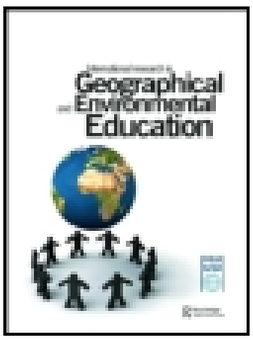

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Powerful geographical knowledge is critical knowledge underpinned by critical realism

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ABSTRACT

Geographical knowledge is powerful if it is critical and empowering. This article develops this argument with reference to the philosophy of knowledge and Laura Wheelahan's advocacy of critical realism as the philosophical strand of her social realist curriculum theory. While the GeoCapabilities Project has drawn on the sociological strand of that theory, its neglect of the philosophical strand means that its concept of powerful geographical knowledge remains ambiguous. Incorporating critical realism, along with critical theory and pedagogy, would allow the project to better realise its aims and open up new directions for research.

KEYWORDS

Powerful knowledge; critical geography; critical theory; critical realism; philosophy; curriculum

Editorials in recent issues of IRGEE have included an interview with David Lambert on the concept of geography as powerful knowledge (Stoltman, Lidstone, & Kidman, 2015) and a challenge to him on this topic, from his former colleagues Frances Slater and Norman Graves (Slater, Graves, & Lambert, 2016). This exchange concluded with David stating that what mattered was not primarily curriculum content but whether teachers could define in what ways geography is powerful knowledge. The editors of this journal have expressed an interest in continuing to address this topic through peer reviewed articles such as this.

My short answer is that geographical knowledge is powerful if it is critical and empowering. To be critical it should reveal the structures and processes at work in the world that lead to injustice, a lack of democracy, and a failure to realise sustainable forms of development. It should reveal ideology that masks these structures and processes and should offer social alternatives or ways of realising justice, democracy, and sustainability that can empower individuals and communities as they apply theory to practice, Critical theory (Bronner, 2011) of many kinds underpins powerful and empowering geographical knowledge as the work of critical academic geographers demonstrates. If geography teachers are to understand this knowledge and draw on it in their curriculum making, they will need to be introduced to the philosophy of knowledge.

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The philosophy of geographical knowledge

Geographers do not agree on what things can be said to exist, what things matter and why, and how knowledge of these things can be produced. Their debates and differences (those between mainstream and critical geographers, for example) reflect different underlying philosophies of knowledge or differences over ontology, epistemology, and methodology. These terms are explained in Figure 1 which also summarises six of the philosophies that geographers use to guide their research, explanation, thinking, and teaching about the world.

While empiricism, positivism and to an extent social constructivism, underpin mainstream geography and geographical education (that describes and explains the current ordering of space, place and nature, without offering significant critique or advocating alternatives), structuralism, critical theory, and critical realism, underpin critical approaches that also draw on social constructivism. Marxist structuralism, the critical theory originating with the Frankfurt School, and critical realism are all founded on dialectical materialism (Waddington, 1974). This understands the world in terms of material causes, not as a complex of ready-made things but as a system of processes, flows, and relations (structures) through which all things come into being, exist, and pass away. Flows of energy, material and information, within and between the bio-physical and social worlds, create, sustain, and undermine human environments, and change results from the contradictory nature of the processes, flows and relations shaping social development. Dialectics seeks to explain the general principles of movement in the bio-physical and social worlds and in thought. These suggest that the environments that people create are always contradictory and problematic because of the multiple relations and processes that shape them. The four principles of dialectics are outlined in Figure 2.

