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Seven posers in the constructivist classroom

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In education, 'constructivism' constitutes the 'grand unified theory' of the moment. In this article, I maintain that constructivism as a theory of knowledge and constructivism as pedagogy are distinct and that the question of what constructivism about knowledge implies for teaching is under-theorised. Seven classroom scenarios are sketched that illustrate the problems that a constructivist view of knowledge can create in the classroom. It is concluded that constructivist epistemology undermines effective teaching; as such, realistic teaching practice cannot proceed from constructivist assumptions regarding the nature of knowledge. The conclusion, however, is neutral regarding teaching practice: constructivist epistemology is neither sufficient nor necessary for what is called 'constructivist' teaching practice.

Keywords: constructivism; epistemology; pedagogy; learning theory; higher education

Introduction

A staple narrative of *learning theory* in higher education is how, sometime during the 1970s, the 'cognitivist' theory of learning was displaced by the 'constructivist' theory. Today, all learning theory in higher education seems tacitly to be cast in a constructivist mould: Jervis and Jervis (2005) point out that the Quality Assurance Agency has been identified as 'the champion for constructive alignment' and that reports to the Economic and Social Research Council identify constructivism as a 'widely favoured approach to teaching'. 'With such advocates as QAA, HE Academy and ESRC', Jervis and Jervis hold, 'constructivism seems unstoppable' (2005, 10).

Jervis and Jervis's observation rings true not only for those working in higher education. According to Matthews (2000, 161), constructivist thinking constitutes the 'grand unified theory' for the educational field as such, doing service as a theory of learning, a theory of teaching, a theory of knowledge and more. Yet, as Geelan stresses, constructivism is firstly an *epistemological* theory (a theory of what knowledge is) and not a pedagogic theory. As such, he holds, constructivism offers no direct prescriptions for how students should be taught (Geelan 2006, 51).

While seemingly nodded through in higher education discourse in the UK, constructivism has been the subject of sustained criticism in other regions of the subject and especially so in science education (Phillips 1995; Matthews 1998, 2000). Constructivism is also a term in use in other fields besides education, and there, too, it comes under continued attack. Constructivists see themselves as drawing on a tradition in the philosophy of science, due mainly to Kuhn (1962) (Loving and Cobern 2000), but somewhat ironically, the attack on constructivism is fiercest exactly in philosophy, where constructivism has always had a cooler reception than elsewhere in the humanities and social sciences (Hacking 2000; Boghossian 2006).

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In what follows I raise a number of disparate doubts about constructivism *as a theory of knowledge for learning and teaching* in higher education. As Geelan rightly holds, constructivism as an educational approach and as a theory of what knowledge is are two distinct matters, yet they also stand in a relation: the teacher's theory of what knowledge is may influence how she thinks she ought to teach. It is this *relation* that I shall seek to address here. The point I hope to make is that constructivism as a theory of knowledge is the wrong theory of knowledge for a realistic teaching practice. I shall contend that, insofar as one hopes to be able to teach effectively (or in some cases at all), one cannot consistently be a constructivist about knowledge. Whether one knows it or not, adopting any realistic teaching *practice* depends on having some non-constructivist view of *knowledge*; as such, even avowed constructivists probably rely more than they realise on a non-constructivist theory of knowledge in the classroom (or at least so I shall argue).

In making this argument considerable generalisation is, unfortunately, unavoidable. Constructivism about knowledge is a broad church (perhaps, as broad as constructivism in pedagogy!) as well as being as old as philosophy itself and this makes reflecting all the different views correspondingly hard. In what follows, I attempt to tease out the non-constructivist assumptions regarding knowledge that must underpin realistic teaching by way of seven fictional classroom examples that, even if they do not all speak directly to all different possible forms of constructivism about knowledge, speak to the usual suspects. While the point of each example will be to identify the non-constructivist assumptions regarding knowledge that make teaching at all possible, it is important to notice that this settles nothing regarding what *teaching practice* should be like (leaving the paper neutral about any pedagogical constructivism that is not also epistemologically constructivist). Student-centred teaching is entirely reconcilable with non-constructivist epistemology and the main challenge in this area is solving the question of what our theories of *knowledge* demand regarding how we ought to teach.

