

THE UNCONSCIOUS TURN IN PEDAGOGIC

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ABSTRACT

The aim of this article is to widen the understanding of the conditions of knowledge formation. Since it is, as will be argued, partly unconscious and automatized, it is also partly out of our control. Various theories which pay attention to unconscious and automatized knowledge formation are described. As the reasoning deals with a number of complex processes about man, culture, language and science, it should be seen as a palette of possible angles. The possibility of strict rationality will, in the light of these supposed circumstances, be elaborated on in relation to Bacon's concept of Idols and to folk theories. The latter are picked up from popular culture and used in our daily efforts to make sense of events and actions. Folk theories could be seen as a modern interpretation of Idols. By means of two examples, the relevant educational implications will be illustrated. One of the cases refers to critical thinking and the other one to feedback in higher education. The final section suggests how to handle a situation with a partly unconscious knowledge formation, which requires for instance to be more humble or more open-minded.

Keywords: Automized, Critical thinking, Feedback, Folk theories, Knowledge formation, Rationality, Unconscious

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Knowledge formation partly out of control

He is still happy that Toweel has beaten Ortiz, but has begun wonder why. Who is Toweel to him? Why should he not be free to choose between Toweel and Ortiz in boxing as he is free to choose between Hamiltons and Villages in rugby? Is he bound to support Toweel, this ugly little man with hunched shoulders and a big nose and tiny blank, black eyes, because Toweel (despite his funny name) is a South African? Do South Africans have to support other South Africans even if they don't know them? (Coetzee, 1997, p. 109)

This quotation is taken from the Nobel Prize winner John Coetzee's book *Boyhood*. The focus is on the boxers Toweel and Ortiz. But there is also more information, for example that boxing and rugby are practised in South Africa and that the proper nouns of the rugby clubs sound like English ones as well as the name of the country of South Africa. Could it be that such "extra" information becomes part of your associative network, without your realizing it?

Imagine a child learning her first language, a truly very complicated task. Why does she not have to learn long glossaries when trying to make connections between words and objects or different phenomena in the surrounding world?

Considerations like this lead to an awareness that knowledge formation must be partly out of our control. Accordingly, it is then something going on unconsciously and automatized. Markauskaite and Goodyear (2017) claim that there have been five turns of

fashion during the last 50 years within research on education, learning and expertise: one cognitive turn away from behaviorism, one practice turning away from cognitivism, one linguistic, one material or socio-material, and one neuro- or “brain-science”. Every turn can be understood as an opening of neglected areas of scientific experience and/or human insight. At the same time, every turn has tended to marginalize what used to dominate, not least because the phenomena under study are very complex. The authors accordingly claim that we need accounts that bring all research together, for example, on discourse, brain, culture and semiotics.

The present article is an attempt to further deepen our understanding of knowledge formation by advocating yet another turn. This entails returning to theory with the help of psychology and social psychology. The overall aim is to improve our understanding of the conditions of knowledge formation within the discipline of pedagogic. Since this process is partly unconscious and automatized, as argued, it is also partly “out of our control.” In the light of these postulated conditions, different forms of rationality will be discussed in relation to concepts like Idols and folk theories. By means of two examples, the relevant educational implications will be illustrated. One of the cases refers to critical thinking, the other one to feedback in higher education. The final section suggests how to handle a situation with a partly unconscious knowledge formation, which requires for instance being more humble or more open-minded.

If the arguments seem to be reasonable, a number of questions would of course need further discussion and research. Consider for instance: “What is the specific meaning of the term unconscious?”, “Are there different types of unconscious processes?” and “How can we learn how to cope with unconscious knowledge formation?” and not least “How does knowledge about unconscious knowledge formation influence our understanding of, for instance, discourse, brain, culture or semiotics as the targets in the “rejected” turns.

CONDITIONS OF KNOWLEDGE FORMATION

The aim of this first section is to describe various theories which pay attention to unconscious and automatized knowledge formation. As the reasoning deals with a number of complex processes about man, culture, language and science, it should be seen as a palette of possible angles.

