From cognition to practice
Theoretical perspectives on the relationship between disciplinary learning and information seeking
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From cognition to practice - theoretical perspectives on the relationship between disciplinary learning and information seeking

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Abstract

The paper contrasts two paradigms of learning, information seeking and use: the prevalent (mainstream) cognitivist paradigm on the one hand, and lesser-known action-oriented approaches on the other. Cognitivist applications on disciplinary learning and information seeking imply a two-stage model of learning, where the student in the first step finds the needed information and in the second step learns from it. At a practical level, this sequential conception has some substantial consequences for information seeking/searching and behavior, some of which are outlined in the paper. The main part of this contribution is a deconstruction of the cognitive assumptions about learning and seeking/searching in the light of action-oriented approaches. We develop two types of action-oriented approach. The first approach, which comes from Critical Psychology, understands learning as a primarily social phenomenon. In contrast to the cognitivist conception, learning is here substantialized through social interactions and conceptualized epistemologically as dialectic. The second approach stems from Agential Realism and brings forward a somewhat radical critique of the cognitivist approach and of the Critical Psychology approach as well. Both have a significant impact on conceptions of information seeking/searching and information literacy.

Keywords: Cognitive learning, information seeking, action theory of learning, Critical Psychology, Agential Realism
The two-stage-model: connecting information searching to learning

Is learning, as far as the domain of higher education is concerned, a two-stage process where students and researchers first seek (we do not in the following distinguish between “seeking” and “searching”), find, access and organize the information they need, and then, when this preparatory phase is completed, engage in activities of “learning from this information”? In which respect can we assume a series of preliminary stages of just finding and organizing information, followed by phases of meaningfully “using” this information in learning? This obviously sequential design of learning in university settings promotes the view, among others, that information seeking, though an important precondition for subsequent learning activities, has the primary function of supporting learning proper in the second phase. In other words, obtaining the needed information is often not considered “real learning.”

This two-stage framework of obtaining information and subsequent learning proper is widespread in information science, and perhaps most prominent in approaches to information retrieval (Blair, 1992; Blair, 2003; Broughton, 2006; Chowdhury, 2010, p. 2-7, 252-255; Cooper, 1971; Fugmann, 2002; Tredinnick, 2006, p. 73-75) Why is it so attractive, particularly for this area of information science? We believe that it is the very basic idea of a “lack of information” in the individual that gives the concept of information seeking a fundamentally autonomous and self-sufficient status. The link between central individual concepts such as a user’s information needs, “information gaps,” (Cooper, 1971; Tredinnick, 2006, p. 73f) or a person’s “Anomalous State of Knowledge” (Belkin, 1980) on the one hand to their “natural consequent” of information searching on the other manifests itself in an informationally problematic situation where the user tries to remedy an individual information deficit by consulting more texts which may contain the needed information (Beghtol, 1986, p. 85; Van Rijsbergen, 1986, p. 482). From this perspective, information interaction processes in phase one are theoretically perpetuated by the dynamics and the
mutual relationships of information lack and searching alone and their study can therefore be conducted, in principle, without reference to learning-related uses of information the user might involve themselves in in successive phases.