Constructivism as a theory of knowledge for learning and teaching

Educational theorists with a surprising variety of interests are apt to call themselves 'constructivist'; in fact, there are so many possible variants of constructivism (besides the main versions – 'radical' and 'social' constructivism – one finds 'contextual', 'sociotransformative', 'sociocultural' and other constructivisms) that one might doubt whether constructivism is one position (see Phillips 1995). But what many hold are the educational commitments of constructivism – student-centeredness, active learning, attention to 'learning styles', etc – are taken to flow from an underlying skepticism about the rationality of the methods of science and even of the very possibility that people may come to know much about the world that we inhabit at all. Take the following characterisations of the epistemological face of constructivism:

> Radical constructivism is an attempt to develop a theory of knowing that is not made illusory from the outset by the traditional assumption that the cognizing activity should lead to a 'true' representation of a world that exists in itself and by itself, independent of the cognizing agent. (Von Glasersfeld 1996, 308)

> [Constructivism constitutes a break] with the foundations of empirico-realism which claims to encode reality in terms of substances and phenomena which are independent of the observers involved. It challenges age-old beliefs which maintain that facts speak for themselves, that knowledge is the reflection of ontological reality and that language refers objectively to this reality. (Larochelle and Bednarz 1998, 5)

> Put into simple terms, constructivism can be described as essentially a theory about the limits of human knowledge, a belief that all knowledge is necessarily a product of our own cognitive acts. (Confrey 1990, 108)

Key to understanding *learning*, all of these writers assert, is that we must be sceptical about human *knowledge*. What this cluster of thoughts implies for teaching practice is not always made clear, however. Standardly, the following sort of inference is made: since knowledge is *just* constructed by us anyway and does not reflect reality, teachers should not *tell* students what is true about reality; they should allow students to construct knowledge for themselves. The inference – from constructivist epistemology to constructivist pedagogy – seems natural enough, but it is generally under-theorised. Indeed, the constructivist epistemology that is taken to underpin constructivist practice leads to the following sort of problems in the classroom.

Poser 1: mixed messages about truth

The first thing to notice about constructivism as epistemology is that it implies a relativism about knowledge. If different individuals (radical constructivism) or different societies (social constructivism) all had different knowledges, there would be no one body of knowledge that is valid for all. Different knowledges would count as adequate for different individuals or societies, making what counts as knowledge relative to who you are.

In one sense, the idea that different people have different knowledge is unobjectionable: different people know different things. For instance, I know how to tell apart a black from a white rhino, but you may not; undoubtedly you also know things that I do not. People know different things because they are interested in different things and have had different opportunities to find things out. Still, what is truly knowledge for us both is the *same* in another sense: if you bothered to find out what the difference is between a black and a white rhino you would end up believing the same as I do (that while they are really both grey-ish brown, the black rhino is smaller and has a sharp prehensile upper lip, while the white rhino is larger and has a broad non-grippy upper lip). This is because what counts as knowledge, properly speaking, depends on what is true[1] and the truth about what rhinos look like is the same for everyone.

Constructivists deny this. They hold that what you already believe (or what your society believes) determines whether any new belief you form will actually be true. So, if you and I start out with different beliefs about rhinos, different things might actually end up being true for us and we'll have different knowledge in *this* sense. I might, say, end up *knowing* (as opposed to just believing it) that white and black rhinos are different, while you *know* that they are the same. Underlying the constructivist claim that knowledge is relative is the further claim that *truth* is relative.

The philosophical demerits of relativism aside (see Boghossian 2006), the idea that truth is relative in this way translates into a real dilemma in the classroom. To see this, imagine the following debate taking place in the classroom of someone trying to teach from a relativist epistemic principle:

Teacher: Let me tell you something about truth: all truth is relative. That means that no truth holds for everybody – what is true for you is not necessarily true for me. For each of us, there are truths that are true for us, but they are not necessarily true for others.

Student: That's interesting, but it seems that you are contradicting yourself. You said that truth is always truth for someone, but you seem to hold that this truth – 'all truth is relative' – is a special case. You think that it is a general truth that all truth is relative; if that is the case then it is *not* the case that all truths are relative (your truth – 'all truth is relative' – sure doesn't seem to be).

Teacher: No no, that is not quite right. I said that all truths are relative, so I guess that must include this one. So it is just true for me that all truth is relative, but it does not have to be true for you.