	Empiricism	Positivism	Structuralism	Social constructivism (post-structuralism)	Critical Theory	Critical Realism
Epistemology What it is possible to know. The reality that exists and how it does so.	Knowledge is based in experience.	Knowledge is based in experience supported by verifiable evidence.	Knowledge is based in the world of structures, processes and relations. Experiences do not necessarily reveal this world.	Knowledge is created subjectively in a world of meanings and representations created by individuals, groups, institutions and media of all kinds	Knowledge is socially constructed in ways that reflect different interests. The dominance of the technical interest limits understanding.	Knowledge is created by building models of how real processes shape events and experiences in the light of contingent circumstances.
Ontology How reality can be known. The criteria for judging the truth of a statement about reality.	The things we experience are the things that exist.	What exists is what we can observe and experience, either directly or with the aid of scientific instruments..	What really exist are the structures, processes and relations that shape the world. These cannot be observed directly.	What exists is what people perceive to exist.	What exists is the possibility of understanding the world through communicative rationality based on consensus.	What exists are the related domains or levels of real processes, actual events, and empirical experience.
Methodology An associated set of rules and procedures to guide research and inquiry.	The presentation of experienced facts.	Verifying regularities and connections between observations of reality, based on hypothesis testing and scientific method.		The investigation of personally and socially constructed meanings, representations, images and discourses in ways that stress subjectivity.	The construction of critical theories in conditions of free and open dialogue that allow all claims to knowledge to be fairly tested for truth.	The building and testing of hypothetical models of how real mechanisms shape events that we may or may not experience.

Figure 1. Six philosophies that underpin different forms of geographical explanation (adapted from Huckle & Martin, 2001, p. 24).

TOTALITY or everything is related. Nature is a coherent whole. Things are related and reciprocally condition each other. They are to be understood in their concrete totality. Everything has something to do with everything else. Nothing is isolated.
MOVEMENT or everything is constantly being transformed. Nature is in a state of becoming. Movement is a quality in everything. Nature, society and thought are not fixed but continually being transformed, never definitely established, always unfinished. The cause of movement is internal struggle or contradiction. The general movement of reality makes common sense. It accords with our experience of the world as one of becoming, existing and passing away.
QUALITATIVE CHANGE or the tendency to self organisation and complexity. Transformation in nature is not a circular process of endless repetition but an evolutionary process towards higher states of self organisation and complexity.
CONTRADICTION or the unity and struggle of opposites. The transformation or evolution of things is only possible because opposing forces coexist within them and simultaneously move toward unity and opposition. Such contradiction is inherent in all things (nature, society and thought) and is the cause of movement whereby contradictory aspects may attain a higher state of resolution (organisation, complexity) that is always conditional, temporal, transitory, and relative

Figure 2. The four principles of dialectics (Gadotti, 1996, pp. 17–20).

Dialectics and the related philosophies that underpin critical geography, claim that knowledge and truth are practical questions or that the validity and power of ideas is demonstrated by their utility. Knowledge starts from activity in the material world and is refined as it is exposed to other contradictory knowledge. The compromise reached is evaluated by applying it in action such that theory is a guide to action and action a test of theory. Reflection and action (a process termed praxis) is the basis of critical pedagogy (critical teaching and learning) or the way in which teachers and pupils can create socially useful knowledge by reflecting and acting on the events, issues, and ideas (including ideas from critical theory) that they experience (Giroux, 2011; Kincheloe, 2005).

Critical geography

Drawing on Blomley (2006), suggests that critical geography based in dialectics has the following characteristics:

(1) *A commitment to theory and a rejection of empiricism*. Critical geography is not content to merely describe the world (empiricism). It consciously deploys critical theory from such sources as Marxism, anarchism, feminism, and post-colonialism, to

explain the structures and processes at work in the world that shape, and are in turn shaped by, nature, space, and place.

(2) *A commitment to reveal the processes that produce oppression and injustice.* Critical geographers seek to unveil power, uncover inequality, expose resistance, and cultivate liberating politics and social change.

(3) *An emphasis on representation as a means of domination and resistance.* A common focus of critical geography is the study of how representations of nature, space, and place sustain power or are used to challenge power.

