Cultural-historical didactics and education theory[i]

Didática histórico-cultural e teoria da educação

Didáctica histórico-cultural y teoría de la educación

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ABSTRACT

Cultural-historical didactics is explained as psychologically based didactics and presented in its essential characteristics, starting from its theoretical grounding. This approach and the relations thereby produced in comparison to educational-theoretical didactics of Wolfgang Klafki are discussed as a contribution most useful to solve current problems of the classroom.

Keywords: *Cultural-historical didactics; Education theory; L. S. Vygotskij.*

RESUMO

A didática histórico-cultural é explicada como didática com base psicológica e apresentada em suas características essenciais, partindo de sua fundamentação teórica. Essa abordagem e as relações assim produzidas em comparação com a didática teórico-educacional de Wolfgang Klafki são discutidas como uma contribuição mais útil para resolver os problemas atuais da sala de aula.

Palavras-chave: Didática histórico-cultural; Teoria da educação; L. S. Vygotskij.

RESUMEN

La didáctica histórico-cultural es explicada como didáctica con base psicológica y presentada en sus características esenciales, partiendo de su fundamentación teórica. Ese abordaje y las relaciones que así se producen, en comparación con la didáctica teórico-educacional de Wolfgang Klafki son discutidas como una contribución más útil para resolver los problemas actuales en la sala de aula.

Palabras clave: *Didáctica Histórico-cultural; Teoría de la educación; L. S. Vygotskij.*

1. INTRODUCTION: VYGOTSKIJ AND CULTURAL-HISTORICAL THEORY

Cultural-historical didactics is not very popular and not well known particularly in Germany as well as in other parts of the western world. There are two main reasons for this. On the one hand, cultural-historical theory which is the theoretical background of cultural-historical didactics stems from the Soviet Union and is supposed to be highly contaminated with Marxist Ideology. This created barriers that hindered a broad in-depth reception in the West, even though scholars form the Soviet Union

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meticulously took note of theories and theorists from the English speaking scientific community before and also after World War Two. Another reason was and still is the language barrier. In order to reach the respective scientific communities in the world publications in English are widely read but not those in Russian or German. For example, Klafki and his Bildungstheorie and didactic theory (categorical education) are not known in cultural-historical didactics in Russia, although there are many similarities between this theory and cultural-historical didactics. But this was certainly also the case the other way round! Precisely because of the low level of awareness, it is worthwhile to take a look at the cultural-historical didactics. This didactics offers a number of suggestions and new approaches that show possibilities to solve current problems of education especially in the classroom.

In the following text I will argue on the following theses: *Cultural-historical didactics* is:

- founded on the basic positions of cultural-historical theory;

- mainly and above all aimed at the research and design of *learning and development processes* (and only at a lesser extent at the determination and justification of educational goals and contents);

- neither learning psychology nor education theory alone, but lies in between – in the sense of psychologically grounded didactics (based on the cultural-historical theory of Lev Semënovič Vygotskij).

2. WHAT ARE BASIC POSITIONS OF THE CULTURAL-HISTORICAL THEORY?

2.1 The crisis of psychology and how to overcome it

Especially in Russia, but also beyond, you can find large numbers of publications on cultural-historical theory and didactics. Looking at the former Soviet Union, the following authors can be mentioned as prominent: the founders – L. S. Vygotskij, A. N. Leont'ev, Luria and their students – El'konin, Zaporožec, Božovič, Gal'perin, Zinčenko, Davydov, Asmolov, A. A. Leont'ev, Kravtzov, Kravtsova, Rubtsov, Sokolova, El´koninova, Visotskaja, Zuckerman, Obuchova. Except the founders the other authors have remained largely unknown in Western Europe. Nevertheless, there are also important representatives in the western world, such as: Cole, Wertsch, Roth, Engeström, Ramirez, Hedegaard, Hakkarainen, Schneuwly, van Oers; in Germany: Lompscher, Kossakowski (GDR) and Jantzen, Feuser, Rückriem and others – see. http://www.ich-sciences.de[2].

Even if – among the founders of the cultural-historical theory – Vygotskij is omnipresent particularly in recent literature worldwide, his work is often reduced to single aspects (e.g. zone of proximal development) and theoretically diminished. Therefore it should be briefly described what the basics of cultural-historical theory are (cf. Jantzen 2014).

Vygotskij's starting point was the crisis of psychology[3]. He saw the core point of this crisis in two conflicting orientations of psychology: the orientation towards humanities on the one hand and on

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[2] This website on cultural-historical theory has existed for about 15 years, there are several series of publications (the series of theory now includes 56 newly published or reissued volumes).
[3] See L. S. Vygotskij (1985, 1987b, 2003).

the other towards science. (I should add here that the competition between empiric-analytic and hermeneutic paradigm is not entirely unknown in pedagogy!)

Vygotskij criticized that scientific-orientated psychology has concentrated often on single objective functions – mostly physiologically analyzable (measurable). But by doing so the human being as an independent subject is not to be grasped. On the other hand psychology oriented towards humanities struggled with the problem to objectify mental phenomena by introspection.

Vygotskij concluded that essential psychological phenomena such as behavior, experience or the unconscious are appearances that can no longer be explained on a uniform theoretical basis. Above all, the relationship between affective and cognitive processes remains unclear.

His diagnosis was that both positions use abstract phenomena to start their analyses. These phenomena are abstract because they are not seen as processes, not as results of developments, and above all not as results of cultural and social developmental processes.[4]

As an alternative to analyzing abstract phenomena and in order to overcome the above mentioned contradiction, he proposed that the psychological functions should be examined historically, using the causal-genetic method by explaining them on the basis of their cultural-historical conditions.

I should add here that it is not just a method but a complex methodology that addresses two aspects. First from an epistemic point of view it will be possible to cross the border of observation. From a radical constructivist's point of view observations principally guarantying not finding out the truth. Exploring phenomena by observing them brings the researcher in the position of an observer. But in contrast to experiments in science it is not possible to meet the restrictive conditions of a scientific experiment in exploring human psychic functions. The researcher is not able to control all variables. In addition to that the collected data must be interpreted by the researcher. Therefore observations in humans only allow finding out causal descriptions and not causal explanations.