Numerous scientists discuss unconscious knowledge processes and their consequences for knowledge formation. Damasio (2000), a leading expert on neurophysiology, argues that very comprehensive and important unconscious processes affect learning, including for example “all the fully formed images to which we do not intend”, “all the neural patterns that never became images” and “all the hidden wisdom and know-how that nature embodied in innate, homeostatic dispositions” (Damasio, p. 228). Kihlström, a cognitive researcher (1999), claims that there are automatic thought processes going on inside the brain, unintentionally and without our being aware of it. The ability to perform such automatic processes is partly inborn and partly automatized by originally conscious processes through training and practice.

As regards consequences for knowledge formation, Markauskaite and Goodyear (2017) argue, referring to Damasio, that higher-level cognition such as conceptual change emerges from basic systems in the brain. Evidence is taken from domains such as neuropsychology, developmental research and robotics. Hartman (1998), a natural science theoretician, maintains that human beings are constructed for drawing general conclusions from experienced regularities and that they also automatically expect these regularities to remain. Such inductive thinking is useful both within most empirical sciences as well as,

according to Ebenhardt, Esser and Haider (2017), in everyday contexts such as car-driving and language acquisition. Dawkins (1998), a zoologist, goes one step further, claiming that not only human beings but also animals and even plants behave like intuitive statisticians looking for non-random statistical patterns.

Kahneman (2012), the influential professor of public affairs, distinguishes between fast and slow thinking. Fast thinking – System 1 – refers to intuitive thoughts and entirely automatized mental activities of memory and perception. It generates feelings, impressions and tacit interpretations of what happens and creates and infers intentions and causes. It is therefore the main source of deliberate choice and explicit beliefs. System 1 is usually very good at what it does, because it gives us (and other animals) accurate models of familiar situations, for instance appropriate initial responses to challenges or useful short-term predictions.

Slow thinking – System 2 – has to do with self-control, cognitive strain and concentration. Only System 2 can compare objects with respect to several attributes, follow rules and generate calculated choices. System 1 continuously produces suggestions for System 2, such as intentions and feelings. It cannot be turned off at will. We generally believe in and act on the impressions originated in System 1. System 2 can, however, take over the freewheeling impulses of System 1 at any time. This occurs, for example, when System 1 cannot answer a question or when we are surprised. This makes us search in our memory to prepare an answer or to make sense. Associative memory (or a machine) is the source of suggestions and deliberate thoughts of both systems. It contains various types of associative links in a vast network, which represent the structure of our world. Ideas generated by association evoke other ideas in a spreading cascade. Memories triggered by words evoke emotions, which in turn evoke facial expressions and other reactions. Such self-reinforcing and associatively coherent patterns of emotional, cognitive and physical responses occur at once and are out of our control.

Bereiter (2002), a cognitive educational psychologist, speaks of a connectionist view of the mind. It can also be understood as a self-organizing system, which continuously and automatically provides answers and meanings to what happens in the world. The system comprises two levels, the neural level, of which we know nothing, and the one we can apprehend. Accordingly, since feelings and cognition cannot be separated, there is no reason to speak of learning in terms of logical statements, images, feelings or facts. This could be compared to the suggestions produced by the vast network proposed by Kahneman (2012). It delivers suggestions where, for instance, emotions are part of that what we apprehend.

Moscovici (1993) speaks of “The Return of the Unconscious”. The author, a social psychologist, asserts that the unconscious part of the psyche is screened from phenomenal awareness. It is enclosed in the individual and in the culture and should hence be apprehended as the individual *and* collective unconscious. Moscovici thus discusses two parallel and intertwined processes. First, what goes on within the individual and, secondly, that our understanding of reality has its origin in social life.

As for the first process, subjects shape their own projected realities as mental processes automatically and organize and direct perceptions, feelings and inferences unconsciously. The subject fashions behavior, shaping coherent memories of situations and stories as well as conventionalizing representations and words, eliminating anything that is unfamiliar or incompatible. The process of projection thereby creates an impression of continuity. As notions are captured into a holistic and familiar context, they lose their autonomy. Abstract concepts, often expressed as images, are among the most influential ones. Memory endows words with an affective tonality, familiar to culture.

As for the collective, or as subsequently called, the folk theoretical unconscious, Moscovici tells us that our beliefs, feelings, metaphors and concepts are automatically

reproduced in typical cultural forms. We think of them continuously and they determine the kind of picture that comes into our mind when we do or say something. They are thoughts before reason, conclusion before premises. Examples include paradigms, political and religious doctrines, ethnic beliefs and common fixed ideas of any other kind. Concepts like superego, mental unity, social self, group mind and social identity aim at describing something similar.