(4) *An optimistic faith in the power of critical scholarship.* Critical geographers believe that critical theories and ideas can be used to resist the dominant representations of reality, and that scholars and teachers can challenge people's partial or false understandings and so help free them from oppression. They have an implicit confidence in the power of critical theory and pedagogy to reach those alienated from the world, and in the capacities of people to defeat alienation by means of reflexive self-education.

(5) *A commitment to progressive practices.* Critical geographers want to make a difference. They claim to contribute to and work with social movements and activists committed to social justice, democracy, and sustainability.

(6) *An understanding of nature, space, and place as critical tools.* Critical geographers pay special attention to how relations between people and the rest of nature, relations between people in space, and the relations between people in any one place, and the representations of these relations, can be the sources of oppression and inequality or of liberation.

At this point, readers may wish to pause and reflect on which of these characteristics entitle critical geography to be labelled powerful knowledge.

Early pointers to a new focus on powerful knowledge and geocapabiities

To understand current debates over powerful geographical knowledge, it is necessary to consider two key texts, one co-authored by Lambert (Lambert & Morgan, 2010) and the other published while he was the chief executive of the Geographical Association (GA). The opening chapter of the first text explains that school geography in England should be seen as part of a continuing engagement with economic and social change and that while it underwent a process of modernisation from the1960s, the curriculum projects of the 1970s and 1980s adopted a consensual (positivist) model of society that favoured the role of geographer as technocrat. This model (ignoring dialectics and critical theory) was unable to address important questions about social change and the authors admit to being 'profoundly affected by the changes of the 1980s and the limits of school geography's responses. The text seeks a robust and intellectually defensive alternative and the authors draw on Lee (1985) who suggested that this should be based in historical and geographical materialism and "not be bound by disciplines". Lambert and Morgan's alternative involves developing a "capability" perspective on school geography and reconceptualising its core concepts.

By publishing its manifesto, *A Different View* (GA, 2009), the GA sought to start a national conversation on school geography around such themes as geography as a

"curriculum resource"; what it means to "think geographically"; the need for teachers to see themselves as curriculum makers; and the subject's potential to help young people to envision themselves in the world now and in the future (a geocapability). The two texts suggest that it was the need to put school geography on more secure ethical, philosophical and sociological foundations that was to lead to concerns over powerful knowledge. The idea then spread to the international community of geographical educators via the Geocapabilities Project (GCP).

Before considering the factors that prompted a return to knowledge by geographical educators and curriculum theorists, it should be noted that critical geography did play a role in the evolution of school geography for a brief period in the 1980s. The journal *Contemporary Issues in Geography and Education* (1984–1987) (Norcup, 2015) along with *Teaching Geography for a Better World* (Fien & Gerber, 1988) are among texts that outlined its potential, but as Morgan (2011a) reminds us such initiatives were too little, too late. The conservative reforming of education using such instruments as national curricula, league tables, the erosion of teacher professionalism and militancy, and the establishment of new kinds of schools (Hill, Lewis, Maisuria, Yarker, & Hill, 2016; NUT, 2017) meant that radical education (Wright, 1989) went into retreat but continued to influence adjectival educations (environmental, development, global, citizenship, etc.) to a greater extent than it did geography. Only a small number of geographical educators continued to argue for a critical approach (for example, Fien, 2010; Heyman, 2010; Huckle, 1997; Morgan, 2011a).

