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This is the author accepted version, accepted for publication in Educational Research Review.
Readers should cite the published version available via the journal website
<http://www.sciencedirect.com/science/journal/1747938X>

Socialising Epistemic Cognition

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Abstract

We draw on recent accounts of social epistemology to present a novel account of epistemic cognition that is ‘socialised’. In developing this account we foreground the: normative and pragmatic nature of knowledge claims; functional role that ‘to know’ plays when agents say they ‘know x’; the social context in which such claims occur at a macro level, including disciplinary and cultural context; and the communicative context in which such claims occur, the ways in which individuals and small groups express and construct (or co-construct) their knowledge claims. We frame prior research in terms of this new approach to provide an exemplification of its application. Practical implications for research and learning contexts are highlighted, suggesting a re-focussing of analysis on the collective level, and the ways knowledge-standards emerge from group-activity, as a communicative property of that activity. *Keywords:* epistemic cognition; epistemological beliefs; collaborative learning; dialogue; discourse; sociocultural theory; social epistemology; epistemology; philosophy; discursive psychology; philosophy of education

1. Introduction

Epistemic cognition, under its various labels, has been much discussed within the field of educational psychology over the last 30 years. In part, this discussion has had in its sights the very nature of the construct: just what is epistemic cognition?; how should it be conceptualised?; under what conditions is it brought to bear?; and so on. We welcome the recent calls for consideration of the philosophical literature regarding epistemology in the conceptualisation of epistemic cognition. However, we highlight a gap in these recent analyses: the consideration of philosophical accounts of social and virtue epistemology, accounts which we argue motivate a greater consideration of the social, dialogic, and normative nature of epistemic cognition. Such a consideration necessitates a discussion of sociocultural and discursive perspectives on learning, which in turn underpins our distinctive socialised account of epistemic cognition. This paper thus sets out what a sociocultural account of epistemic cognition informed by social epistemology might look like. The aim of the paper is not to argue for or provide new empirical evidence supporting that particular stance on epistemology, or indeed for its application in epistemic cognition; rather, it aims to provide a starting point in a socialised description of epistemic cognition. Despite the social nature of our account, it nonetheless warrants consideration as a perspective on epistemic *cognition* insofar as it takes as its target the constructs of existing models, intending a re-specification of these rather than a rejection of them. Epistemic cognition is thus seen not as some set of underlying traits, beliefs, attitudes, or cognitive-constructs, but in the everyday talk of people as they go about various (epistemic) tasks; a position aligned well with social epistemology. We thus address the questions: (1) “How would an account of epistemic cognition drawing on social epistemology be conceptualised?”; (2) “How does a social account of epistemic cognition frame existing work?”; (3) “What are the methodological implications of an account of epistemic cognition that draws on social epistemology?”.

In the rest of this paper we will first introduce a broad classic account of epistemic cognition, before going on to outline recent conceptual developments in epistemic cognition research. Addressing the question “How would an account of epistemic cognition drawing on social epistemology be conceptualised?” we then introduce an account of social epistemology, which we use to motivate our socialised account of epistemic cognition. We argue that our account provides a novel perspective on the existing body of epistemic cognition research. It is novel, insofar as it is fundamentally pragmatic, normative, and social, taking as its primary focus the ways in which people make and make-sense-of knowledge claims. However, in addressing the question “how does a social account of epistemic cognition frame existing work”, we will argue that this account aligns with existing research agendas in that its focus is on the ways we refer to, and make use of, epistemic language-in-action. We follow in the tradition of discursive psychologists (Edwards, 2005; Potter & Edwards, 1999) in respect of ‘re-specifying’ traditional cognitive constructs through the analysis of language-in-use. That is, we describe epistemic cognition not in terms of underlying cognitive constructs, but in terms of how such constructs are implicated through language use in salient contexts. In the penultimate section we frame established empirical work in the recent epistemic cognition literature in terms of our socialised account, before concluding by drawing comparison between the socialised account we propose and existing cognitivist models of epistemic cognition.

1.1 Classic Conception of Epistemic Cognition

An increasing body of research explores epistemic cognition: the ways in which learners conceptualise knowledge and coming to know (for an early review, see Schraw, 2001, and more recently, 2013). Across this body of work, an array of labels has been used, variously: epistemological beliefs (Schommer, 1990); epistemic beliefs (Schraw, Bendixen, & Dunkle, 2002); epistemological understanding (Kuhn, Cheney, & Weinstock, 2000) or

thinking (Kuhn & Weinstock, 2002); personal epistemology (Hofer & Pintrich, 2002); epistemic commitments (C.-C. Tsai, 2001; Zeineddin & Abd-El-Khalick, 2010) or in related work, information commitments (C.-C. Tsai, 2004; Wu & Tsai, 2005); and epistemic cognition (Kitchener, 2002) which Greene, Azevedo, and Torney-Purta (2008) suggest is adopted as the overarching term for this array of labels. This research has explored epistemic cognition in various contexts, including as related to task-understanding and completion (Bromme, Pieschl, & Stahl, 2009); in multiple document processing tasks (see Bråten, 2008 for a review of the relevant literature to 2008); conceptual change research (see, Murphy, Alexander, Greene, & Edwards, 2007); lifelong (Bath & Smith, 2009) and workplace learning (Bauer, Festner, Gruber, Harteis, & Heid, 2004); physics (see, for example, Hammer & Elby, 2003; Scherr & Hammer, 2009) science generally (see, for examples, Colvin, 1977; Hutchison & Hammer, 2010; Lin & Tsai, 2008; C.-C. Tsai, 2001), and history learning (Forsyth, 2014; Maggioni & Fox, 2009); and the role and nature of teacher epistemic cognition (Hong & Lin, 2010; Maggioni & Parkinson, 2008; Mohamed, 2014; Schraw & Olafson, 2003; P.-S. Tsai, Tsai, & Hwang, 2011).

Across the various models of epistemic cognition, there is broad agreement on two main areas for study, outlined by Mason, Boldrin, and Ariasi (2009) namely: What knowledge is, and how one comes to know:

There are two dimensions within the first area (knowledge):

- *Certainty of knowledge: the degree to which knowledge is conceived as stable or changing, ranging from absolute to tentative and evolving knowledge;*
- *Simplicity of knowledge: the degree to which knowledge is conceived as compartmentalized or interrelated, ranging from knowledge as made up of discrete and simple facts to knowledge as complex and comprising interrelated concepts.*

There are also two dimensions which can be identified within the second area (knowing):

- *Source of knowledge: the relationship between knower and known, ranging from the belief that knowledge resides outside the self and is transmitted, to the belief that it is constructed by the self:*
- *The justification for knowing: what makes a sufficient knowledge claim, ranging from the belief in observation or authority as sources, to the belief in the use of rules of inquiry and evaluation of expertise*

(Mason, Boldrin, & Ariasi, 2010, p. 69)

An array of empirical approaches has been taken to epistemic cognition, with interview schedules (Barzilai & Zohar, 2012; Mason et al., 2010), think-aloud protocols (Barzilai & Zohar, 2012; Ferguson, Bråten, & Strømsø, 2012) systematic observation (Scherr & Hammer, 2009); and a number of survey instruments developed and deployed. Research studies typically rely upon self-report data or/and laboratory studies. However, three common survey instruments have been criticised for their psychometric properties (DeBacker, Crowson, Beesley, Thoma, & Hestevold, 2008) while, for example, concerns have been raised around the activation of metacognitive practices in the use of think-aloud protocols or their potential to distract from activity (see for example, Branch, 2001; Schraw, 2000; Schraw & Impara, 2000), and generally task designs abstracting individuals from social contexts (for exceptions, see ‘Evidence for a Socialised Account of Epistemic Cognition’).