A parallel can be drawn to the Bakhtin (1986) concepts of primary and secondary speech genres. The primary genres consist of utterances used in everyday life and form the basis for more complex and compound secondary speech genres. Examples of the latter are novels and scientific texts. According to the author, existing genres form frameworks for the meaning given to different phenomena. As I understand Bakhtin, the incorporation of different genres mostly happens unconsciously and automatized, but secondary genres may to a greater extent be made conscious, much like Kahneman's System 2.

In sum, the individual and the collective unconscious are imperative and can neither be resisted nor mastered. Being usually of a cultural origin, these ideas possess us and give us models for understanding what is going on around us. Moscovici regards this as probably the most pervasive phenomenon in our common life. If that is so, I conclude that it also applies to our understanding of knowledge formation.

Rationality

In this section the concept of rationality is discussed. A definition where rationality is roughly defined as endowed with reason exemplified in hypothetical thinking is, in accordance with the reasoning in the former section, questioned. If we follow Kahneman (2012), two ideas have until recently been broadly accepted among social scientists. One idea is that humans are generally rational and logical, while another is that emotions such as affection, fear and hatred can explain the departure from rationality. The author argues, on the contrary, that people typically make systematic errors in thinking. This can be traced back to the machinery of cognition, rather than being caused by the corruption of thought by emotion.

One frequent error in knowledge formation has to do with intuitive heuristics (Risen, 2016). For instance, we answer an easier question when faced with a more difficult one *without noticing the substitution*. When a skilled solution is unavailable intuition delivers an answer; it is just there to be used. Another frequent error is to believe in stories created by System 1. Kahneman even constructed an abbreviation for this phenomenon: WYSIATI "What you see is all there is." System 1 constructs the best story possible out of the information currently active but cannot consider information it does not have, as conscious doubt is not part of the repertoire. Because we jump to conclusions but do not systematically search for relevant information, it is thus possible to make quick judgments, some good, and some bad.

However, even System 2 is not a paragon for rationality. Its abilities are limited as well as the knowledge, to which it has access. Reasoning is therefore (Trippas, Handley, Verde and Morsanyi, 2016) not always straightforward, as reasoning and errors are not always caused by incorrect and intrusive intuitions. Mistakes are due to the fact that we often do not know better. The possibility of rationality seems, accordingly, to be an antithesis to the understanding of knowledge formation as partly unconscious and automatized.

"Rationality" has different meanings in a colloquial and scientific context, even though we refer in both cases to something that can be described as endowed with reason, sanity, intelligence and judiciousness (Chambers, 1988), as well as having more calculation, greater deliberation, and less warmth (Kahneman, 2012), in other words the way we often characterize human nature. This definition goes back to Aristotle (Stanovich, 2011). The author tells us that the opposite is not irrationality, but "arationality."

Stanovich (2011) defines rationality in its stronger sense (mentioned throughout as “strict rationality”) as degrees of distance in thought or behavior from an ideal normative model. One example is hypothetical thinking. Here, we are, however, at risk of confusing representations of imagined situations with representations of the real world. Another typical example refers to individual fulfilment behavior: we behave in a way to get exactly what we want, assuming that resources are provided. Strict rationality can also be exemplified by syllogistic reasoning. Premises, when joined together, assert that one will reach a conclusion without any doubts. Moreover, Stanovich maintains that strict rationality contains multiple components. Consequently, it is easier to specify to what extent rationality has been violated rather than specifying all of its components.

