Epistemological access as an open question in education

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Introduction

In his book *Learning to Teach in South Africa* Morrow (2007)[1] argues that teacher education's ultimate aim is *to enable epistemological access*[2] *to knowledge in the modern world*, and that there is a need to find new ways of thinking about teaching in South Africa if we are to meet the challenge of enabling all learners to gain such epistemological access. Morrow relates problems of epistemological access to the dominance of an empiricist epistemology in education, and he also comments on how this is obscured by the ideologies of Outcomes Based Education and learner-centred education (with attendant constructivist, relativist assumptions about knowledge). These problems, he argues, have come to shape curriculum thinking, and hence teaching practice, creating a muddled epistemological context in which teaching practices are taking place. He argues for a *realist focus* but he does not elaborate on what such a realist focus might mean for enabling epistemological access or for associated teaching practice or for teacher education. He does, however, propose that systematic learning is a necessary way forward.

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1 This paper will also be published in an edited book which collects a series of papers that respond to Morrow's (2007) book '*Learning to teach in South Africa'* entitled 'Retrieving teaching in South Africa: a dialogue with Wally Morrow' (Shalem, Y. and Pendlebury, S. (Eds) (in press) UCT Press, Cape Town). The paper was first presented in a Kenton Education Conference Symposium, which led to the publication of this collection.

2 I understand this to mean that teachers have a *teaching practice* responsibility that enables learners to gain access to *particular forms of knowledge* – in this case Morrow seems to think it is forms of knowledge that are valued in the modern world. In the formal school system, this has traditionally meant that teachers are expected to support learners to gain access to propositional or more abstract forms of knowledge, since they would not need to go to school to simply encounter more experiential knowledge of the variety that they encounter in the every day. This has led to distinctions between context dependent knowledge, and context independent knowledge (Gamble, 2006); and school knowledge and everyday knowledge (Daniels, 2001); and debates on differentiation and de-differentiation (Muller, 2006).

In this paper, I reflect on the epistemological muddle that Morrow points to, and I engage with his proposed solution i.e. a *realist focus*, and what it might mean for *teacher education.* I also propose that the epistemological muddle is not only a South African phenomenon, but that its roots may lie (partially) in the wider transition from high modernity (Morrow's 'modern world') to reflexive or late modernity as described by Ulrich Beck (1992, 1999) and other sociologists such as Giddens (1999) and Delanty (1999). In this transition, two major critiques of epistemology have emerged, the first being the rejection of empiricist epistemologies, and the second being a more recent rejection of relativist epistemologies (Delanty, 1999). Out of this is an emerging return to realism, but of a different kind to the empiricist realism that characterised the positivist era (Sayer, 2001). The paper argues that this changing epistemological context has implications for how teachers might engage with the practice of *enabling epistemological access* in schools, and it has consequences for teacher education practice too, which I also discuss.

A methodological note

To shed light on the consequences of the epistemological muddle that Morrow alerts us to for learning, and to probe what this might mean for teacher education practice relating to enabling epistemological access, I centre the discussion on four case stories of teaching practices observed in our research programme.[3] These case stories were purposefully selected from a wider set of similar, yet slightly different practices reported on in a range of case studies undertaken mostly in Eastern Cape rural schools, as such they provide insight into the relationship between teaching practice and enabling epistemological access in this context.

They are not isolated cases, in the sense that numerous similar cases have been observed, but the caveats of generalisation from cases remain an impediment to making wider claims from these four cases. Bassey (1999) does argue, however, that it *is* possible to make tentative or 'fuzzy generalisations' from

[3] The research programme focuses on the relationship between 'Environment and Sustainability Education and Educational Quality and Relevance'. This research programme was first established through a Rhodes University/NRF research programme into environmental education, curriculum and learning, and later extended to a SADC research programme into the relationship between Education for Sustainable Development and Educational Quality and Relevance. It consists of some 20 M.Ed half thesis case studies, and staff research projects. We are currently in a phase of synthesising the research, this paper being one contribution amongst others.

cases, particularly if similar patterns begin to emerge in a range of relatively similar cases. Sayer (2001) argues that all research takes place on a continuum between intensive and extensive research, with intensive research providing causal explanations of the production of certain objects or events, which might not necessarily be representative, while extensive research produces descriptive quasi-representative 'generalisations' that lack explanatory penetration. Even research that claims to be representative of a whole population suffers from difficulties of being generalisable to other populations at different times and places.