According to Marx there is a difference between a constructor and a bee. The constructor has built up his construction mentally (in his brain) before he will start the construction in practice. So by constructing it the mental idea is set up in practice. This means the idea corresponds to practice, it can be assumed as a true proposition.

Looking at psychology, in order to overcome the limits of observation the research process and its results have to be designed. The design addresses socio-cultural conditions (e.g. means) that have an effect on the humans' psychic functions. But this effect is mediated: not the conditions itself but human activity causes the development of new psychic functions, constructed or produced by the activity.

And secondly, the causal-genetic method allows treating the human research-object as a subject, allows the human research subject to take an active part as well. The classical situation is that the researcher is subject (takes the active part) of his research and the humans to be studied are the objects of his research activity. But humans are subjects (need to be in power) of their activity, losing this function would mean losing the characteristics of human existence. So the treatment has to involve the researcher and his or her research-object as subjects = agents of their own doings, acting

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4 See Vygotskij (1987a).

self-regulated. This is the case in causal-genetic method. This method shows a way to solve the subject-subject-problem in human psychological research (see also Engeström 2008, 2009).

2.2. Basic propositions and concepts

The analysis mentioned above should be based on the following propositions.

The cultural-historical theory assumes that the specifically human *psychological functions* do not have a natural, but a cultural origin. They are not a product of biological evolution, but emerged as part of the development of human society.

Humans created their culture themselves socially. This was done by *activity* – originally work. Work is a collective or common activity, division of labor, socially organized creation of society (to regulate the metabolism with nature – Marx).

In order to optimize the effects of work in terms of creating a human culture, it has to take place within the social framework – which leads to division of labor. Through *division of labor*, a *collective subject* became active in order to achieve a new, for the individual unattainable goal, thereby creating culture. The interaction (*cooperation*) with regard to a common goal (i.e. creating society) required *communication* (social regulation of cooperation – language, media). At the same time, three things were connected:

1. Each individual can only act individually in the division of labor if the things he or she cannot do are done by others. The *collective* is therefore the prerequisite for *individuality*, and individuality is the condition for a strong collective. The unfolding of personality is therefore tied to the activity within the collective and within society.

2. The products of labor, both materially (product of the activity) and ideally (regulation of cooperation and communication) exist as cultural elements between human beings first; only later they exist in individuals and require therefore interiorization (see also Aebli 1983): complex (higher) psychic functions are initially interpsychic (between human beings), and then intrapsychic (inside individuals).

3. This marks a development in which collective activity has to come ahead of individual activity: what can be achieved together with a culturally competent partner is characterizing the *zone of proximal development*. Activity is shaped through cooperation (interiorization) and forms the zone of actual performance. Development is thus the interiorization of cooperation and communication: cooperation and communication with others precedes cooperation and communication with oneself (thinking as the process of an inner dialogue, see Zuckerman, 2004, Giest 2018).

3. WHAT ARE CHARACTERISTICS / ELEMENTS OF A CULTURAL-HISTORICAL DIDACTICS?

3.1. Psychological didactics

Didactic theory is above all aimed at school and classroom, but overall at learning and teaching. The focus is always on learning and / or learning effects as a target. The role of teaching – notwithstanding the question if it plays a role at all, is viewed differently from theory to theory (Giest & Lompscher 2017). But despite all the differences, every theoretical approach should show or explain the way to achieve the best possible learning effect for the learners. It should therefore be self-evident that a

didactic approach cannot be developed without learning theory if it is to have concrete significance for the design of classroom. This is exactly the goal of psychologic didactics.

> "It is a discipline in the border area between psychology and didactics, namely general didactics based on psychology or didactically oriented teaching psychology. (…) The specificity targeted by the term psychological didactics is that teaching is explicitly considered and treated here from a psychological point of view. That means: Psychological knowledge, terms and methods form the instruments for the analysis and design of classroom practice. Consequences and recommendations or experiments or other measures of intervention have to be derived as well as justified on the basis of this knowledge" (Lompscher 1994, p. 5, translated by the author). (So, also causal genetic methodology as well as the core concept of psychological didactics has much in common with the approach of design based research.)

Unfortunately, until now it can still be stated that the theoretical development of the theory of psychological didactics has not been continued systematically. And therefore the lack of a scientific bridge between didactics and learning psychology, such as it exists in psychological didactics, is widely lamented by several authors (Aebli 1970, Oser & Sarasin 1995, Oser & Baeriswyl 2001, Giest 2010, 2013a, b, 2016).

Aebli's (1983, 1987 – a student of Piaget) approach is committed to psychological didactics and based on cognitive science. But psychological didactics also refers to a second line of theory, namely the *theory of learning activity within the framework of the cultural-historical theoretical approach* and in particular the *instructional strategy of ascending from the abstract to the concrete (AC)*. In addition to its location in psychological didactics, this approach is characterized by the fact that the learning theory is based on several interacting disciplines: it combines epistemology, general didactics, learning and developmental psychology, which has a positive effect on the practical importance of the approach.

3.2. General didactics – dialectics of learning and teaching (Klingberg)

Classroom is generally to be understood as an educational interaction between teaching and learning. In adopting you aim at taking on an individual-oriented, subject-related position, a pedagogical paradox arises: At the philosophical level, the subject-subject interaction is not possible. Subjects as acting individuals have the property of activity, directed to an external object. From this point of view all external things are objects. Since everything that is not subject in this sense must be the object of the subject's activity (see also the above mentioned subject-subject-problem in human psychological research). Therefore, with regard to the teacher as a subject, the pupil becomes an object, and vice versa. Therefore teaching in the sense of "effecting learning" is excluded, since the learner as a subject can only learn by itself.

