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Contemporary Epistemological Research in Education

Reconciliation and Reconceptualization of the Field

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ABSTRACT. In this article the authors challenge contemporary epistemological research within educational settings. After a reconciliation of the current models which treat epistemological beliefs as static and mechanical, the authors present a teaching experience to illustrate their enactivist view that epistemological beliefs should be conceptualized as fluid and dynamic constructs, emerging in web-like configurations. Answers to epistemological questions unfold within the interstices and mutual interactions between people and their environment. Boundaries between student–teacher, individual–community, cognition–bodily experience are becoming blurred. From this enactivist perspective the researcher’s role changes considerably. Instead of determining teachers’ personal traits and epistemological make-up, the researcher should sensitize teachers to the subtle ways epistemological beliefs are enmeshed within their day-to-day professional lives, focusing on the complex fabric of the teaching practice.

KEY WORDS: contemporary epistemological research, education, enactivism, lived experiences, personal epistemology

*We rehearse information,
but perform meaning.*

*Information is like the web of links in a wire fence;
Meaning is like the cascade of waves on a mountain stream.*

Cliff Crego (2002) © 2002 picture-poems.com

What is the true nature of knowledge, and how does a person come to know? These questions first became subject of psychological investigation in the late 1960s through the seminal work of Perry (1968). Today, these questions are studied under the umbrella of research on personal epistemology (Hofer & Pintrich, 2002). Personal epistemology has come to be seen as the common denominator for research done within this field and as a term signifying individual conceptions of knowledge and knowing. These conceptions are referred to by many disparate labels, of which the most commonly used term is 'epistemological belief'. Other labels are: epistemological posture, epistemological resource, and ways of knowing (Niessen, Vermunt, Abma, Widdershoven, & van der Vleuten, 2004). Because the term '(epistemological) belief' is already more broadly used within (educational) psychology and thus easy to associate with, we will use this term throughout the article when referring to issues of knowledge and knowing.

Within this article we provide a cognitive psychological and an enactivist account of epistemological beliefs and claim that the differences between both are ultimately reflected in Crego's distinction between the rehearsing of information and performing of meaning. We will apply the enactivist perspective to an interview segment to enable deeper understanding of teaching practice. The application of the enactivist account to this case has the character of a hermeneutic circle. This means that the enactivist account provides us with a background view that enables us to understand teachers' experiences more fully. At the same time, the process of application is also a practice of opening up and being caught by new insights while interpreting. These insights might alter our epistemological perspective.

This study is part of a larger ongoing investigation to understand the phenomenon of resistance by teachers to a Problem-Based Learning (PBL) environment using the epistemological perspective as our interpretive framework. PBL, in short, is an instructional method that, contrary to frontal teaching, chooses not to instruct students directly, but to facilitate the process in which students themselves and in collaboration with each other learn the necessary knowledge and skills by working on real-life problems. The role of the teacher is paramount to the success of this method. This is why the example used throughout this article highlights a teacher (Josie) who is situated within a PBL course. In the following we will first present the fragment taken from the interview with Josie. In this fragment she talks about her struggle to introduce a group of new staff members to Problem-Based Learning. We will also provide a more in-depth linguistic, methodological, and ontological characterization to contemporary epistemological research. Finally the contours of the enactivist perspective will be drawn in more detail.

Josie's Case

Interviewer (I): How would you describe yourself as a trainer?

Josie (J): I always try to get the group excited about PBL.

I: How do you do that?

J: By trying to get everybody involved. At the same time, this is a potential pitfall. For instance, in a training session last week there was a group of student tutors and this group was really very critical, because they had attended other PBL courses. That was when I found myself trying to create more structure—that's where I felt inadequate, because there were so many people with so much experience. In these instances it's important to offer students guidelines and structure. You should be able to deviate from this structure—but only in those cases when it's possible. Some teachers see this very clearly. Personally, I tend to create structure together with the group—on the spot. With some groups this works out just fine and with other groups it would have been better if I had provided a clear structure from the start. We would have come further.