The cases presented here are more intensive in nature. A realist analysis of the cases allows the discourses of the stories to be related to their referents and contexts, since text-like representations are only ever partial representations of reality. In this regard Sayer (2001, p.20) states that "Much of what happens does not depend on or correspond to actors' understandings; there are unintended consequences and unacknowledged conditions and things can happen to people regardless of their understandings." A wider literature review on curriculum implementation issues facing the South African schooling system[4] reveals many of the issues raised in these stories, providing wider contextual evidence that the four cases presented might not be 'isolated', but that similar causal influences and conditions are shaping teaching practices relating to the enabling of epistemological access in South African schools. It is at the level of causal influences that it is possible to make the 'fuzzy generalisations' referred to by Bassey (1999).

As such, the cases provide further illustrations of much of what is being learned about the context of education in South Africa today, at least since the advent of outcomes-based education, strengthening the arguments that have been put forward by educators such as Taylor and Vinjevold (1999) and Muller (2000, 2001, 2006) for 'reclaiming knowledge'.

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[4] See for example: Taylor and Vinjevold (1999); Jansen and Christie (1999); Harley and Wedekind (2004); Lotz-Sisitka and Raven (2001); Young and Gamble (2006); Morrow (2007).

A realist interpretation of some teaching practices

Case stories of teaching practice that (don't) enable epistemological access

The stories presented here are in many senses 'negative cases' in that they report on teaching practices that essentially fail to enable epistemological access.[5] They are drawn from teaching practices in a range of different Learning Areas, since our interest has been to examine environmental learning processes in a range of different Learning Areas in the National Curriculum Statement. The schools are all rural Eastern Cape public schools, by and large all are subject to the range of contextual, historical and socio-economic conditions affecting rural education as described by the Nelson Mandela Foundation in their 2005 study on 'Emerging Voices'. The full scope of these will not be reported here, but most are former homeland schools with inadequate resource provisioning, teachers who were educated and trained under Bantu Education, and communities that are affected by poverty and socio-economic stresses. The reason for choosing these negative cases was to sharpen our observations of what questions arise for teaching practice, and for teacher education. The cases were not chosen to vilify teachers, but rather to allow us to develop a critical and emergent response framework for teacher education. As such, these practices allowed for a deeper realist causal analysis, opening space for considering what constraints could be absented to inform new teacher education practices.

The first story, rooted in an earlier more personal research experience, started a deeper probing of teaching practices related to epistemological access in our research programme.

Story 1: The mutualism/commensualism homework

About 5 years ago a 12-year-old child living on our farm made a simple request, one made by children everywhere 'Please help me with this homework'. Looking into the homework, I found that he had been asked to

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5 'Negative cases' were selected in relation to the expectations of what it means to enable epistemological access in a modern world as defined by curriculum norms and expectations, and knowledge forms presented in the curriculum (i.e. the assumptions of modern education systems). Positive cases could also have been selected, but for this analysis I chose negative cases as they appear to be more **analytically productive** for understanding the issues facing teachers, and teacher education in South Africa. They were not chosen to vilify teachers, or to place the blame on teachers, as outlined in the realist reading of the cases.

explain and then draw pictures of two science concepts 'commensualism and mutualism'. Having practiced as a primary school teacher myself, I immediately assessed that he was being asked to distinguish between and explain these concepts. I asked him: Did the teacher give you any materials, do you have a textbook, and do you know what the words mean? The answer to all of this was 'no'. We then started to resolve the problem – first by using the dictionary (which was not very helpful as it simply provided us with a more detailed explanation of the concepts in abstract terms). I then checked my understanding of the dictionary concepts by asking my husband (an ecologist) to help us explain the difference between the two concepts. We then took some books from our natural history bookshelf, and we looked for pictures in the books, and in some magazines which illustrated these two concepts. Mercifully we found a picture of a buffalo and some oxpeckers, and a mushroom/fungi growing on a tree trunk. We went into the field and looked at the cows, and noticed an eagret sitting just near the cows in the field. We also found some lichen growing on a tree near the house. With these resources at hand – the dictionary, the pictures and the examples in the field, I was able to explain the difference between these two concepts and the child could draw his pictures and write his explanations. After about 90 minutes the homework was complete, and one could say that the child had gained 'epistemological access' to some modern scientific/ecological concepts. He got full marks for the homework, and the teacher complimented him for exemplary work. He reported that he was the only child able to complete the homework.