The cultural turn and the retreat from subject knowledge

The cultural turn taken by academic geography in the 1980s and 1990s reflected the challenges to modern knowledge mounted by post-modernists and post-structuralists (Belsey, 2002; Butler, 2002) who questioned its foundationalism, totalisation, and utopianism (see

Modern Knowledge	Postmodern Knowledge	Critical realism
Foudationalism There are indisputable foundations for knowledge in sensory experience (empiricism) and rationality (rationalism). Scientific enquiry and reason can reveal the essential truth about the world.	**Anti-foundationalism** There are no indisputable foundations for knowledge; no general criteria to distinguish truth and falsity. Language, thought and reality are interdependent and all knowledge is mediated through language rather than being an accurate reflection of nature. Truth is relative and there are no guarantees of truth or reality outside language or discourse.	**Foundationalism VS Antifoundationalism** Acknowledging the inevitable mediation of reality does not mean that there is no criteria at all, or indeed general criteria, for deciding what is true of right. Nor does it mean that there is no connection between language and discourse and the real world.
Totalization. It is possible to advance general or universal theories about nature, society, geography and history. They each have an inner logic and are ordered according to universal laws.	**Anti-totalization**. It is arrogant to advance general theories that pretend to reveal universal truths or meanings. We should abandon such attempts and accept a diversity of limited theories and truths. We should be particularly sceptical of totalizing thinking that seeks to explain the world from centred and privileged positions of male power.	**Totalization VS Anti-totalization** Accepting a multitude of limited theories or texts should not mean abandoning the search for general theories that seek to show how these are related to one another.
Utopianism. The application of increasing knowledge brings constant improvement in the human condition. Science, technology and bureaucracy offer rational control of nature and society and thereby bring material prosperity, individual liberty, social equity, universal morality, and emancipation from natural calamity, poverty, disease, and political oppression. This is sometimes called the modern project.	**Anti-utopianism** Modern knowledge has not delivered utopia or enlightenment, but has resulted in oppression and domination. There is no justification for accepting grand stories or narratives of human progress that suggest that history has purpose and that things will continually get better.	**Utopianism VS Anti-utopianism** Modern rationality can be used to dominate or liberate. The problem is not the modern notion of progress but its partial realization. We should retain a realistic utopianism.

Figure 3. Characteristics of modern and post-modern knowledge and how critical realism seeks to reconcile these (Pilkington, 1997).

Figure 3). Central to these challenges is the notion of social constructivism (Figure 1). Critical realism offers a way of resolving the differences between modern and post-modern knowledge and we will be examining its assumptions later.

For the moment, it is sufficient to note that social constructivism has led to a multiple academic geographies (children's, feminist, tourist, queer, behavioural, consumer, etc.) and has impacted on school geography where the assumption that the world is a text that can be read in various ways in now common (Morgan, 2010). Matters of representation, consumption, and identity are given greater attention but to the extent that cultural geography focuses on representations and neglects underlying political economy, it risks becoming an idealistic diversion (Smith, 2007).

Lambert and Morgan (2010), Morgan (2010, 2011b), and Mitchell (2017) all consider the impact of educational reform and the transition from modern to postmodern school geography on teacher and learner identities and teachers' roles as curriculum makers. In short, a host of factors led to the education of autonomous learners (cognitive and social skills or competences) and the promotion of social cohesion through notions of global citizenship, taking priority over the transmission of subject knowledge.

The turn to knowledge via geocapabiities

To address the neglect of subject knowledge, Lambert and Morgan (2010) advocated an approach to school geography based on education for geographical understanding and pupils as knowledge producers. The geography curriculum should aim to foster geo-capabilities or "the capacity of children and young people to use the key, organizing concepts of geography (such as scale and interdependence) in their enquiries and endeavours to make sense of the world" (p. 53). The idea of capabilities is derived from the work of Amartya Sen and Martha Nussbaum in welfare economics. Capabilities are value laden (reflect aims and purposes) and their delivery therefore requires engagement with questions of philosophy. Pupils need both the vocabulary (extensive knowledge) and grammar (intensive knowledge) of geography, and the authors explore how core concepts can be reconstructed using a range of grammars (philosophies). They argue that geography teachers should have their own philosophies of geography and education but appear reluctant to evaluate the power of different philosophies or suggest a philosophy that can hold them together in creative tension. I will later argue that critical realism can do this.

