 1990 and Krummheuer & Naujok 1999). Such a comparative analysis provides conditions for the possibility of generating ex-post-facto hypotheses, an operation that is congruent to the control of intervening variables in quantitative research designs (see Kelle 1994, p. 365). It enables and controls the

- valuation of the generalization of the theoretical conclusions and
- documentation of the complexity of reality made comprehensible by the specifically developed theory.

The first point deals with the notion of “conceptual representativeness” as mentioned by Strauss & Corbin 1990 (p. 190). Interpretative research aims to confirm the developed theoretical concepts as conceptually represented in the chosen strips of reality. This is a different idea than that of representativity in terms of quantitative research. If the generated novel concepts enable an appropriate understanding of extremely different episodes of reality then one can conclude a relative global domain of application.

“... there will be wider applicability of the theory, because more and different sets of conditions affecting phenomena are uncovered” (Strauss & Corbin 1990, p. 190f).

Regarding the second topic above (the documentation of the complexity...) it is stressed that one purpose of comparative analysis is the comprehension of the specificity of the chosen piece of reality. One is obliged to “saturatingly” describe the unique conditions of the single cases. Pragmatically, this is only possible within certain limits. By the comparison of the interpretation of different episodes one increases the likelihood of determining the specificity of a case in *relation* on other cases. Strauss & Corbin 1993 call this accordingly “relational and variational sampling” or “discriminate sampling” (p. 185–188).

It might be mentioned that studies applying comparative analysis are no case-study in the classical sense. Rather several episodes or cases will be analyzed and collated

in a reconstructive-interpretative way. This issue is easily overseen in the common debate about quantitative versus qualitative research. Following the argumentation of Hammersley 1989, this restricted comprehension of qualitative research as the accomplishment of single case studies invaded the methodological controversy already in the 50s.

The general achievement of interpretative research is the development of contextual theories. These are theories which deliberately take into account the oral and processual, the specific and non-conformic, the local and domain-specific and the historical and biographical (see Toulmin 1990). Abandoning decontextual theories is not to be considered as abandoning research based on scientific standards. It is rather a shift to the empirically grounded development of "middle-range-theories" (Merton 1968, p. 50f; see also Kelle 1994, p. 225ff). The progress in theory and method is bound to a specific domain. Thus a multitude of different contextual theories are accomplished across the same domain, even though they conflict each other.

In the case of the following articles these theories focus on the specifics of primary mathematics education. They are supposed to introduce a gamut of concepts and methods applied for specific research questions in this domain according to the development of contextual theories. The intention is not to develop suggestions for the unification or simplification of these different theoretical approaches. On the contrary it is my intention to give an insight into the variety in this research domain, thus underlining its importance and vitality. All articles attempt to cope with the comparison of interpretation from different episodes or cases, be they different students, different learning situations or different teaching styles.

Alain Mercier et al. (*How social interactions within a class depend on the teacher's assessment of the pupils' various mathematical capabilities, a case study*) address from a clinical, mainly post-Piagetian point of view the issue of the relationship between the knowledge acquiring processes and the social interactions within a mathematics class: a) how can knowledge determine the kind of social relationship established during a didactic interaction, and b) reciprocally, how can the social relationship already established within the class influence each and every pupil's acquisition of knowledge?

Alison Price (*The role of real world scripts in the teaching and learning of addition*) discusses classroom session transcripts with respect to the question how the teacher uses language and examples from everyday social life to teach the children addition and what effect this process of situating mathematics has on the children's learning and understanding. One of the involved issue is the social nature of learning, as the child tries to make sense both of mathematics and of their life experiences in this situation.

Heinz Steinbring (*Interaction analysis of mathematical communication in primary teaching: the epistemological perspective*) focuses on the problem of the essential characteristics of mathematical teaching interaction. He uses the concept of "social communication as an autopoietic system" (Luhmann) as one general theoretical perspective and combines this approach with an epistemological analy-

sis in order to clarify some characteristics of mathematical interaction in contrast to general social interaction.

Terry Wood (*Differences in teaching and opportunities for learning in primary mathematics classes*) presents a research approach in which the focus is on the actions of the teacher as she attempts to improve the conditions for mathematics learning by implementing an innovative classroom setting of discursive argumentation and multiple solving approaches by the students.

Götz Krummheuer (*Studies of argumentation in primary mathematics education*) presents some results from two related research projects about processes of argumentation in primary mathematics classrooms. His central research interest is to examine the relationship between the participation of students in argumentative processes and their individual content-related development in regular classroom settings. Based on a micro-sociological perspective he describes the narrative feature of these processes.

Despite their theoretical contextualization, methodological implications of these research reports reach far beyond this early school setting. Features of a novel paradigm of research in mathematics education itself arise in these studies, in which the relationship between mathematics as subject matter and learning mathematics as individual and/or social phenomenon is conceptualized in new ways.

References

- Bohnsack, R. (1993): Rekonstruktive Sozialforschung. Einführung in Methodologie und Praxis qualitativer Sozialforschung. – Opladen: Leske + Budrich; 2. Auflage
- Glaser, B.; Strauss, A. (1967): The discovery of grounded theory: Strategies for qualitative research. – New York: Aldine
- Hammersley, M. (1989): The dilemma of qualitative method. Herbert Blumer and the Chicago tradition. – London, New York: Routledge
- Kelle, U. (1994): Empirisch begründete Theoriebildung. Zur Logik und Methodologie interpretativer Sozialforschung. – Weinheim: Deutscher Studien Verlag
- Krummheuer, G.; Naujok, N. (1999): Grundlagen und Beispiele Interpretativer Unterrichtsforschung. – Opladen: Leske + Budrich
- Merton, R. K. (1968): Social theory and social structure. – New York: The Free Press
- Strauss, A.; Corbin, J. (1990): Basics of qualitative research. Grounded theory procedures and techniques. – Newbury Park, CA; London, UK; New Delhi, India: Sage
- Toulmin, S. (1990): Cosmopolis. The hidden agenda of modernity. – New York: The Free Press

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