If this was just an isolated incident, it could be treated as an interesting curiosity. However, this pattern was repeated over a period of five years with Mathematics homework, Geography homework, Life Orientation homework, English homework, Technology homework and even Arts and Culture[6] *homework, with different teachers each time. The result of this was that the child's experience of schooling was littered with 'foreign words' that apparently held little meaning; concepts that were not accessible to him through the cultural resources in his life world (except through the innovative strategy he used in asking for help with his homework through which he could access other cultural resources and a mediation process). Eventually this was*

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6 I recall one instance where he was asked to compare the clothes, religious symbols, food and activities of Christians, Muslims, Jews, Hindus and Africans. He got as far as writing that Africans wear Jeans and T-Shirts before coming to ask for help with the homework. Completing this homework required a trip to the library and to some religious establishments in town, and due to the impossibility of the task, some simplistic renditions (i.e. stereotyping) of richly textured cultures and cultural practices, showing that it can also be the nature of the task that creates epistemological access problems.

not enough, and last year he dropped out of school in grade 11, despite the fact that he was a motivated student, keen to learn, and intellectually capable.

Much has been written about the distinction between school knowledge and everyday knowledge, the different structures of knowledge (vertical and horizontal) and how these ought to be developed and mediated through progressive sequencing of knowledge, systematic learning and concept clarification (Bernstein, 1990, 1999; Daniels, 2001; Muller, 2000; Gamble, 2006). Davydof (1995) argued that the process of meaning making should be one of 'ascending from the abstract to the concrete', which was ". . . extended by Hedegaard and Chaiklin (1990) into a conceptualisation of teaching and learning as a 'double move' between situated activity and subject matter concepts." (Daniels, 2001, p.97). This case story therefore raises a question about the teaching practices necessary to allow this 'double move' to take place, in order to enable epistemological access at the interface of concept and context; or school knowledge and everyday knowledge?

Story 2: Under-teaching and vestiges of teacher memory

Story 2 involves a teacher who wrote the following Assessment Standards in her Lesson Plan for a Grade 7 lesson focussing on Learning Outcome 1 (Health Promotion) in the Life Orientation Learning Area which expected learners to 'make informed decisions regarding personal, social and environmental health':

- *Critically analyse the **causes of common diseases** in relation to socio-economic and **environmental** factors [emphasis here indicates the connection points made by the teacher].*

- *Demonstrate informed, responsible decision making about health and safety.*

- *Examine health and safety issues related to violence and propose alternatives to violence as well as counter strategies.*

In the lesson she did the following: she asked learners to answer some questions about what they know about common diseases, and she listed some causes of common diseases. She then listed food stuff on the board, and took the learners out to the school garden where they had to name different vegetable plants. She divided them into groups (boys and girls), gave the boys spades, forks and hand hoes, and the girls rakes and asked them to work in the

school garden to tend the vegetables. No assessment took place, and for the remainder of the lesson the teacher seemed to be unconcerned about the intended learning outcome and assessment standards that she had indicated in her lesson planning work. She indicated that she could not teach the learners anything about the indigenous plants in the school's indigenous garden because she did not know anything about them, thus missing the opportunities for decision making about health using plant resources for example.

Selective appropriation and ideological transformation of curriculum policy statements (official pedagogic discourse) is one of the critical processes that Bernstein (1990) alerts researchers to in his descriptions of the recontextualisation process, and one could argue that recontextualisation is a normal meaning making process, and thus a normal teaching practice. In this case, however, the recontextualisation process involved a loose 'surface marking' of an allegiance to the Learning Outcomes and Assessment Standards, and selectively appropriation of a few connecting points associated mostly with the teachers' prior knowledge and experience (vestiges of memory). Other examples of this practice can be found in the studies of Mvula Jamela (2007); Jenkins (2008); Lotz-Sistika (2007). Our observations point to an 'under-teaching' in relation to expected curriculum standards, while appearing to be situated within the curriculum framework. We have also identified some cases where the vestiges of teacher memory (linked to the past curriculum or their own life world experience) *are* the curriculum, with no reference being made to any curriculum framework, structure, content or assessment or standards framework (see for example Jenkins, 2008). In this case, the teaching practices *are* providing epistemological access to some forms of knowledge, but it is of a lower than expected standard (if judged by the curricular and assessment norms), and remains largely dependent on the teachers' memory. Our conclusion from these observations is that such teaching practices are not providing adequate access to knowledge in the modern world (normatively framed by curricula), as expected by Morrow (2007). The question that arises here is what relationship (ought) to exist between normative standards for enabling epistemological access, teacher knowledge and experience, and teaching practice?