2. Recent Developments in Epistemic Cognition Research

Perhaps because of this array of research applications, conceptual labels, and methodological approaches – including their various advantages and disadvantages – there has been some concern regarding the nature of epistemic cognition as a construct. Since its inception in developmental-stage terms (Perry, 1970) there has been concern to specify components of epistemic cognition (Hofer & Pintrich, 1997; Schommer, 1990), the domain specificity or generality of those beliefs (Hofer, 2006; Muis, Bendixen, & Haerle, 2006) and generally to develop conceptual models to characterize differing epistemic beliefs across contexts in terms of their sophistication. Additionally, some have argued that greater attention

should be given to the distinction between epistemic and ontological cognition (Greene et al., 2008; Schraw, 2013), and more generally there have been calls for a philosophical approach to conceptualising epistemic cognition (Alexander, 2006; Chinn, Buckland, & Samarapungavan, 2011; Greene et al., 2008; Muis et al., 2006).

However, this recent interest has tended, (perhaps in deference to existing models of epistemic cognition and their successes in identification of individual differences, and perhaps also because the literature in philosophical epistemology is expanding rapidly), towards a narrower focus on the philosophical literature than that literature offers. In particular, it has tended to emphasise: classical models of reasoning or evidentiary standards (for example rationalism, empiricism); analytic epistemology, emphasising justified true belief (JTB) and the commensurate need for an account of ‘justification’; and individualised accounts of ‘knowing’ in which the agent is an individual knower, abstracted from their social context. In so doing, recent work in social epistemology is overlooked.

Thus, while Greene, Azevedo and Torney-Purta (2008) discuss the philosophical literature in the context of epistemic cognition research, they explicitly focus on ‘classical’ notions of epistemology in which ontology (the study of the nature of being) is seen as distinct from epistemology (the study of the nature of knowledge) while recent pragmatic epistemology might reject such a distinction (see, for example, discussion of metaphysics in Hookway, 2015). Similarly, a comprehensive timeline of philosophical approaches to epistemology is given in Muis, Bendixen and Haerle (2006). These authors' attempts to relate particular epistemologies with domains – empiricism with science, rationalism with mathematics – are made as a means to explore the domain specific epistemic stances. Here they note that it is challenging to generate domain-general, and cross-domain-comparative measures of epistemic cognition and that an analysis of domain practices is of interest precisely because those domains hold normative, socially contextualised epistemic stances.

Muis, Bendixen and Haerle's (2006) suggestion, then, of a sociocultural approach to understanding epistemic cognition, might be taken to indicate a commitment to analysis of domain context in understanding domain-epistemologies, but not necessarily a commitment to sociocultural methodologies or their associated epistemological commitments. That is, it is a recognition that disciplinary context matters, but one which focuses on individuals (in abstracted disciplinary contexts), rather than the sociocultural pragmatic concern with sets of individuals as parts of those contexts, as simultaneously comprising and being comprised by their sociocultural context.

Indeed, with regard to context sensitivity Chinn, Buckland and Samarapungavan note: “judgements of whether dispositions such as open-mindedness should be regarded as an epistemic virtue or vice can vary according to the context” (Chinn et al., 2011, p. 156). In their exploration of recent philosophical epistemology, they note the increased focus in the literature on ‘testimony’ as a source of knowledge; noting that this facet of coming to know is largely ignored or rejected by epistemic cognition literature which has tended to view a reliance on testimony qua ‘given’ ‘authority’, or ‘self-experience’ as maladaptive. This shift to readmit the notion of testimonial knowledge is also reflected in some recent psychological literature which notes the importance of ‘believing what you’re told’ in many contexts, including in educational contexts (see, for example, Harris, 2012; and the interesting discussion of children’s belief in testimony in Clément, 2010). Chinn, Buckland and Samarapungavan thus propose a model which, “differs from the current prevalent conceptualization of the structure of knowledge” (Chinn et al., 2011, p. 150) in proposing a multi- rather than uni-dimensional structure of knowledge, and in emphasising “some more specific structural forms such as mechanisms and causal frameworks” (Chinn et al., 2011, p. 150). In doing so, they extend the current focus of epistemic cognition on facets ‘2’ and ‘3’ of the five facets that they identify, summarised thus:

1. Epistemic aims and epistemic value – what is the aim of knowledge work, and what is its value?
2. The structure of knowledge and other epistemic achievements – is knowledge and its aims complex or simple?
3. The sources and justification of knowledge and other epistemic achievements, together with related epistemic stances – where does knowledge originate, and what reasons are good warrants for knowledge claims? What stances can one hold towards knowledge claims (true/false, tentative belief, entertained possibility, etc.)?
4. Epistemic virtues and vices – the sorts of praiseworthy dispositions (virtues), and dispositions likely to hinder achievement of epistemic aims (vices)
5. Reliable and unreliable processes for achieving epistemic aims – what processes does a student hold as good for developing knowledge?

As a corollary to this expansion, and their concern that judgements regarding epistemic vice and virtue remain context sensitive, they propose a shift from questionnaires to interviews and observations, suggesting that such methods might explore the “reliable social processes (e.g., argumentation, peer review, media processes) for achieving epistemic aims.” (Chinn et al., 2011, p. 163)

It is to this that the following section turns – the socialising of both the object of inquiry (epistemic cognition), and the commensurate methodological approaches. As we note above with regard to Muis et al – this should not represent solely a shift in the scope of the construct ‘epistemic cognition’, perhaps to include domain specificity, or bring under its purview the ‘aims’ of inquiry for individuals. Thus, while the broadened scope of inquiry proposed by Chinn et al. is certainly important, to be theoretically coherent with the literature from which it draws this broadened scope should consider the wider *social* component of epistemology. Of particular interest is Chinn et al.,’s (ibid) suggestion that rather than theorising around ‘epistemic beliefs’, we might instead refer to *epistemic commitments* (Chinn & Brewer, 1993); a focus on “tendenc[ies] to act in specified ways, such as a proclivity to provide justifications based on personal experience” (Chinn et al., 2011, p. 146).

In explicating our perspective on this issue we will first give a brief introduction to social epistemology. We note that, with the exception of Chinn et al (ibid), the epistemic cognition

literature thus far has not addressed recent developments around social epistemology. As we note above, this motivates a shift in both the object, and nature, of inquiry. When we act in the world, we are fundamentally engaging in social practices. Thus, in the subsequent section we highlight the ways in which epistemic cognitions – or commitments – may be understood as social, and analysed as such.

3. Recent Developments in Social and Virtue Epistemologies

As we note above, there has been recent philosophical interest in the kinds of ‘good’ practices associated with the acquisition of knowledge – epistemic virtues (see, Axtell, 2000; DePaul & Zagzebski, 2003; Roberts & Wood, 2007); and more generally the relationship of ‘knowledge’ to our social nature and environment (see, Baehr, 2011; Goldberg, 2010; Goldman & Whitcomb, 2011; Haddock, Millar, & Pritchard, 2010), including a focus on testimony – and informant power statuses – as a source of knowledge (Fricker, 2009; Goldberg, 2010; Lackey, 2008; Lackey & Sosa, 2006) and the implications of these developments for education (see, Baehr, 2011; and in particular, Kotzee, 2013).

