

# CONSIDERATIONS ON BASIC ISSUES CONCERNING RESEARCH ON “CONTENT KNOWLEDGE IN TEACHER EDUCATION”

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*Research on the optimisation of subject matter related teacher education could potentially benefit from objections concerning basic issues that were discussed in the 70s and 80s. This these reflects in particular the observation that actual research in mathematics education applies often directly methods and agendas from psychology and with that take over their deficits that were figured-out during that time. Issues that will be touched in the following cover so different topics as the general embedding of actual educational research, categorical concepts for grasping the mediation of individual and societal reproduction and didactical reconstruction.*

## INTRODUCTION

As a result of PISA the education of educational students attracts new research interest. One expects that higher teacher competences will lead to higher student competences. In contrast to the 70s and 80s, when research on university education was mainly considered as general didactic and sociological, the actual efforts focus on the respective subject, for example on mathematics. Whereas in G.B. and in the U.S.A. research on higher education in mathematics is well-established this is not the case for Germany. As a mathematician with interests in research on mathematics education I am involved in several projects working on a change of this unsatisfactory situation. In the following I will briefly discuss a few basic issues, which are relevant in this field, but are as such located beyond those projects.

## GENERAL EMBEDDING AND ORIENTATION

Actual educational research its organizational circumstances like funding for example and its goals should be seen in the context of GATS (1994) and BOLOGNA. A crucial point regarding BOLOGNA is whether intrastate standards and guidelines, if they exist at all, are seen to ensure important societal functions and allow democratic participation or are regarded as constraints for economical prosperity. These poles do not represent a general contradiction but are contradictory under certain societal “boundary conditions”. This remark does not mean that projects like PISA and its follow ups has only to be seen as a function of problematic societal processes, but they have **also** to be seen in relation to them. From my point of view there is too little research on those aspects and nearly no research on a “critical” explication of the gain of knowledge obtained by this research.

That the educational system is not only the result of efforts optimizing learning processes is, of course, not a fundamental new insight. It is well-known that comprehensive scientific analyses of self-contradictorily phenomena emerging in the educational

system demand approaches, which are able to take into account their dialectic character. Moreover an understanding of learning requires a remedy of the “subject”-problem: Accepting the assertion that all learning has to be seen as arising from and situated in a socially and culturally structured world the “subject”-problem leads to the “challenging problem ... to address the structural character of that world at the level at which it is lived.” (Lave & Wenger, 2008, p. 123) This task lies in the heart of Critical Theory, see already (Horkheimer, 1937): One of the crucial goals in Critical Theory considering society was to show, that and how forms of social life, which appear as “natural”, are in fact produced and reproduced in historical and societal processes. The corresponding analytical categories reflecting those processes present abstract assignments of relations in the “real” world and claim to cover the emerging “forms” of social life in their historical specificity. That Critical Theory remained critical and could not become “constructive” arises to some extent from their denunciation of scientific-analytic forms of knowledge as “logic of dominance”, see (Furth, 1980).

## **CATOGORICAL CONCEPTS**

Critical Psychology claims to present a scientific discussable elaboration of basic concepts (categories) for grasping the mediation of individual and societal reproduction, which allow the integration of “mainstream” theories and their empirical results. The central category worked out in (Holzkamp, 1985) is action potency, which is the potency to ensure the disposal about “my” individual living conditions together with others. Crucial is the “possibility relation” with respect to “reality”, which characterizes to some extent the actual form of subjectivity and is in particular related to the basic experience of intentionality. Therefore a very basic aspect of action potency is given by the relation between possibilities and restrictions. Its historic-specific concretization with respect to bourgeois society is described as the relation between restricted and generalized action potency. Regarding learning this area of conflict is concretized by the distinction between defensive and expansive learning actions, see (Holzkamp, 1993). This distinction expresses a categorical caused problem that might be taken over by the student and/or the teacher for their self-understanding.

In the face of the specific modus of subjective action experience world conditions are given in terms of meanings, which are understood as generalized societal action possibilities. Meanings that are action relevant for “me” become premises. Therefore psychological considerations are essentially given by premises-reasons-relations. “Premises”, “reasons” and their relationship are not obvious. Besides the fact, that psychoanalysis and critical psychology have in common the subject-scientific level of categories and procedures, the specific significance of psychoanalysis with respect to the historic-specific form of action potency consists in its accentuation and analysis of unconscious processes: It “must be understood that, owing to the ineradicable contradiction between immediate experience and the societal mediated nature of individual existence, unconscious aspects of subjective experience of self and the world play

a necessary role in the struggle for a conscious mode of living.” (Holzkamp, 1991, p. 99)

Obviously, the main critical psychological and psychoanalytical concepts are meaningless in a variable psychological context. Moreover, their categorical concepts, with respect to which they consider real world phenomena and work out empirical theses, cannot be justified by a variable-psychological approach. On the other hand the historical and societal nature of psychological phenomena cannot be grasped by treating the subject abstractly and by an identification of variables and studying their relations. This impossibility can be seen as a main source for fundamental methodological problems of the “mainstream” approaches regarding for example validity, relevance, indeterminacy and partisanship, see (Markard, 2009). With respect to validity consider for example competence models, (Schaper, 2009): Until now they show severe problems with respect to criteria validity and there is only little progress with respect to content validity. Typically in projects that evaluate competence models “only” construct validity is considered, which reproduces more or less well-established views of experts.

## **DIDACTICAL RECONSTRUCTION**

Didactical reconstructions fit basically to a subject-scientific approach, since they consider mathematics in terms of meanings. Concepts like “fundamental ideas” or “Grundvorstellungen” can be understood as pragmatically determined concepts describing meanings in the context of mathematical learning problems. Didactical reconstructions take also into account the importance of different contexts. In principal “all the various spheres of practice (academic mathematics is one of them) in which mathematics is used are, in principle, relevant sources of meaning.” (Biehler, 2005, p. 61) But the elements of reconstructed mathematical subjects are a priori not on par in the “world” as well as in “premises-structures”. In (Skovsmose, 2005, pp. 83-85) the author emphasized that meaning “can also be described in relations to social structures, which requires that the whole educational process be taken into consideration” and “it is also possible to ask about the meaning of a (mathematical) task as part of an educational practice.” For example one has to take into account that the educational situation at university might corrupt meanings (i.e. possibilities), which were a priori described in reconstructions of a mathematical concept. Taking not only into account social aspects of meaning but also the specific modality of subjective experience could prevent didactical reconstructions to turn into something that was criticized as “conceptualism”, see (Skovsmose, 2005). In the end it remains an actual empiric question, whether a specific meaning of a mathematical concept becomes realized and is suitable for a successful learning.

## **CONCLUSION**

Whereas general objections concerning “traditional” scientific approaches were already discussed for a long time, see for example (Horkheimer, 1937), the significance

as well as the fruitfulness of “critical” approaches in actual research on subject matter related teacher education seems to be rather limited. Recognizing general deficits of actual dominating approaches could serve as a motivator for further research but cannot replace a thorough analysis and own developments. In the end the practical relevance of “critical” objections can only be proven in actual empirical research processes, which however require suitable basic concepts that are waiting to be worked out in detail regarding the considered field.

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