The return to knowledge via curriculum theory

Beyond geographical education, curriculum theory was being enlivened by those who claimed, from differing political viewpoints, that everyday contextual and immediately applicable knowledge had displaced academic, disciplinary knowledge from the school curriculum because it was seen as more productive and relevant (Beck, 2013). Both social constructivism and technical instrumentalism, are guilty of this neglect, with one casting learners as context dependent constructors of knowledge, and the other stressing content relevant to pupils' future working lives. Traditional conservatism maintains an emphasis on disciplinary knowledge, again for instrumental reasons (the access it provides to higher education and professional careers).

Social constructivism, technical instrumentalism, and traditional conservatism had led to a crisis of curriculum theory since all regard knowledge instrumentally and not as an objective in its own right (worth knowing for its own sake). This crisis led Young (2008, 2014, 2015) to revise his earlier position on the classification. framing, and politics of educational knowledge (Young, 1971). While disciplinary knowledge and subject boundaries were earlier seen as imposed by the powerful in their own interests (and were to be eroded by the introduction of integrated curricula with weakened classification of knowledge), he now advocates a curriculum based in powerful disciplinary knowledge (PDK) that all pupils have a right to learn (Morgan, 2014a).

Young's revised thinking distinguishes between two kinds of knowledge that his earlier position conflated: knowledge of the powerful (high status knowledge that is useful to the powerful and often laden with ideology) and PDK that enables learners to participate in society's conversation about itself; think the not yet thought; see beyond appearances; and imagine alternative futures. Such knowledge provides access to political and policy arguments and is developed in disciplinary communities of scholars. As far as geography is concerned, I argue that it is that body of knowledge developed by critical geographers.

The social realist curriculum and objective knowledge

The curriculum theory that has emerged stressing why knowledge matters, is termed social realist (Wheelahan, 2010). It is social in arguing that all knowledge is socially produced by communities of knowledge producers and is therefore fallible and open to change. It is realist in arguing that knowledge is about an objective world, one that exists independently of our social construction of it. It maintains that the purpose of education is the acquisition of knowledge and that access to theoretical knowledge provides the means to navigate both the boundaries between theoretical and everyday knowledge and those between different kinds of theoretical knowledge. Such boundary navigation is central to such fields as education for sustainability (Evans, 2012; Huckle & Sterling, 2016; UNESCO, 2017) that draws on the natural and social sciences and the humanities and assumes that new forms of understanding will encourage changed forms of ethics, citizenship, and everyday living.

Social realism and school geography

The turn to knowledge and social realism has attracted the attention of geographical educators in the UK, including Lambert (Firth, 2012; Young & Lambert, 2014). Firth introduces geography teachers to the social realist conception of knowledge and curriculum, comparing it with an absolutist conception underpinned by a positivist philosophy of knowledge and a relativist conception underpinned by social constructivism. He terms social realism a sociological rather than a philosophical approach to knowledge that seeks to identify the social basis of the objectivity of knowledge in relation to education.

Objectivity (truth) has its social basis in scholarly communities (e.g. academic geographers) who, as we have seen, draw on philosophies of knowledge that with suitable adaptation, should be incorporated into meaningful learning in schools. Firth follows Young and Muller (2010) in evaluating educational futures based on absolutism (content acquisition), social constructivism (learning to learn), and social realism (induction into ways of

knowing), claiming that the latter can accommodate both the commitment of socially progressive constructivists to social justice and that of traditional conservatives to disciplinary knowledge.

The concepts of PDK and alternative curriculum futures were adopted and developed by the GCP.

The Geocapabilities Project (GCP)

The GCP (GCP, 2017a; Lambert, Solem, & Tani, 2015a) develops the notion of geocapabilities earlier introduced by Lambert and Morgan (2010) by drawing on social realist curriculum theory and seeking to identify PDK in school geography that develops learners' capabilities to lead lives they have reason to value within the contexts in which they find themselves. It associates a socially realist educational future (Future 3) with a curriculum of engagement whereby pupils are introduced to geographical ways of thinking that foster geocapabilities.