I: Students get restless?

J: No, yes, well, there's too much input and too few conclusions. I think that's a major thing in PBL—it's a major issue that too often, maybe, no actual conclusion is reached. That's really what I think is probably my own shortcoming, something that as a student I thought was missing in the system. That structure—the framework in which you work.

I: What does this framework look like—what is it made of? Do you know what I mean?

J: A connecting thread.

I: You say that on the one hand you're trying to find this thread—and you want to connect it with the experiences of the participants—but that's difficult because their experiences are so diverse and a common theme is hard to discern.

J: Well, maybe that's because there just isn't one single thread and because PBL is based on the assumption that the available knowledge is relative. So you cannot say there's one single solution to a particular problem. The important thing is that you are working towards a solution.

Josie (a pseudonym) is a junior teacher trainer at the Faculty of Economics and Business Administration. She was one out of a group of 10 teacher trainers and 9 new staff members of Maastricht University in the Netherlands who were interviewed about their experiences with PBL, their concerns and unresolved issues. The participants we interviewed came from different departments of Maastricht University and differed considerably in experience with PBL, general attitude towards teaching, general teaching experience, and opinion about the value of PBL for student learning. Despite the marked differences in background and experience among the interviewees, Josie was not the only one who presented a complex and multilayered experience. Looking at other participants' day-to-day teaching experiences, we similarly encountered varied and multilayered stories. This phenomenon is neither strange nor new. Studies by Perry (1968) and Lyons (1990), but also more recently from Phillion and Connelly (2004), show us that when researchers turn their attention to actual teaching experiences, the presented picture of teaching and epistemological beliefs is more textured and complex. The

selection of this particular segment has been guided by the potential to learn from it about the role of epistemological beliefs in teaching. According to Stake (1994), 'the potential for learning is a different and sometimes superior criterion to representativeness' (p. 243).

The fragment shows how Josie is struggling with the question: 'How do these students come to know?' In the interview, Josie as a teacher trainer talks about her ideas and ideals of student involvement within her courses. She says that in some situations she finds it difficult to realize these ideals. She refers to her attempts to structure group sessions. She thinks that in order to do so, she has to develop 'a connecting thread' that will enable the group to achieve a sense of closure. This metaphor nicely illustrates Josie's narrative approach to teaching. Her goal is to develop, together with the group, a storyline with a beginning, middle, and an ending. She expects that this jointly developed plot will enable the group to close the session in a satisfactory way.

Josie's ideas and strategy implicitly characterize her epistemological approach to one of the key questions in epistemology: 'How does a person come to know?', or 'How should this group of students come to know?' We can see an answer emerging from the confrontation between her ideals, her self-image, and the group with its characteristics. When she says 'It's in these instances that it's important to offer students guidelines and structure', she refers to her failed attempt to provide guidance, which, to her, was necessary to give the group a satisfactory sense of closure. This experience appears to have triggered a slight change in her epistemological outlook. Instead of her a priori assumption that students should be regarded as knowledgeable others, who will work together with the teacher to create a common thread, she now thinks that the group process also depends on her ability accurately to estimate the amount of prior experience that students bring to the course and her own experience and skills.

Josie's rapport with the group of students is coloured by her ideals about student involvement. It is also with this particular group of students, who have so 'much experience', that she discovers the failure of her usual strategy, i.e. developing a structure 'on the spot' together with the group. In her own words: 'Their experiences are so diverse and a common theme is hard to find.' As a result she is confused and forced to reassess her epistemological ideal of student involvement in light of the concrete situation. Looking back on this experience, she reflects on the epistemological perspective underlying PBL and in doing so realizes that there isn't just one single solution to a problem and that all knowledge can make a contribution.