From a cultural-historical point of view, the essence of the activity is working together – the collective activity to some extent creates cultural-historical development. The characteristic of collective activity is bringing different individual acting subjects together despite their individual diversity but with respect of common goals allowing the interaction of different subjects. For classroom practice with its multitude of different acting subjects this means creating a collective subject of cooperating and communicating learners and teachers. A cooperative subject is characterized by an intersection of common goals, contents and methods (means) of the activity. In the classroom, it is therefore important to create a correspondence or dialectical relationship between the goals of learning and teaching, the content of learning and teaching, and its methods. Basically, it is all about the subject-

related collective activity of teacher and student. The task of the teacher is to promote, support and scaffold the learner's activity, i.e. helping students to do it themselves! (Montessori). However, this is only possible within the framework of a cooperation of (then) interacting subjects directed towards common goals and objects and supported by common needs, which in this way – from a philosophical point of view – represents a dialectical unity of opposites.

3.3. Learning and activity theory reference – didactic in depth analysis

The interrelation of learning and teaching activity forms an analytical framework connecting the level of didactics with the level of (psychological) action-regulation.

The following model describes the relationship between learning and teaching activity at different levels:

a) a more didactical level is addressing the problem (interdependency) of goals, contents and methods (means) of *instruction in classroom*, and
b) a level of (psychic) action regulation is addressing the interaction of learning and teaching *actions* respecting the components of action-regulation (learning motives, learning goals), orientation-, execution- and control-regulation (learning actions and action control) (see Fig. 1.).

At the level of the instructional goals, the interaction of teaching goals and learning goals is analyzed (designing learning situations suitable for stimulating and consciously initiating learning goals in children, or modifying teaching goals in a way that is appropriate to the learning goals). At the level of the instructional content, it has to be analyzed whether and how an intended teaching object becomes the learning object of the learners (given the rare ideal case, when both are identical, this is not necessary). And finally, at the instructional-method level, the interaction between teaching methods and learning methods is to be examined, particularly the mutual relationship between learning and teaching actions.

Fig. 1: Didactic in depth analysis

	pupils (learning activity)		teacher (teaching activity)
goal-level: content-level: method-level:	learning goals learning object learning-methods (-means)	⟺ ⟺ ⟺	teaching goals teaching object teaching methods (-means)
in depth analyze of classroom on action-level:			
	learning motive	⟺	motivating
	learning goal	⟺	learning goal orientation
	learning actions	⟺	action scaffolding, -enabling
	- planning - executing - controlling - judging		control assessment/ evaluation

Teaching methods are efficient if they have a stimulating effect on learning actions, on the development of learning methods or on learning behavior as a whole. In-depth analysis (at the action level) refers in particular to this aspect. Above all, it must be analyzed how teaching actions contribute to enable and support/ scaffold learning actions and their development (thus enabling children to act appropriately as far as teaching and learning goals are concerned – formation of learning actions). The analysis then relates to

- *Motivation (*How it can be ensured that action-motives arise in the learner?);
- *Formation of learning goals* (How it can be ensured that learners form their own action-goals?);
- *Action planning* (How it can be ensured that learners anticipate and plan learning actions carefully?);
- *Action-Execution* (How it can be ensured that learners can carry out actions independently?),
- *Action control and evaluation (How it can be ensured that the learners perform their actions completely and that new learning goals arise from controlling and assessing of previous learning goals, which may then lead to new instructional goals again – see in detail Gal'perin 1969, 1992, 2014; Giest 2010, 2013b; Giest & Lompscher 2006).*

3.4 Learning and developmental psychology – development-promoting teaching

Measures of instructional support must be targeted at each child's zone of proximal development. The model shown below (see Fig. 2) describes this developmental process and the interaction of learning and instruction.

The dialectics of learning and instruction is taken up in the model: it is a three-step process that proceeds from self-regulated, discovery learning via supported learning (scaffolding), to self-regulated, discovery learning at a higher level.

1. *Self-regulated, discovery and cooperative learning in the zone of actual performance:* The starting point for inquiry should arise from real-life-problems that include problems and questions meaningful for children; these are of educational significance (exemplary, elementary, fundamental – in the sense of Klafki 1993). While trying to solve learning problems and -tasks by learning activities that are spontaneous, self-directed and in cooperation with learning-partners children come to the limits of their zone of actual performance. With the teacher's support they become aware of a contradiction between the learning goal and the learning prerequisites. This provides the basis for the emergence of a common goal of learners and teachers alike and, consequently, for specific cooperative activity in classroom, in which teaching is scaffolding learning and not preventing or disabling it (Holzkamp 1991).

Fig. 2: model of development promoting classroom

Orientation of classroom on the	Characteristics of teaching and learning behavior	dominant features of the learner's role	dominant features of the teacher's role
Zone of actual performance	nondirective classroom/ creative, spontaneous, discovery learning	"self-directed" – active acting learner	the learning accompanying teacher observing, supporting, advice giving
In discovery learning there appear contradictions between ability and desire (learning goal) → learning motives arise			
Zone of proximal development	directive classroom / stringent, systematic, reproductive learning	"externally determined" – acting learner who interacts with the teacher and partly uses his instructions	leading, educating and instructing teacher while cooperating with the learner

The zone of proximal development becomes the zone of the (next) actual performance; the unity between ability and desire (learning goal) has been recreated at a higher level.			
Zone of (higher) actual performance	nondirective/ productive learning, increasing discovery learning	on a higher level self-directed, active acting learner	regarding to the higher level the learner supporting, accompanying, observing teacher

2. *Externally by teacher supported learning (scaffolding) – empowering the learners to achieve their learning goals*: the contradiction between the learning motive, the learning goal and the available learning prerequisites is made productive by reproducing knowledge existing in society and thus acquiring it in a meaningful way (by making/ constructing sense of it). The pedagogical activity (formation of object-related learning activity) is aimed at supporting learning with respect of the zone of proximal development. This happens among other things by developing and applying a basis of orientation together with the learners. These relate to learning requirements that are relevant for acquiring the learning object. In the learning process, these basic principles serve as supports for the increasingly self-regulated execution of actions.