The present article exemplifies strict rationality by discussing educational implications. First, in this section, we will briefly refer to the conditions of teaching; secondly, in the next section we will focus on critical thinking and dealing with student feedback. The possibility of strict rationality and thereby making rational choices in “real” life is widely questioned (Stenning, Martignon and Varga, 2017), especially regarding the theory of the rational choice of economics, where individuals are supposed to act as if they balance costs against benefits in order to arrive at actions that maximize personal advantages. Hedström and Stern (2008) point to two components characterizing this “rationality assumption” which underlies most economic analyses. First, individuals form correct beliefs about the world and, second, given these beliefs, they then choose those actions that best satisfy their preferences. Føllesdal, Walløe and Elster (1993) discuss the problem of knowing how much information one needs to make an informed rational choice by selecting the *best* of a number of available alternatives to achieve a specific goal. This is impossible for at least two reasons. There is always more information to gain (if you are not occupied with syllogisms), and you cannot know if you have the correct information. This also implies that you cannot know if more information would have led your decision in other directions. For economists and decision theorists the only test of rationality is whether a person’s beliefs are internally consistent (Kahneman, 2012). “Rationality is logical coherence – reasonable or not” (p. 411). Kahneman claims that the definition presupposes adherence to rules of logic which a finite mind cannot implement. According to sociologists (Hedström and Stern, 2008), actors are assumed to act rationally, making rational choices, but in a wider sense of the term. The focus is rather on explaining the aggregate of outcomes such as collective actions, patterns of segregation and the emergence of norms. This focus seems thereby to pave the way for including unconscious processes in understanding rationality.

Professionals have to handle a great deal of information. This is also due to the fact that praxis is situated, complex and unique. Lipsky’s (2010) concept of “street-level bureaucrats” alludes to a broad spectrum of civil positions such as teachers, lawyers, police officers and health workers. The author describes the dilemma of the duality between the responsibility to the clients’ needs and to ensuring that policies are properly implemented. The policy goals are mostly oblique and not clearly stated, thus leading to a broad interpretation. The street-level bureaucrat often adjusts policy goals to meet her own situation and, consequently, specific goals and decisions vary from client to client.

Lipsky captures one difficulty in working, say, as a teacher or lawyer. If we connect to the argumentation about unconscious knowledge processes and the possibility of a strict rationality, the situation becomes even more complex. In teaching, for example, we have to face a complex situation where a number of competences are needed, very few of which are grounded in scientific theory. Jank and Meyer (1997) list 14 factors influencing teaching, such as the personality of the teacher, experience as a teacher, knowledge of didactic theory, political and societal orientation, ingrained patterns of behaviour and knowledge of the connection between teaching and learning (every factor being very complicated in itself).

Others are, to refer to Lipsky, the problem of understanding the meaning and intentions of the curriculum and to be fair in assessment. In my perspective, it is not only that praxis differs from theory, but praxis also changes, or there is a lack of experience. As knowledge formation is partly out of our control, being unconscious, automatized, “infected” by values and of other people, teachers, even at best, can only strive at strict rationality, but never implement it.

Idols and folk theories

In this and the following section another angle of approach to knowledge formation is presented, which is compatible with a) the argumentation of automatic knowledge processes and b) a wider understanding of the concept of rationality. The argumentation takes its point of departure in the concepts of Idols and folk-theories.

Francis Bacon (1561-1626) speaks in his work *Novum Organum* (Bacon, 1620) of Idols which beset human minds. These false notions or biases have, according to Bacon, deep roots in man and his understanding of the world and of himself. Bacon’s description of Idols is interesting, since it could be seen as a recitation of the consequences of understanding knowledge formation as partly unconscious and automatized. The Idols are of four kinds, namely the Idols of the Tribe (human race), of the Cave (individual disposition), of the Theatre (especially language) and of the Marketplace (“bad” science and philosophy).

The Idols of the Tribe, claims Bacon (1620), have their foundation in human nature and in the race of man. Human understanding is like a false mirror which discolors and distorts the nature of things. All our perceptions are measures of the individual and not a measure of the universe. Bacon lists a number of Idols characterizing human understanding. We are, for instance, prone to assume the existence of more regularity and order in the world than there is. The greatest hindrance proceeds, however, from the dullness and incompetence of the senses. Things which strike the senses outweigh those often more important things which do not immediately strike them. The Idols of the Cave arise in the mental or bodily constitution of each individual. Thus, everyone looks at the world from his “cave”. In addition to these supposedly inborn characteristics, we take part in conversations, education and the reading of authors we admire¹, all of which discolors and distracts the light of nature. Furthermore, some minds are more apt to mark the difference of things, while others mark their resemblances. The Idols of the Marketplace are, if we follow Bacon, formed in intercourse with others. Man associates by discourse, but ill or unfit choices of words obstruct understanding. Moreover, words overrule understanding and throw everything into confusion. Therefore, these Idols are the most troublesome.