This interest is motivated by a desire to understand how social ways of ‘knowing’ can be normative, while retaining weight beyond ‘mere’ belief (see, Goldman, 2010; and, Greco & Turri, 2013). By this we mean that social epistemology seeks to explain how claims of “I know x” are both bound up with the norms and practices of a social group, while maintaining that such claims can reflect facts about the world rather than relativistic beliefs. That is, attempting to explain how group normative standards can be understood as properties of those groups, and yet not be treated ‘equally’ (as in some relativistic perspectives). A particular focus of this work has been an interest in how one comes to ‘know’ through testimonial knowledge, that is, the circumstances under which I might claim knowledge of some thing, because you (an informant) have told me about it (see, Adler, 2014). There are also recent developments to apply such theorising to the use of technologies, prompting

questions such as “What do I know when I have pervasive access to an encyclopaedia?” under various theorised accounts of cognition including distributed cognition (for example, Palermos & Pritchard, 2013). Common to this work is an interest in understanding the conditions under which an agent’s capabilities confer knowledge, as opposed to ‘mere’ belief. That is, what environmental, social, capability, or justificatory method results in circumstances under which a special status – knowledge – is conferred on an agent’s true utterance, while in others that knowledge is considered more tentatively (as ‘belief’, true or otherwise). Such work has important implications for education given our desire to understand how learners gain knowledge from being presented, verbally, in written form, or via other media, with information.

In the case of virtue epistemology this exploration has particularly focused on the types of intellectual characteristics associated with the reliable production of knowledge. A core interest of much of this broad work has been the analysis of how knowledge standards are maintained at both a micro level (what are the conditions under which I may claim ‘knowledge’ from your testimony or my experience) and macro level (what are the conditions of ‘knowledge’ within this epistemic-group – what processes and practices should be displayed to indicate one has knowledge). This work has thus explored both the kinds of practices individuals should engage in when assessing knowledge claims from informants, and the kinds of signs or credibility-giving properties of ‘good’ informants.

Of course, these concerns are of interest in epistemic cognition research too, particularly in its consideration of the conditions under which: authority, personal-knowledge or experience, or corroborative weight, in the sourcing of knowledge; and/or argument structure, evidential kind, or methodological process, in the justification of knowledge, lead to knowledge.

For the purposes of this work, we may remain agnostic regarding the specific virtue or social epistemological concepts and arguments around their scope. What is of interest here is the more general claim: that claims of ‘knowledge’ are normative, and that it is only by understanding the social context within which they are made that such claims can be understood. This marks a shift in the understanding of knowledge away from a delineation of its a priori constraints, such as the a priori conditions for ‘justification’ under a ‘Justified Truth Belief’ (JTB) model of knowledge. Instead, these approaches focus on a naturalised understanding of the ‘function’ of knowledge – as a socially deployed, mediated, and communicative construct (see particularly, Craig, 1999)¹.

Thus, while ‘traditional’ accounts of epistemology have been bound up with metaphysical ontic issues regarding the nature of the truth-world relationship and an agent’s access to it (broadly pertaining to the nature and source of knowledge respectively), recent social and pragmatic accounts refocus on the normative role of ‘knowledge’ as a communicative ends in pragmatic action – that is, how knowledge relates to our action as human doers. Thus, the pragmatic and social epistemological move is to cast epistemology in light of our social and situated position: that knowledge claims are made for a purpose, that they are action-oriented, and within particular normative contexts. Thus, while epistemic cognition research has typically characterised its conceptual target as the ‘nature of knowledge’ and ‘the source of knowledge’ (or, how one comes to know), a social characterisation of epistemology focuses on the following questions: (1) what functional role does ‘know’ play in an actor’s (social) environment and (2) what are the (justificatory, capability, or virtue) conditions on that knowledge?

Note that this shift in focus is not an attempt to discard earlier epistemic cognition work, but rather to cast the foci of that work in light of their normative role, thus: (1) that

¹ Some readers may see similarities here between ‘Communities of Practice’ (Lave & Wenger, 1991; Wenger, 1998) and the kind of social epistemology of interest here. For one discussion of a Deweyan social epistemology in this light see Garrison (1995).

how one comes to know is fundamentally tied up with the (social) purposes of knowledge; (2) one's reliable belief forming capability should be normatively understood, and (arising from this); (3) one's ability to integrate and evaluate testimony, including one's own experience in; (4) particular epistemic contexts.

This shift in focus is marked by an epistemological attention to *reasons* – which are fundamentally human and pragmatic in nature – over the kinds of *justification* described in rationalist and empiricist models (through correspondence of claims to states of the world, the coherence of sets of beliefs into justificatory frames, and so on). That is, human action is seen in light of the normatively situated epistemically contextualized *reasons* for that action. This is in contrast to a perspective on action which views that action in terms of independently rational justificatory frames for motivation, belief, and knowledge.

In their 2012 chapter, Kelly, McDonald and Wickman (2012) highlight three epistemological perspectives in science learning research: a normative-disciplinary perspective which focuses on practicing communities; a personal perspective focussing on internal representations and cognitive structures of learner's personal views on truth, and education systems to examine these; and a social practices view which examines knowledge-claims in the context of social-group negotiation. An aim of this current paper is to bring a version of these three perspectives together, motivated by our understanding of social epistemology in which individual cognition and representations (the middle perspective) are fundamentally mediated and mediating in the context of small group and wider social practices.

There are thus three points of interest in our re-specification of epistemic cognition which tie together the five foci raised by Chinn, Buckland and Samarapungavan noted above. First, knowledge claims are pragmatic: Recent developments in social epistemology are clear that 'to know' (or, to claim that one knows) serves an action-oriented social function, and it is

from this point that analysis begins. Given the relationship between classical models of epistemology and epistemic cognition, this point is likely to have important consequences, particularly with regards to the kinds of normative judgements we make (“That student has a weak epistemic perspective, because s/he tends to authority” and so on) where such judgements require context sensitivity for the purpose for which knowledge is being sought or claimed. What separates this issue from what we characterise as a ‘cultural’ issue (2 below), is that the claim that epistemic practices are pragmatic, is a meta-level claim. It is not a claim about specific cultural practices, but rather to say that if we wish to understand knowledge claims, we must understand them as pragmatic; we should ask the question: What functional role is ‘to know’ playing when you say you ‘know x’?. Commensurately, epistemic cognition research should investigate instances of actors (teachers, students, scientists, historians, etc.) claiming knowledge of some thing, and their purpose in doing so.

Second, knowledge claims are normative. This is a macro, or cultural level point. That the occurrence of these normative practices takes place in domain-specific (science, history, maths, etc.) and cultural practices in which features of those cultures play a role in the specific epistemic practices engaged in; we should ask the question: What are the social and physical conditions which make an instance of ‘to know’ acceptable or unacceptable in this social group? Commensurately, epistemic cognition research should investigate the conditions – social, physical, justificatory – under which knowledge is ascribed to actors (teachers, students, scientists, historians, etc.) and the ways in which such groups are composed and distinguished².