3. *Self-regulated learning at a higher level of coping with the learning requirements:* After reaching the zone of proximal development, learning proceeds self-regulated at a new, higher level and thus constitutes a new zone of the actual performance.

3.5 Ascending from the abstract to the concrete

Learning aimed at acquiring school education (Bildung), i.e. human culture developed in a cultural-historical process, is characterized by intentionality, co-construction, awareness and reflexivity and is called *learning activity* in the reference discipline (Giest & Lompscher 2006). Essentially, it is about an activity that is dominant for a certain developmental phase in ontogeny and is aimed at the conscious and intentional acquisition of social knowledge and skills – as a prerequisite for a competent and responsible participation in life in society.

An essential difference to the incidental, unconscious learning (supported by innate or matured brain programs), which accompanies all our activities, is that learning activity is based on cognition. Therefore, it is in essence a cognitive activity, specifically aimed at the conscious, intentional (and not incidental) intellectual construction, above all of scientific or higher cultural knowledge about the natural, social environment and the self. The epistemological justification of learning activity and the psychological-didactic approach directed to its formation and development therefore plays an important role.

The *instructional strategy "ascending from the abstract to the concrete"* (AC) takes up an epistemologically based method, which Descartes already mentioned, and which also can be found in the writings of Hegel and was used brilliantly by Marx in his analysis of capital (see *Einleitung zur Kritik der Politischen Ökonomie* [The Introduction to the Critique of Political Economy] 1971) (Wolf 2008, Iljenkow 1979). This method is about the way of cognition: *ascending from the abstract to the concrete* or more precise formulated *ascending from the sensually concrete via the abstract to the intellectual concrete*. The premise of this method is the acknowledgement of objective, i.e. lawful connections in society and nature existing outside and independent of human consciousness. The (abstract) intellectual concrete (or the essence, the nature of a thing) is not perceptible and general and essential only accessible through intellectual analysis. The method only makes sense if these essential connections (the inner nature or essence) are seen as existing and accessible through

intellectual analysis, unlike radical constructivists argue. The *sensually concrete* describes the sensually accessible phenomena that appear chaotic as a totality of connections and determinations. With the aim of bringing a logical order into the chaos of appearances of a thing, one has to search for its abstract nature (essence) – the (contentual) abstract (Hegel). This can be done by analyzing the development, change, genesis of the thing: One has to find out the logic that is behind the succession of developmental stages, changes of a thing, a class of phenomena. It is important to find out what is behind the changing appearances of this thing, what are the invariants that are hidden or lay behind different appearances in the *development of the thing*.[5] This logic finds its way into the set of characteristics of the abstract concept. In this context it can be referred to as the dialectical unity of the logical and historical. The essence of a thing in which its law of development is depicted is the starting point for its intellectual (re)construction. Intellectually reconstructing a thing is to apply the inner connection between a thing's various appearances to their development and e.g. predicting new, unknown phenomena on this basis, being able to explain = *intellectual concrete*. The intellectual (re)construction of the thing expresses the ascending from the abstract to the (intellectual) concrete. Since this is the actually important way of knowledge, the formation of theory, the method – shortening the whole procedure somewhat – is called ascending from the abstract to the concrete.

4. What are the links between the cultural-historical didactics and Wolfgang Klafki's education theory (Bildungstheorie)?

This question is answered above all referring to the aspects of the *instructional strategy of ascending from the abstract to the concrete* and *didactic analysis* closely related to Klafki's work. This reveals interesting tensions between Aebli and Klafki, which to a certain extent reflect both the causes of the psychological crisis and the problems of cognitive psychology in dealing adequately with the problem of meaning.

4.1. Instructional strategy A→C

The method (AC) outlined above was not taken advantage of long time in school classroom as well as in didactic theory, because the path from the relevant epistemology to learning theory was blocked or not feasible. The pedagogical classics (e.g. Humboldt, Diesterweg, Fröbel) already pointed to the relationship between the universal, particular and singular, the abstract and the concrete, which were particularly taken up in Klafki's education theory (Bildungstheorie, see 1985) (see also Walgenbach 2000). But these statements were not explicitly based on epistemology or learning theory.

> For example, the following quote can be found in Klafki: "Ausgehend von kategorialen Anschauungen wird im Elementaren Allgemeines erfasst und wirkt als Kategorie künftiger Erfahrung und Erkenntnis" (Starting from categorial intuition, the elementary universal is grasp and acts as a category of future experience and cognition (1985, p. 83).

> However, in Klafki's work epistemological and learning-theoretical justifications or differentiations of this statement can hardly be found. Klafki's theory of categorial education was more or less developed without any psychologically based learning theory. And even though it shows a lot of similarities to Davydov's (1977)

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[5] These (inner) characteristics (essence) remain hidden when only comparing (outer) appearances of different things, because here are only external similarities, invariants of appearances taken into account. This is the main difference between the formal or empirical and the contentual or theoretical generalization (Davydov 1977).

psychological-didactic approach, the teaching strategy (AC), both authors did not know anything about it in their time (see also Meyer & Rakhkochkine 2018).

In Klafki's "Neue Studien zur Bildungstheorie und Didaktik "(New Studies on Education Theory and Didactics" (loc. cit.) references show that he considered aspects of action theory, as well as other authors related to the cultural-historical approach (Gal'perin, Leont'ev, Lompscher and Drefenstedt – cf. p. 193f.). But Klafki reduces his reception to the theory of step-by-step formation of mental actions and does not note the underlying learning theory of the cultural-historical school. Moreover he emphasizes that the respective theoretical statements are neither new nor of reasonable relevance (with respect to the concept of education/ Bildung) (p. 284). Although Klafki does not negate the importance of learning psychology for didactics, he does not develop it in a differentiated manner, but only takes it into account where it appears to be useful in the didactical context.