The conceptual division between searching for information and “learning from it” can be traced in other important areas in information science as well, with research in information literacy as another prominent example (Bawden, 2001; DaCosta, 2011; Grassian & Kaplowitz, 2009; Pinto, Cordón, & Gómez Díaz, 2010). Here, the traditional concepts of library instruction (Accardi, Drabinski, & Kumbier, 2010; Grassian & Kaplowitz, 2009, ch. 1; Oakleaf & VanScoy, 2010) and the well-known “standards” for information-literate users of information resources (ACRL) can be seen as indicators for a separation of “information competencies” from their use in learning environments. “Standards” in information literacy can be taught in library instruction separately from subsequent text learning. This separation manifests itself in the popular idea of a set of general information competencies (with librarians as their perhaps most ardent advocates), which appear then as learning/teaching objects without reference to learning proper and disciplinary learning. This, again, leads to the postulate of learning independent from the documents found in the information-searching process (opposing views are presented in Kautoo & Talja, 2007; Woolwine, 2010). In the literature, approaches to information literacy focusing on a general toolbox of competencies and abstracting from learning from the found documents are subsumed under the label of generic information literacy skills (Julien & Williamson, 2011, p. 6; Limberg, Sundin, & Talja, 2012, p. 99; Lupton & Bruce, 2010). This view has been criticized from different angles (Bruce & Hughes, 2010, p. A2; Kopp & Olson-Kopp, 2010, p. 59; Owusu-Ansah, 2003, p. 225), some of them directly addressing the issue of learnability (Bruce, 1998; Bruce & Hughes, 2010; Limberg et al., 2012; Lupton, 2008; Marton & Booth, 1997).
From a two-stage perspective, information seeking is linked to disciplinary learning in different ways. Typically, students and researchers seek to deepen or expand a topic they are working with by including other, topically related texts. This step toward a new text basis can then lead to broader and more complex studies and understandings, which again stimulate the need for further texts (similar ideas of the circularity of learning and information seeking are developed in Bruce & Hughes, 2010). As all information-seeking activities are, as their final goal, guided toward novel, improved understandings (seeking is never conducted for its own sake), and new understandings are at the same time incentives for successive searching, a dynamic, circular concept of seeking and text learning arises, where information-searching activities both take their departure from and point toward deepened and modified text understandings (Littlejohn, 2005; Marton & Booth, 1997).

From a learning theoretics perspective, reading texts and the processing of their contents in formal teaching environments often coincides with a cognitive conception of learning, where learning from texts occurs consciously and in a largely controlled manner, while information-handling activities typically appear learning theoretically as more neutral and anonymous. Information searching as a learning mode comes then into play when the student abandons their orientation toward text understanding and information content and starts relating themselves to the text properties and the document itself, now conceptualized as the carrier of information (Hjørland, 2003; Svenonius, 2000, p. 8). This shift in perspective, which is an implicit assumption of the two-stage model of searching and learning, can be understood as a turn in psychological attitude in the learning individual, a move from text-as-content to text-as-container (Lakoff & Johnson, 1980; Reddy, 1993).

Following this line of argumentation, some interesting questions arise. When does a need for new texts emerge and which conditions can be involved in this need? Why does a researcher or a student “jump” from their primary, “secure,” and meriting mode of processing
information contents for learning into the more “costly” activities of managing information-carrying documents? As a consequence of the two-stage approach to searching/learning, all moves from text-as-content to text-as-container kick the researcher/student, though for a limited span of time, out of their primary learning environment. Information seeking is costly, in terms of time if not other things, and it therefore has to “pay off.” Similarly, what does it mean for the student to organize their searching strategies and results in a way that allows them to return as soon as possible to their standard learning mode with an improved text basis? What are “satisfying” and sufficient results for a student/researcher? We will critically address some of these questions (though not all) related to the idea of the two-stage model as explained above in the present paper.

Generally speaking, our aim in the following paper is to explore perspectives on learning which strive to connect standard, disciplinary learning in the university domain with learning related to information-seeking activities, the latter domain often being associated with the library. We want to ask how the learning individual establishes coherence and meaning in shifting from one domain to the other (Wenger, 1998, p. 51ff). As a basis for our discussion we chose the cognitive–constructivist paradigm, which still seems to be the predominant approach to learning in higher education institutions. Here we will arrive at some dilemmas which arise when cognitivism–constructivism is applied to both disciplinary learning and information searching. In the main part of this paper we will then sketch alternative concepts of learning which to a larger degree knit university learning together with competencies managing information in one meaningful individual process.

**Cognitive scenarios of information needs and learning: a critique**
Learning in the university domain is often described in terms of formal (intended) and informal (non-intended) effects of learning. Intended learning indicates conscious planning and preparation (Notari & Honegger, 2012, p. 23; Pachler & Daly, 2011, p. 43), while informal learning typically happens without conscious control. One characteristic result of informal learning is tacit knowledge, hereunder tacit attitudes to one’s discipline, acquired typically in communicative practices in formal and informal learning environments (Wenger, 1998). Learning in higher educational settings therefore involves both implicit (tacit) and explicit knowledge and learning, though with a strong institutional focus on explicit learning. We will, in a later section, take up the question of whether information searching as a learning mode can be described in terms of this formal-explicit/informal-implicit (tacit) dimension.