The lived experiences of Josie as a teacher are interpreted as an indication that the epistemological questions can only be meaningfully understood when they are placed within the context of the story that defines the situation as a whole. To put it in more general terms, in order to assess a situation epistemologically or

make sense of teachers' experiences epistemologically, we need to take account of the circumstances that constitute each new teaching situation. In Josie's case these circumstances included her conviction that a common thread had to be identified, her skills to get the group to do this, the group size and group members' varied experience. We would assert that her epistemological belief is essentially 'indexical' (Roth, Lawless, & Tobin, 2000), meaning that it is significant only as seen from within the concrete circumstances in which it arises. In the following section we will focus on the contrast between this view of epistemological beliefs and the prevailing views in contemporary epistemological research.

Contemporary Epistemological Research

Although the term 'contemporary epistemological research' suggests that there is a unified research domain, there are in fact different movements to which researchers within the domain of personal epistemology may turn. These movements may be referred to as 'trait-oriented', 'theory-minded', and 'resource-oriented'. This means that researchers typify epistemological beliefs respectively as traits, theories, or resources (Hammer & Elby, 2002). Although we agree with Hammer and Elby that there are some important differences among these movements, we also discern an important mutual characteristic: all are rooted in cognitive psychology. This seems to offer an interesting perspective for an analysis and characterization of the field as a whole, because it would go to the very heart of research on epistemological beliefs regardless of the particular movement. In our view, Crego's phrase 'rehearsal of information' very aptly captures the essence of contemporary epistemological research in relation to three interrelated angles: language, methodology, and ontology.

Linguistic Idiosyncrasies of Contemporary Epistemological Research

A striking linguistic characteristic of the cognitive psychological discourse about the foundations of thinking and believing is a marked preference for the use of nouns (Säljö, 2002). Since contemporary epistemological research is grounded in cognitive psychology, this characteristic is also discernible in epistemological research. The phenomenon addressed within epistemological research can be denoted by different labels: epistemological belief (Duell & Schommer-Aikins, 2001; Hofer, 2000; Hofer & Pintrich, 1997, 2002; Schommer, 1994, 1998b), epistemological position (Perry, 1968, 1988); epistemological theory (Hofer, 2000; Hofer & Pintrich, 1997, 2002), epistemological standard

(Ryan, 1984a, 1984b), epistemological resource (Hammer & Elby, 2002), epistemological style (Martin, Silva, Newman, & Thayer, 1994), epistemological reflection (Baxter Magolda, 1992, 1994, 1996), epistemological posture (Désautels & Larochelle, 1997), epistemological orientation (Belenky, Clinchy, Goldberger, & Tarule, 1986), epistemological antecedent (Powell, 1996), and ways of knowing (Belenky et al., 1986).

The worrisome aspect of the predominance of nouns as the building blocks for thinking and believing is that it creates the impression that people's capacities and ideas should be conceived of as unchanging objects (Säljö, 2002). Nouns distract our attention from the processes in which epistemological constructs can be seen to emerge. Nouns denote a final state as opposed to a process in which actions and thoughts are continuously taking shape and modifying each other. The idea of stability is reinforced by the tendency to represent epistemological beliefs as stable cognitive traits or theories (Hammer & Elby, 2002). Epistemological beliefs are seen as trait-like or theory-like features which are stored and acted upon inside the brain. From an epistemological trait perspective, individuals' beliefs and ideas about epistemology tend to cohere into stable 'positions' or 'levels', 'phases' or 'stages', which can be distinguished from other 'levels' and 'phases' with regards to organization and quality. They are seen as declarative knowledge to which a person has conscious and articulate access. In epistemological theories, beliefs are perceived as being structured in this way (Hofer & Pintrich, 1997, 2002). Congruent with the tendency to see epistemological beliefs as stable and object-like traits or theories stored within the individual mind, most researchers tend to refer to epistemological beliefs in terms of 'individuals having them' (Pehkonen & Törner, 1999).