Third, and finally, ‘knowledge’ claims are communicative. This is a micro or social level point. Of interest to this recent epistemological research is the ways in which learning occurs through the interactions, and within them. That is, how interaction both leads to

² This focus aligns well with Gee’s description of ‘big D’ Discourses as normatively driven practices of being (and communicating) (Gee, 2012)

epistemic stances being developed by individuals (that is, the interactions represent stances), and how those interactions co-construct stances. This latter claim again has implications for our unit of analysis in epistemic cognition research – analysis of and claims regarding individuals, even in situ, may not capture the co-constructive nature of epistemic stance; we should thus ask the question: What is the social unit trying to do collectively, and individually, when an instance of ‘I know’ is deployed? Commensurately, epistemic cognition research should investigate the micro-level interactional processes of sharing and building knowledge together within and across actors of varying standings (teachers, students, scientists, historians, etc.)³.

4. Socialising Epistemic Cognition

The triad of foci noted above bears strong relationship to that discussed in van Dijk’s book ‘Discourse and Knowledge: A Sociocognitive approach’ (van Dijk, 2014)⁴ in which he notes – as do we – that there has thus far been relatively little psychological consideration of the role of discourse in understanding knowledge, nor of the socio-cognitive relationship to knowledge, its sharing and acquisition, with research tending to focus on persuasion and attitudes instead. In particular we note a shared philosophical literature underpinning both van Dijk’s and the social epistemological perspective we present. However, we note that van Dijk’s attention did not turn to the learning sciences literature, which is of core interest to our endeavour here, particularly with regard to the position that any approach to discourse and knowledge should be not just “contextual but also co-textual and interactional [...because...] knowledge expressed in text and talk also depends on other, related discourses...” (van Dijk, 2014, p. 404). Nor was van Dijk’s project concerned with the implications of such an analysis of discourse and knowledge for how we understand changes in the ways people talk about

³ This focus aligns well with Gee’s description of ‘little d’ discourse – language-in-use, as an interactive activity-oriented tool (Gee, 2012)

⁴ Page numbers are given to the Kindle edition ‘locations’

knowledge – conceptual change on a psychological level – a core concern for learning scientists, including ourselves.

Paralleling the position outlined above, van Dijk takes a socio-cognitive approach, noting that “Knowledge on the one hand is socially construed, transmitted, shared and changed by communities, and on the other hand it is socially acquired and used by its individual members, especially also in socially situated discourse” (van Dijk, 2014, p. 4356). He thus highlights that neither individual cognitive analysis or interactionist analysis is adequate for the analysis of discourse and knowledge. In line with van Dijk (2014) we highlight that our account is of ‘epistemic cognition socialised’ to indicate not just a social-learning perspective on epistemic cognition (in which the micro-interactional social features play a learning role), nor a social qua socialisation perspective on epistemic cognition (in which the macro-societal level features play a developmental role), but the interaction of the two. To extend this point, the socialised account goes beyond merely a *scaffolded* account of epistemic cognition, in which learners are brought into epistemic-cultures through their social interaction with more capable teachers or peers. Instead, we make the claim that a socialised account of epistemic cognition shifts the nature of the construct itself to include the social-pragmatic features described above, and that this shift entails a commensurate focus on the social-interaction features of epistemic cognition (at the micro level) and a focus on the social-normative features of epistemic cognition (at the macro level).

Human behaviour – including human epistemic behaviour – does not occur in a vacuum, it is constituted in and constitutive of interactions and such interaction is primarily linguistic in nature. As such, the current research agenda focussing on individual cognition, and – where the treatment of dialogue or talk is involved at all – interview or think-aloud data, is problematic insofar as it necessarily limits the scope of salient context. Such a tendency is likely to focus on dialogue as a representation of beliefs, with context provided

through physical environmental or domain features, reducing the role of dialogue from a tool to *create* and *negotiate* context anew in social interaction, to one to *represent* and *be represented in* given contexts. As Kärkkäinen (to whom we return shortly) notes: “stance in discourse is not the transparent linguistic packaging of ‘internal states’ of knowledge, but rather emerges from dialogic interaction” (Kärkkäinen, 2006, p. 699). Under an idealized perspective on the communicative properties of language the points raised here align well with a perspective of learning, sharing some history with discursive psychology. This perspective notes that wherever learning is taking place, commonality is key, and language provides us with the social mode of thinking to build this ‘common knowledge’ as a resource for further communication, and joint action (Edwards & Mercer, 1987). Or as Mercer and Howe note, “To ‘know’ is to operate discursively within such a community [of practice]” (Mercer & Howe, 2012, p. 19), that is, knowledge is bound up in normative, communicative (discursive) practices.

4.1 Methodological Implications of Epistemic Cognition Socialised

We raise this shared perspective to highlight some of the common theoretical underpinnings of social epistemology, and sociocultural approaches, following for example Greeno, Collins and Resnick (1992). In so doing, we wish to highlight the important relationships between the theorised account of epistemic commitments, and the methodological shift to discourse. Of course, that knowledge is social is hardly a new claim in educational psychology (see, for example, Arievidtch & Haenen, 2005; Barab, Hay, & Yamagata-Lynch, 2001; Pea, 1993; Säljö, 2009), but the focus of this paper, though aligned, is separate in highlighting how an account grounded in social epistemology shifts the focus of epistemic cognition research.

Fundamentally, the social epistemological position motivates a greater attention to understanding knowledge as communicative, particularly given that:

epistemicity [of language] is a phenomenon that derives from the inherently dialogic nature of speech, that talk is always directed to a particular recipient or recipients within the sequential context of the turn-by-turn unfolding talk (Bakhtin, 1981; Voloshinov, 1973, Chapter 3). In such a view, subjectivity is no longer regarded as a more or less static mental state of the speaker, but a dynamic concept constructed in the course of some action; i.e., subjectivity is an integral part of the interaction between conversational co-participants (Kärkkäinen, 2006, p. 706).

Of course, to some extent current approaches to epistemic cognition must consider social relations in any given learner's epistemic cognition. The resources implicated in students' learning – documents, teachers, other students, science experiments and so on – do not exist in a social vacuum. However, such features are often considered as 'given', and are not typically considered in the design of task paradigms or conceptual exegesis, nor studied (methodologically) except in highly controlled experimental conditions. Similarly, as Sandoval has noted (for example, Sandoval, 2005), a focus on experimental approaches to epistemic cognition can exclude the rich reasoning students engage in amongst themselves in attempting to solve problems in ways other than those the researcher might expect.

A case, then, can be made for the socialising of epistemic cognition. The account outlined above, indicates that the standards for 'knowing' are driven by normative collective concerns regarding what one is trying to do in making knowledge claims in any given situation, this is social insofar as it involves both normative group practices, and social-communicative epistemic talk, which is targeted at some (pragmatic) ends. This consideration motivates:

1. A shift in focus from a priori standards, to emergent standards for knowing. That is not, to be clear, a shift to *relativistic* standards for what it is to know, but rather a reflection that such standards are normatively driven, and are both constitutive of and emergent from group interaction. They are both dynamic and evolving, and socioculturally embedded and emergent.

2. A shift or refocussing in the unit of analysis towards collectives (such as small groups), both as the object of inquiry (i.e., the source of [collective] data regarding a given knowledge state or meta-knowledge state), and as the comparator (i.e., the epistemic-commitments of the groups of inquiry are compared to those of other groups).
3. A shift in the methodological position from attempts to capture psychometric properties of individuals in de-contextualised settings, to analysis of construction of enacted epistemic-commitments in practice. Away from beliefs, and towards analysis of processes and products, with a perspective on epistemic cognition – as knowledge more broadly – as communicative, and co-constructed.