In higher education, text reading is still viewed as the predominant means of knowledge acquisition (cf. the text-related opposing notions of deep and superficial learning) (Littlejohn, 2005; Marton & Booth, 1997). As such, it is linked to a cognitive–constructivist approach, where the students build up their knowledge of the world through textual representations. The resulting understandings of these textual interpretations (and the world) are then set in relation to the learners’ environments, where learners construct new and more socially founded understandings of the topic at hand through active interaction with peers, teachers, and learning contents (Cubric, 2012, p. 149; Lindquist & Long, 2011, p. 226). The central role of texts in higher educational learning accounts for the dominance of cognitive–constructivist thought in both understanding and implementing learning in this domain.

From a cognitive point of view, new knowledge emerges when texts modify a learner’s prior understanding of a topic in a way that future interpretation of the topic occurs with a shifted cognitive point of departure. Construction in a constructivist framework means a move from individual interpretations of a text to the environment’s (peers’, teachers’ …) established
understandings and back. This constructive, iterative process is realized in discourses between teacher and the student, and peers in between (Grassian & Kaplowitz, 2009, p. 31; Walton & Hepworth, 2011, p. 463).

New knowledge can in social relations be confirmed or corrected with the consequence that former understandings of textual contents are adapted and revised. An important assumption in the cognitivist view of learning is therefore that all new information has to be adapted to existing knowledge (Cubric, 2012, p. 149; Petrie & Oshlag, 1993, p. 583; Williams & Evans, 2008, p. 62). If it is possible to interpret novel knowledge within existing frames (“schemata”) (Kari & Savolainen, 2010, p. 233; Kimmerle, Cress, Held, & Moskaliuk, 2010), an increase of knowledge takes place without changing the learner’s principal stance toward the topic. This process of “assimilation” (a term stemming from Piaget) is in opposition to “accommodation,” which refers to the learner’s cognitive adaption to new content by modifying their own patterns of interpretation (Marton & Booth, 1997, p. 6).

Accommodative learning is, from this perspective, prompted by an imbalance of cognitive schemata on the one hand and incoming information on the other, where new information cannot, or, at least, not without considerable effort, be interpreted within existing cognitive frames. The learner reestablishes balance by producing new modes of understanding which can incorporate the new information (and, by that, creates new knowledge). This is why assimilation is considered to be “learning without cognitive conflict” by solely quantitatively adding new content to existing knowledge. Accommodation, however, implies a cognitive imbalance where existing knowledge is restructured with the consequence of a “qualitative” increase of knowledge (Cubric, 2012, p. 158). In other words, accommodative learning is the central learning mechanism according to cognitive–constructivist views of learning, learning proper, so to say (Cress & Kimmerle, 2008, p. 112f; Kimmerle et al., 2010, p. 43f; Marton & Booth, 1997, p. 6). Here it must be noted that both accommodation as an imbalance concept
and the information science notions of “information needs” or “Anomalous State of Knowledge” (see section above) correspond to each other semantically being essentially concepts referring to deficit conditions. We cannot explore this interesting observation further here.

Now, we want to discuss four theoretical scenarios demonstrating how the basic cognitive–constructivist categories of assimilation and accommodation can be linked to the central information science concepts of information needs and “gaps” discussed in the preceding section. On the basis of our discussion of cognitive learning conceptions we can identify four typical learning situations and strategies in relation to texts (cf. Dolin, 2013, p. 71):

1. New texts are assimilated by the learner and no cognitive imbalance occurs (standard assimilation).
2. A cognitive imbalance occurs in the learner’s confrontation with new texts but the learner chooses to discard/ignore them.
3. New cognitive contents are learned in addition to old ones. An overall imbalance exists which is “absorbed” in a parallelism of incompatible knowledge through internally compatible-assimilative constructions.
4. In a situation of cognitive imbalance the learner accommodates new texts by modifying/adapting their previous understandings (standard accommodation).