Another feature within Western society that reinforces thinking about epistemological beliefs as objects and unchanging is the linguistic tendency to typify mental phenomena dichotomously, i.e. as belonging to either-or categories (Amstutz, 1999; Davis & Sumara, 1997). Examples of such dichotomies are: mental-physical, internal-external, individual-collective (Davis & Sumara, 2001; Heft, 2001). Membership of one category precludes membership of the other one of the pair. This divisive either/or mode of thinking reinforces the image of people as unchanging. Something or someone is or is not of some category. According to Langer (1989, 1997), divisive thinking has this effect when people take categories or opposites literally or without mindful attention. She calls for heedful and critical thinking in which mindless acceptance of categories is regarded as the opposite of powerful learning. We think that a contemporary interpretation with a language that treats epistemological beliefs as stable and trait-like or object-like has trouble interpreting the epistemological picture that arises from teachers' concrete perspectives.

When we analyse Josie's account and realize that she tunes into the situation as a process that unfolds in interaction with the group, we realize

that the boundaries between individual–collective, self–other, and internal–external are not clear-cut. They are fuzzy, blurred, and overlapping, and we see no clearly outlined either/or distinctions. We think epistemological beliefs should be better conceived of as emerging characterizations within a process of mutual adaptation, such as in Josie’s attempts to tune in to the ideas of the group and to her own and reconcile them. Because this process unfolds concurrently with the teaching process, it cannot be fully anticipated a priori or even as it is being enacted. To us, this view is compatible with a concept of epistemological beliefs as continuously unfolding processes, like waves cascading down a mountain stream. Just as the water and the mountain are being shaped and reshaped in their continuous interaction, so is the answer to the epistemological question ‘How do these students come to know?’ being rephrased under the influence of interaction in a concrete teaching situation.

Particularities Regarding the Methodology within a Contemporary Epistemological Perspective

Characterizing the methodologies that are used in contemporary epistemological research, we see an equally differentiated array of instruments: production-type tasks, open-ended interviews, vignettes, observations, ill-structured problems, and Likert-type questionnaires (Duell & Schommer-Aikins, 2001). What is striking to us is that despite this diversity, epistemological beliefs research is exceptionally unitary in its preference for using the individual and his or her beliefs, knowledge, desires, and attitudes as the unit of analysis (Lyons, 1990). We think this preference is congruent with the predilection for nouns emphasizing the object-oriented way of thinking; it seems to us that an orientation towards epistemological beliefs as object-like has been (tacitly) operative in the development of instruments that are used to study them as personal and stable traits or theories.

We notice that an orientation to the individual is especially recognizable in questionnaire (Likert-type) studies and standardized interview studies. Despite growing criticism of questionnaire studies, they have been and continue to be an important method in studies of epistemological beliefs (Duell & Schommer-Aikins, 2001). Part of their popularity seems to be attributable to their easy and quick administration.

Nevertheless, Hammer and Elby (2002) reveal a fundamental problem when they point out that item formulation is often far removed from day-to-day teaching practice while at the same time it is assumed to pertain to these contexts (see, e.g., Schommer, 1998a; questionnaire: ‘Nothing is certain but death and taxes’). According to Hammer and Elby, this is neither true nor

viable when made explicit. Most epistemological studies ask participants direct questions about their beliefs, often by presenting epistemological statements and asking them to rate their agreement/disagreement on a Likert scale. For example, students may be asked whether they agree or disagree that 'the best thing about science courses is that most problems have one right answer' (Schommer, 1990, p. 499); 'the science principles in the textbooks will always be true' (Songer & Linn, 1991, p. 769); or 'knowledge in physics consists of many pieces of information, each of which applies primarily to a specific situation' (Redish, Saul, & Steinberg, 1998, p. 217). It is only by a presumption of unitarity that the results of these studies may be considered to apply to all contexts of learning (Hammer & Elby, 2002).