Lastly, the Idols of the Theatre, or systems, have their origin in dogmas of philosophies and perverted laws of demonstration. By the latter, Bacon refers to the many axioms and principles used in science. Thoughts derived from philosophical sects, plenty of which flourished among the Greeks, mislead our minds. They could be compared to a theatre play, with stories invented for the stage, compact and elegant, but something else than true stories out of history.

The point Bacon makes is that as scientists we have to be acquainted with the Idols and must *learn how to see through them*. It is thus possible to be strictly rational, in spite of any unconscious knowledge processes. Bacon emphasizes, however, that even more advanced and experienced scientists must beware, since the Idols may always infect the search for true knowledge.

¹ Bacon alludes to Aristotle

“ . . . they will again in the very instauration of the sciences meet and trouble us, unless men being forewarned of the danger fortify themselves as far as may be against their assaults” (Bacon, 1620, § XXXVIII). One could add that Bacon is surprisingly modern. One parallel has, for example, to do with the theory of science and Popper’s falsification as an alternative to logic positivism and another with Kuhn and science mixed with values.

FOLK THEORIES

Folk theories could be seen as a modern interpretation of Idols. One difference is, however, that folk theory seems to presuppose the existence of unconscious and automatized knowledge formation. There are, however, several ways of understanding the term “folk theory”. In accordance with Bereiter (2002), the expression could refer to what we believe in the absence of scientific theories, as was the case in ancient times. Another interpretation, which is in line with the scope of this article, is that folk theories are picked up from popular culture and used in our daily efforts to make sense of events and actions.

Bereiter (2002) talks about folk physics, folk biology, folk economics and a folk theory of mind. Lakoff (1987) speaks of folk theories and expert theories within the fields of categorization, language, medicine, politics and physics. Each theory, folk or expert, involves some sort of idealized cognitive model and a corresponding vocabulary. We may also hold one or several expert and folk theory beliefs in the same field. Lakoff even argues that most of us have a non-coherent theory of how the physical world works. Wolpert (1992) claims that scientific knowledge most often seems counterintuitive, both because different phenomena cannot be understood as a result of a simple inspection and because in a scientific work it is necessary to be on one’s guard, especially against the pitfalls of “natural thinking”. People most often believe in the achievements of science, even if the majority cannot explain *why* things happen this way or that. Most Britons, for example, believe that the Earth orbits around the Sun but, in Wolpert’s opinion, at most one out of 100,000 can explain why.

Moscovici (1993) speaks, as mentioned above, about beliefs, metaphors and concepts reproduced in typically cultural forms which determine what pictures come into our minds when we are doing or thinking of something. The origin, maintains the author, is found in the culture, or in my words, in folk theories. Malle (2005) asserts that a folk theory of mind underpins all our unconscious and conscious thinking and perceptions of the world. It seems to be similar, as Moscovici asserts, to the common fixed ideas which give us models for understanding what is going on. The suggestions generated by System 1 (Kahneman, 2012) are of the same character.

In addition, within pedagogic, both Bruner (1996) and Olson and Bruner (1996) have strongly advocated folk theories like folk psychology and folk pedagogy. Folk psychology reflects ingrained cultural beliefs, things rarely made explicit, about the mind, which steer our ordinary interactions. One folk-psychology assumption is to understand the learner’s mind as passive and empty; another is that the mind constructs models or theories of the world. Folk pedagogy, that is how to help children (and grown-ups) learn, reflects a variety of assumptions about the child, for example as lacking knowledge which can only be provided by adults as well as holding implicit intuitions that can be made explicit in school.

We may question, therefore, How do folk theories then differ from scientific knowledge?² This is not so easy to say, since there are continuous overflows, especially from science to folk theories. Parts of old and new scientific theories, explaining all sorts of things, are gradually incorporated within folk theories (Bereiter, 2002). This overflow is both a

² What science means more precisely is outside the scope of this article.

resource and an obstacle, not least in pedagogic contexts. For example, many teachers have incorporated the metaphor of learning as a form of transfer of knowledge from the teacher's mind into the pupils' minds (cf. Sellbjer, 2009). Theories inspired by John Locke and behaviorism can be taken to support such folk theories.

