ACCESS: CONTEMPORARY ISSUES IN EDUCATION
1995, VOL. 13, NO. 2, 72–77

RESPONSE

Constructing objectivism: A response to Robert Nola

Michael Peters

Department of Education, The University of Auckland.

Robert Nola's argument is clear and lucid, and there is much with which I can agree. His position is based upon the following main arguments: (1) that there are ' severe difficulties' with constructivism as an account of the nature of knowledge - an argument that he attempts to establish by reference to the true justified belief account of knowledge first developed by Plato; (2) that, contrary to claims made by some constructivists, there is no necessary relation between objectivism, on the one hand, and a didactic account of teaching, on the other; (3) that constructivism, unlike objectivism, has problems accounting for the very possibility of correction; (4) that some accounts of what I shall call 'meaning constructivism' are 'wedded to an untenable behaviourism', and; (5) that the hypotheticodeductive (H-D) method serves as a rival model of learning to constructivism.

Preliminary observations

I shall begin by making some preliminary observations about the structure of Nola's arguments before advancing some of my own. Nola's second argument amounts to a defensive strategy: it implicitly accepts the negative value attributed to didacticism by constructivists and attempts to demonstrate that there is no necessary relation between objectivism and didacticism. It is an argument which does not impinge on the viability of constructivism as an account of either knowledge or learning/teaching. Underlying the second argument, it seems, is a more general argument to which Nola is committed: that there is no necessary link between accounts of knowledge and learning and/or teaching.[1] The net effect of entertaining this more general claim means that it is possible to consistently hold radically different accounts of knowledge and learning/teaching. Nola argues, for instance, that it is perfectly consistent to be an objectivist in terms of knowledge without being a didactivist in pedagogy; he even suggests that there may be "useful things to be obtained from some constructivist accounts of learning and teaching". I am not sure what this claim amounts to: does it mean that the constructivist account of learning/ teaching (or some variant of it) could be true? Does it mean that it is possible, perhaps, to be a objectivist when it comes to epistemology and a constructivist when it comes to pedagogy? I find this altogether puzzling.

Another matter somewhat puzzling in the structure of Nola's argument is that he embraces a Platonic theory of knowledge and yet in order to argue against Osborne and Freyberg's 'untenable behaviourism' he adverts to recent developments in contemporary theory of meaning based on the work of Wittgenstein (and Chomsky) which is manifestly anti-Platonic (Pears, 1988). It is not clear to me whether Nola himself accepts a Wittgensteinian view of meaning. If he does not, his argument against Osborne and Freyberg seems weak for he is using an account of meaning against them which he is not prepared to accept himself; if he does then he is obliged to square his Platonic account of knowledge with his anti-Platonic account of meaning, that is, if one accepts that there is or ought to be some sort of relation of internal consistency between accounts of knowledge and meaning that one embraces. Even if it is the case that Osborne and Freyberg's model of generative learning is open to criticism from the Wittgensteinian view of meaning (and I would agree with Nola

that it is), this does not impugn the general case for constructivism when it comes to either knowledge or meaning.

The third argument is important and one that, I think, constructivists, radical or otherwise, are obliged to address directly. Nola's claim is that "Constructivists who abandon the idea of objective knowledge make heavy weather of even the bare possibility of correcting pupil 's false or inadequate constructions." I would like to suggest that constructivists should tum to the later Wittgenstein for an account of 'correction' which does not assume a realist or more particularly, Platonic, view of meaning and yet satisfies Nola's objection. Wittgenstein's views are well known and I shall not therefore labour the point here except to point out that Wittgenstein in his later work rejects all a priori attempts to argue that thought and language must have a (deep) structure imposed upon it by the world. Both his earlier theory advanced in the *Tractatus* and Plato's philosophy, he comes to understand as postulates of reason (rather than experiential discoveries) which can never be verified. Wittgenstein understands that both his earlier philosophy and that of Plato contribute to a view concerning the fixity of meaning that renders language impossible (Pears, 1988: 206, 363, 385, 483-8). Wittgenstein emphasises that speaking a language is a practice and practices as instances of what we actually do helps to determine what we ought to do. This normative element is important when we come to understand the nature of rule-following, and, in particular, "the indefinitely prolonged sequence of correct applications of a word [which] cannot be fixed unequivocally by any example or set of examples". As Pears (1988: 208) expresses it: "The correct continuation of a series can only be determined by what we, who continue it, find it natural to do". While the cases of language learning or the acquisition of the meanings of words and concepts are more complex matters, my point is that constructivists if they accepted a Wittgensteinian view of meaning would find no inconsistency in holding an account of 'correction' which does not presuppose objectivism.