However, the item formulation must be generic to preserve internal congruence throughout the whole study. It would be incongruent to perceive of epistemological beliefs as stable traits or theories but apply highly context-specific or dialogical research methods. A generic item formulation makes perfect sense given the a priori position that epistemological beliefs are stable phenomena. Epistemological beliefs are seen as tangible features and measured congruently. They can therefore be conceived of as entities that impact on teaching behaviour linearly, i.e. cause exists as an inherent constituent of epistemological beliefs. Contemporary cognitive epistemological research is concerned with the search for explanations of the epistemological perspective in order to predict and control students' and teachers' behaviour. Using standardized (correlational) measuring techniques, researchers are able to identify these linear and law-governed patterns. The role of the researcher in this process is merely to uncover these relationships objectively, with validity and reliability (Guba & Lincoln, 1989, 1994; Lincoln & Guba, 1985, 2000).

In interpreting Josie's segment, it is true that Josie shows an epistemological preference to create a common thread together. At the same time we also see that this preference becomes 'active' and is questioned while interacting with this specific group. Her experience of the situation she describes has led her to acknowledge that in this instance—given her own and the group's experience—a different approach might have been more successful. Confronted with this new experience, a breach is made within otherwise customized behaviour. These breaches provide opportunities for change and revision of ideas to suit local circumstances. We interpret Josie's ultimate handling of the situation as the result of reciprocal dynamics between different personal and situational elements, whose influence can be seen from a holistic point of view, but which cannot be reduced to any element or correlation in particular.

The Particularities Regarding the Ontology within a Contemporary Epistemological Interpretation

Ontology is the subdivision within metaphysics that deals with the nature of being. More concretely, ontology is revealed in the question: What is real? We might thus ask whether epistemological beliefs are real. According to Baptiste (2001), one of the most troublesome questions surrounding the issue of ontology is the distinction between the *facticity* and the *quality* of a thing.

Facticity refers to the question of whether a thing exists. In our case we might ask if epistemological beliefs do exist. Departing from a realist perspective (Heron & Reason, 1997), the answer within contemporary epistemological research is that epistemological beliefs do indeed exist as theories, traits, or resources. For realists, epistemological beliefs are just as real and tangible as observable objects.

The quality of a thing refers to the form of a phenomenon or the nature of an object. Within contemporary epistemological research, epistemological beliefs are thought of as psychological and physical phenomena. They are psychological because they reside in a person's mind. They are also (presumably) physical on the basis of the default assumption that epistemological beliefs correspond to cognitive units in the brain (Hammer & Elby, 2002).

Finally, there is the question of whether it would be possible for epistemological researchers to claim that epistemological beliefs exist without reference to cognitive psychology or cognitive science. Contemporary epistemological research, although not explicitly referred to, heavily draws on cognitive science and cognitive psychology as its foundational precursors, meaning that these strands are the background theories they implicitly build on. Varela, Thompson, and Rosch (1997) have pointed to the reifying effect of cognitive science on cognitive psychology when describing the centrality of the computer metaphor and similar language use. This computer-oriented language is also apparent within educational research in general and epistemological research in particular (Davis & Sumara, 1997). It depicts humans as disenchanted, cerebral beings who receive and process information from events and objects to establish representations (beliefs, desires). These representations in turn govern and give meaning to their own behaviour and that of others.

In Josie's interview, but also in the other interviews we conducted, we see from an enactive viewpoint first and foremost acting persons (Packer & Winne, 1995) who stumble and haphazardly manage to guide their classes through the course. Josie's hesitation to infer definite conclusions about the preferred course of action in this particular situation is hard to interpret as an image of information rehearsal, the picture we see framed within contemporary epistemological research. As we see it, in this particular situation her answer to the question 'How do these students come to know?' is embedded within a network of concrete relations and a process of mutual attunement.