These four cognitive learning situations, constituted by two standard situations, 1 and 4, and two intermediary situations, 2 and 3, have in theory significant consequences for the student’s information needs, their incentive to initiate an information search and the concrete information behavior as an outcome of these factors. We will, in the following, sketch four search scenarios related to the four cognitive learning situations above.
Assimilation (1). In the assimilative scenario, the learner’s information need appears as a need for similar texts which both topically and in terms of used theory and method follow previous texts and already assimilated contents. This need for “something similar” can be met by specific and restrictive search strategies, for instance by retrieving different works by the same author or accessing material from reference lists of already assimilated documents. Typical tools for retrieving texts in the assimilative scenario are the “Similar Article” button in online databases or the strategy of “exemplary documents” (cf. Blair & Kimbrough, 2002), where the investigator continues their search with an identical (or almost identical) set of subject terms. This type of search, where “like meets like,” is being taught at library and information science schools as the paradigmatic search scenario and has almost gained an axiomatic character in much of the library-inspired information scientific literature on thesauri, classification, and other library tools (Batley, 2005; Beghtol, 2009; Broughton, 2006; Chowdhury, 2010).

Ignoring (2). As in assimilation (1), the student will in the ignoring scenario take a restrictive and specific approach to searching and retrieved material, though primarily in relation to texts being rejected. The student/researcher develops a topical characterization of unwished documents, which in turn allows them to effectively sort out material to be ignored. “Imbalanced” authors, theories, and paradigms can be excluded, for instance, by using the AND-NOT function or other tools in more elaborate search syntaxes.

Parallelisms (3). A parallel learning situation can result in open and broad searching strategies, where more or less all results are regarded as relevant by the student/researcher. The resulting deluge of relevant documents confronts the researcher with the necessity of specifying the research question at hand or defining the topic’s theoretical basis in a more precise manner. The parallel scenario can thus be described as a transitional stadium in theoretical reflection, with a strong incentive for learning, where an unmanageable number of
hits (as a consequence of the broad searching strategy) motivate the student/researcher to abandon incompatible knowledge constructions. As the assessment of which knowledge system has to be preserved must be conducted on professional grounds, the elimination of parallel knowledge is a highly learning-intensive process.

Accommodation (4). The accommodative scenario is characterized by a previous restructuring of the topic, which makes the student less restrictive and more experimental and open toward new documents. The relevance of texts (Borlund, 2003; Harter, 1992; Mai, 1999) in relation to new knowledge can at this point of the accommodative process not unambiguously be ascertained. A number of documents can be relevant and only a new round of reading and learning can decide which ones are ultimately relevant. This scenario, similar to parallelisms (3), can be regarded as highly learning-intensive.

These four scenarios are hypothetical deductions from four differing cognitive learning situations (or learning types) and the assumption of an “information gap” that is not specified further. Although the scenarios have some intuitive plausibility with them, they have to be validated by empirical studies. This would give us a more substantial picture of how students and researchers of type 1, 2, 3, or 4 adapt their information-seeking strategy in accordance with the four scenarios.

Looking at learning from a meta-theoretical perspective, the cognitivist approach to learning expresses a number of dualisms; most important of these are a separation between known and knower, and a separation between knowledge and the objects or phenomena the knowledge is of. Furthermore cognitivist conceptions are characterized by understanding learning and the acquisition of knowledge as sequentially arranged processes.

The cognitive–constructivist conception of learning characterized so far is the dominant view of learning in our age. One significant characteristic of this view is its focus on processing
information and knowledge, which goes hand in hand with an understanding of actions as results of such processing, i.e., we act after acquiring the information and the knowledge necessary for the action to take place. Ordinary conceptions of, for example, information needs, and the cognitive adoptions related to those needs, are in general based on such cognitive–constructivist assumptions about the relation between actions and information/knowledge. Correspondingly, the concept of information literacy is in general based on the same line of thinking, i.e., understanding information literacy as constituted by sequentiality and causal information–action connections. When it comes to learning, as Jean Lave points out, this mindset characterizes the fundamental way in which we usually understand learning (Lave, 2011). We are inclined to follow the same sequentiality mentioned above: knowledge is 1) transferred from teacher/facilitator and/or texts; 2) is internalized by the person who is learning; 3) is transferred from the learning context to new contexts; and 4) applied. Linearity is another characteristic bound up with this way of thinking.