The case Nola makes for the H-D method of learning as a rival to constructivism is philosophically interesting and convincing. As a 'model' of learning it seems logically possible and deserving of serious consideration. My only question concerns the status of the model: it is advanced a priori and surely stands in need of empirical testing? This leaves the question of the adequacy of constructivism as an account of knowledge which is really Nola's main argument. I agree with a number of Nola's criticisms of constructivism, at least the versions he outlines in his paper.[2] I will not attempt to defend constructivism but rather I will suggest that Nola's account of objectivism constitutes a *construction* of sorts, an interpretation which is essentially a Platonic construction .

Constructing objectivism

Most philosophers trained in the analytic tradition would accept there is a difference between science itself and accounts of science, the latter being a matter of philosophical interpretation rather than one of knowledge. Those who have grown up in the tradition would probably acknowledge that philosophical accounts of knowledge, while employing reason and argument, have not occasioned anything like a consensus. As philosophers we come to learn the tradition in which we stand, in part, by coming to understand and criticise the theories or accounts that have warranted attention over the years and together comprise or define the tradition. Students of philosophy learn there are different accounts of knowledge – say, rationalist, empiricist, pragmatist - and versions of these accounts. They learn, in part, by following the debates that surround these accounts. Sometimes they learn by examining the thought of a particular philosopher and often become followers: a Platonist, an empiricist Lockean, a Wittgensteinian or even a Nietzschean.

Robert Nola belongs to the analytic tradition. He is a skilled practitioner. He has learned to make arguments and distinctions and on this basis he reconstructs the tradition to make the case for objective knowledge and against constructivism. He invokes the true justified belief account of

knowledge; he recognises and uses established rules of logic (modus ponens, modus tollens); he distinguishes between 'reasons' and 'meanings', 'constructing' and 'testing' sentences; he appeals to Chomsky and Wittgenstein on language learning to reject empiricist accounts of meanings and appeals to Ryle on the grammar of ' achievement' words; and so on. He also *constructs* a case - one that cannot be simply read off 'reality' or the history of either science or the· philosophy of science - and provides an *interpretation.* The interpretation he presents is Platonic in terms of the account of knowledge or of teaching/learning he presents (eternal ideas?); in terms of the story he wants to tell about the history of both science and the philosophy of science as essentially ·the *achievement* of Platonism; in terms of separation of questions of 'knowledge' and 'power', of science and politics. Science, on Nola's Platonic model of knowledge, is somehow autonomous from the rest of society.

I find this view problematic, especially in light of developments in the studies of science written since Thomas Kuhn's (1970) *The Structure of Scientific Revolutions.*[3] Given the limitations of space here I can do no more than advert to and schematise the main lines of post-Kuhnian inquiry. I should start by acknowledging, as Steve Fuller (1994: 83) does, that "Kuhn was probably the *least* prominent of the group of thinkers - including Michael Polyani, Stephen Toulmin, Norwood Russell Hanson, and Paul Feyerabend - who are usually said to have advanced similar views of science".[4] He proceeds to explain, in terms which remind me of Wittgenstein's (1972: Investigations: # 66, 144, 340) exhortation to *' look and* see':

> The example that Kuhn supposedly set for these scholars was to look beyond the positivist jargon that scientists use to justify their activities and to focus instead on what scientists *actually do* in their workplaces. Thus, the characteristic methodologies for this post-Kuhnian enterprise have involved ethnographies of 'laboratory life' and deconstructions of scientific discourse (my emphasis; 83).[5]

To these efforts to re-evaluate standard objectivist accounts of science we can add substantially: feminist standpoint epistemology (Harding, 1991) which attempts "to strengthen the notion of objectivity . . . after the demise of the ideal of neutrality" (Harding, 1994:83); postcolonial critiques of Western science (Goonatilake, 1984; Nandy, 1989; Petitjean et. al., 1992; Harding, 1994); feminist critiques of Western science (Haraway, 1991); new cultural histories of science (Jacob, 1994); postmodern non-foundational accounts of science (Griffin, 1988; Bohm, 1980, 1985, 1988; Toulmin, 1982, 1985, 1990); social epistemology (see the journal of the same name, established by Steve Fuller); the ecological critique and the so-called 'new philosophy of science' (Grene, 1985; Birch, 1988; Sheldrake, 1991); poststructuralist accounts of science and philosophy (Lyotard, 1984; Rouse, 1987; Deleuze & Guattari, 1994).[6]