Such a shift brings a number of benefits. Current epistemic cognition research has struggled to reconcile the general and specific context sensitivity of epistemic cognition – instances in which it might be said a particular belief is more or less sophisticated, whether beliefs are stable across contexts or vary, how we theorise learning from testimonial knowledge, and so on. Our socialised account addresses this struggle by providing a theorised approach in which such context sensitivity is explained with reference to the normative features of the pragmatic context. That is, a socialised account of epistemic cognition addresses some of the concerns of classic epistemic cognition research.

Moreover an account of epistemic cognition drawn from social epistemology brings the construct of epistemic cognition into alignment with other socioculturally driven learning research, reconciling the social nature of individuals at both a small group and cultural level; issues largely absent from current epistemic cognition research. In drawing this alignment we highlight, for example, Wickman and Östman's (2002; see also Wickman, 2004) sociocultural account of learning as discourse change, also bringing a commensurate shift in methods towards approaches to investigate interaction and discourse, which is grounded in

similar pragmatic philosophical theory. Our account thus shifts focus towards the emergent and co-constructed nature of epistemic cognition in situated contexts over self-report methods (interview, talk aloud, surveys, etc.); again we see benefits here in the potential exploration of interaction-based methods which are largely absent from current epistemic cognition research (although, see the following section).

Finally, the expanded scope – taking an interest in testimony, the aims (pragmatic, and virtue oriented) of knowledge, and practices of achieving epistemic aims (over and above ‘the justification of knowledge’) – offers a fertile ground for future research agendas in the field. Understanding epistemic cognition in this way also foregrounds that the epistemic stances one takes may fulfil aims that are not solely epistemic; including in exerting or submitting to power, choosing to be more or less collaborative, and so on – a consideration that receives minimal attention (with regard to the authority of informants) in current epistemic cognition research. Within the scope of our socialised account, we thus see (as noted above) both an ability to explain the concerns of existing epistemic cognition research, and an extension of the constructs salient to such research.

4.2 Evidence for a Socialised Account of Epistemic Cognition

We have then proposed a shift in our understanding of epistemic cognition, to focus on knowledge as:

1. Pragmatic, serving a social function, in which the question should be asked: What functional role is ‘to know’ playing when you say you ‘know x’?.
2. Normative, a macro or cultural level point, indicating a focus on practices and the question: What are the social and physical conditions which make an instance of ‘to know’ acceptable or unacceptable in this social group?

3. Communicative, a micro or social level point, that knowledge is embedded in interaction, indicating the question: What is the social unit trying to do collectively, and individually, when an instance of ‘I know’ is deployed?

We note that this triad of claims, motivated by our understanding of social epistemology, is supported by some – currently, disparately motivated – specific examples (given below) indicating that a re-specified account of epistemic cognition socialised provides an analysis of knowledge as: a normatively driven pragmatic feature; embedded in cultural practices; and communicative and intersubjective in nature. In the following section we highlight research aligned with a socialised account, but without a unified perspective. The social account of epistemic cognition presented herein proves one frame through which to bring these various perspectives into alignment, as we now outline..

With regard particularly to the second – macro or cultural – point, that epistemic cognition is embedded in cultural practices, Sandoval (2012) has recently made similar claims, calling for epistemic cognition researchers to take seriously a ‘situated’ approach, building on similar theoretical foundations to this work. In that work the point is made that:

One important way to understand the epistemic ideas that people bring to bear is to examine their participation in practices of knowledge evaluation and construction. Changes in the form of participation are indicators of changes in the meaning that individuals make of the activity in which they are engaged...Change in participation can indicate a shift in epistemic perspective, but it is the shift itself that suggests what particular epistemic ideas are brought to bear in the first place (Sandoval, 2012, p. 350)

Similarly, arguably addressing the third – micro, discursive – element of knowledge as communicative and intersubjective, Österholm calls for a focus in epistemic cognition research on dialogue, using the approach of discursive psychology, which shares the same Wittgenstinian roots built on by social-epistemology. This perspective describes “the activity, the discourse, as the site where epistemological beliefs come to existence, through explicit or implicit references to prior experiences (epistemological resources)” (Österholm, 2009, p.

262), suggesting that we should not see beliefs and communication as “two separate ‘objects’ that can affect each other, but as more integrated aspects of cognition and/or behaviour” (Österholm, 2010, p. 242). Thus, the interest is not “what does it [language] represent? But, what is going on?” (Edwards, 1993, p. 218).

Österholm argues that this discursive perspective is well aligned with the ‘resources’ model of epistemic cognition (Hammer & Elby, 2003) which views epistemic beliefs as inseparable from the resources available to the cognizer at any time; very arguably a core point for the first – pragmatic – point raised above. The emphasis of this perspective as “theory-in-action” – in which context, domain, culture, and task conditions interact – permits an important consideration of context-sensitivity. For example the finding from experimental epistemology research that stakes matter in the ascribing of knowledge (i.e., in higher stakes cases we require claimers to be more certain of their belief) (Beebe, 2014), alongside contextual cases that standard models of epistemic cognition may account for, for example that, “it is not very sophisticated to view the idea that the earth is round rather than flat as ‘tentative’ whereas theories of dinosaur extinction do require a more tentative stance” (Barzilai & Zohar, 2012, p. 42).

As Hyytinen, Holma, Toom, Shavelson, and Lindblom-Ylänne (2014) also note, the most sophisticated critical thinkers need to be able to come to conclusions – constant weighing of pros/cons is not epistemically sophisticated, also noting that assumed relationships between classical epistemological stances (realism, relativism) and epistemic-cognition (belief in authority, a contextual perspective on authority) may not hold in students’ think aloud data.

This is of interest. Very few studies to date have explored the use of language in action as a lens on epistemic cognition (although of course many use interviews or questionnaires). Yet, it is important to consider how language mediates and represents learner’s views on their

learning. Hutchinson and Hammer (2010) provide a science classroom case study, illustrated by excerpts of the type seen in sociocultural discourse analysis, in which absolutist perspectives from students are given in contrast to more dialogic or sensemaking dialogue (or, as we discuss it below, ‘exploratory’ dialogue).. For example, in their excerpts, an illustration is given of a student’s explanation (Bekah) being taken up and referenced collectively by other students later in the discussion as “Bekah’s Law”. In the framing of this paper, that excerpt illustrates , the ways in which language can be both constituted in, and constitutive of, context – that is, contextually embedded, and forming a fundamental shaping force on that context – in this case through the repetition of a term that has taken on meaning for the collective (a ‘cohesive tie’) (Hutchison & Hammer, 2010).

Similarly, Rosenberg, Hammer and Phelan’s (2006) study can be framed in terms of our socialised perspective. In the article describing that research,, a case study was presented of a 15 minute discussion of the ‘rock cycle’ by a group of 8th graders – again, making use of dialogue excerpts to illustrate the epistemic processes undertaken. Rosenberg et al., (2006) note that in the initial stages students were engaged in largely unproductive talk (there was some accretion of knowledge, with little explanation or evidence of understanding – it was largely *cumulative* in nature), suggesting this was because: "They [were] treating knowledge as comprised of isolated, simple pieces of information expressed with specific vocabulary and provided by authority" (Rosenberg et al., 2006, p. 270). After a brief intervention by the teacher, suggesting the students might build on their own knowledge, this talk instead shifted to more productive dialogue, with students seeking coherence and understanding in their attempts to create a theory and use terms they understood. As with Hutchison and Hammer’s study above, this latter type of dialogue (which we might characterise as ‘exploratory’) indicates attempts to co-construct perspectives on knowledge, indicating the micro-level discursive nature of epistemic cognition.