It is no surprise that this comprehension of learning is as dominant as it is, considering it is the same pattern we find in the structures and organization of our institutionalized “learning arrangements” across all levels of education (Dreier, 2001). Teaching is arranged in a way that knowledge is transferred (from teacher/texts), internalized by students/pupils, transferred again (possibly in combination with prior acquired knowledge), and applied (in the present situation or later). The same is the case when it comes to information literacy. Information literacy is the consequence of a transfer of suitable tools and information-seeking behavior from librarians/teachers, the user’s internalization of tools and behavior and the transfer to and application in other situations.

So the essence of a cognitive comprehension of learning is its connectedness to the concepts of information and knowledge, and especially the idea that knowledge is primary to (and
precedes) action. The following discussion will try to disprove this premise by turning to theoretical conceptions of learning that, so to speak, turn it the other way around, i.e., by placing social practice and human actions at the center, primary to information and knowledge.

**Learning as social practice – an action-oriented approach**

The theory of social practice we are referring to here stems from an approach called “Critical Psychology.” Critical Psychology was initiated at Freie Universität Berlin in the 1970s, in cooperation with psychologists at the University of Copenhagen. This psychological movement was in many ways similar to the socio-cultural theory in Russian psychology, i.e., the tradition from Vygotsky and later on Leontjev (Leont'ev, 1981; Leont'ev, 1978; Vygotskij, 1978) among others. Critical Psychology and the socio-cultural tradition in Russian psychology are based on Marx’s historical and dialectic epistemology, and from a meta-theoretical point of view they might therefore look very much alike. However, from a conceptual, theoretical, and methodological perspective, there are a number of significant differences.

The need for a new and different psychological approach arose as a consequence of critical psychologists’ perception of prevailing psychological theorizing and research as losing the subject, i.e., neglecting to take its starting point from a subjective perspective. This was also the case in the development of the Vygotskian tradition in psychology. Holzkamp (1983) described Critical Psychology as a science of subjectivity, shifting the focus away from a third-person perspective (the most common perspective in psychology) to a first person perspective, again bringing subjective actions to the foreground.
Several concepts have been developed in Critical Psychology with specific reference to their meta-theoretical outset, which is also reflected in its understanding of learning. The theoretical emphasis lies on conceptualizing how practice is continuously created and recreated through the individual’s subjective participations in and across actual contexts. By concentrating on the principle of the first person perspective and on concrete actions of human beings, Critical Psychology attempts to avoid the conceptual fragmentations and diversities which are characteristically the case in the field of (mainstream) psychology as a whole. The great many sub-disciplines in psychology have a tendency to lock themselves into their own specific scientific domains with little mutual scientific benefit coming of it.

Looking at it from a Critical Psychology point of view, the cognitive–constructivist approach to learning is a good example of such a fragment. It delimits its research to isolated cognitive aspects and is unable to grasp a person in any way qua an entire being. The fragmentation also conveys itself in the mix of concepts without substantiations in their own right, so to speak. The concept of information needs is now and then used in this way.

A different notion of this fragmentation might be reductionism – a critical psychologist would see it that way. The action-oriented understanding of learning tries to avoid reductionism by taking the subject as its starting point in research and theorizing. When it comes to needs and an understanding of motivation in general, the action-oriented approach differs very much from the cognitive one. Thinking and acting are, in a Critical Psychology perspective, connected and integrated with emotions. Emotions are related to people’s motivation, i.e., they influence people’s motivation to act. How motivated a person is to act is furthermore dependent on the specific and actual opportunities for acting in real life, and emotions are spontaneous elements in the evaluation of these opportunities (Jartoft, 1996). Ambiguous opportunities or opportunities full of contradictions will thus reflect ambiguous emotions with an effect on motivation. The point in this line of argumentation is that
motivation for learning, or the lack thereof, can only be comprehended as situated in its concrete and real-life circumstances, i.e., related to a particular person in a specific situation including the opportunities and restrictions this may offer them – a first person perspective.