It is, I think, simply wrong-headed to homogenise these views - they issue from different perspectives and advance different arguments. Each must be taken on its own merits and carefully evaluated.[7]

Robert Nola has in the spirit of inquiry, provided a critique of some versions of constructivism found in the literature on science education - a critique with which I have some sympathy. He has also advanced some positive and strong arguments for alternative conceptions both of (scientific) know ledge and learning based upon a certain Platonism. It is a view with which I disagree. Such disagreement should be seen as the basis of an on-going dialogue (perhaps in the spirit of Plato).

Notes

1. Nola is somewhat ambiguous in this regard. While he is generally prepared, it seems, to argue that there is no necessary link between accounts of knowledge, on the one hand, and accounts of learning/teaching, on the other, he also is ready to accept that if constructivists (e.g., von Glasersfeld) believe or 'insist' there is a link, then we can conclude that "since the constructivist conception of knowledge is defective, so is their account of learning and teaching which is based upon it". Yet, of course, this conclusion does not follow, for the mere fact that, say, von Glasersfeld insists that there is a link is not grounds for accepting that there is, and on Nola's own argument which disputes that

there is a link, there are no consistent grounds for concluding the defectiveness of constructivist accounts of learning/teaching simply follows from the defectiveness of constructivist accounts of knowledge.

2. In addition, I entertain a set of objections to constructivism - at least those versions characterised by Nola from the recent science education literature - that might be called objections to individualism, to the inherently individualistic bias which vitiates most accounts, a bias I suspect that Nola's 'objectivism' shares. He addresses this question briefly under the first of his useful set of three questions but does not pursue the objections which might be raised via the *social* construction of 'teaching' and 'learning', 'teacher training', the 'curriculum', the 'classroom', the 'school' and 'schooling'. That knowledge can be only understood or analysed in terms of the individual - a feature of both some forms of objectivism and constructivism - I take to be one of the elements which defines liberalism as a political ideology. Certainly, an objectivism based squarely upon the justified true belief account of knowledge is inherently individualistic: both the phrase 'For A to know that p' (where 'A' is an individual person and 'p', a proposition, sentence or statement) and the belief condition are predicated on the unexamined conceptual primacy of the individual knowing subject. The truth and justification conditions, it might be argued, admit a social (i.e., extra-individual) dimension, especially in versions which embrace a 'consensus' view of truth or justification.

3. I was encouraged in this reading of Nola, strangely perhaps, by Fullers' (1994) insightful 'Teaching Thomas Kuhn to Teach the Cold War Vision of Science'. I say ' strangely ' because Fuller reads Kuhn's *The Structure of Scientific Revolutions* not in terms of the normal story of how " it liberated the academy from a ' positivist' or 'objectivist' conception of science" (p. 82) - that is, as a *rupture* - but rather as a *symptom* - "as an exemplary document of the Cold War era, one which depicts its author as a 'normal scientist' in the Cold War political paradigm constructed by James Bryant Conant". This Cold War vision of science, Fuller observes (and comments upon at some length) was driven by the "mission of Platonism" (seep. 87, pp. 88-93).

4. These works are so well known to need no mention here. What is less well known, however, is the continuing work of both Toulmin and Feyerabend, both strongly influenced by Wittgenstein. Toulmin (1982, 1985, 1990) has embraced a version of post-modem science. He (Toulmin, 1985 :29) argues the case in the following terms:

> The emergence of post-modem science has several implications for scientific activity, for our concepts of scientific progress, and therefore, for science policy. One is that the old positivist idea that all the sciences have to be based on a single set of methods is no longer viable. Another is that since the scientist-as-spectator option is no longer open to us, neither is the assumption that science is value-free or that scientists bear no responsibility for the social consequences of their work. Post-modem science must be increasingly bound up with social, political, and ethical considerations ...