Aebli (1983, 1987) presents a didactics based on psychology, but this is based on Piaget's theory of learning and development (cf. Staub 2006). And for this reason he can neither take up the strategy ascending from the abstract to the concrete (as a method of cognition and thinking), nor can he meaningfully integrate the statements made by Klafki or his didactic approach (see also 1998, 2000).

4.2. From the concrete to the abstract or from the abstract to the concrete?

For Aebli (1983) conceptual formation means constructing a network of relationships with a conceptual top (a system constructed out of relations and simple parts, directed to a mentally top – analogous to a concept pyramid). This mental top is characterized by increasing abstraction and must be fully elaborated in order to be able to adequately understand the relevant facts and finally adequately apply knowledge based on it.

For example (see above, p. 263f.) the explanation of the differences in the appearance of duck and drake in mallard ducks is about tracing it back to the idea of adaptation. The process of thinking or learning is then as follows: Duck and drake differ in appearance and behavior, whereby the duck (precocial) hatches the eggs on the ground and must not be detected by predators (e.g. fox). Therefore, it must be camouflaged, i.e. hidden in the environment in which it breeds. The drake, on the other hand, does not breed, but must be attractive for the duck in order to get his' turn (to the mating). Therefore, the drake is more conspicuously colored; it does not have to be as camouflaged as the duck. Camouflage is done by a coloration (camouflage color) that is adapted to the environment. Everything culminates in adaptation as an important feature of living beings. The special appearance and behavior of duck and drake is attributed to the adaptation to the environment and can be explained as shown above.

The line of thought thus leads from the sensually perceptible, concrete (different appearance of duck and drake) to the abstract (adaptation) with the actual (educational) goal not explicitly mentioned with Aebli, but intended with Klafki, to be able to apply this abstract knowledge to further concrete cases (e.g. the appearance and behavior of a tiger, the chameleon etc.).

But in order to be able to apply the abstract concept, the concrete features must be kept and lifted to a higher level in the abstract ("aufheben"); they must not simply be lost or disregarded in the process of abstraction. But this is exactly what usually happens when a conceptual pyramid is built up by (formal) abstraction: at the top there is then only an abstract concept whose set of characteristics contains only one characteristic (here: adaptation) or very few. Since this characteristic was obtained from a concrete example (mallard duck), it can still be applied to this example (as long as it is not forgotten), but not to other concrete cases (transfer problem). In order to prevent this

teachers in classroom often use several examples which contain the same abstract features. But on one hand the abstract features are gained usually only by comparing appearances (formal abstraction). And on the other hand often enough, once the abstract features have been worked out, the concrete features of the examples just dealt with are forgotten by the learners.

> This happens, for example, when tulips, daffodils, violets, snowdrops, hyacinths and other spring bloomers are compared in classroom (concrete level) and it is then discovered and summed up that they all have food storage organs. The abstract is then: spring bloomers are the first plants to flower in the year and have food storage organs (bulb, rootstock, or tuber). Often only this statement is memorized. Or: swallow, crane, stork, cuckoo and others are migratory birds, they all have in common that they migrate south in autumn or winter or at least change to another region (territory changing birds) where they spend the winter. Here, too, knowledge is reduced to the abstract set of characteristics. And the concrete examples to a certain extent standing side by side are often forgotten. A deep understanding of the facts and their application, i.e. the independent intellectual comprehension of further concrete cases belonging to the problem area is often impossible. A similar thing happens when, after working in classroom on plants and animals, the concept of a living being is to be gained by comparing certain representatives (e.g. domestic chicken, dogs and pea plants, potatoes). Living beings have the common characteristics of reproduction, development, metabolism (nutrition). To the question, "Why are peas and chickens living beings?", the students answer, "Because they feed, develop and reproduce.", and to the question, "Why do ducks and drakes differ in appearance?", "This is because adaptation." But they fail in explaining the particularities, for example of how a chicken or a pea is developing, or reproducing, or feed (Giest 2002). In other words, things can be compared by external, sensual perceived features, but not explained by their nature, and knowledge cannot be applied to new facts.

This problem was addressed indirectly by Klafki (exemplary learning – see 2007, p. 141ff.) and quite specifically by Davydov (loc. cit.). The latter criticizes the insufficiently developed ability of students to apply knowledge constructively, to think scientifically, and sees a) a decisive cause in the way knowledge is acquired in classroom and b) in the way the subject matter is arranged. For this purpose he analyzed the way of generalization in classroom underlying the acquisition of knowledge and the arrangement of subject matter. He found out that, following Piaget and his pupil Aebli, the subject material is predominantly arranged from the concrete to the abstract, because it is assumed that the development of children's thinking is characterized by an increasing ability to think in abstract terms (cf. the sequence of phases of mental operations in Piaget's work).

The scientific achievement of Vygotskij and his students, including Davydov (1999), was that – unlike Piaget and, with him, many cognitive psychologists – they distinguished in principle and systematically between contentual and formal generalization, scientific (theoretical) and everyday concepts (empirical concepts). They recognized that both concepts are based on completely different types of abstraction: Everyday terms are usually formed on the basis of formal or empirical abstraction, but scientific or theoretical terms are formed by contentual or theoretical abstraction. However, scientific concepts that serve the purpose of cognition, science, theory formation are formed differently. Here, the process of concept formation is exactly the opposite (which has been confirmed in numerous empirical studies – cf. Vygotskij 2002).

The base for the development of (scientific, theoretical) concepts are concepts formed via empirical or formal generalization, they serve as their empirical basis. Formal, empirical or everyday concepts (external or practical features are classified) and contentual, scientific concepts (internal, essential or theoretical features are classified) therefore also differ in the relationship between object and concept.