Story 3: Not teaching what is not possessed as own knowledge

The third story involves another teacher from another school who reflected that he could not teach children about marine resources along the coast (the school was just next to the coast and the biodiversity knowledge component in the Science curriculum requires teachers to teach about biological diversity).

He said this was because he did not come from the area and the children would know more than he did about the coastal marine resources. He also said he did not know about biodiversity as this was a new concept in the curriculum and he had not received training in this.

Similar instances can be found in other studies in the research programme (e.g. Schudel, 2006; Mvula Jamela, 2007; Jenkins, 2008; Mbuyazwe, in press). The epistemological access question here relates to how it might be possible to broaden teaching practices beyond teaching what is possessed as own knowledge?

Story 4: Mis-teaching and mis-assessing

The fourth story involves a range of mis-teachings and mis-assessments observed in a project to support the use of a set of outcomes-based curriculum materials (Schudel, 2006):

- *In one lesson plan, a clearly inaccurate bar graph recorded eight of the learners as having used 1600 litres of water (200 litres per person) to brush their teeth in one day (even for a household, this would be unrealistic). The teacher gave the learner full marks for the graph. The problem was difficult to pinpoint but may have been a failure to convert from litres to millilitres. The teacher herself drew up a worksheet adding the results from the whole class and failed to convert to a common unit when adding the figures.*

- *In another example, the teacher did not challenge a graph drawn by learners with no units of measurement, which made the graph meaningless and impossible to interpret.*

- *In yet another example the teacher did not notice a multiplication error in a worksheet calculating the amount of water lost by leaking taps, which lead to a misleading answer.*

- *In another case the teacher prepared a resource labelled 'alien invasive plants' which consisted of a number of line drawings of different plants. Most of the plants were 'alien' vegetables but not invasive (no distinction between these two appears to have been made for the learners). The resource also included pictures of two unidentifiable trees.*

- *One teacher assessed evidence of learners sticking pictures of 'alien invasive plants' (the pictures were not all of alien invasive plants) as showing evidence of learners being able to 'make informed decisions' about which trees to plant. Here the teacher appears to be making the assumption that being able to identify plant pictures is sufficient for developing the skill of making informed decisions without actually assessing whether informed decisions had been made or not.*

- *In another case, learners answered questions for assessment about the differences between rural and urban life which clearly was not an assessment of learners' ability to critically evaluate why these differences exist.*

- *Rubrics often tend to be used to assess worksheets, looking at the same knowledge that could be assessed through the worksheet itself. The assessment technology (i.e. design and use of rubrics) appears to be overwhelming the assessment purpose and process itself. (All examples here are drawn from Schudel, 2006)*

Similar instances can be found in the studies of Mvula Jamela (2007); Jenkins, (2008); Tundzi, (2009); Mbuyazwe, (in press); Mazingiza, (2009). The epistemological access question raised here relates to how quality of feedback and assessment provided by the teachers might enhance epistemological access and thus quality of learning, and how teachers might become more reflexive of their own knowledge practices?

A realist reading of the stories

As indicated above, the four stories above have raised a number of questions related to epistemological access and teaching practice. They have shown that teaching practices can:

- Constrain epistemological access to knowledge represented in abstract form (e.g. concepts) if sophisticated approaches to mediating between the abstract and concrete, or situated activity and subject matter concepts are not practiced;

- Limit the scope and level of epistemological access in relation to curricular (normative) standards; if adequate attention is not given to normative expectations associated with knowledge structures, progression and standards;

- Limit the scope and depth of exposure to new knowledge, and the unknown (as defined by the teachers' knowledge of a topic); if teachers are not prepared to risk teaching that which is not fully known to them personally; and

- Affect the quality of the epistemological access process, if inadequate feedback is provided (i.e. learners are not challenged to reflect on the quality of their work), or if inaccuracies are glossed over or go unnoticed (if teachers are not able to reflexively review the quality of their own contributions).