For Feyerabend see his *Against Method* (1975), *Science in a Free Society* (1978) and *Farewell to Reason* (1987) in which he holds that although there are ' patterns' of success in the sciences, they are "not stable and cannot be universalized"; "there exist [no] universally valid and binding standards of knowledge and action" (pp. 9-12). It is in *Farewell to Reason* that Feyerabend defends Protagoras against Plato. See also Feyerabend's 'Concluding Unphilosophical Conversation' in the fine collection, *Beyond Reason: Essays on the Philosophy of Paul K. Feyerabend,* ed. G. Munevar (1991). See also Ravetz's 'Ideological Commitments in the Philosophy of Science' in the same collection.

5. Fuller mentions the so-called 'strong programme' in the sociology of knowledge by (the Wittgensteinians) David Bloor and Barry Barnes; Bruno Latour's and Steve Woolgar's (1979) ethnography *Laboratory Life;* and Karin Knorr-Cetina's (1981) *The Manufacture of Knowledge.* I would also add Scott Atran's (1990) *Cognitive Foundations of Natural History: Towards an Anthropology of Science.*

6. Not all of these developments are strictly post-Kuhnian in the sense that they spring from an interpretation of Kuhn's own work but the list is intended to convey the *diversity* of endeavours after Kuhn. Those who consider themselves following in the footsteps of Kuhn we might call *social constructivists,* a position usefully distinguished by Nelson (1994: 535-6) as entailing a commitment to two sorts of relativism: "an ontological relativism about [theoretical] entities and processes" which are understood to be "constituted or constructed by scientists *post hoe"* and a relativism about scientific rationality which denies the universality of standards - "They think instead that decisions are made on the basis of commitments that are particular to scientific communities", commitments

which "are tacit and implicit in the functioning of a scientific community." I think it is noteworthy to mention that most current debates about constructivism seem to ignore the *German* philosophical position known as constructivism originating with Hugo Dingler and developed further by the 'Erlanger School' of Paul Lorenzen and Wilhelm Kamlah. Contrary to the educational constructivists that Nola discusses, these philosophers argue that the basic ideas of the exact sciences (mathematics and mechanics) are not derived from experience but rather arise as a kind of operational construction grounded in the *Lebenswelt* (the prereflexive, pre-scientific world of purposive human action) and, thereby, stem from *practice.* As Robert Butts and James Brown (1989: xvi) indicate in their excellent collection "[German] constructivism must be seen as an alternative to realist rationalism and to empiricism in its present forms". It is they argue, therefore, not possible in their view to locate it in terms of empiricist-realist debates of Anglo-American philosophy of science.

7. I should acknowledge my own sympathies with poststructuralists accounts of science (see Peters, 1989, 1993, 1995a, 1995b; Marshall & Peters, 1995.) I mention this in a mere footnote because I have not directly contemplated the relation of the poststructuralist views that I have developed to the question of constructivism in science education. I have, however, reviewed and critiqued the recent *restructuring* of science policy in New Zealand (see Peters, 1995c) which has been 'driven', like many of the 'reforms' introduced by successive governments since 1984, by a neoliberal social and economic philosophy. For the policy constructions and effects of such a philosophy upon New Zealand education and society see Peters & Marshall (1995).

References

Atran, S. (1990) *Cognitive Foundations of Natural History: Towards an Anthropology of Science.* Cambridge: Cambridge University Press.

Birch, C. (1988) Eight Fallacies of the Modem World and Five Axioms for a Postmodern Worldview, *Perspectives in Biology and Medicine,* 32 (1), Autumn, 12-30.

Bloor, D. (1976) *Knowledge and Social Image ry.* London: Routledge & Kegan Paul. Bohm, D. (1980) *Wholeness and the Implicate Order.* London: Routledge and Kegan Paul.

Bohm, D. (1985) *Unfolding Meaning: A Weekend of Dialogue with David Bohm,* Factor, D (Ed.). Mickleton: Foundation House.

Bohm, D. (1988) Postmodern Science and a Postmodern World, in Griffin, R.G. (Ed.) *The Reenchantment of Science: Postmodern Proposals.* New York: State University of New York Press.

Butts, R. and Brown, J. R. (1989) *Constructivism and Science: Essays in Recent German Philosophy.* Dordrecht: Kluwer.

Deleuze, G. & Guattari, F. (1994) *What is Philosophy?,* trans. G. Burchell & H. Tomlinson. London: Verso.

Feyerabend, P. K. (1987) *Farewell to Reason.* London: Verso. Feyerabend, P.K. (1975) *Against Method.* London: Verso.

Feyerabend, P.K. (1978) *Science in a Free Society.* London: New Left Books.