Students' framing of activities as the production of answers for the teacher or test, as opposed to gaining understanding, implies a particular epistemic stance towards their education (Hutchison & Hammer, 2010). And indeed, such perspectives may be observable in the behaviours of collaborative groups (Scherr & Hammer, 2009). This is true of both free-form spoken dialogue, and the use of collaborative knowledge building tools which through their scaffolding features may not only encourage higher levels of engagement, but also greater collaboration, reflection, and a shift to more constructivist epistemological beliefs (see Hong & Lin, 2010 for evidence in teacher trainees). Indeed, some of this framing is non-epistemic in nature, time, resources, and social constraints are important considerations which vary across context (Kawasaki, DeLiema, & Sandoval, 2014); these factors have important pragmatic and normative implications (the first point raised above) with regard to appropriate epistemic practices.

However, what is lacking from analysis of dialogue in these prior studies is a consideration of the normative features of the dialogue in use. The type of dialogue used is discussed, but why a particular type of dialogue might be related to a particular (desired) educational outcome is largely undiscussed. However, these types of dialogue are not simply pedagogic tools (about which we might be agnostic were it not for the epistemically-related outcomes) but learning tools in their own right. Social elements of learning, most crucially dialogue, do not just represent learning states, they create them co-constructively and iteratively.

The epistemic cognition literature which deals with philosophical approaches has, thus far, tended to explore what that philosophical literature tells us about the scope of 'epistemology' (i.e., what features or targets of inquiry it relates to – largely the source or justification of knowledge), but not its internal structure (i.e., how those features relate to each other, and the implications of this for inquiry). To put it another way, with the exception

of the preliminary (and ongoing) discussions noted here, most research thus far has, where philosophy is considered at all, considered it in a descriptive role (“What is epistemology”). It has not, however, considered philosophy’s explanatory (“Why – philosophically – this evidence is taken to provide knowledge?”) or normative roles (“Why this evidentiary standard is taken to be – epistemically – ‘better’ than that one?”). This omission has in large part excluded the communicative nature of ‘knowledge’ claims from the attention of epistemic cognition researchers. The approach we propose holds a number of benefits in terms of developing a coherent perspective of epistemic cognition drawing on the extant philosophical literature. In addition, it addresses many of the concerns currently highlighted in the epistemic cognition literature, for example regarding domain specificity of beliefs, normative standards (often characterised in terms of ‘naïve’ versus ‘sophisticated’ epistemic beliefs), and of course the very scope of the construct (encompassing ontological concerns, etc.).

4.3 A Proposal for Epistemic Commitments in Learning Dialogue

In the preceding section (p.17) we briefly introduced the notion of ‘common knowledge’: the body of shared contextual knowledge which is built up through discourse and joint action, and forms the basis for further communication (Edwards & Mercer, 1987; Littleton & Mercer, 2013). Furthermore, as van Dijk notes, text and talk are critical to understanding culture both because they represent, and are constituted through, discourse (van Dijk, 2014). Given the social epistemological account, it is clear that wherever knowledge claims are made, common knowledge, the shared mutual and co-constructed understanding of what is being said, is key. This is because such claims occur in a social context, they require others’ understanding to be knowledge claims, and they require an understanding of a shared body of knowledge to be well formed as such.

Of course, common knowledge is equally important in a variety of cases of coming to know (or, learning), and indeed even in the case of what might traditionally have been conceptualised as ‘transfer’ of knowledge from a knower to a learner (‘testimonial knowledge’) it would be an impoverished view of learning to view the learning states as simple transfer from one individual to another (Knight & Littleton, 2015). In this paper, our interest is in students’ conceptual frames for such learning – the ways epistemic-cognition shapes perspectives on what is to be learnt – and here too, understanding the communicative nature of learning is important, and presently underexplored by epistemic cognition literature.

We have found Kärkkäinen’s work on intersubjective stance taking (Kärkkäinen, 2006) particularly instructive in our thinking on this topic. As Kärkkäinen notes:

We do not express our evaluations, attitudes or affective states in a vacuum; participants in discourse do not merely act, but interact. They achieve intersubjective understandings of the ongoing conversation as they display their own understanding (their subjectivities, if you like) in their sequentially next turns, while correcting or confirming those of their co-participants (Kärkkäinen, 2006, p. 704)

By epistemic stance, Kärkkäinen means “marking the degree of commitment to what one is saying, or marking attitudes toward knowledge. This definition also includes evidential distinctions, or how knowledge was obtained and what kind of evidence the speaker provides for it” (Kärkkäinen, 2006, p. 705); such markers include ‘I think’, ‘he’ or ‘she’ said, ‘I don’t know’ ‘I guess’, ‘I thought’, epistemic adverbs such as ‘maybe’, ‘probably’, ‘apparently’, ‘of course’, and epistemic modal auxiliaries such as ‘would’, ‘must’, ‘might’, ‘could’, ‘will’, ‘may’. As Kärkkäinen highlights, understanding of such utterances has typically been seen from an individual perspective, as a static representation of interior states of speakers; it is her argument that instead, we should start with an analysis of actions ‘to do’ in interactive contexts, taking stance to be emergent from sequential interactive contexts. “Thus, stance is more properly viewed from an intersubjective vantage point, rather than being regarded as a primarily subjective dimension of language.” (Kärkkäinen, 2006, p. 700). The implication,

then, is that positioning towards knowledge claims is not a feature of individual language or cognition, but in-relation to other linguistic expressions and speakers; that epistemic stance emerges through the ways people talk and interact together, jointly.

Our claim is that the kind of ‘stance’ described by Kärkkäinen viewed in light of the philosophical social-epistemology described above, motivates an analysis of particular classes of discourse that might be described as epistemic in nature. We suggest that the analysis of discourse, in context, over time, is the site through which student’s *epistemic commitments* are brought to bear. Such commitments might be thought of as the tendencies – with no assumptions regarding underlying cognitive attitude implied – of epistemic stances. That is, we see an epistemic commitment as the repetition of connections between particular epistemic modes of discourse and contexts in which they occur. We use the word *commitment* here, following on from Chinn et al., (2011), Knight, Arastoopour, Williamson Shaffer, Buckingham Shum, & Littleton (2014), and Wu and Tsai’s description of information commitments (C.-C. Tsai, 2004; Wu & Tsai, 2005) in order to foreground our position that, through our actions – encompassing the discursive stances we take – we commit to particular ways of seeing, and dealing with, the world; our epistemic commitments. This perspective accords with Chinn et al.’s (2011) suggestion of ‘epistemic commitments’ as behavioural traits in contrast to tacit ‘beliefs’. However, in agreeing, we intend to expand the potential unit of analysis away from individualised accounts of epistemic commitments as tendencies to act in such and such a way, favouring an approach which accounts for small-group analysis and the social circumstances in which epistemic commitments are played out. That is, our perspective shifts away from individuals to social units, and from individual-behavioural tendencies, to small group behavioural traits and socially contextualised accounts of that behaviour.

4.4 Implications for Learning Contexts

Core to the account we have outlined is that the consideration of epistemic cognition socialised involves an analysis of the ways in which contextual features of our environments – including our dialogue, which we take to be a core feature of, and resource for context – come together to shape our epistemic commitments.