To provide a realist reading of these teaching practices and constraints to epistemological access, I consider the stories from an open systems perspective (i.e. I do not assume a closed system in which a regular relation is expected between the cause event (the specific teaching practice) and its effects (i.e. loss of opportunity for epistemological access and learning). A realist reading considers the diverse range of circumstances that have, and may influence teaching practices oriented towards enabling epistemological access. As mentioned briefly above, all of the schools and teachers involved in the studies were primarily from the rural Eastern Cape with its particular history and resource-based difficulties, and socio-economic conditions. Most significantly however, teachers prior knowledge and experience of teaching, the absence of teaching and learning support materials, and teachers' abilities to navigate the new curriculum structure, assessment system and constructivist epistemology seemed to be significant causal mechanisms influencing the teaching practices, and thus the enabling/constraining of epistemological access. These have all emerged in other studies on teaching and learning in South African schools, as mentioned and referenced earlier in the paper. The quality of teacher's knowledge, the quality of teacher education, the educational policy framework, and the link between these would therefore seem to be key underlying causal mechanisms influencing teaching practices and epistemological access. The constructivist epistemological assumptions of the curriculum also appear to be influencing teaching practices that constrain epistemological access, although it is not clear whether this would also be the case with a curriculum with an empiricist epistemological underpinning as well. This could probably be established through analysis of teaching practices and epistemological access within an empiricist curriculum framework in similar schools. As mentioned by Morrow, the South African curriculum framework is muddled by an empiricist epistemology, and a constructivist

epistemology which are difficult to untangle because of complex histories. From the stories it might be surmised that the teachers concerned have not developed adequate abilities or do not have appropriate conditions available to enable epistemological access from within an empiricist epistemological framework *or* a constructivist epistemological framework. Continuities between earlier forms of Bantu Education and Outcomes-Based Education suggest that this might be the case (Chisholm, 2004; Nelson Mandela Foundation, 2005).

The normative framework of the curriculum, and its assumptions about 'epistemological access to the modern world' and associated power relations, life world experiences and cultures (i.e. a modernist epistemological frame for education) may also be a mechanism influencing the situations in the stories, as may the issue of language of instruction. A realist causal analysis indicates that it is probably not any one of these factors, but a variety of them, in various interactions with each other that influence the way teaching practices are constraining and enabling epistemological access in South African schools. Sayer (2001, p.23) states that "No mechanism or set of mechanisms, especially not those of the programme, is to be taken as a 'black box'. Their identification is not a matter of finding more specific regularities . . . etc. . . . for to do so would not explain the mechanisms [and their relation to each other] but merely redefine the problem." What the identification of causal mechanisms does allow for, however, is a purchase on the possible range of mechanisms that are influencing practices, and it is *these* (and their relations to each other) that need to be probed and investigated in more depth for what needs to be absented in order to allow for the emergence of new practice.

Considering possible responses

One could respond to these causal mechanisms in various ways with teacher education and curriculum design practices, all of which appear to be necessary if we are to support teachers to fulfil the task that Morrow (2007) outlines for them *to enable epistemological access to the modern world.* Some solutions may look like this:

- *Absent the constraint of poor disciplinary knowledge and lack of structure and differentiation in the curriculum*: Teach teachers the discipline-based knowledge they are required to teach; Differentiate the curriculum more clearly so as to make it more explicit and less confusing

so that teachers have a better idea of what ought to be taught by when and how and at what level (Muller, 2006); and induct teachers into the vertical and horizontal knowledge structures defined by Bernstein (1990) get teachers to teach systematically and sequentially. As one of the reviewers of an earlier draft of this paper stated ". . . teachers first need to acquire the specialised knowledge they are supposed to teach. The other good things *follow from* it – increased reflexivity, the ability to make connections between contextual and decontextualised knowledge etc. – they are not an alternative route *to* it, as the constructivists all too often imply" (blind reviewer, 2008).

- *Absent the constraint of inappropriate level and scope of teaching*: Teach teachers that there is a need to teach at an appropriate level, and that teaching cannot simply be based on 'own knowledge and experience' or vestiges of own memory, but ought to be normatively aligned according to the curriculum framework and standards.

- *Absent the constraint of inadequate feedback and reflection*: Teach teachers how to assess learning and provide accurate feedback; and how to assess their own knowledge practices.

- *Absent the constraints of empiricist views of knowledge*: Teach teachers to access and adapt to a changing knowledge environment; teach teachers that you don't need to know everything before you teach it, and that you can draw on the knowledge of others and information in materials in a teaching-learning situation, and that not everything is necessarily known before hand – through for example use of enquiry-based teaching methods.