Feyerabend, P.K. (1991) Concluding Unphilosophical Conversation, in: Munévar, G. (Ed.) *Beyond Reason,* 487-527.

Fuller, S. (1994) Teaching Thomas Kuhn to Teach the Cold War Vision of Science, *Contention,* 4, 1: 81-106.

Goonatilake, S. (1984) *Aborted Discovery: Science and Creativity in the Third World.* London: Zed Books.

Grene, M. (1985) Perception, Interpretation and the Sciences: Toward a New Philosophy of Science, in Depew, D.J. and Weber, B.H. (Eds) *Evolution at the Crossroads: The New Biology and the New Philosophy of Science.* Cambridge, MA.: MIT Press.

Griffin, R. G. (1998) (Ed.) *The Reenchantment of Science: Postmodern Proposals.* New York: State University of New York Press.

Haraway, D. (1991) *Simians, Cyborgs and Women: The Reinvention of Nature.* New York: Routledge.

Harding, S. (1991) *Whose science? Whose Knowledge? Thinking from Women's Lives.* Ithaca: Cornell University Press.

Harding, S. (1994) After the Neutrality Ideal: Science, Politics, and Strong Objectivity, in Jacob, M.C. *(Ed.) The Politics of Western Science,* 1640-1990: 81-101.

Jacob, M.C. (1994) (ed.) *The Politics of Western Science,* 1940-1990. New Jersey: Humanities Press.

Kuhn, T. S. (1970) *The Structure of Scientific Revolutions,* 2nd ed., Chicago: University of Chicago Press.

Latour, B. & Woolgar, S. (1979) *Laboratory Life: The Social Construction of Scientific Facts.* London: Sage.

Lyotard, J.-F. (1984) *The Postmodern Condition: A Report on Knowledge,* trans. G. Bennington & B. Massumi, Foreword by F. Jameson, Manchester: Manchester University Press.
Munévar, G. (1991) (Ed.) *Beyond Reason: Essays on the Philosophy of Paul K. Feyerabend.* Dordrecht: Kluwer.
Nandy, A. (1989) (Ed.) *Science, Hegemony and Violence: A Requiem for Modernity.* New Delhi: Oxford University Press.
Nelson, A. (1994) How Could Scientific Facts be Socially Constructed?, *Studies in the History and Philosophy of Science,* 25, 4: 535-547 .
Pears, D. (1988) *The False Prison: A Study of the Development of Wittgenstein's Philosophy,* Vol. II. Oxford: Clarendon Press.
Peters, M. (1989) Techno-science, Rationality and the University: Lyotard on the Postmodern Condition, *Educational Theory,* 39, 2: 93-106.
Peters, M. (1993) Post-modern Science in Aotearoa? Conservation, Cosmology and Critique, seminar presented to the Department of Conservation, Wellington, December 15, 1992, in: Rimoldi, E. (Ed.) Monograph 20, Research Unit for Maori Education.
Peters, M. (1995a) (Ed) *Education and the Postmodern Condition,* New York: Bergin and Garvey.
Peters, M. (1995b) Science and Education in the Information Society in: Peters, M. (Ed) *Poststructuralism, Politics and Education,* New York: Bergin & Garvey (in press).
Peters, M. (1995c) The New Zealand Science Policy Regime in New Zealand: A Review and Critique, *New Zealand Sociology* (forthcoming).
Peters, M. & Marshall, J. (1995) *Individualism and Community: Education and Social Policy in the Postmodern Condition.* London: Falmer Press (forthcoming).
Petitjean, P. Catherine, J. and Anne Marie, M. (1992) *Science and Empires: Historical Studies About Scientific Development and European Expansion,* Dordrecht: Kluwer.
Rouse, J. (1987) *Knowledge and Power: Toward a Political Philosophy of Science.* Ithaca: Cornell university Press.
Sheldrake, R. (1991) *The Rebirth of Nature: The Greening of Science and God.* New York: Bantam.
Toulmin S. (1982) *The Return to Cosmology: Postmodern Science and the Theology of Nature.* Berkeley: University of California Press.
Toulmin, S. (1985) Pluralism and Responsibility in Post-Modern Science, *Science, Technology and Human Values,* 10, 1: 28-35.
Toulmin, S. (1990) *Cosmopolis: The Hidden Agenda of Modernity.* New York: The Free Press. Wittgenstein, L. (1972) *Philosophical Investigations,* trans. G. E. M. Anscombe. Oxford: Blackwell.