> ***Future 3*** GeoCapabilities is concerned with active pedagogies, but also with **what** young people learn. GeoCapabilities wants teachers and young people to be engaged with dynamic, evolving geographical knowledge. Future 3 is interested in the shifting ideas and arguments that have created powerful disciplinary knowledge. It is this, rather that lists of disconnected, inert or given 'facts', that defines the F3 curriculum. (GCP, 2017b)

The GCP acknowledges aims in education by linking PDK to the development of human capabilities (Uhlenwinkel, Béneker, Bladh, Tani, & Lambert, 2016) or what people need to achieve their potential: to stay healthy, take part in economic, political, and cultural life, and take responsibility for their own lives (GCP, 2017c). The project maintains that access to specialised knowledge in school can influence human capabilities or that knowledge derived from the community of geographical scholars enables young people to "think the not yet thought" (GCP, 2017b).

Drawing on Nussbaum's classification of human capabilities, the project has identified three hypothetical geocapabilities:

- Promoting individual autonomy and freedom, and the ability to use one's imagination and to be able to think and reason;
- Identifying and exercising one's choices in how to live based on worthwhile distinctions with regard to citizenship and sustainability; and
- Understanding one's potential as a creative and productive citizen in the context of the global economy and culture.

The characteristics of the PDK that contributes to these capabilities, as identified by the Project and Maude, are outlined in Figure 4. Again, the reader may wish to pause at this point and consider which of these characteristics can only be realised if the curriculum contains significant elements of critical geography.

GCP has partners around the world, embraces diversity in culture, language, and in how geography is understood and expressed in national school standards, and believes that a capabilities approach helps geography educators in all jurisdictions articulate the relevance and power of learning how to think geographically (Lambert, 2015). It has

Powerful disciplinary knowledge is:	Geography's five powerful knowledge types are:
evidence based abstract and theoretical (conceptual) part of a system of thought dynamic, evolving, changing – but reliable ('testable' and open to challenge) sometimes counter-intuitive exists outside the direct experience of the teacher and the learner discipline based (or at least in domains that are not arbitrary) (GCP, 2017d)	knowledge that provides students with 'new ways of seeing the world'; knowledge that provides students with powerful ways to analyse, explain and understand the world; knowledge that gives students some power over their own knowledge knowledge that enables young people to follow and participate in debates on significant local, national and global issues; knowledge of the world. (Maude, 2016, 2017)

Figure 4. Characteristics of powerful geographical knowledge.

created materials (training modules and curriculum vignettes) that develop teachers as curriculum makers and leaders.

Critical realism

The failure of Lambert and the GCP to associate powerful knowledge with critical geography is largely due to its overlooking the philosophical strand of Wheelahan's socially realist argument. As summarised in Figure 5, her curriculum theory combines insights from both the philosophy and sociology of knowledge. The nature of knowledge itself (the philosophy of knowledge as revealed by critical realism) has implications for the how knowledge is classified, sequenced, presented, paced, and evaluated in curriculum, while the social basis of knowledge (sociology of knowledge) needs to be identified if the curriculum is to provide equitable access for all pupils. These two strands have much in common, as indicated by the third column of Figure 5, but it is the philosophy of critical realism (column one) that should shape a critical and powerful school geography. To date, few geographical educators have realised this, but see Major (2017) and Huckle (2004).

Critical realism's notions of ontological depth, emergence, stratification, and co-determination

Critical realism (Archer et al., 1998; Bhaskar, 1997; Collier, 1994) builds on dialectics with its notions of ontological depth, emergence, stratification, and co-determination (Figure 5, column one). These will now be explained with reference to dialectics and the powerful knowledge that is needed to develop geocapabilities relating to citizenship, sustainability, and the global economy.