- *Absent the constraints associated with lack of materials*: Improve teaching and learning support materials so that they do not compound the problems, and teach teachers how to use them systematically in schools.

Biersta (2006) would describe such a set of solutions as technological solutions, since they focus mainly on the effectiveness of knowledge transfer, and leave little room for more open-ended approaches to enabling epistemological access. He (2006, p.9) states that this approach to enabling epistemological access through 'effective' teaching practice represents a "modern understanding of education in which education is understood in terms of the 'production' of the rational autonomous person and in which the

educator is seen as the midwife whose task it is to release the rational potential of the human being".

He, and other epistemologists, sociologists and pedagogues (Giddens, 1999; Archer, 2007; Beck, 1999; Engeström, 2005) argue that such an assumption in today's knowledge environment (characterised by complexity, inequality of access, and risk) would be a *necessary* but *not sufficient* condition for gaining epistemological access to knowledge in **late modernity**. Late modernity, has been described by Giddens (1999), Beck (1992, 1999) and others as a 'runaway world', a 'globalising world', and a world characterised by 'risk and uncertainty'. Many of the children in the schools involved in the case stories reported above are faced with risks and uncertainties linked to personal safety, economic security, health, food security and poverty in their immediate futures (Nelson Mandela Foundation, 2005); and wider issues such as loss of resources, economic insecurity and climate change risks in their longer term futures (UNEP, 2006; Africa Geographic, 2007; Vyas and Ponzi, 2007), and because of this, it may also be necessary to consider *absenting the limitations of knowledge assumptions designed for high modernity (which dominate formal education structures and histories) and societies characterised by low risk and certainty.*

Our research programme is pointing to the need to *not only* focus on acquisition of concepts and content, within the framework of existant modern vertical and horizontal knowledge structures in teaching practices (to ensure *effective* epistemological access), but *also* to allow children to experiment with open-ended, reflexive epistemological questions such as 'what could be done now?, and 'how can we respond to situation x, y and z with what we know?', and 'how does A relate to B and why might this be interesting or useful to us/ or our community' etc. Perhaps there is something to be gained from thinking deeply about the comment made by Latour (1993) who argues that 'we have never really been modern', and no matter how hard we try to purify knowledge into abstract and structurally defined disciplines, there is always something left over – he calls these 'hybrids', and 'networks' and asks us to consider what lies between the vertical and horizontal differentiations of knowledge that dominate our epistemological access work in education. He wonders why the most complex problems facing humanity today, notably HIV/AIDS and climate change [and poverty] are *inter-disciplinary* or *trans-disciplinary* problems, requiring complex and unusual combinations of disciplinary and other forms of knowledge. Considering this dimension of epistemological access (i.e. within a more open-ended dynamic and complex

framework), *in addition to* the more technical and systematic responses outlined above, is, in my view, a necessary condition of enabling epistemological access for South African learners in an emerging democracy that is unfolding in a wider risk society.

I am also not sure that I completely agree with the blind reviewer cited above, that this is *necessarily* a linear process, even though I agree with the view that knowledge structures do exist outside of our constructions of them, and that existant knowledge pre-exists new knowledge. Archer (2007) argues, from a social realist vantage point, that we can really only make our way in the world reflexively, and for this we need to be able to flexibly engage with knowledge in varieties of applications and circumstances which implies a more open-ended, not quite as linear, approach to epistemological access. Simply focussing on acquisition of knowledge in a systematic order, as proposed by some realists would seem to only half-way address the realist focus that Morrow (2007) asked for in his book. Not engaging with contextual complexity while dealing with structured and systematic approaches to teaching and learning may result in structural redundancy, while only dealing with contextual complexity without structured and systematic knowledge building may result in chaos.

In this sense, I more or less[7] agree with Biersta (2006, p.148) who argues that ". . . the responsibility of the educator is [also] a responsibility for what is to come, without knowledge of what is to come". In this argument, he, in my view proposes an argument for an epistemological foundation for education that is neither empiricist, nor relativist, but located in a form of realism that recognises that it is possible to access a systematically organised and presented body of knowledge that exists outside of our constructions of it (i.e. a realist ontology), but that knowledge is fallible and open to change, and that new contextually significant meaning making possibilities may emerge (i.e. epistemologically constructivist), making *in relation to,* and *emergent from* knowledge that exists in the world out there, and that precedes individual constructions.