A central interest of our approach lies in understanding how contextual features combine. For example, in understanding the circumstances under which one is justified in claiming knowledge from an informant (testimonial knowledge) an understanding of a set of features around authority-establishing, argumentation-schema, corroboration, and prior knowledge integration are key. One way in which such context is salient is in the normative-communicative context in which speakers are ‘required’ to inform some recipient of their knowledge (a teacher, a priest, a struggling child, and so on) (van Dijk, 2014).

Indeed, we see parallels here between such stances, and the kind of epistemic dialogue we discuss further below which Reznitskaya and Gregory (2013) recently discussed in relation to epistemic cognition (in conceptual change). In that article, they point out that the sort of dialogic talk related to exploratory talk (described in Wegerif, 2006) stands in stark contrast to the kinds of ‘monologism’ described by Bakhtin (1984) in which dialogue portends to readymade and singular truth. In doing so, they elaborate theory which is in strong accord with that described above. They point out (p.118-119) that dialogic learning contexts are:

1. About recognising expertise and its limits – that is, authoritativeness is respected, but not unquestioningly so.
2. Centred on divergent questions – that is, ill structured questions about which there are different perspectives are key.

3. Metacognitive in nature, involving both products and processes, awareness of others – that is, student must consider ‘the other’, consider how they themselves come to know and do so in the context of their tools and outputs.

Reznitskaya and Gregory (2013) suggest that epistemic cognition of an ‘evaluativist’ kind – which they hold to be more sophisticated – is closely associated with the kind of exploratory talk associated with educational gains. Mercer and colleagues have extensively researched such dialogue, developed an intervention strategy called ‘Thinking Together’, and highlighted a particular form of productive dialogue which, adapting the term from Douglas Barnes’ (Barnes & Todd, 1977) original broadly individualistic description, they have termed ‘exploratory’⁵, in which in contrast to cumulative or disputational talk:

Partners engage critically but constructively with each other’s ideas. Statements and suggestions are offered for joint consideration. These may be challenged and counter-challenged, but challenges are justified and alternative hypotheses are offered. Partners all actively participate, and opinions are sought and considered before decisions are jointly made. Compared with the other two types, in exploratory talk knowledge is made more publicly accountable and reasoning is more visible in the talk. (Mercer & Littleton, 2007, pp. 58–59)

Similar characterisations of effective dialogue have emerged from the work of other researchers across a range of ages (Michaels, O’Connor, Hall, & Resnick, 2002; Resnick, 2001). In this research, Accountable Talk is described as encompassing three broad dimensions:

1. *accountability to the learning community, in which participants listen to and build their contributions in response to those of others;*
2. *accountability to accepted standards of reasoning, talk that emphasizes logical connections and the drawing of reasonable conclusions; and,*

⁵ To be clear, this is not just a theorised account, the strong consensus among researchers is that in a variety of contexts, high quality dialogue is associated with learning (see the collection edited by Littleton and Howe (2010)). That research shows that, “Engaging children in extended talk which encourages them to ‘interthink’ and explain themselves... stimulates both their subject learning, and general reasoning skills (Mercer, Dawes, Wegerif, & Sams, 2004; Mercer, Wegerif, & Dawes, 1999; Mercer & Sams, 2006; Rojas-Drummond, Littleton, Hernández, & Zúñiga, 2010), as well as their social and language skills (Wegerif, Littleton, Dawes, Mercer, & Rowe, 2004)” (Knight, 2013).

3. *accountability to knowledge, talk that is based explicitly on facts, written texts, or other public information.* (Michaels, O'Connor, & Resnick, 2008, p. 283)

As with the typology of talk developed by Mercer and colleagues, the emphasis of Accountable Talk is not on learning particular subject or topic knowledge and language, but rather on learning to engage with other's ideas, and in doing so use skills of explanation and reasoning, learning to use language as a tool for thinking and *interthinking* (for example, Littleton & Mercer, 2013).

In the context of learning, the kinds of languages we expect students to engage in are those precisely met by accountable or exploratory dialogue. Thus, our claim is that exploratory dialogue – the kind of dialogue associated with common knowledge – is likely to be a necessary but not sufficient component in our understanding of epistemic cognition *in learning contexts*. In these types of talk the interlocutors:

1. Emphasise learning from, and listening to others
2. Have a commitment to expressing, and explaining their ideas
3. A respect for the standards or practices of the community, using the appropriate type of argument in discourse

Our own account of epistemic commitments thus follows Reznitskaya and Gregory's analysis of dialogic talk in the context of conceptual change. However, we note that their analysis of epistemic cognition focuses on the developmental classificatory system of Kuhn (1991) in which learners develop from absolutists, to multiplists, to evaluativists. While the theme of epistemic development is related here, concerns with the epistemological assumptions underlying this approach to epistemic cognition – and its corresponding methodological implications – were raised above (and indeed, by Reznitskaya and Gregory, pp.125-6).

The socialised account of epistemic cognition that we present is motivated by a theorised account of epistemology, and which – as we indicate in section 4.2 - can frame the existing extant body of work on epistemic cognition. The account we provide, then, has at its core the claims that:

1. As we describe in the section ‘Recent Developments in Social and Virtue Epistemologies’, knowledge claims are pragmatic, normative, and communicative,
2. As we describe in the section ‘Socialising Epistemic Cognition’, knowledge claims should thus be understood as emergent from and constitutive of (normative) social groups, necessitating a refocussing on collectives in our understanding of knowledge claims, and the commensurate methodological implication towards a focus on group processes rather than cognitive-constructs.

The argument, then, is that:

1. Epistemic commitments are seen in emergent and co-constructed interactions between members of a social group
2. What makes these epistemic, and of interest to us as educational psychologists scientists, is their pragmatic force – that the learners are *doing* something in implicitly or explicitly making knowledge claims, and the ways in which they do that
3. We thus see a re-specification, but not a discarding of, existing epistemic cognition work – the constructs referred to, the ways we talk about the epistemic are fundamentally bound up with the ways students use epistemic-language to make and make sense of knowledge claims

What is key in this account is that the language used provides ways of treating information, and informants. Stance taking can thus be characterised as:

an interactive activity engaged in by co-participants in conversation, rather than being an isolated mental activity of an individual speaker. When making a concluding assessment of the preceding story, speakers display an orientation toward involving recipients in the assessment activity, and recipients generally join in to negotiate a shared stance toward, and an understanding of, the story or some aspect of the story. But such joint stance taking is not only a form of participation in the reception of a story, it is often simultaneously a negotiation of some underlying social norm or value implicit in the story (Kärkkäinen, 2006, pp. 723–724)

And in our position, the repetition of such stance can be seen as an epistemic commitment. Thus, language is both constitutive of, and constituted in, epistemic stances; the ways these are brought to bear on particular epistemic features constitute epistemic commitments. We are, in this context, particularly interested in *learning* dialogue. The everyday scientific discourse of science-professionals is likely to be different to this (although of course, would no doubt involve mutual learning encounters too). In this learning context there are good theoretical and empirical reasons for supposing the kind of dialogue we describe above is associated with the ‘taking on’ of knowledge. This is more than just ‘learning’ qua transfer; we do not just *gain* knowledge – in order for such gains to be made one must be receptive to that knowledge, and it is this active receptiveness that we are interested in as a form of epistemic commitment, and which we associate with ‘common knowledge’ above.