In our view, Josie's hesitation to draw definite conclusions should not be deplored but welcomed, because it may open up opportunities that may lead to epistemological attunement, which may guide students and teachers to the most appropriate end. The interview excerpt with Josie illustrates the existential dialogical nature or ontology in which it is hard to dissect the knower from the known, mind from body, student from teacher, teacher from context, et cetera (Hosking & Bouwen, 2000). Josie's teaching might be viewed as a responsive choreography in which her behaviour and beliefs co-evolve within a relational web of individual inclinations or cognitions, her skills as a teacher trainer, the characteristics of the students she teaches, and the dialogue between these elements altogether.

In the final section of this paper, we will explain and illustrate our enactive or dialogical world orientation. An enactivist world orientation is grounded in the assertion that people form complex fabrics of fundamentally and inextricably intertwined relationships with everything else—physically/biologically and experientially/phenomenologically (Davis & Sumara, 1997). From this viewpoint, epistemological beliefs are not primarily or solely cognitive features, but they are temporarily crystallized enactments in ever-changing webs of mutually defining elements.

An Enactive and Dialogical Perspective on Epistemological Beliefs

So far, we have focused on a passage from Josie and characterized contemporary cognitive epistemological research from a linguistic, methodological, and ontological point of view. The enactive epistemological perspective takes into account many elements, such as the group experience, the group size, and her own (in)abilities to provide a common thread (structure). In this final part of the discussion, we take up the challenge to sketch and explain more thoroughly the contours of an enactivist interpretation that enables us to take into account these elements to which Josie refers. Although we typify our interpretation as enactivist, we will also draw on theoretical notions derived from philosophical hermeneutics (Gadamer, 1990; Widdershoven, 1999) and narrative psychology (Abma, 2000; Josselson & Lieblich, 1999; Lyons & LaBoskey, 2002).

Enactivism is an emerging worldview that lingers in between and draws from different domains, including philosophical phenomenology (Varela, 1999), complexity theory (Waldrop, 1992), and evolutionary biology (Bateson, 1979, 1987). Although this worldview is of reasonably recent date, it is receiving more and more attention within the domain of education (Davis & Sumara, 1997, 2001, 2002; Davis, Sumara, & Kieren, 1996; Sumara & Davis, 1997). Within the domain of contemporary epistemological research, enactivism has been largely absent, although the work by Belenky et al. (1986) and Lyons (1990) shows strong similarities. In the following we will

first explain enactivism as it is defined by Davis and Sumara in the field of education (Davis & Sumara, 1997, 2000, 2002; Davis et al., 1996). Although not directly translated to the educational or the epistemological field, we will also be using some of the terms (eclectically) used by Varela et al. (1997) since they are eminent in the field of enactivism.

To 'enact' means 'to work in or upon' or 'to act or perform'. 'Enactivism' refers to the idea of knowing in action. People come to know and believe about the world by interacting with it bodily, experientially, and cognitively. This means that individuals are simultaneously biological and social beings who experientially embody both cognitive and physical dimensions within their actions. Because continuous interaction is such an important feature of enactivism, one could claim that it holds a relational ontology meaning that all social realities and all knowledge of self, others, and things are viewed as interdependent or co-dependent constructions existing and known only in relation to each other (Hosking & Bouwen, 2000).

When we review Josie's story again, we see a rather inexperienced teacher trainer who struggles with the epistemological question: 'How should these students come to know?' Her commonly used approach to create a common thread together is rather problematic given her own (in)abilities within a large group of experienced students. As a consequence of this inexperience she adjusts her epistemological outlook to include the notion that when faced with a rather experienced group she needs to hold more control. Interpreting her account enactively, we would claim that her final outlook to this particular situation is the result of the *interaction* between her ideal to create a common thread together and her communication skills, her self-image, the group's size, and the amount of experience of the group. It is the confrontation of these elements within the concrete enactment that sets the stage for this particular response to arise.