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7 Note my addition of [also].

So what might this mean for teacher education practice?

As indicated in the introduction of this paper, Morrow proposed that the current epistemological muddle influencing teaching practice in South Africa can be addressed through a realist focus. I have tried to examine what this might mean in the context of teaching practices oriented to enabling epistemological access, using a selection of 'negative cases' and a realist causal analysis. From this I was able to identify a number of technical solutions that might improve the current situation in schools in South Africa. I have also, however, drawing on Biersta (2006), proposed that we need to move beyond technical solutions and *additionally* embrace an open-ended notion of epistemological access to enhance reflexivity, agency and responsiveness to risk and vulnerability given that such conditions characterise the contemporary context in which children are learning, and people everywhere are living. Projections on HIV/AIDS, climate change risks, loss of ecosystem services, poverty and food insecurity for example, indicate that southern Africa is one of the geographical regions most at risk from the compounded and interrelated impacts of these issues (UNEP, 2006; Africa Geographic, 2007). Educational proposals, if they are to be adequately grounded in realist assumptions should take account of social realist proposals for enhancing reflexivity and heightened forms of agency, and education has a critical role to play in preparing children to live in the world. If such a world presents such challenges, then our conceptions of epistemological access need to take the nature of these challenges into account.

In the past five years we have been experimenting with various teacher education inservice practices that are aimed at addressing some of the issues identified above. Since we are a small programme in a wider faculty, we have not been able to mainstream these across the faculty, or across the teacher education system in any meaningful way. They remain therefore experimental, but appear to have some potential for mainstreaming within an un-muddled epistemological environment, should this be achieved through policy and other measures. I briefly describe three such practices. A more detailed rendition of the practices and their efficacy and wider applicability would need to be the subject of further research. All of these practices are oriented towards addressing some aspect of the 'absenting' agenda outlined above.

Practice 1: Absenting the constraint of lack of resource materials use through resource-based learning approaches

In this experiment we have researched the use of fact sheets in relation to activity sheets in teacher practices. We found that the fact sheets were used by the teachers to 'inform themselves' so that they could use the activity sheets and assist the learners to complete the activities (Mbanjwa, 2001). We found these to be critical 'knowledge resources' for teachers, and found that because they were not too heavily packaged or too difficult to work with, they improved teachers knowledge of the subject they were teaching, and they were able to provide the learners with a more substantive content focus in the lesson. Our most recent experiments here are oriented towards examining teacher's knowledge and how to use more complex materials as we found that teachers consistently choose easier materials (Lotz-Sisitka and Raven, 2001). We are doing this by supporting teachers to use a range of learning materials *in relation to* each other (e.g. fact sheets, museum resource persons and textbooks) (Nduna, 2003; Mbuyaswe, in press). We are learning that there is a need to support teachers to learn how to select materials appropriately, to read more, to use factual information in relation to activity based work, and to develop materials that allow children to read and write. We have also found that a good 'mix' of materials such as a fact sheet, an activity sheet, and enquiry activity and a reporting activity (four in a pack) appears to provide adequate support and guidance for a good quality lesson. Too many materials are 'overpackaged' or too full of activities and no content, and thus do not seem to be grounded in a consideration of enabling epistemological access in the classroom.

Practice 2: Absenting the concept into context transfer problem, with context to concept knowledge experiments

To address the constraints to epistemological access described in the first story (the 'commensualism and mutualism' homework) which pointed to conceptual transfer problems, we are seeking to open 'access routes' that enable learners to differentiate and make more explicit what is known in the everyday through establishing an *iterative relationship between* everyday knowledges and institutional/propositional forms of knowledge that circulate in schools and formal learning institutions. In the case of Story 1, this might mean taking learners to see the cows and eagrets, and the lichen in the tree and then introducing the concepts of commensualism and mutualism, and their value and validity for better understandings of the modern world in a wider time-space register than that offered by the local/everyday practice of simply 'seeing' the eagret and the cow together in the field. We have worked with a