The emphasis the action-oriented theory puts on the first person perspective of learning further implies a focus on participation. Instead of seeing learning as a unified corpus of more-or-less isolated cognitive elements, the action theory of learning sees learning as trajectories of learning. Learning as such is accordingly defined as modifications of abilities to act across and through the different contexts in which participation takes place. This conception is essential to the action theory of learning and does not refer to certain ways of acting, but is instead an analytical conception containing ordinary psychological concepts such as thinking, emotions, needs, and the like. Critical psychologists understand such categories as functional aspects of abilities to act, which are not to be seen as separate inner psychological categories. Accordingly, learning is taking place in coherent and continued trajectories as well as in discontinuous and interrupted ones. Former learning can be replaced by new learning, and formerly replaced learning can break open again under new circumstances and in new contexts.

**Perspectives of an action-oriented conception of learning on information literacy**

Looking at the problem from an action-oriented perspective, students and researchers are situated in many different contexts in their everyday lives. It is the students and the researchers themselves who create connections and coherence, or lack of coherence, through the trajectories they move along and the shifts and changes they make. An example is a shift from a situation of disciplinary learning in a university setting to activities related to information seeking in a library. The latter implies acting, among others, through special
retrieving procedures in order to obtain suitable information or texts. This requires several functional abilities in handling specific situations, such as acting appropriately in relation to the topics at hand, judgments of relevance, the organization of references, and the like.

Information literacy in this framework is a functional category, a proficiency in handling specific problems in a suitable way across situations and different circumstances; it is not a personal ‘quality’ or ‘property’ that can be possessed, contrary to the cognitive conception of it. A cognitive approach to learning has a built-in conception of finality and permanence, i.e., information literacy is something you have. From an action-oriented perspective, information literacy is something you do, i.e., the latter sees the acquirement and performance of information literacy as primarily linked to practical abilities. Information and knowledge are functional categories that might enable this to be done.

What’s the difference, then, you may ask? The difference obviously does not reveal itself in our information-seeking practices, in the organization of teaching, or in the way in which we generally arrange educational activities. It reveals itself in our very different comprehensions of what is going on when we participate in such activities — a question of different epistemologies, so to speak.

So far we have stuck to the conception of learning as modifications of abilities to act. As pointed out above, the definition is founded on a Marxian epistemology, i.e., historical and dialectical materialism. The essence of this epistemology was articulated by Marx in many different ways. He expressed it in his “Theses on Feuerbach” thus (Marx 1845):

“The question whether objective truth can be attributed to human thinking is not a question of theory but is a practical question. Man must prove the truth — i.e. the reality and power, the this-sidedness of his thinking in practice. The dispute over the reality or non-reality of thinking that is isolated from practice is a purely scholastic question.”
and

“All social life is essentially practical. All mysteries which lead theory to mysticism find their rational solution in human practice and in the comprehension of this practice.”

The figure below is an attempt to illustrate the essence of the action-oriented approach along the line of Marx’s epistemological thinking.

Figure 1. Action-oriented approach

An important epistemological difference between an action-oriented and a cognitivist theory of learning is apparent in our figure. It illustrates how the relation between subject and object are theorized in an action-oriented epistemology. As in the above quotes from Marx’s “Theses on Feuerbach,” the relation between subject and object is dialectical in the sense that we are not dealing with two separate entities, a subject and an object. Marx emphasizes that
the subject as well as the object cannot be appropriately understood unless we see them as results of one another; their mutual connectedness is revealed in actions from a Critical Psychology perspective. We are then confronted by a general comprehension of learning and social processes as mediated through actions – visualized above as a figure with three elements. The way in which the figure visualizes the subjective and objective as being mediated and linked through actions might produce an impression of linearity and sequentiality. It is crucial, therefore, to notice that what the illustration is visualizing is an epistemological abstraction; from a dialectical and materialistic point of view the only thing that really is, is concrete action. If we had divided our figure into two elements, we would have given an illustration of a cognitivist epistemology on learning. That is not to say that there are no mediations taking place in cognitive–constructivist conceptions of learning, but that, if there are, those mediations are interpreted as internal cognitive mediations with no direct mediating link to external objects. As pointed out earlier, the cognitive approach to the subject–object relation is one of transfer.