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If objects are to be compared in terms of their characteristics in order to establish a conceptual order this way, the *object* must exist *before its concept* (*sensually concrete → abstract*). But if the term is to serve to intellectually reconstruct an area of reality or sphere of subjective reality with the help of it (on its basis) then the (abstract) *concept* has to exist *before its object*. On the basis of sensual experiences (arranged in empirical concepts), an intentional (e.g. following a subject-specific cognitive goal) contentual analysis is carried out, i.e. a theoretically determined line of abstraction is mentally followed. The abstract concept thus formed is first of all a hypothesis on its object, which is intellectually (re-)constructed with the help of the concept, which means that the abstract is concretized (*contentual abstract → intellectually concrete*).

Of decisive importance for the fruitfulness and the results of the ascending to the concrete is the quality of the abstraction, of the abstract concept, its power for opening up the subject of cognition or learning intellectually. In other words: It must be exemplary for this subject. Therefore, we are looking for *initial abstractions* with a particularly high power for opening up the comprehension with regard to the object to be intellectually grasped, opened up and learned.

*With Aebli, however, the abstract forms the end of the concept formation process, the problem of elaborating initial abstractions is not addressed at all. Klafki, on the other hand, cannot explicitly comment on this problem due to the lack of reference to learning psychology, but certain analogies can be seen in his didactic approach. This is pointed out by Aebli (op. cit.), without being aware of it, who in his "Twelve Basic Forms of Teaching" refers to Klafki as the only general didactician (see also Staub op. cit.). Dealing with Klafki, Aebli discovers a contradiction: He wonders why Klafki, after analyzing the conceptual content of the subject matter – i.e. the abstract – goes back to the level of phenomena. Here he searches for special phenomena in which the structure of the content becomes interesting, questionable, accessible, comprehensible, and vivid. These phenomena he calls categorial views of the elementary – which is characterized by a high degree of power for opening up the subject matter of cognition. He asks specifically (cf. loc. cit., p. 263f.) why Klafki (suddenly leaving the abstract mentally again) looks back at the subject matter or theme from which his conceptual content was extracted and why he does not simply start from the subject matter and conclude on the conceptual content. In other words: for Aebli, the analysis of the concrete (appearances of the subject matter) leads to the abstract (conceptual content). In classroom the path of ascending from the concrete to the abstract is usually followed: duck/ drake → breeding / wooing → camouflage color / camouflage → adaptation. For Klafki, after the analysis of the abstract, the path leads back to the sensually concrete, from which the particular abstract (initial abstraction) can be extracted, with which the (intellectual) concrete is then opened up. The teaching-learning procedure could then look like this: example = mallard duck (because drake and duck are strikingly different); analysis of physique and way of life: initial abstractum = adaptation (**m**orphology, **n**utrition, **r**eproduction, **d**evelopment) → bird (**m, n, r, d**) → water bird (**m, n, r, d**) → camouflage as concrete form of adaptation: It becomes visible that it is not only about the clarification of a singular problem (explanation of the different coloring of mallard ducks and drakes due to adaptation = camouflage by coloring like the environment), but the adaptation is related to characteristics of life and thus can be applied to all living beings, here concretely to birds, water birds and therein included the mallard duck.*

The path of reconstructing the content of the object of cognition cannot simply start with every abstract concept. It depends on whether the abstraction or the abstract conceptual features are sustainable (have the power to intellectually opening up an object of knowledge). Within the framework of the instructional strategy (AC), it is therefore important to look for sustainable initial

abstractions and corresponding series of concretizations with which the widest possible range of subjects can be studied. Initial abstractions, so to speak, provide the key for it. In Klafki's work and his categorial education, the fundamental is addressed here, or the inherent power in it of opening up an object of cognition intellectually.

If, for example, the law of levers is to be addressed in classroom, it is necessary to ask which principle underlies the phenomena area. It has to be answered on the one hand, a) what is the lever's physical nature and, on the other hand, b) via which area of phenomenon or which problem situation it is particularly vivid and accessible for students? From such an analysis it becomes clear that the corresponding initial abstraction must refer to a) the elementary machine and Golden Rule of Mechanics. The corresponding abstract features are not invariants in phenomena (e.g. by comparing similar or dissimilar levers – Lohrmann 2010a, b), but invariants in the development, genesis of the object, which become accessible through analysis of the different stages of development or even the historical genesis of the problem area (Kuhn 2012): Humans have only limited forces, but want to do as much work as possible (e.g. moving large, heavy stone blocks when building pyramids). The solution of the problem is therefore the Golden Rule of Mechanics: Whatever you save in power, you must add in distance. Ramps (inclined levels) on which the stone blocks were pulled up were the solution of the pyramid builders. And b) this can also be experienced in a particularly vivid way in this example. With the help of the recognized principle, other phenomena (levers, pulleys, pulley blocks – force-converting devices, etc.) can now be opened up intellectually, whereby the acquisition of new knowledge takes place as an application (transfer) of the initial abstraction. The scientific concept thus exists and develops as a dialectical unit of abstract and concrete.

4.3. Similarities or commonalities with other approaches

Although the initial abstractum and the Advance Organizer (Ausubel 1960) are not congruent due to their different theoretical references (cultural-historical learning theory vs. instructional psychology/instructional design), there are certain similarities between them. In both cases it is about meaningful learning, whereby the theory of learning activity, unlike cognitive psychology, consequently differentiates between knowledge and information and doesn't reduce learning to information processing. However, Ausubel emphasizes that the important point is not that the teacher presents information, but whether and how the learner is able to integrate this information into his existing knowledge and reasoning. In Ausubel's view, this requires an overview of the goals and methods of learning when introducing new material. In this way, on a meta-level reflection on the subject matter and learning should be carried out in order to be able to place it in larger contexts and link it to existing knowledge. In other words, the information presented should be evaluated and individually interpreted from a higher level of meaning. Meaningful learning refers to content-related dimensions as well as to initial abstractions, which are intended to prevent formal learning of non-meaningful, i.e. subjectively meaningless information.