Student: Fine, but if 'all truth is relative' is just true for you and doesn't have to be true for me, I need not pay too much attention to what you just tried to teach me. After all, you

admitted that what you just said ('all truth is relative') is only true for you, so *I* need not believe it.

Encapsulated in this little scene is the original problem for any kind of relativism about truth; the problem was already noticed by Plato (who made it clear in his arguments against Protagorean relativism), but it seems not to be taken very seriously amongst educational constructivists. Those that do (e.g., Quale 2007) construe it as some sort of clever logical trick to undermine constructivism, but Plato's objection is no trick. There is a fundamental instability to the position of anyone who tries to teach that 'all truth is relative'; consequently, the anti-relativist simply need not take the relativist seriously. The point is that no-one can try to teach someone that all truth is relative without raising a really big question about what they mean: does the constructivist teacher mean that it is true for everyone that all truth is relative or does she mean that it is just true for her that all truth is relative? Either way, the stance is problematic and the constructivist teacher is sending mixed messages to her students about the nature of truth.

Poser 2: mixed messages about cultural relativity

The problem that exists for anyone who holds that 'all truth is relative' does not hold only for the 'radical' constructivist (who believes that truth is relative to a person in that each person has his/her own truth), but also for the 'social' constructivist who holds that truth is relative to a society or culture. In his aptly named *Fear of knowledge* Paul Boghossian (2006) points out that relativising truth to society or culture makes no bones in escaping Plato's dilemma for the relativist. Far from being a completely stable relativist position, if one is going to say something like 'x is true in culture y, but not true in culture z', this in itself assumes that there are settled facts about what culture y and culture z *are like* and *what people in both cultures believe*. The point is that, for one to be able to say that two world-views are different and that different things are true for people depending on which culture they belong to (which is what the relativist wants to say) there need to be truths about what the two world-views in question *are* in the first place. Talk of relativism of truth to world-views, then, lands the constructivist on the horns of a dilemma much as above. The first horn is this: if there are definite facts about world-views, then all truth is not relative to a world-view – the truths about *what the world-views are* are not relative. The second horn is this: if there are no facts about what the world-views are, it becomes impossible to hold for certain that there really *are* different world-views, rendering the purported relativism groundless. Take the following problem that can arise in any classroom in which someone tries to *teach* someone that different things are really true in different cultures.

Teacher: You must understand that it is not *true* that human beings evolved from the apes. That is only true for westerners. According to the world-view of the Native Americans, human beings were made from clay by the Earth-maker, who breathed life into them. That human beings were made from clay is true for Native Americans and that humans evolved from the apes is true for westerners.

Student: You say that what is true is true only relative to a world-view. But take the Native American world-view you talk of: is it true that, according to the Native American world-view, man was made from clay? How do you know that it is not the Native American world-view that man was sneezed into existence by an extra-terrestrial?

Teacher: Listen, I took anthropology very seriously at university. *That* is most definitely not the Native American world-view. It is their view that they were made from clay.

Student: So this truth, that it is the Native American view that man was made out of clay, is not relative to a world-view, it is just true? But then it contradicts your view that all truths are true only relative to a world-view.

Teacher: No, no, that's not right. All truths are true only relative to a world-view, so I suppose I had better admit that it might only be *my* world-view that the world-view of the

native-American is that man from clay. According to someone else's world-view, I suppose, the world-view of the native-American could be something else.

Student: Great. It is actually my world-view that the Native Americans believe that man evolved from the apes.

Teacher: Sigh. You're just being difficult. That is not your world-view.

Student: Are you questioning my right to my own world-view? You just held that different people have different world-views and that all of these world-views are equally valid, so I'm afraid you're going to have to grant me my world-view now. It is my world-view that, when they think about it, people around the world (including the Native Americans) all believe the same thing, i.e., that man evolved from the apes. In short, I need not pay any attention to what you say about different world-views because that they are different is only your view, not mine.

Whilst an assumption of cultural relativism seems standard in many parts of the social sciences and humanities, in philosophy, the standard view is that a simple cultural relativism is untenable, because discovering things like 'this is true in that culture, but not in this other culture' *itself presupposes* a neutral, non-relative position from which to identify what is true in different cultures. The relationship between language, culture and thought, is, of course, still alive in the subject and forms the topic of an important debate, but the work of Donald Davidson (1984) points the way – even for those who take seriously the idea that language determines thought – to understand this relationship without reaching the problematic conclusion that what is *true* (as opposed to what is taken to be true) is relative to language or culture.