Two forms of rationality

If we follow Bacon (1620), science is an instrument to give man power over nature. Idols can be seen through if one uses good science; in other words, creating engineer-controlled experiments using a hypothetico-deductive method. Implementing strict rationality is hence possible if, as a scientist, one is careful enough. Rationality is at risk, however, since Idols can always affect the search for true knowledge. The division between ordinary people and scientists is distinct in this respect, since the former are trapped in the world of Idols.

The folk theoretical approach leads to another kind of reasoning. It is not possible to gain enough information to arrive at a well-reasoned standpoint in every question or decision, as supposed by Bacon and in most economic analyses. This is rather an exception, reserved for areas in which we have much knowledge or experience. Accordingly, the use of folk theories should not be discussed in terms of extermination and combat, nor should it be regarded as inappropriate or a sign of moral deprivation. On the contrary, the use of folk theories is rational, but in a proper sense, since it helps us to handle a vast amount of information. Dijksterhuis and Nordgren (2006) maintain that decisions about complicated matters are often better approached with the help of unconscious thought. Malle (2005) even thinks that most unconscious processes perform roughly the same functions as the corresponding conscious processes, but do it more efficiently. Kahneman's (2012) System 1 is the main source of belief and gives us, for instance, models of familiar situations and useful short-term predictions. Of course, folk theories also darken the search for truth as they prevent us from seeing the world "as is".

Hence, good science is not a search for truth, but for a well-reasoned standpoint within a theoretical framework. Good science is also, if we take the conditions of knowledge formation into consideration, an effort to be as rational as possible. Knowledge formation is, nevertheless, partly out of our control, being unconscious, and thus automatized, "infected", for instance, by values, needs, and other people's talk and opinions. The division between ordinary people and scientists is in this perspective more a question of grades of rationality, since the former are mostly trapped in a world of folk theories.

EDUCATIONAL IMPLICATIONS – CRITICAL THINKING AND FEEDBACK THEORIES

In this section, two educational examples are elaborated on to illustrate previous reasoning. The first example refers to critical thinking and the second example to student feedback. Critical thinking, sometimes referred to as critical reflection, transferable skills, or scientific thinking, represents one of the core competencies in higher education. Students are supposed to improve such capacities along with their advancement within the academic system.

Walters (1994) speaks of two waves characterizing research on critical thinking. The first can be understood as logistic — that is, concentrating on how lectures and exercises drill students in logical argumentation. Examples are deductive and inductive reasoning, problem solving, fallacy recognition, evidence assessment, and quantitative calculation. Paul and Elder (2012) can be regarded as representing this first wave, at least partly. According to these authors, critical thinking means, to realize that thinking must be assessed and analyzed for its accuracy, clarity, depth, relevance, breadth, and logicalness. We have to understand that all

information used in reasoning must be interpreted and that every basic inference has implications.

Paul, Binker, Martin, and Adamson (1989) maintain that a critical thinker is a “reasonable person” with intellectual autonomy. One of the most important steps toward this ideal is to be aware of your own perspective, which you need to work on and change. You have to command the elements of thinking and develop special traits of mind such as intellectual courage, humility, and integrity. A weak critical thinker is egocentric or sociocentric, as these traits are only restrictively developed (cf. Bacon). The authors speak of the option of optimizing perfection of thought, showing clarity, precision, consistency and being logical.

It is agreed that good thinking implies analytical and logical processes in the second wave of critical thinking (Walters, 1994). However, it is emphasized that there is always something more. The thoughts of reasonable individuals may involve, for example, personal commitment, imaginative creativity, intuition, self-inspection, and sensitivity to contextual styles of persuasion as well as discourses. The subject brings a complex set of presuppositions and commitments to the act, leaving room for a personal response to claims and arguments. Thinking is, thus, inseparable from human values, norms, and interests.

Mezirow (1990) is more representative of this second wave monitored by Walters. According to Mezirow, we all hold meaning perspectives, which are generated by beliefs, propositions, theories, evaluations, higher-order schemata and networks of arguments. New experiences are assimilated and transformed in processes of interpretation within these meaning perspectives. They are mostly acquired uncritically in childhood by means of socialization, often in an emotionally charged relationship context in which teachers and parents play a major role. Furthermore, meaning perspectives have three functions: to guide actions, to reassess the justification of what you already know, and to provide coherence to familiarity. The meaning of critical reflection is, according to Mezirow, to challenge the validity of already made presuppositions. It requires that we are critical about our habitual and established patterns of expectations, as well as of the meaning perspectives we use to provide a meaningful interpretation of our encounters with ourselves, others and the world, and that we then challenge them. With an allusion to Thomas Kuhn, Mezirow speaks about anomalies or dilemmas that may trigger transformations or critical reflection. It is like a trip from one paradigm to another. It also involves an awareness of how our presuppositions constrain the way we perceive, understand, and feel about the world.