The differences between the two approaches to learning may also be seen as the outcome of two different scientific traditions with different scientific interests, characterizing the cognitivist tradition as being motivated mainly by technical and instrumental interests, and the action-oriented tradition being motivated by emancipatory endeavors. Some fifty years ago, Habermas described this by identifying diverging knowledge-related interests behind the natural sciences, humanities, and the social sciences (Habermas, 1968). We will not elaborate further on this here, but return to the action-oriented theory with some additional remarks.

Actions, in the tradition of Critical Psychology, have to do with subjective and objective changes and alterations as described above, designated in a learning context as modifications of abilities to act. The key question is, then, how we might understand modifications that take place through actions which simultaneously alter the subject as well as the object. In Critical
Psychology, as mentioned before, the focus is on first person perspectives of subjective actions, i.e., the focus is on subjectivity in context. A somewhat different comprehension and focus on change was recently developed by Karen Barad, an approach which also understands change from a materialistic point of view, though not in a dialectical way (Barad, 2007). The preface of her book we refer to in this paper begins in the following way:

“This book is about entanglements. To be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence. Existence is not an individual affair. Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating.” (Barad, 2007, p. ix)

Barad substantiates her view of entanglement by drawing on inspirations from a number of different sciences, theories, and philosophies, such as quantum physics, feminist studies, and different inputs from poststructuralist writers, to mention a few. She is herself a quantum physicist. In particular, she is inspired by the philosophy of the Danish physicist Niels Bohr and her theoretical efforts are assembled to some extent in line with this inspiration under the title agential realism. Conceptualizing agential realism brings forward several relevant points of critique in relation to the cognitivist approach to learning as well as to an action-oriented approach. Agential realism might be a possible analytical opening and enhancement of the complexity already illustrated by the action-oriented approach. In the following, we have selected some key concepts and sketched the impact agential realism has on our theorizing on this point.

“A performative understanding of scientific practices, for example, takes account the fact that knowing does not come from standing at a distance and representing but rather from a direct material engagement with the world”. (Barad, 2007, p. 49)
Barad is addressing the problem of a dualistic understanding of change and points to representationalism as a very important problem in our way of thinking. Representationalism refers to the belief in an ontological distinction between representations and what they represent, and implies a conception of two distinct and independent entities. This conception is, in Barad’s view, so deeply entrenched within Western culture that it has almost taken on a common sense appeal. Obviously, the cognitivist approach to learning is affected by this conception; representations are here established and transferred between independent entities.

The action-oriented theory in its dialectic approach and conception of action as a constituting mediator of subjective and objective entities deals with separate entities epistemologically, but not ontologically. By introducing and using the notion of performativity, Barad wants to hold on to the indivisibility in our engagement with the world, an indivisibility which also counts as a critique of the action-oriented theory and its division into ontological and epistemological aspects of the world.

In the theoretical configuration of agential realism Barad introduces, as mentioned above, concepts from a number of different sciences and philosophies, reinstalling them in a new theoretical framework. Such a concept is *intra-action*. The notion of intra-action is borrowed from a poststructuralist theoretical framework, with its somewhat identical focus on agentiality (Højgaard & Søndergaard, 2011). In a Foucault-inspired poststructuralist thinking, agentiality has to do mainly with discursive practices, i.e., in constituting subjects and knowledge discursively through intra-actions. Barad’s conception of intra-action goes far beyond discursive practices. In her understanding of intra-action, everything is performative and has agency – everything is intra-acting with something else. This is the *realistic* aspect of agential realism.

“The notion of intra-action is a key element of my agential realist framework. The neologism ‘intra-action’ signifies the mutual constitution of entangled agencies. That is, in contrast to
the usual ‘interaction,’ which assumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through their intra-action. It is important to note that the ‘distinct’ agencies are only distinct in a relational, not an absolute, sense, that is, *agencies are only distinct in relation to their mutual entanglement; they don’t exist as individual elements*. *(Barad, 2007, p. 33)*

Taking the conception of intra-actions at face value, our cognitive as well as action-oriented theoretical understandings concerning learning and information-seeking processes seem to have reached a dead end. From an agential realism point of view, we cannot substantiate anything in these intra-active processes. It is impossible to put forward anything as a point of departure from the dissolved enactments between entities. We have to understand at least from this that subjects, as parts of the intra-acting processes of learning, retrieval of information, and the like, are not privileged above other aspects intra-acting mutually and simultaneously in the same processes – for example, technology, co-partners, physical and material conditions, and the like.

