English Summaries

The aim of this article is to describe and discuss in what ways socio-cultural theories and frameworks may be used in order to increase the understanding of everyday situations of meaning-making and learning in a classroom perspective. The literature review indicates that nearly all of the socio-cultural or cultural-historical frameworks are in some ways connected to or originate from the work of Lev Semenovich Vygotsky and his colleagues during a relatively short span during the first decades after the Russian Revolution. A crucial contribution to the work of understanding the human mind was to overcome the Cartesian division between the individual and the world (mind/body dualism) that still constitutes an important feature in both Piaget's and the behavioristic approach to learning.

An important agenda was to develop a theory where the individual mind could only be understood or explored through analyzing mind in relation to the use of cultural means and progress in society from the perspective of how individuals and groups use and produce these artefacts. According to Wertsch, the relationship between the human mind, tools and artefacts is so fundamental and irreducible that a description of humans and their actions ought to be described as *individual(s)-acting/operating-with-mediational-means*. This implies that the essence of a socio-cultural analysis is to focus on how learners interact with the accessible cultural products and how these artefacts influence the participant's actions and thoughts.

The analytic part of the article focuses mainly on students' collective approaches and use of accessible cultural products, their appropriation of the mediational potentials of the included artifacts and their negotiations when discussing different explanatory models. In addition, it seeks to analyze how the students understand, formulate and draw conclusions in relation to the scientific content they discuss. A central feature in the analysis is to concentrate on students' use of language and how they make use of different conceptual resources from scientific disciplines or discourses. In other words, how they are able to distinguish, delineate and add to scientific ways of reasoning and arguing when using concepts and theories. The students' conversations and dialogues become examples of overlapping languages

where scientific terms, everyday expressions and the instructional language are mixed in meaning-making processes and where the words sometimes risk getting different meanings and implications. In these kinds of transactions the students become involved in a joint conceptual clarification and semiotic co-ordination.

Marie Leijon and Fredrik Lindstrand: Social semiotics and designs for learning: Two multimodal theories about learning, representation and sign-making /Socialsemiotik och design för lärande: två multimodala teorier om lärande, representation och teckenskapande/. *Pedagogisk Forskning i Sverige*, Vol. 17, No 3–4, pp. 171–192. Stockholm: ISSN 1401-6788

This article presents two related theories about learning and meaning-making developed in the last couple of decades: *multimodal social semiotics* and *designs for learning*. The theories are here applied in relation to questions about learning and conditions for learning within the field of higher education. Three areas are highlighted as important when looking at learning and education today, in a time of instability and multiplicity: the *complexity of learning*, issues regarding *goal-steering* in education and the importance of revealing *cultures of recognition* that become important in relation to learning and assessment in different situations.

Social semiotics and designs for learning share a view of learning as a social, communicational and sign-making activity. The human being is seen as active, meaning-making, social and in constant interplay with other people. In this theoretical context communication and representation are seen as social processes of sign-making. Focus is thereby directed towards how people communicate and make meaning with a number of different socially and culturally shaped semiotic resources, or *modes*. We process and express our understanding of different things by making our own combinations of signs in an interpretative and transformative process. This is characteristic for all types of communication, but also for learning. The notion of multimodality (which refers to the fact that people always combine a variety of modes, such as speech, gesture, image, sound and movement in their communication with each other) brings attention to the nuances in this work and reminds of how complex and creative the work is to connect form and content in different kinds of representations.

Within this framework, learning is not about acquiring knowledge or about a simple transfer of information from one person to another. Learning implies that the learner works to interpret and construe meaning by connecting form and content in different ways with the resources available in the specific

situation. Consequently, meaning is always made anew, when it is expressed or interpreted.

The social semiotic perspective stems from the functional linguistics of M.A.K. Halliday but was elaborated by Hodge and Kress in the late 1970s by changing the linguistic basis to a semiotic one and by applying Halliday's ideas to meaning systems beyond language. The central concepts that are introduced in relation to learning in this article are *mode*, *multimodality, communication, representation, sign* and *sign-making*. The presentation of social semiotics is concluded with some reflections regarding the theory's potentials for approaching learning in higher education, seen in relation to the three areas mentioned above.

Designs for learning has evolved at the meeting-point between multimodal social semiotics and didactic theories related to socio-cultural perspectives on learning. It combines central assumptions about communication and representation, multimodality and sign-making from the former with an emphasis on the role of context and social setting to understand meaning-making and learning from the latter. Communication and learning are consequently articulated as sign-making processes that have to be understood against the background of specific socio-cultural contexts. To sum up, social semiotics offers analytical tools for understanding how learning and meaning-making occurs multimodally in sign-making processes. Designs for learning provides a possibility to understand multimodal learning in relation to a context and in relation to the specific conditions for learning in different settings and situations. The article is concluded with a discussion on how the design oriented perspective can be used as a tool for understanding learning and the conditions for learning in higher education today.