Philosophy of Knowledge (Bhaskar's critical realism)	Sociology of Knowledge (Berstein's social theory)	Agreement that:
Focuses on the extent to which knowledge portrays the real world of objects (structures) with generative mechanisms that shapes events and experiences. Identifies the causal and emergent properties of knowledge that arise from critical realism's notions of ontological depth, emergence, stratification and co-determination. The fallibility of knowledge and judgemental rationality are based on the need to choose between competing accounts of the same world. The theoretical is distinguished from the everyday because it represents our systematic knowledge about the relations between things which extends and supersedes our ordinary understanding of things. Theoretical knowledge, organised in disciplinary frameworks, is society's collective representation of the causal mechanisms the disciplines study by exploring the relationship between the real, actual and empirical. It enables society to transcend the everyday; provides access to the real world; and should play a key role in curriculum design, delivery and evaluation.	Focuses on the social relations shaping how educational knowledge is produced (classified) and reproduced / delivered (framed) in the curriculum. The distinctions between esoteric (theoretical) and mundane (everyday) knowledge structure social practices and social relations, including those associated with schooling. Argues that access to theoretical knowledge is a question of social justice. Identifies the causal and emergent properties of structures of knowledge. Distinguishes between theoretical knowledge as vertical discourse and everyday knowledge as horizontal discourse. Differentiates within vertical discourses and suggests that the resulting classification of knowledge provides the basis for connecting knowledge production with its reproduction in curriculum. Disciplinary knowledge is a social product marked by the social conditions of its production which include power and privilege. Enriches critical realism which does not generally pay sufficient attention to the structures of knowledge as a generative mechanism.	Both regard society as consisting of objective, socially differentiated social structures and in this sense are realist. Both see knowledge as real with properties that transcend the conditions under which it was produced. Both see knowledge as historically and socially constructed and agree that the social mediates practice and the creation of knowledge. Both seek to go beyond 'the facts' to identify the 'invisibles', that is, the objects and their generative mechanisms that structure the world, and each emphasizes the role of society in understanding and accessing the world and in building knowledge. Both are committed to a 'depth' ontology in which generative mechanisms in the domain of 'the real' interact in necessary and contingent ways to produce events and experiences in the domains of 'the actual; and 'the empirical' respectively. Both are committed to a notion of alternative possibilities because their analysis identifies the ways in which generative mechanisms interact and the ways in which they could interact to give rise to different outcomes.

Figure 5. The philosophy and sociology of knowledge as foundations for curriculum theory (Vernon, 2016; Wheelahan, 2010).

Ontological depth suggests that to understand the totality (Figure 2) of the world we need to recognise three domains of reality:

- *The real domain* consisting of structures (e.g. the solar system, ecosystems, capitalism, language, society) and their generative mechanisms (e.g. gravity, ecological succession, profit seeking, discourse, social class). Structures (relations) and mechanisms (processes) here generate events that happen and the things we experience. Movement and qualitative change (Figure 2) mean that structures change with time (e.g. stars die, species become extinct the Soviet Union disintegrates, new social classes, and forms of politics appear). Structures of economic political and cultural power, operating at different geographical scales, shape and are shaped by differing forms of governance and politics, and determine whether or not societies develop in sustainable ways.
- *The actual domain* of events that are co-determined by the interaction of different mechanisms (totality, Figure 2). The same mechanism (e.g. profit seeking) and its underlying structures (e.g. class power) can produce different results depending on contingent circumstances (e.g. nation states introduce different policies on sustainable development due to their differing economies and the balance of power between corporations, political parties, trade unions, and groups in civil society urging sustainability).
- *The empirical domain* of experience. Events in the actual domain, caused by mechanisms in the real domain, may or may not be experienced (e.g. without lessons in critical geography young citizens may be unaware of biodiversity loss and/or unaware of its links to the global capitalist economy's accelerating commodification of ecological habitats and resources).