Poser 3: opinions drown out opinions

Constructivist teachers do not always try to make systematic pronouncements about the nature of truth and its relation to culture in the classroom. Often teachers' constructivism about knowledge amounts to little more than a democratic attitude to knowledge – to the idea that teaching anyone that something is true is authoritarian and that students should be left to make up their own minds about what to believe. While this democratic attitude is admirable and effective in many settings (I do not doubt the *motivating power* of classroom democracy, nor that cultivating intellectual independence is the ultimate point of an education) it bears acknowledging that even university education cannot be *relativistically* democratic. There is also a forgotten downside: always allowing students the latitude to decide for themselves may begin to look like an abdication of the responsibility to teach anything (see poser 7); worse, the attitude that no-one should tell anyone what to believe can undermine one's capability to teach anyone anything at all. Take the following example.

Teacher: In this class, everyone's opinions are equally valid. What you think is just as valid as what I think.

Student: I don't care what you say. You're a woman and women are stupid.

Teacher: Women are not less intelligent than men. Your attitude is unscientific; it is also prejudiced and offensive.

Student: Well, you said that all ideas are equally valid and that science is just one form of explanation amongst others. So your accusation that I am unscientific does not sting me in the least. And you said that no one value system is better than any other either. So I insist on my right to hold my own values and according to my values it is not in the least offensive or prejudiced to assert what I do. Moreover, it is *true from my point of view*: women are stupid, so I won't listen to a thing you say.

The example hints at an uncomfortable truth about relativism in the classroom. If all opinions are indeed deemed equally valid, students are left entirely free to hold a range of opinions that work against the very possibility of educating them: that the teacher is not worth listening to, that the subject they are being taught is pointless, that education is not worth it, etc. In this

instance, the student also holds an abhorrent moral view (that women are inferior) that the teacher's relativism precludes her from tackling head on. Consider how she might try to do it:

Teacher: Look, I told you before: we have to respect each other's opinions in this classroom. I'll respect your opinion that I'm stupid, but then you'll have to respect my opinion that I'm not. So you can't say I'm stupid.
Student: I'm afraid I can. In this class, we're all free to have our own opinions – you said so yourself. Now, it is my *opinion* that I don't have to respect your opinion. So that leaves me free to keep saying that you're stupid *and* to keep ignoring what you're trying to teach me.

In the case above, it is the very democratic epistemic principle that all opinions are equally valid that works against the possibility that anything can be learned; the principle turns the classroom into a space where opinions are simply *voiced* without anything providing the impetus for someone to be persuaded of something. The point is *not* that teachers are justified in trying to impose beliefs (especially moral beliefs) on students or that teachers should not reason with and persuade students. Neither is it to say that teachers must be epistemically and morally infallible. The point is that if a teacher is to be in a position to *teach* a class anything, she must not deny herself a leg to stand on: she must teach from the assumption that she has a *right* to challenge students' bad views (whether it is about mathematics or morality) and attempt to reform them. If the assumption is made from the start that the teacher's opinion is no more valid than that of her students, the teacher lays herself open to students ignoring or silencing her in the manner the student in the example does above. Pendlebury puts it well: 'education cannot get off the ground unless we grant *teachers* some sort of epistemic authority' (Pendlebury 2005, 55) Admittedly, assuming this epistemic authority does not mean that students will listen, but advertising that one has no epistemic authority raises the question why they should.

Poser 4: who decides what counts as evidence?

Cognisant of this difficulty, many teachers employ a different rule in their classrooms than complete epistemic democracy: not 'everyone's opinion is equally valid', but 'every opinion is valid *as long as that opinion is backed up by evidence*'.

While generous to students' views, the amended rule is not without its problems either. Imagine the following argument between a teacher and a student.