The enactive paradigm as exemplified by Varela et al. (1997) emphasizes the relevance of action, embodiment, and agent/environment mutuality. Therefore, in the enactivist perspective, cognition is not considered an abstract agent internal process, but rather embodied action, being the outcome of the dynamic interaction between agent and environment and their mutual specification during the unfolding of the situation. Varela et al. (1997) have called this phenomenon 'co-emergence' or 'mutual specification', and earlier Maturana and Varela (1987) have called it 'structural coupling'. Sumara (1996) signifies this mutuality as the *us/not-us* relationship, meaning the inextricability between what we call 'subject' and what we call 'context'. The signifier 'us/not-us' acknowledges that we can identify individual cognizing agents while simultaneously announcing that we can only perceive and interpret their action by attending to the conditions of their existence. Figure and ground—us and not/us—are simultaneously defined.

Hermeneutics is important in helping us to interpret the *us/not-us* relationships between the 'subject' and the 'context'. What is important to know are the

relations among things. Gadamer (1990) calls this continual process of interpreting the relations among past, present, and projected experience a 'fusing of horizons'. What hermeneutics points at is that Josie in our case is engaged in a continuous process of self-interpretation. Learning about things that are 'not us' means being involved in a learning relation that informs one about oneself. Josie's interpretation makes her learn that she is not knowledgeable to inform her students the way she normally does. She learns that her approach is not that fixed but contingent on the changing relations between her (us) and her students, the group size, the amount of experience, her skills (all not-us).

Narrative psychology helps to understand how people make sense of and give meaning to their own identity (us) and the context (not us). Stories help to endow situations with meaning, to weave events into a meaningful whole, and relate varied elements into a plotline (Josselson & Lieblich, 1999). A narrative is always context-bound; it positions a character in a specific time and place. A story does not only describe a specific situation, it also enables the narrator to find guidelines for action and to influence others to adjust their actions. Stories have a performative character. Josie finds out how to act in a similar situation by telling stories. Stories are appropriate to make sense of situations because they acknowledge particulars (Josselson & Lieblich, 1999; Lyons & LaBoskey, 2002).

Implications and Conclusions

Dynamic forms and dialogical structures are concepts that are not easy. Apart from the fact that the use of language in itself entails abstraction, it seems that our Western linguistic propensities lead us to freeze, fix, isolate, and define epistemological beliefs as causal features that govern teacher and student behaviour, whether it be in 'phases' or 'stages', as is done by trait-like theories, or as 'components' or 'correlations' within theory-like views of epistemological beliefs. One might say that Crego's metaphor of 'rehearsing information' appears to play the leading role in today's epistemological research, whereas we think that the metaphor of the 'performance of meaning' resonates more immediately with the enacted experiences of teachers like Josie.

Departing from the enactive perspective, epistemological beliefs are evolving features. Varela et al. (1997) speak in this regard of 'co-emergence' and 'mutual specification'. Epistemological beliefs unfold in reciprocal, co-determined interactions between persons. The specific epistemological belief, or, perhaps better, enactment, that we see exemplified in Josie's story is the result of reciprocal actions between her and the students she teaches. This means that her enactment ultimately cannot be reduced to anyone or anything in particular. It emerges in the dialogical process in which people mutually specify each other. In processes of typification or specification, Josie, the group, as well as the epistemological belief, simultaneously emerge or, phrased otherwise, co-emerge.

Referring to Josie’s fragment and the accompanying enactivist language of attunement and mutuality, one might wonder if the enactivist perspective is not overly naïve or idealistic, assuming a too egalitarian and democratic portrayal of teaching. Within teaching, power inevitably plays a role, potentially disturbing the processes of mutual tuning and balancing. Josie might have been a person holding on rigidly to her epistemological notions. This would have been an obstacle to reaching mutual understanding. We think that learning can only take place when curiously and courageously opening to the other within dialogue. Had Josie insisted and used her authority to hold on to her ideas, she would not have learned much about her self or her students. From an enactivist perspective, one should strive to strike the balance between holding on to what is known and dear but at the same time keep an open mind to what is new. The lack of being mindful about this friction and holding mindlessly to one’s own authority is a major obstacle potentially harming any learning taking place within student–teacher encounters (Langer, 1989, 1997).