Looking at the pedagogical procedures in designing concrete learning situations in the classroom, there are a number of parallels to the learning-teaching strategy (AC), for example

- the design of complex learning situations or problem-solving situations: to anchored instruction (see Bransford, Sherwood, Hasselbring, Kinzer & Williams 1990, Cognition and Technology Group at Vanderbilt 1990, Collins, Brown & Newmann 1989, Rogoff 1990) and to the inquiry approach (see Milhoffer 2004) or to problem-based learning (Klauser 1998)

- the creation of a system of material (materialized, symbolic) and personal-demonstrative learning models (to modelling – see Nersessian 2008) and providing personal learning aids (such as coaching, scaffolding, apprenticeship – see also Steiner 2006, Gentner, Loewenstein & Thompson 2003, Reiser 2004, de Jong 2006, Hogan & Pressley 1997, Wood, Bruner & Ross 1976),

- concrete, requirement-related support of the appropriation of the learning object through medialization (to media-based learning – cf. Kerres 2007),

- to "instrumental enrichment" (see Feuerstein et al. 2006), to cognitive behavior modification or step-by-step training of mental actions in apprenticeship learning, modeling, coaching, fading-out (see Collins, Brown & Newmann 1989, Rogoff 1990, van de Pol, Volman & Beishuizen 2010, Smith, Gonon & Foley 2015 or to reciprocal learning (see Palincsar & Brown 1984),

- to the aspect of learning activity in situated contextualized learning, explicit learning (cf. Lave & Wenger 1991, Reiser 2004), to mastery learning (cf. Eigler & Straka 1978), to situated learning (cf. Billett 1996, Schliemann 1998, Lave 1988, Klauer 2001).

Even more recent approaches, which have been developed primarily for adult education, show similarities with aspects of the procedure followed by the teaching strategy (e.g. Four-Component Instructional Design, Goal-based Scenario, Learning through Research, Learning by Design, Knowledge Building (cf. Kollar & Fischer 2008, Klauser 1998, Kolodner at al. 2003, White & Fredriksen 1998, Kirschner, Sweller & Clark 2006, Schänk, Pano, Bell & Jona 1994), but without being based on a consistent, complex theory of learning or learning activity.

A parallel can also be seen to current studies, particularly with regard to science teaching, which are attempting to use intervention to address the discrepancy between the demands made on pupils and the development of misconceptions. The target group here is usually pupils in the initial subject-specific lessons of grade 8 or 9 (e.g. Eilks 2002, Mikelskis-Seifert & Leisner 2003, Mikelskis-Seifert 2006, Grygier, Günther & Kircher 2007, Sodian, Jonen, Thoermer & Kircher 2006, Sodian, Koerber, & Thoermer 2006) but also primary school pupils (Möller et al. 2006).

A comprehensive overview of different studies on and the procedure applying the instructional strategy (AC) in classroom and also further examples can be found in Lompscher 2006, Giest & Lompscher 2006, Giest & Lompscher 2017 and a current study in Giest 2014, 2016; Giest & Hintze 2014, see also Oers et al 2008, Hedegaard & Lompscher1999, Heedegaard 2001, Kozulin et al. 2003 a.o.).

In summary, the following similarities between the instructional strategy analyzed here for cultural-historical didactics and Klafki's approach can be noted:

For the instructional strategy (AC) as well as for Klafki it is of utmost importance that the material and formal side of education form a unity. On the side of material education (the aspects of declarative subject-specific knowledge), we are dealing with paradigmatic contents by which categorical principles become visible (recognizable), i.e. the intellectually opening up of reality. On the side of formal education, learner gain categories (psychological means, learning tools) which help them intellectually to open up reality. In the application of these means they changes as personalities, in which the essence of their (learning) activity is expressed. Thus it is exactly the double (mutual) intellectually opening up that the learning strategy aims at, only it is not called so.

Klafki's forms of the fundamental and elementary can also be found within the approach of the instructional strategy AC (except for the simple functional forms and the simple aesthetic forms). The teaching-learning strategy clearly focused on scientific thinking, so it is not generally applicable as an educational strategy. It serves as a meaningful strategy for learning and teaching theoretical (scientific) knowledge.

The forms of the fundamental and elementary marked in italics are important both for the selection of the subject matter and for obtaining the initial abstractions:

- *The fundamental – basic experiences that cannot be taught*

- *The exemplars – the particular by which the universal can be recognized*

- *The typical – tangible form of the elementary (see primary concept[6])*

- *The classical – the humanly particularly valued*

- *The Representative – Concrete, in which the universal is represented with regard to history*

- The simple form of purpose – content with practical significance (interior – exterior, purpose – means; form – content separated)

- The simple aesthetic form – unity of form and content (form and content not separated)

4.4. Basic positions of a cooperative planning of learning and teaching in classroom – didactic analysis

Our basic positions on cooperative planning of learning and instruction in classroom are based on Wolfgang Klafki's approach of didactic analysis, which for him is the core of lesson preparation (cf. approximately 1964a, b, 1985, 1995, 2000):

1. learners and teachers must form a collective subject in the classroom and interact in joint activity

2. the learning activity, its development and formation is at the center, it is the starting and end point of the analysis, and the teaching activity is derived from it. Teaching has, of course, to be in accordance with the subject matter's logic (e.g. the logic of the respective special discipline – content knowledge), but above all it has to be based on the logic of learning (logic of the learning activity).

3. the concrete interaction of learning and teaching activities must be analyzed down to the level of action.

With didactic analysis, we by no means grasp the entire teaching or the teaching "as such", but its essential cell: the interrelation between learning and teaching (see also Klingberg 1997).

As shown above, the introduction of the collective subject – different subjects (teachers, learners) whose teaching- and learning-need overlap, who therefore pursue corresponding common goals and coordinate their individual actions with regard to the common goals and the common object – on the

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[6] See Geissler, H.G. & Puffe, M. (2000, 106): Part 2: Experiments on discrete feature processing. In: Geissler, E.A. (Ed.): Modern Issues in Perception. Amsterdam: Elsevier, 106-124. Hoffmann, J. (1986): A Simulation Approach to Conceptual Identification. In: Kurcz, I. Shugar, G.W. & Danks, J.H.: Knowledge and Language. Amsterdam: Elsevier, 49-68.

one hand makes it possible to resolve the pedagogical paradox and at the same time learning and teaching as a function of cooperating subjects in classroom become tangible, plannable and formable.