Teacher: You can hold any opinion you like in my class as long as you back it up by providing evidence.
Student: Your class is rubbish.
Teacher: That is not a valid opinion. You didn't back it up with any evidence.
Student: OK. You're rubbish – my favourite band says so.
Teacher: I'm sorry, but the fact that your favourite band says so does not provide evidence that I'm rubbish.
Student: Well, actually, my dog says that the fact that my favourite band says you're rubbish is evidence for your being rubbish.
Teacher: That is not *good* evidence.
Student: Ah, so you decide what is good evidence and what is not?
Teacher: No. Good evidence is just good evidence.
Student: So I cannot in fact hold what I want as long as I provide evidence for it. On matters of what is evidence for what I am not free to hold my own opinion but I must hold what you do.
Teacher: No, of course we could have a discussion about what is evidence for what.
Student: Great. I think what my band says is evidence for your being rubbish and that what my dog says is evidence for that and that my favourite colour's being black is evidence for that and…

It is clearly not *genuinely* acceptable for a student to hold any opinion as long as that opinion is backed up by evidence. In reality, the demand is stronger: any opinion can be held as long as

good evidence is provided for it and the question of what is good evidence for what cannot itself be up for discussion in exactly the same way as other matters are up for discussion in the classroom. The democratic rule that any opinion can be voiced as long as evidence is provided for it will only work in the classroom if it is assumed that what is good evidence for what is *not* just a matter that students can construct for themselves (or the absurd evidence the student in the example constructs must be admissible too). Students' latitude to hold any opinion they like can only go so far: teachers must be in a position to correct them on evidence and their handling of evidence, or it leaves teachers without the tools *with which* to convince students. The implication for constructivism about knowledge is that any teacher attempting to teach a student *how to handle evidence* must be an anti-constructivist regarding the nature of good evidence. What is good evidence for what cannot simply be a matter of what a student 'makes up'; not only may that get teachers bogged down in the pointless sort of discussion above, it would leave the teacher incapable of correcting her students' handling of evidence and thereby improving it. Far from being the principle way by which a teacher may encourage her students to handle evidence critically for themselves (as is the aim of the critical thinking movement – see, for instance Siegel 1988) constructivism regarding knowledge of *logic* makes the teaching of critical thinking skills impossible.

Poser 5: you say you 'facilitate' you don't 'teach'. What's the difference?

According to another common view, constructivism about knowledge is really a theory about the *process* of acquiring knowledge rather than one about the nature of knowledge. It is held to be of the essence of knowledge that it cannot straightforwardly be encoded by one party (the teacher), transmitted and then faultlessly be decoded by another party (the student). Besides the possibility of mistake or forgetting, the student, it is said, will always interpret the message in the light of what she already knows and internalise it in a unique way that makes sense to her. Teaching is facilitation of this process of making sense rather than transmission of a content. But what does 'facilitation' mean? Does it really mean 'allowing students to make sense of it all for themselves'? Take the following example:

Student: What is the 'categorical imperative'?
Teacher: You could put it in Kant's words and say 'act only according to that maxim whereby you can at the same time will that it should become a universal law'. Others hold that it means 'do unto others as you would have them do to you'. But I really want you to make up your own mind.
Student: OK, what should I write down?
Teacher: It's not a matter of what you should write down. You should decide for yourself what to believe.
Student: Can I make up my own mind that the categorical imperative is kind of a pumpkin?
Teacher: No, it really is something like a statement of a rule that we should all necessarily follow, I mean, some don't think it exists… but it is not a pumpkin.
Student: So you've got a pretty good idea what you want me to believe at the end of this lesson, why don't you just come out with it?
Teacher: Because it's better for you if you come to decide for yourself.
Student: Says who? I just want to hear the answer. You already know what you want me to believe, but you don't want to just *tell* me, instead you want to *manipulate* me into believing what you want me to believe.

Instead of really being happy as long as the student makes up her own mind, the teacher in this example secretly does have an idea of what she wants her students to believe at the end of the class. If she didn't, she couldn't plan her courses, or set 'outcomes' for them, or measure how successful her classes are. In some subjects – literature, say – there is a higher tolerance for personal interpretation, but even that goes only so far (a student cannot realistically hold

that Hamlet's soliloquy is about rhinos or pumpkins). And even if this is called 'facilitation', the teacher does want to *change* her students' understanding from what it currently is to be reconcilable with what she has in mind, so it is not all construction on their part, there is a shaping of students' views going on, too.