Emergence means that the biological world emerged from the physical world and social world emerged from bio-physical world. Reality displays *stratification* with higher level strata unable to escape lower level laws (e.g. the laws of physics and ecology that impose ecological limits to economic growth). Individuals, communities, societies, and states are different kinds of things in the social world, with different properties, and the ability to act reflexively to affect their ongoing development. The environmental crisis challenges them to find emergent forms of social organisation, laws, and citizenship, that allow the co-evolution of the bio-physical and social worlds in progressive and sustainable ways. Critical theory suggests that such qualitative change (Figure 2) will be characterised by radical forms of democracy and ecological and global forms of citizenship, and will be driven by the mounting contradictions (Figure 2) associated with the current global capitalist economy (Harvey, 2010, 2014).

Co-determination means that while things have propensities to act in certain ways given their composition, they may or may not act in these ways when they interact with other things in open systems. Events are contingent on other events; contradiction is inherent in all things; and if society attains sustainability and/or the world realises global democracy these higher states of organisation and complexity are likely to be conditional, temporal, transitory, and relative (Figure 2).

An indication of what powerful knowledge might inform curriculum making that foster capabilities relating to sustainability and citizenship is provided by Death (2014), Ecopedagogy (Kahn, 2010) has a long history in geography (Toro, 2016) and provides a related critical pedagogy.

Towards a critical and powerful school geography

Critical realism suggests that the geography curriculum needs to acknowledge depth ontology (all three domains of reality) by encouraging forms of understanding that relate experience and events to underlying structures, mechanisms and things. Empiricism, positivism, and social constructivism, the dominant philosophies shaping the curriculum (Futures 1 and 2), fail to do this, seeking explanation in the ordering of observed events and experience, or suggesting that these are merely what people and language claim them to be. By assuming that what happens (or what is socially constructed in language) is all that could happen, dominant philosophies deny the possibility of realist alternatives (Frase, 2016; Mason, 2016; Wright, 2010) anchored in the potentials of the real domain. Furthermore they encourage an understanding of the world devoid of structures and constraints, in which all that is necessary to change the world is for individuals to think and act differently.

Incorporating critical realism puts the Futures 3 curriculum on a more secure foundation, allowing teachers and students to create knowledge whilst becoming aware of the strengths weaknesses and powers of different philosophies or grammars of geography. It is key to the robust and intellectually defensive alternative school geography that Lambert and Morgan propose.

Research directions

My argument suggests priorities for further research leading to possible articles in this journal:

- An evaluation of GCP's curriculum vignettes to assess the extent to which they draw on critical geography, critical pedagogy, and critical realism.
- An exploration of the kinds of curriculum making that lead pupils to view the world from the perspective of dialectics and critical realism. Research should focus on the nature of such thinking, its links to critical pedagogy, and how it differs from current formulations of critical thinking (Burbules & Berk, 1999).
- Dialectics and critical realism suggest that the fragmented school curriculum is a source of alienation (Dickens, 1996) and pupils' interests would be better served by integrated curricula in the form of environmental education, social studies, or global education. While current realities lead to guidance on embedding education for sustainable development and global citizenship in school subjects such as geography (UNESCO, 2017), researchers should continue to explore the politics of school knowledge and the costs and benefits of relaxing the classification of educational knowledge (Huckle, 1975).
- As an international project seeking to foster capabilities relating to sustainable development and global citizenship, the GCP should have given more attention to UNESCO guidance (UNESCO, 2014, 2015a, 2015b, 2017).There is scope for researchers to assess how might be incorporated into the theory and practice of delivering geocapabilities.

Ultimately critical geography and powerful knowledge can only flourish, as part of integrated curricula, within a future socialist society with radical education policies (Fielding & Moss, 2011). Meanwhile, it is geography that holds a privileged place in the school curricula of many countries and it is geography teachers who would benefit from a more empowering definition of powerful knowledge.

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