From an enactivist perspective on epistemological beliefs, research should not focus on the components of experience (person, objects), but on the relations that bind them together within enacted webs of many interacting elements and persons. In this respect, Lyons (1990) refers to the need for a psychology of relations. Answers to epistemological questions emerge in the interstices between people. Lyons captures the complex and relational character of teaching practice by referring to it as ‘nested’ within relationships between people. From this perspective, epistemological beliefs characterize the relationships between people (student, teacher), subject content, and the teaching/learning situation. To examine and characterize these webs of relationships as temporarily crystallized enactments, we need research that moves the unit of analysis from the individual person to the interface between people. Research should shift its focus from the individual as isolated cognitive being to cognition as formed within socially and situated mediated practices.¹ We have summarized some of the differences to the enactivist and cognitive perspective in Table 1.

Linear methodologies and causal models seem less appropriate to the perspective in which epistemological enactments are perceived as emerging in interrelated webs of personal and contextual features which constitute and mutually define each other. This issue is also addressed within complexity theories to which enactivism refers (Davis & Sumara, 1997; Phelps, 2002).

TABLE 1.

Cognitivist	Enactivist
Cognitive pre-ordered world	Enacted enchanted world
Individuality	Mutuality
Beliefs necessarily stable / fixed	Beliefs not necessarily fluent
Linear / direct influence from beliefs on behaviour	Enacted configuration

Complexity theory emphasizes the importance of acknowledging the whole range of variables impacting on any context and the inability to control such variables while maintaining contextual integrity; in complexity terms, it is important to acknowledge the impossibility of reaching a full understanding of the whole through an understanding of its separate parts (Phelps, 2002).

Sceptics might wonder why we should even consider an epistemological perspective that is situational and seems to have less predictive power. It is our belief that the epistemological perspective that is opened up by an enactive perspective might well reveal stable tendencies within enactments that transcend time and place. However, it is not the researcher who has to determine whether this is 'really' so. Referring to Stake (2000; Stake & Trumbull, 1982), we contend that generalizations across time and situations are best made by the persons involved, since they are better able to appraise whether the epistemological beliefs that are revealed cover a broader (time- and place-independent) terrain of action.

With this new epistemological perspective, the role of the researcher changes. We should not explain teaching behaviour through causal modelling, but rather sensitize teachers to the dialogical and situational nature of the epistemological perspective by providing and provoking them with thick descriptions (Geertz, 1973). Thick descriptions attend to epistemological beliefs in a manner that is sensitive to and acknowledges the complexities and contingencies of everyday teaching practice. With regard to those who, like Josie, already refer to epistemological beliefs and seem to be aware that they take part in their functioning, the researcher's role might be to invite them to express their epistemological inclinations more explicitly and as concretely as possible, focusing on concrete situations.

With regards to our initial question whether contemporary epistemological research is equipped to understand teachers' lived experiences, we have strong reservations. While agreeing that the epistemological perspective is paramount within teachers' experiences, we are not equally convinced that the contingent and complex nature of teaching practice is appropriately represented by the language, research methodology, and ontology that characterize contemporary epistemological research. Despite the obvious need for further fine-tuning, we think that our enactivist approach offers a promising perspective (Davis & Sumara, 1997). Finally, and perhaps most importantly, we hope that teachers will be comfortable with this new perspective: an outlook that intends to take the complex nature of teaching practice seriously and tries to preserve it.

Note

1. There are already well-articulated theories that provide clear explanations of this issue, for example the dialogical self-theory of Hermans (2002) and Hermans, Kempen, and van Loon (1992).

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