True enough, some teachers hold that they don't teach, they just ask the right questions. The sentiment is pleasingly Socratic, but the Socratic method is not *constructivist* – in the epistemological sense – at all. In the famous example, Socrates leads Meno's slave boy to understand how to construct a square twice the area of a first square without direct teaching. While the slave boy is encouraged to try and find out the answer for himself, Socrates leads the slave boy to a definite conclusion that the slave boy does not *make up* or *choose* (a square double the size of a first square will have sides equal in length to the diagonal of the first square). Socrates can only brings the slave boy to the correct answer by leading him through the false answers first because he *knows* the correct answer already and what Socrates tries to impart to the slave boy is not just the impulse to intellectual freedom, but *the correct answer*. As Peter Boghossian (2006, 716) puts it: 'The presupposition of the Socratic method is that there is a truth of the matter and that that truth can be known through discourse…' The epistemological lesson of the Socratic method, then, is not that students construct their own truth: 'the Socratic interpretation is that… there is a truth, we just need cooperation and dialogue to find it' (Boghossian 2006, 720).

Poser 6: assessment, assessment

How does a true constructivist about the nature of knowledge justify assessing students' learning? Consider the problems this creates for the *radical* constructivist.

Student: You gave me 0% on my test.
Teacher: That's because in answer to my question, 'when will you apply the chi-square test?', you wrote 'when hell freezes over'.
Student: I'm taking over my father's building business. It will never be appropriate for me to apply the chi-square test. I therefore constructed my own knowledge about the chi-square test that is appropriate to me. The knowledge I constructed is that I don't need to know anything about it since I'll never apply it. From a radical constructivist perspective, my answer deserves 100%.

It is hard to fault the student's reasoning, here. According to radical constructivism, students construct for themselves the knowledge that is appropriate to them. The problem is that ignoring much of the curriculum often seems appropriate to students (or believing falsehoods, distortions, or very rough approximations), but if it is really up to students themselves to decide for themselves what they will know, what grounds does the teacher have for criticising this students' knowledge by holding that it is not worth anything? One may think that the radical constructivist teacher may judge the complexity or interestingness of the student's constructions rather than how closely the construction approaches her own view of things and grade *that*, but who is to say what is interesting (or complex for that matter) and who says that complexity itself, rather than simplicity or elegance deserves top marks?

The social constructivist does not entirely escape this poser either. Imagine, in the example below, that the teacher is English.

Student: You gave me 0% on my test.
Teacher: That's because in answer to my question, 'why did Edward I invade Scotland in 1296' you wrote that it was 'because he was the son of the devil'.
Student: I'm Scottish – that's what we believe. From a social constructivist perspective, my answer deserves 100%.

When teacher and student hail from different cultures, assessing learning takes on a difficult dimension for the social constructivist. Depending on the different cultural groups in her class, she might have to take different answers as correct, compromising the principles of fairness and consistency that underpin good assessment. In an attempt to steer clear of this sort of problem, the trend in constructivist inspired assessment is to assess thinking and learning *processes*, rather than content learnt, but, as Shay (2008) holds, if only process is assessed the 'object' of assessment – knowledge – drops out. Furthermore, there is no guarantee that assessing process (as opposed to assessing content) is itself free from cultural bias. Two problems arise. Firstly, who is to say that all cultures value the same learning processes equally highly? Secondly, how can the teacher (who herself belongs to a specific culture) judge the adequacy of students' learning processes to what is valued in their own culture without assuming an objective 'god's eye' view of the cultures in her classroom that contradicts her epistemological position that there is no such view?

Poser 7: how does epistemological constructivism fit pedagogical constructivism?

Above, it was noted that it is not clear what the exact relationship is between epistemological and pedagogical constructivism: it is not clear how an idea about what knowledge is (that it is always constructed by people and cannot capture how reality truly is) should influence how we teach. The two ideas seem beguilingly close; surely if we want to know how to foster knowledge, we have to take our cue from what knowledge is… if knowledge is constructivist, teaching must be constructivist too! Sliding together the two issues, however, is far from helpful, as Howe and Berv (2000, 30) point out when they remark on the 'looseness of fit' that exists between constructivist epistemology and constructivist pedagogy. The point is that even if you are a constructivist about knowledge, that does not mean you will be a constructivist teacher. Take these last classroom examples:

> Teacher: I am a radical constructivist. I believe that teachers cannot pour knowledge into students' heads. No matter what I say, you will always construct your own knowledge, rather than absorbing mine. Since you're all going to make it up for yourself anyway, I'm not even going to try to teach you anything, nor will I bother assessing your learning: that would just be imposing my constructions on you. I'm getting on with my own constructions, so I'll sit here writing a few research papers while you get on constructing your own knowledge.