In physics *diffraction* has to do with the way in which waves intra-act. The particle–wave problem, studied by Niels Bohr, concerns electrons and light and is one source of inspiration for Barad in her conceptualization of diffraction. A different inspiration comes from a poststructuralist use of the notion of diffraction, especially that expressed by Donna Haraway *(Haraway, 1997)*. Haraway uses “diffraction” as a metaphor for a critical consciousness and argues that diffraction should replace our much-used notion of reflection. Barad *(2007, p. 89)* schematically formulates some important differences in our conceptions of the world as a result of this:
• Reflection has to do with mirroring and sameness, analogue to a representative view of things, whereas diffraction has to do with marking differences from within, i.e., as part of entangled intra-actions.

• Reflection relates to a binary ontology–epistemology conception, i.e., knowledge is true beliefs concerning reflections from a distance. Diffractions relate to an “onto-epistem-ology,” where knowing is a material practice of engagement as part of the world in its differential becoming.

“In an agential realist account, matter does not refer to a fixed substance; rather, matter is substance in its intra-active becoming – not a thing but a doing, a congealing of agency“.
(Barad, 2007, p. 151)

Epilogue

Our starting point in this paper was to explore different conceptions of learning that related disciplinary learning in the educational domain and information-seeking activities, often associated with the library domain. We have described three different conceptual, theoretical, and meta-theoretical perspectives on learning in relation to information-seeking activities: a cognitivist–constructionist approach, an action-oriented approach, and an agential realistic approach to learning. In this process, we moved from an understanding of learning as a transfer of information and knowledge to learning understood as an inter-active social and dialectical process, ending up with conceptions of learning as an intra-active and diffractive process.

The basis for the dominant position of cognitivist conceptions of learning in educational contexts might have to do with their seemingly promising instrumental and operational
approach, due to their meta-theoretical foundation. Meta-theoretically speaking, thinking in causalities is connected with an effort to reveal what is going on in the “engine-room” of our cognition, so to speak, in order to be able to predict and control.

The action-oriented conception of learning takes a quite different epistemological stance, and focuses on learning primarily as a social process. The nature of a social process is that it is dialectical and, as such, substantially ambiguous, complex, and uncontrollable, so to speak. A transfer metaphor of learning is, therefore, from this point of view, not capable of grasping the complexity and, thereby, the essence of learning, i.e., grasping the essence of modifications and change.

Agential realism makes an effort to get to grips with these complexities by introducing conceptions such as intra-action and diffraction. The foundation of these conceptualizations dissolves the idea of representationalism and the habitual distinction between epistemology and ontology. It reveals a significant and substantial critique of conceptions of learning as a two-component phenomenon. Learning processes must, according to this critique, be understood as dynamic processes where everything present in a situation of learning participates intra-actively and diffractively – both material and non-material substances. From this point of view it is not possible to substantiate what is going on in such indivisibly intra-active processes.

Where does this leave us?

Are we still facing an unsolved problem or are we dealing with an inextricable mystery?

Some final remarks on the question we entrust the too-often overlooked French philosopher Gabriel Marcel (Marcel, 1949):
“… a mystery is something in which I am myself involved, and it can therefore only be thought of as a sphere where the distinction between what is in me and what is before me loses its meaning and its initial validity. A genuine problem is subject to an appropriate technique by the exercise of which it is defined: whereas a mystery, by definition, transcends every conceivably technique. It is, no doubt, always possible (logically and psychologically) to degrade a mystery so as to turn it into a problem. But this is a fundamentally vicious proceeding, whose springs might perhaps be discovered in a kind of corruption of the intelligence”. (Marcel, 1949, p. 117)

References