Pernille Krogh Fryd: Introduction to Niklas Luhmann's epistemology of differential logic and systemic operative theory of learning /Introduktion til Niklas Luhmanns forskelslogiske epistemologi og systemisk operative laeringsteori/. *Pedagogisk Forskning i Sverige,* **Vol. 17, No 3–4, pp. 193–215. Stockholm: ISSN 1401-6788**

The aim of this article is to introduce Niklas Luhmann's (1927–1998) social semantic analysis of the education systems of modern, contemporary societies, beginning with the distinction between social structures and semantics. The article shows how Luhmann describes modern society as a polycentric and hypercomplex society which is pre-dominantly differentiated into different functional systems. An important point of this perspective is that modern society co-produces epistemological and pedagogical consequences that have to be clarified precisely as a consequence of functional differentiation. Functional differentiation is a horizontal form of differentiation as opposed to a

hierarchical one, such as stratification and segmentation. In extension to this description of the modern society, Luhmann is concerned with observing contemporary society through contemporary society. As a consequence of this paradoxically formulated starting point, there are no external observers. In fact Luhmann reduce the general term »second order», to second order observing, or describing, what others observe or describe. More precisely he develops an empirically based and sociologically generalized super-theory of second order observation, that can be used to describe and analyze how different social systems are linked to each other, or how different mental systems (personal minds) and social system, on the level of interaction, are linked to each other.

One of the distinguishing marks of this ambitious theoretical framework of modern society, leads Luhmann to formulate a non-foundational epistemology, that incorporates a sociological and system theoretical perspective on epistemology and learning. This perspective distances itself from earlier ontological and *transcendental philosophic* perspectives, in particular the foundational assumption of the existence of a transcendental subject, which in Jürgen Habermas latest reformulation results in an intersubjective solution, that guarantees stability and certainty. Luhmann also separates his sociological and system theoretical framework, from earlier cybernetic system *theories,* represented by Gregory Bateson, Jean Piaget and Ernst von Glaserfeldts radical constructivist perspective on learning and education. According to Luhmann these epistemological assumptions of learning and education, use ontogenetic and deterministic concepts, such as »equilibrium thermo-dynamics» and »adaptation» to explain the evolutionary development of cognitive intelligence. Luhmann explicitly distances himself from von Glaserfeldts radical constructivist learning theory, by naming his own epistemological approach to modern learning theory operative constructivism.

This article goes thoroughly into how Luhmann elaborate his *epistemological* platform with inspiration from the evolutionary biologist and cybernetician Humberto Maturana's studies of living and nervous systems. Maturana characterized the recursive phenomenon of biological autopoietic systems as self-referential organizations. The idea of a self-referential organization, explains how an autopoietic system recursively reproduces its elements through its own elements. More precisely, an autopoietic system recursively uses its own output as input to reproduce and change its internal organization. This definition of an autopoietic system leads Maturana to elaborate on a new concept named structural coupling, which replaces the concept of adaptation. The latter gives an outdated and deterministic (trivial) expression of how autopoietic systems operate.

Luhmann incorporates Maturana's definitions of autopoiesis and structural coupling into his general theory of second order observation, and he clarifies the earlier, Enlightenment epistemological solutions by borrowing George Spencer Brown's logic of form. The latter provides Luhmann with a mathematical and very formal concept of second order observation. Spencer Brown begins his investigations with this sentence:

> We take for given the idea of distinction and the idea of indication, and that we cannot make an indication without drawing a distinction. We take, therefore, the form of distinction for the form.

Reality as such, the unity of observing system and its environment, the paradoxical sameness of difference, of inside and outside, remains inaccessible; it is what »one does not perceive, when one perceives it», the »blind spot» that actually enables the system to observe. It seems that Spencer Brown's idea of an observing system, escapes earlier perspectives on observation, which claims to correspond with the real world. According to Spencer Browns idea of observation, an outside observer can make the blind spot visible, by distinguishing the observed system's distinctions as a form that contains both of its sides. But in doing so, the system has to re-entry the distinction on the systems inside. But to notice, any such reflexive second order observation must rely on its own blind spot to reproduce the paradox of observation, at the operational level of its own distinctions.

   Luhmann generalizes Maturana's concept of biological autopoietic systems to mental and social systems, in the way that mental systems operate recursively through consciousness and social systems, on the level of interaction, operate recursively through communication. Mental autopoietic systems and social systems are structurally coupled and they use language as a medium. In this conceptualization of language, language can be understood as a source of irritation or productive disorder which stimulates the internal self-referential organization of autopoietic systems.

   Social systems use communication to fascinate the consciousness of mental systems and mental system can in return »participate» in communication, but only to the extent, that mental systems engage these recursive consciousness operations, in a so-called double contingency communication process, which must be synthesized in a tripartite selection of information, utterance and understanding. In that way, understanding is an essential component of double contingency communication process, but it is not a telos as in the linguistic and hermeneutic way of understanding, such as Habermas' conceptualization of *consensus,* as vital to the nature of rational communication. Luhmann's conceptualization of communication is primarily concerned with its own self-reference. Understanding as an important element in Luhmann's concept of communication, neither requires an accurate reconstruction of the »true» intention behind human beings, behavior or valuebased attitudes, nor does it exclude the possibility of misunderstanding. If communication should solve the problem of double contingency, the tripartite selection of information, utterance, and understanding, must be synthesized into a professional event that involves control of understanding.

   In other words; using Luhmann's operative constrictivism as a new approach to modern learning theory, makes it in one way irrelevant to think of education, as a causal linear message from sender (teacher) to receiver (a learning pupil). On the other hand, Luhmanns's perspective on double contingency communication does not mean that the teacher should abstain from using communication, as an intentional educational act. Intentional commu-

nication is actually seen as a necessary pedagogical environment for individual learning processes. If teachers use communication in a professional way, which involves research-based competence to distinguish between more or less relevant didactic approaches, intentional communication has the potential to stimulate pupils' individual learning processes and learning outcome in a successful manner. But not to forget: A relevant didactic approach involves evaluation strategies that can handle the double-contingency perspective, which might lead to a comprehensibility gap, in a reflexive way. In this case, Luhmann recommends second order observation, as a new reflexive approach to both teachers' and pupils' self-evaluation.