Representatives of the two waves, of course, is an awareness that critical thinking is influenced by, for example, feelings, intuitions and prejudices. If Mezirow should be taken as a representative of the second wave, we also have to assume that, even when we become critically aware of our established meaning perspectives, the associative machinery of mind interferes with the constructional process of building new meaning perspectives. Accordingly, it is crucial whether it is possible to think and act strictly rationally.

In the first wave, it seems to be taken for granted that critical thinking is generic and thus transferable to other contexts. If you want students to think well, you have to hone their analytic skills. More practice reshapes the mind, making it more rational, not only in a special domain, but in all domains.

In the second wave, the presupposition is that we can be more aware of shortcomings but never overcome them. Strict rationality is an exception and can only be executed intermittently and in small steps.

Feedback

The second example is about feedback, in other words, some sort of response provided by a teacher with respect to something a student has produced. The example takes place in the

context of higher education. One way of reasoning is derived from closed-system thinking and cognitive science (Price, Handle, Millar and O'Donovan, 2010). Accordingly, feedback is understood as correction and to "putting things right." Such feedback implies clarity of direction and the option of an unambiguous corrective measure. The idea of strict rationality is perhaps most obvious in Ramsden's (2003) description of assessment, which includes feedback comments: "As teaching tells information and procedures, so assessment classifies the students on the criterion of how well they have absorbed the data thus transmitted. What could be simpler?" (Ramsden, 2003, p. 178).

Several researchers argue that feedback has to do with filling a gap. Hattie and Timberley (2007) speak of ". . . the task or process of learning that fills a gap between that is understood and that is aimed to be understood" (p. 82), while Price et al. (2010) state: "When the gap relates to the curriculum content, the feedback may be able to specify the knowledge that needs to be understood" (p. 278). Researchers also seem to presuppose the possibility of mutual understanding of feedback comments. Quotes such as (italicized text added) "Within the feedback process, clarity of purpose *must be shared by all parties* to enable evaluation to be useful" (Price et al., 2010, p. 278). and ". . . if the learners have *appropriate knowledge* of results showing how much progress they have made and pointing out specific areas in which additional work is needed" (Astin, 2012, p. 197) provide the insight that information can be transported from a tutor to the students, if ideal conditions are met.

Despite expressing the possibility of strict rationality, the case of students who misinterpret and cannot fully decode feedback comments is well known (Handley & Williams, 2011; Nicol, 2010; Sellbjer, 2017; Walker, 2009). Ramsden (2003) maintains that assessment always includes making fallible human judgments. Accordingly, it is an uncertain process and essentially relativistic, involving a series of relations between the assessor and the assessee.

Dialogue and mutuality

In recent research, the power of dialogue is more in focus. The problem of misunderstanding feedback could thus be solved by engaging tutors and students in a dialogue. Nicol (2010) argues that dissatisfaction with feedback could be understood as symptoms of a fractured and impoverished dialogue. Price et al. (2010) point at the relationship between assessor and student as the heart of successful feedback processes. The idea of mutual understanding of feedback can be addressed from different angles. Language or "linguaging" (Linell, 2009) plays a central role in understanding feedback. In accordance with the folk theory of language, there is a strict line between what an individual thinks and says, and what another individual comprehends. To implement this information transfer effectively, Linell notes that several conditions need to be met. For example, it is necessary that a) you know what to say before you speak, b) the words you choose have fixed and stable meanings, c) the other person perceives exactly what you say, and d) the listener understands the message the way you initially intended.