number of such reconstructive research experiments involving the mobilisation of local and indigenous knowledge practices in curriculum contexts.[8] Examples include working with school environmental policies in relation to curriculum requirements (Mvula-Jamela, 2006); looking after wild leafy vegetables in Agricultural Sciences (Asafo-Adjei, 2004) to widen knowledge of agricultural science options use; making of *amaRhewu* in Consumer Studies, to discuss and orient learners to a wider range of healthy food and nutrition options available to them (Kota, 2006); and even brewing traditional beer in Natural Sciences to make knowledge of fermentation processes more explicit (Hanisi, 2006) etc. In essence we are experimenting with Hedegaard and Chaiklin's (1990) 'double move' between situated activity and subject matter concepts, but not in the way that Davydov proposed which was from 'ascending from abstract to concrete' only. We have also not considered these in a sequential process of knowledge acquisition as proposed by the knowledge structures argument of Bernstein (1990) as yet. So far, these studies are beginning to show that working the other way round to the way that Davydov proposed appears to be a) motivating learners and teachers to 'make connections'; b) enhancing epistemological access; and c) unexpectedly generating stronger learning relationships with parents and communities around the schools (O'Donoghue, Lotz-Sisitka, Asafo-Adjei, Hanisi and Kota, 2007).

Practice 3: Absenting poor understanding of disciplinary structures through multi-disciplinary knowledge experiments

The third reconstructive experiment involves teachers in investigating complex knowledge relations in relation to complex problems such as HIV/AIDS and Climate Change. In these knowledge experiments we consider the whole issue from a transdisciplinary perspective, and *at the same time,* we identify the specific disciplinary dimensions of knowledge related to the issues. For example in relation to health and environmental issues we consider the issue in relation to society as a whole, and we consider all kinds of reports, discourses and stories relevant to the issue. We then 'break it up' into disciplinary interpretations, and investigate what each discipline brings to the resolution of the problem, probing the epistemological structure of the discipline and its purpose and intent. In this way we are able to develop knowledge of disciplinary structures (in relation to each other), and also explore the 'hybrid' or 'network' spaces that exist between the disciplines and that make up the picture of the whole. In the context of climate change issues,

[8] Many of these can be credited to the efforts of Rob O'Donoghue's research and supervision leadership.

for example, we examine what is known, and what is not known (i.e. knowledge and unawareness). In some senses and in the context of teacher education practice one can describe this as a 'knowledge exercise' aimed at sharpening the skills necessary for gaining and enabling epistemological access, and for developing confidence in working with knowledge.

We also consider the links between knowledge and practice and consider processes of decision making and agency in relation to available knowledge resources that are available from different disciplinary frameworks. What we are learning so far from this is that the process of investigating complex knowledge relationships in this way enables teachers to gain (critical) perspective on the disciplinary structure of the curriculum and the knowledge environment in which they find themselves (from 'outside' of the disciplinary framing of things), and to 'find flexible pathways' in and out of a structured, categorised, propositional knowledge environment. This should, we think, begin to address the problem in Story 3 where teachers don't want to teach anything unless they 'know' it beforehand. Through this process teachers are able to develop an understanding of the realist nature of knowledge, as well as its fallibility and open-ended possibilities.

Conclusion

As can be seen from the descriptions of the experimental practices above, they are still in embryonic form, and many other such experimental practices are possible. We see these as reconstructive experiments in which we can re-imagine and create new practices in response to the causal factors influencing teaching practice *at the level of teacher education only.* In practicing these experiments, we are acutely aware of the fact that these issues cannot only be addressed by teacher education institutions alone, although they *do* have a critical role to play. A range of other structural and policy related interventions are necessary to adequately address the epistemological access problems in schools, for example efficient distribution of textbooks that are knowledge rich, and of a high quality, and a more differentiated curriculum policy that also allows some flexibility for open-ended epistemological access and the emergence of reflexivity in response to risk.

The paper has essentially argued that for teachers to become *good teachers* in the structured knowledge environment of a formalised, disciplinary curriculum context (influenced by a more complex and changing knowledge

environment), they themselves need to have a broader understanding of the contemporary knowledge environment. This will be necessary if they are to address the constraints reported in stories 1–4 above in non-mechanistic ways. In our view, this requires careful experimentation and 'trying out' (with teachers) how to best enable epistemological access in schools through teaching practices.

In closing this paper I propose that there is the potential to explore many more such open-ended practice-centred reconstructive experiments and that this might provide us with the creative space necessary to consider questions of enabling epistemological access more carefully, critically and creatively in future. Epistemological access, in the sense used by Biersta (2006) and in the sense used in relation to these practices, remains an open question in education. We have yet to learn more about, and address the complex array of problems associated with epistemological access identified in this paper (and reported by others over the past few years), if we are to adequately address the realist focus that Morrow proposed in his book.

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