The idea that every person constructs her own knowledge does not necessarily translate into a pedagogy that provides students with opportunities and incentives to build up their own knowledge. In the case above, the teacher's constructivist epistemology instead leads her to abdicate her pedagogical responsibility. Only the addition of the anti-constructivist assumption that the teacher knows what the students should learn can restore this responsibility. Or consider:

> Teacher: I am a social constructivist, I believe that different things are true in different cultures. Now in this class, there are some English students and some Scottish students. I'll spend half the lesson telling the English students what they should believe and then I'll spend the other half telling the Scottish students what they should believe. There will be no discussion, because once we've discovered what's true in different cultures, that's as far as we can go.

Social constructivism (the idea that different things may count as knowledge for different cultures) does not by itself imply a constructivist pedagogy either. It certainly doesn't rule out teaching by telling. In the example, the social constructivist teacher just accepts cultural relativity as a fact of life and teaches by listing, for each culture in her class, what 'is true in their culture'.

She makes no attempt to foster a dialogue between the cultures in her class, for, according to her epistemological views, that would be impossible. The point is that it is the teacher's very *relativist epistemology* that rules out that she can accomplish in her class what is truly important regarding teaching in a multi-cultural society – to challenge her students from different cultures to contrast, compare and understand other cultures *and possibly even give up their own beliefs and adopt someone else's*. Only on a non-relativist epistemology is *comparison* of culture possible (see poser 2, above).

Conclusion

So far, I have consistently held that an anti-constructivist assumption regarding the nature of knowledge is a pre-requisite for being able to teach anything, but I have not made clear what positive view regarding the nature of knowledge is implied by *rejecting* constructivism. It is clear that some form of *realism* (see, for instance, Young 2008) – that holds that knowledge is more than just a matter of what people believe, that we should believe what the best evidence suggests and that holds that we can always be wrong – should fit the bill.

What realism in epistemology implies for teaching practice, however is uncertain. We have seen that the fact that you hold constructivist epistemological views will not guarantee that you will be a constructivist teacher. And even if you are an anti-constructivist about knowledge, that does not mean that you will necessarily be a teacher-centred or authoritarian teacher either. Constructivist epistemology is neither sufficient nor necessary for student-centred pedagogy and *realist* epistemology certainly doesn't imply *authoritarian* teaching.

Many of the features of student-centred pedagogy (encouragement of student independence and active learning, empathy with what the individual student already knows and so-on) are entirely reconcilable with a realist approach to knowledge. It is very easy to believe that everything you as a teacher know about your subject (about geometry, rhinos, Scottish history and so-on) make up – when they are right! – real objective descriptions (of spaces, *rhinocerotidae* and past affairs north of the border) and *still* hold that it is best for your individual students' if their own curiosity (both natural and fostered by you) drive them to find things out for themselves (by reading books, talking to other people, doing experiments or just thinking it through). That you have a pretty good idea what you want your students to find out by taking your course (and that you think this will correspond fairly well to how the world actually is) does not mean that your students cannot actually *find it out actively, independently and largely for themselves.* Take this example:

Teacher:	And if one side of the figure be of two feet, and the other side be of two feet, how much will the whole be? Let me explain: if in one direction the space was of two feet, and in the other direction of one foot, the whole would be of two feet taken once?
Student:	Yes.
Teacher:	But since this side is also of two feet, there are twice two feet?
Student:	There are.
Teacher:	Then the square is of twice two feet?
Student:	Yes.
Socrates:	And how many are twice two feet? Count and tell me.
Boy:	Four, Socrates.
	Etc.

Notes

1. The simplicity of the statement is deliberate. As a starting point, one can say that much confusion in this area arises because of a conflation of 'knowledge' and 'belief'. Much confusion can also be cleared up by sticking to the standard approach to knowledge in epistemology: To *know* something, one must

first believe it, but one must also be justified in believing it and the belief must be true. A discussion of the confusion between belief and knowledge and a comprehensive case for a sharp distinction can be found in Nola and Irzik (2005, 51–91).

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