5. Conclusions: Epistemic Cognition – The Socialised Account

This paper has outlined a new, social, account of epistemic cognition, bringing together recent work in social epistemology alongside some existing epistemic cognition research. The aim of the paper is not, to be clear, to suggest that we should disregard existing theory, but rather to broaden its conceptual and methodological scope to recognise the sociocultural components of epistemic cognition. Furthermore, the claim we are making here is not, to be clear, that epistemic cognition can or should be reduced to the presence or lack thereof of exploratory or accountable dialogue. Clearly, what researchers are trying to ‘get at’

when they *do* epistemic cognition research, expands beyond the use of one type of dialogue or another. Indeed, we would agree with Säljö, who notes an overreliance on static or given ‘thing like’ metaphors in cognitive models of human learning, which thus de-emphasise the ways in which learning occurs through interaction with the environment (Säljö, 2002, p. 402). Understanding the multitude of ways in which learners develop their epistemic capabilities is thus particularly important given the potential that, while students are not engaged in the kinds of action we – as researchers, and assessors of ‘scientific’ behaviour – think are epistemically productive, that is not to say the students are not engaged in rather sophisticated, contextually salient, epistemic behaviour (for example, Sandoval, 2005, 2012).

We argue for a socialised account of epistemic cognition in which the construct itself is understood as fundamentally socioculturally co-constructed, and instances of ‘epistemic cognizing’ are seen as involving both individuals (in social, possibly social-learning) contexts, and the broad social settings that learners act within. As such, the ‘conflicting’ perspectives between a cognitive perspective – of knowledge as possession – and the sociocultural perspective – of knowledge as “belonging, participating, and communicating” (Mason, 2007, p. 3) are, we argue, brought to a shared headwater in a socialised account. Indeed in describing a sociocultural account of knowledge as “belonging, participating, and communicating”, Mason (*ibid*), was introducing a special issue on “bridging the cognitive and sociocultural approaches in research on conceptual change” in which Greeno and van de Sande (2007) propose “that a bridge between the cognitive and sociocultural approaches can be built simultaneously from both sides in a more symmetrical way than in previous efforts” (Mason, 2007, p. 5). Their proposal is for an understanding of learning which builds in contextual features of activities through “perspectival understanding” which can introduce constraints on the satisfaction of task requirements. As the articles in that special issue highlight (and in particular the commentaries by Mercer (2007) and moreover Alexander

(2007), the issue here is not only the theorised account of conceptual change qua the developmental process of conceptual change, but a theorised account of just what conceptual change is qua construct. Such an understanding should reflect the epistemological context of the sociocultural and cognitive perspectives on learning and conceptual change (Alexander, 2007); that is our endeavour here, building on recent philosophical literature in epistemology. As Alexander notes “To extend Greeno and van de Sande’s [ibid] metaphor: A river without two banks ceases to be a river” (Alexander, 2007, p. 69); however our account, in contrast to that proposed by Greeno and van de Sande, offers a mapping of the terrain which makes it clear that the sociocultural and cognitive banks of the river come to a shared headwater – that is, that both perspectives stem from the same source, they are connected, and it is here that the object of inquiry should be focussed. We go further, suggesting that to bridge the banks we should understand their shared geology, the natural environment from which they emerge, a pragmatic understanding of knowledge, carving those banks out. We thus take an explicitly pragmatic perspective on epistemology, noting that knowledge is purposeful, it occurs in a natural environment, and serves a functional role in that environment (see, for example, Frega, 2011). In considering the roles of the cognitive, and social – the ‘banks’ of the river – we should not forget this shared, pragmatic, headstream; individuals cognize in social contexts, situated in a material world.

We have argued for a greater attention to the social, discursive, nature of epistemic cognition. It is not just a call to explore the types of dialogue which occur in epistemic contexts more – although for sure that would be a valuable pursuit – rather, it is a call for deeper theorising around and study of the discursive properties of epistemic talk, the communicative acts, the ways meaning is shared and co-constructed (or not), the resources deployed, and the reasons that people and resources are taken as good or poor informants. This language is orienting in nature, and it is to that which we call for further attention. This

is motivated in this paper by our account of social epistemology, which is fundamentally *social* in nature. We use the word ‘fundamentally’ here quite deliberately, to highlight the shared headwaters of individual-cognitivist models of epistemic-cognition, and sociocultural situated models of the same; our argument has been that these banks of the river, that shape and direct our epistemic-activities stem from a shared – fundamentally social – environment. The mode of primary interaction in this environment is linguistic, and it is through our – primarily language-based – tool-mediated interactions that we bring to bear knowledge claims and evaluations.

‘Exploratory talk’ describes one relatively simple communicative stance that learners might take. But it does not describe the things about which we take a stance – the targets of those stances. Understanding these targets is fundamental to developing a deeper understanding of epistemic cognition as a socioculturally situated discursive and communicative practice. This is in line with Goodyear and Zenios’ argument for an “action-oriented conception of learning in higher education” (Goodyear & Zenios, 2007, p. 351), bringing together epistemic activity and epistemic fluency, in which *discussion* and collaborative activity is seen as a fundamental component of developing epistemic fluency, as achieved in and demonstrated through epistemic activities. That is, they claim that by engaging in the discourse of a community, while undertaking the tasks (the epistemic, knowledge oriented, tasks) of those communities, students develop epistemic fluency, the “ability to *recognise* and *practice* a variety of epistemic games [...] epistemic fluency allows one to recognise, appreciate and understand the subtlety and complexity of a belief system that one has not encountered before” (Goodyear & Zenios, 2007, p. 358).

Such contexts are frequent in learning contexts – including formal education. As Furberg (2009) notes,

students' talk and interaction while engaging with Web-based learning environments constitute a possible entrance for understanding how they actually make sense of and employ prompts as structuring resources in their learning processes. During interaction, participants constantly make meanings and interpretations of situations, events and actions visible and observable to other participants as well as for us as analysts (Linell, 1998; Mercer, 2004) (Furberg, 2009, p. 400).

The kinds of 'openness' exhibited in dialogic, exploratory, and accountable talk are crucially epistemic in nature. This claim suggests that – in line with calls from other researchers – a greater focus is needed on high quality discourse in learning settings. More broadly, this paper has argued for a perspective on epistemic cognition, grounded in recent philosophical work, which starts from an understanding of the normative, intersubjective, practices in which people engage when they build and claim knowledge. Such a perspective motivates a shift to analysis of collectives (small and larger groups), engaged in activity oriented communicative acts through which researchers may probe epistemic commitments, both as they relate to and are constructed through particular contexts, and as they relate to alternative contexts, settings, or cultures. To highlight, our argument is not that such an account of 'epistemic cognition socialised' is of 'coming in to communities of expertise', or of 'scaffolding' individual's capabilities – both macro level analysis of practices, and micro level analysis of interactions is crucial to our understanding. Thus, we have argued that these elements of understanding epistemic cognition stem from the same headwater – that people claim knowledge in social and material environments, and that such claims are pragmatically oriented. This understanding of epistemology motivates and parallels our proposal for a socialised account of epistemic cognition, which as we outline, aligns with, and draws together, some existing socially-oriented accounts of epistemic cognition providing a fertile ground for further research.

Acknowledgements

Our thanks to the anonymous reviewers, and Clark Chinn, Neil Mercer, and Bill Sandoval for their comments on and discussions about earlier versions of this work which improved its quality immeasurably. Thanks too to Sten Ludvigsen, Helge Strømsø, Leila Ferguson, and colleagues at the University of Oslo who provided useful discussion on an early presentation of this work. This work was begun while the first author was undertaking his PhD at the Open University, UK to whom thanks are extended for their support.

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