Two aspects are of particular importance in this context:

1. the emergence of a reciprocal need for cooperation, the overlapping of the goals of learners and teachers – ideally, the learners want to learn exactly what the teacher wants/should teach them – and

2. the analysis of the learning requirement, the subjective learning prerequisites and the identification of those requirements that lie in the zone of proximal development (the analysis showing the fit between objective learning requirements and subjective learning prerequisites) relating to it.

Because of the great importance of compatible needs as a prerequisite for cooperation, we assume that initially learners and teachers negotiate together on topics and contents, whereby the interests and wishes of the learners must be taken into account. Planning of teaching and especially of learning is not only the teachers' task, but the learners play an important role here. In principle, the content to be taught must actually become an object of learning, i.e. it must be evaluated by the learners as personally significant and meaningful and can be integrated into their learning activities only this way. If this possibility is not given, it cannot be expected that a collective subject with common goals related to the content in question will result.

The starting point is therefore a certain topic that appears in the learners' learning environment (own interests, teaching material, curriculum, etc.). In a first step, the teacher will analyze the *educational significance* (Bildungswert) of the topic, its potential for opening-up the topic intellectually. (Which concrete area of reality can learners open up on the basis of the educational significance of the topic for themselves? – see Klafki 1964a, 1985). Once the educational value is verified, the learners' concrete learning activity becomes the focus of the analysis and planning for the classroom and in particular the learners' learning actions. In a second step, the teacher has to analyze the *objective learning requirements* associated with the acquisition of the material. (What do learners need to know and be able to do, especially which actions and operations they have to master in which quality as part of which competence? How does the corresponding competence comes about?) For example, from more or less complex learning actions, the sub-actions and operations constituting them must be extracted. In a third step, the *subjective learning prerequisites* of the learners are to be identified with regard to the objective learning requirements. Only now, in a fourth step, the *fit between objective learning requirements and subjective learning prerequisites* can be analyzed and teaching goals can be derived as hypothetical learning goals. For this purpose, the objective learning requirements must be located in the learners' "zone of proximal development". It is not primarily about helping children to cope with any new and higher learning demands as an educational demand stemming "from outside", because the child's "zone of proximal development" is characterized above all by the fact that children experience the higher demands, which they cannot yet deal with alone, as meaningful (construction of meaning). Only then these demands can be permanently integrated into the competence reservoir of the child's personality. Concrete teaching goals cannot therefore be simply taken from the curriculum, but can only be formulated as the result of an analysis of the fit between objective learning requirements (desired, necessary competence level) and subjective learning prerequisites (existing competence level and meaning-horizon), if possible with a view to each student and with regard to the special conditions and possibilities of classroom design (learning-teaching interaction).

The pedagogical creation of the fit of objective learning requirements and subjective learning prerequisites via concrete pedagogical interaction is the core business of the actual *methodological analysis and planning* in a fifth step. The methodological analysis (classroom-methods) must (in addition to all known moments – didactic functions, social forms, teaching materials, etc.) above all address the concrete interaction of learning and teaching at the action level. The aim is to enable learners to gain greater autonomy in their learning (self-activity). For this purpose the following questions are to be answered: What is the relationship between teaching and learning goals, teaching and learning content, teaching and learning methods? How can learners be supported in (active) learning? How can the emergence of learning motives and learning goals in learners be promoted through the teacher's appropriate motivation and learning goal orientation? How can learners be supported in the planning, execution, control and evaluation of their learning activities/ actions (e.g. by means of suitable learning aids or orientation bases) (cf. fig. 1, see in detail Giest & Lompscher 2006)?

5. CONCLUSION

Cultural-historical didactics is above all psychological didactics. As a theoretical approach, it is still in the early stages of its development and awaits thorough elaboration and unfolding. This also applies (among other things due to the fall of the Berlin Wall) to Russia, where a new start has been made in recent years. Regardless of this, numerous possibilities for answering current questions are emerging, and it is worth summing up:

- it is a (moderate) constructivist approach,

- it is aimed at personality development (thus at "output"), but does not reduce this to measurable cognitive performance dispositions;

- With its instructional strategy AC it offers suggestions and starting points for the arrangement and selection of subject matter, but also for the training/promotion of learning activities in classroom,

- thereby it is connected by its content to the research on learning and instruction as well as to the conceptual change approach (Halldén 1999, Vosniadou 2008; see Giest 2014, 2016 on the theory of the formation and development of scientific concepts and scientific reasoning),

- and it provides methodological principles for inclusion (cooperative didactics) – which could not be shown here because of limited space (see Giest 2015, 2018).

A didactic theory that is meaningful and powerful in terms of application in classroom-practice (cf. Einsiedler 2011) must be at the intersection of epistemology, learning theory and general didactics and must be substantiated in subject didactics. For this purpose, the theoretical field of psychological didactics should be further developed in a specific way, whereby it is also a matter of supplementing phenomenological and empirical-analytical, descriptive approaches with research on learning and instruction. This could increase the applicability of didactic theory with regard to the practical design of the actual classroom. In addition, didactic theory and classroom instruction should pay more attention to an arrangement of teaching materials that is appropriate to the cognitive processes as well as the learning process and to the logic of cognition and learning. Without doubt, it is necessary to further develop the theory of instructional strategy (AC) and enhance its applicability and concretization to disciplinary and transdisciplinary subjects (Giest & Walgenbach 2002). In this way,

both an important contribution can be made to the development of a New Learning Culture, which is deemed necessary looking at present day knowledge society, and a contribution can be made to increase the efficiency of school learning and teaching by solving several problems of self-directed learning yet unsolved.

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