If one presupposes that words have fixed and stable meanings, phenomena in the external world need to be structured to make it possible for the mind to mirror nature. Since the mind needs to represent conceptually what 'really exists' in the external world (e. g., animals, plants and objects) it also has to be structured in terms of entities, properties and relations. In general, the objectivist paradigm has its own metaphysics and epistemology (Lakoff, 1987) and is a precondition for true knowledge and hence for the transfer of information in a feedback process and thus also for strict rationality. In everyday life, we typically act as though mutual understanding is possible. Even a more reflective dialogue, say in education or between students and tutors regarding feedback, is usually performed as if such understanding is possible. Consequently, we believe in the accuracy of the dialogue by

force of habit, since it seems to have worked well enough before. We use the same words, but have somewhat different conceptual understanding, hence overlooking the plasticity and dynamics of words and concepts. This is the case especially in a feedback process, in which abstract concepts are often used and complex theories discussed.

Generating meanings presupposes access to a language, knowledge about the world, norms, identities and so on, but also resources that control expectations and efforts to construct meanings in specific situations (Linell, 2009). Typically, the resources are socially shared but they may also be tacit, biographical, conscious or unconscious. One could speak of them as belonging to traditions. Moscovici (1993) tells us that notions are captured in a holistic and familiar context, losing their autonomy. Linell (2009) also asserts that speech “completes” rather than constructs and expresses thoughts and that readers “fill in” the meanings of written texts. Perhaps unconscious cognition creates a picture of the world and provides a background in which the tutor and students fill in what they partly consciously may have read, thought of and realized. Feedback is hence rather a meeting between individuals, captured in their partly private perspective rather than some form of strict rational transmission of information. This is, of course, not to say that dialogue is meaningless or a waste of time. Dialogue is the basis of collaboration and necessary for negotiation and therefore can reduce misunderstandings but we need to be aware that it does not delete them.

FINALLY

If we understand knowledge formation in a somewhat different way, as has been outlined in the present article, the consequences are numerous. If, as one of my colleagues in the psychology department argues, as much as 90 percent of knowledge formation has to do with unconscious processes, the consequences are tremendous. Knowledge formation is partly unconscious and automatized. Knowledge processes can thus not be understood as something overt, where all information can be put on the table and all is possible, if one only tries hard enough. Markauskaite and Goodyear (2017) open for such reasoning, arguing that a mentalist approach, in this case in understanding conceptual change, has to be combined with a neuropsychological, phenomenological, situated sociocultural and environmentalist approach. My argument is that every theoretical account also has to relate to theories of unconscious and automatized knowledge processes. Markauskaite and Goodyear (2017) argue that there have been five turns within research on education, learning and expertise. Although I agree that this is the case, it is about time to consider a sixth approach, that of the impact of unconscious and automatized knowledge processes.

Since we cannot escape, we have to cope, ever again realizing that we cannot, even in our role as researchers, be strictly rational. A general point is to do what we have always done, which includes for example being humble, and not so sure, checking again, showing an open attitude, and discussing. Still, as we might have strong and even idolized folk-theory assumptions infecting our thinking without realizing it, this is not enough. We have to try to be aware of these folk theories or, as Olson and Bruner (1996) express it, “to think explicitly about . . . folk psychological assumptions and to bring them more clearly out of the shadows of tacit knowledge . . .” (p. 11). Importantly, these authors are commenting on the conditions for teaching, but the suggestion is supposed to have relevance for all professional settings.

One way of accomplishing this is for one to self-introspect, which is not such an easy operation, since in some way we have to go outside ourselves. Another is to discuss with others whom we know well, asking them what sort of views we usually advocate. Yet another is to take notes every time we become upset, for instance, or more engaged, to try to find some patterns in our output.

In the example regarding the professional situation as a teacher, one solution is to act as if strict rationality is possible when you meet pupils and parents. Otherwise, you risk losing your legitimacy in trying to explain that assessment is always inexact and thus partly unfair, that you really do not understand the curriculum as intended, or that you are partly driven by unrealistic beliefs about the pupils. In this case, uncertainty could be focused on in internal discussions with other teachers, school administration and at further education training. Another solution is to stand up for uncertainty, explaining the complexity of the work. This approach, however, demands great confidence, knowledge, authority and experience. However, dealing with critical thinking and feedback, to briefly comment on the last two examples, we have to strive to be as strictly rational as possible, even though such rationality is an exception from the norm. Yet again, as knowledge formation is partly unconscious, a hidden agenda surrounds and prevails within each one of us.

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