THE VYGOTSKIAN PERSPECTIVE AND THE RADICAL VERSES THE SOCIAL CONSTRUCTIVISM DEBATE

Stuart Rowlands, Ted Graham and John Berry Centre of
Teaching Mathematics, University of Plymouth

Despite its widespread support, constructivism's credibility is now under scrutiny. Many constructivists refer to Vygotsky as an authority to substantiate their position; however, the various interpretations of Vygotsky open an interesting element in the constructivism controversy. This paper will argue that the Vygotskian perspective is the attempt to build a psychology structured by the Marxist epistemology of theory and practice, that to know the world it is necessary to change it by our interaction: if we are to explain the mental functions of the student as a developmental process, then we must facilitate the completion of a task that the student cannot do unaided To place the constructivism controversy within the Vygotskian perspective, a parallel will be drawn between the positions taken up in the controversy and the subjective, consensus and objectivist positions that have been adopted in the philosophy of science.

1. Introduction

Despite its widespread support, constructivism has recently become under scrutiny. The constructivist controversy has raised many issues, but the central issue in the debate seems to be the question *what is knowledge and how is it constructed?* For von Glasersfeld (1894, 1995, 1996), knowledge is an individual construction that describes or refers to the individual's experience, and does not describe or refer to an objective real world. For Ernest (1994), knowledge is an individual construction in response to experiences in social contexts. However, if knowledge is subjective and not of an external world then how is the social reconciled with the individual? The following three passages highlights the issue:

The major confusion that arises from the desire to claim that knowledge is constructed by the individual but that sometimes knowledge is absorbed from culture (Cobb, et ai), or as social convention (Ernest) or through the role of the social dimension (Bauersfeld) is that as long as the individual is at the heart of the process, as the one who ascribes meaning, any social interaction is itself interpreted individually .....As long as there is a separation between the subject and the world, including other people, one has to go all the wiry with solipsism, or give it up (Lerman, 1994).

Some critics say that the emphasis on subjectivity is tantamount to solipsism, because, they seem to think, it implies that individuals are free to construct whatever realities they like; others claim that the constructivist approach is absurd, because it disregards the role of society and social interaction in the development of an individual's knowledge. Both objections are unwarranted ..... (von Glasersfeld, 1995).

But since our scientific knowledge is concordant with that of others within common understandings of the world, there is no practical room for doubt that it is the common world that we understand and have knowledge of It is all very well for von Glasersfeld to be 'post-epistemological', but to insist that it is not the world that we know is more like the post-modernist cutting off the branch on which one sits. Amusing as creative writing, but not to be taken seriously or taught to children. The very discussion of constructivism relies on common understanding; it is important for consistency

and for teaching that it does not lapse into a self-contradictory absurdity comparable to that of a proselytizing solipsism (Thomas, 1994).

Radical constructivism replaces the objective content of knowledge with subjective expenence. Social constructivism, on the other hand, reduces the objective content of knowledge to social acceptance. For example, consider the following claims by Ernest (1991):

Publication is necessary (but not sufficient) for subjective knowledge to become objective mathematical knowledge (page 43).
To identify the immutable and enduring objectivity of the objects and truths of mathematics with something as mutable and arbitrary as socially accepted knowledge does, initially, seem problematic. However we have already established that all mathematical knowledge is fallible and mutable. Thus many of the traditional attributes of objectivity, such as its enduring and immutable nature, are already dismissed. With them go many of the traditional arguments for objectivity as a super-human ideal. Following Bloor we shall adopt a necessary condition for objectivity, social acceptance, to be its sufficient condition as well (page 45).

Radical constructivism may be generalised as a form of *subjective-idealism,* whilst social constructivism may be classified as a form of *intersubjective* (or *collective)-idealism.* Both radical and social constructivists refer to some of the positions that have been adopted in the philosophy of science to establish credibility. To place the constructivist controversy in perspective, this review will refer to Chalmers (1978) distinction between the *subjective, consensus* and *objectivist* approaches in the philosophy of science.

Many radical and social constructivists refer to Vygotsky as an authority to substantiate their position (e.g. Cobb, 1996; Ernest, 1991, 1994; Fosnot, 1996; Jaworski, 1994; Smith, 1994; Steffe and Tzur, 1994; von Glasersfeld, 1995), and the main interpretation seems to be that no separation can be made between the individual and the social context within which knowledge and understanding develops. However, the next section will attempt to show that this interpretation is somewhat naive. For Vygotsky, all higher mental functions originate as social relations - but a distinction can always be made between inter- and intra-psychological functions:

An interpersonal process is transformed into an intrapersonal one. Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (in terpsych ological) , and then inside the child (intrapsychological). (Vygotsky, 1978, author's emphasis).

For Vygotsky, the link between the social and the private is the learning of scientific concepts.

Vygotsky believed that it is through learning concepts separate from the immediate and the concrete 50.

that structures are provided. It is by learning scientific concepts divorced from immediate concrete experiences that structures are supplied (by the scientific concepts) *for the upward development of the child's spontaneous concepts toward consciousness and deliberate use* (Vygotsky, 1962; page 109). This is only possible because:

In the scientific concepts that the child acquires in school, the relationship to an object is mediated from the start by some other concept. Thus the very notion of scientific concept implies a certain position in relation to other concepts, i.e., a place within a system of concepts. It is our contention that the rudiments of systematization first enter the child's mind by way of his contact with scientific concepts and are then transferred to everyday concepts, changing their psychological structure from the top down (Vygotsky, 1962; page 93).

This raises two essential points. Firstly, Vygotsky's treatment of scientific concepts (or *decontextualised concepts* in general, which would include mathematical concepts) implies an objectivist approach towards the subject matter to be taught. The objectivist approach will be discussed in section 3. Secondly, Vygotsky's relation between the private and the social is essentially one of *method* - that to understand the higher mental functions of an individual as a developmental process, the teacher or researcher has to facilitate the process. This will be discussed in section 2.

2. The Social Verses The Radical

For Ernest (1994), there is a Vygotskian version of social constructivism For Lerman (1993), social constructivism is incoherent and he suggests that it should be replaced with a Vygotskian theory of mind. If much reference is made to Vygotsky as an authority, but that authority is open to interpretation, then it may help matters if an attempt is made to understand his epistemological perspective - the considerations that underlie his method of research. Vygotsky was a Marxist and attempted to build a Marxist psychology (Cole and Scribner, introduction to Vygotsky, see Vygotsky, 1978; Wertsch, 1985). The following is an attempt to understand Vygotsky but within the context that he himself constructed: a psychology structured by the Marxist epistemology of *theory and practice.*

The Marxist epistemology is that although we can think about the world, nevertheless we can only know the world if no separation is made between theory and practice. According to Marx: (1969):

The question whether objective {gegenstandlichej truth can be attributed to human thinking is not a question of theory, but is a practical question. In practice man must prove the truth, that is, the reality and power, the this-sidedness {Diesseitigkeitj of his thinking. The dispute over the reality or

non-reality of thinking which is isolated from practice is a purely scholastic question. (Thesis no. ***II,*** author's emphasis).

To know the world I must interact with it, otherwise any theory I have about the world would be pure metaphysical assumption. However, by interacting with the world I also change the world - just as the anthropologist changes the behaviour of the tribe that he or she is researching. *The philosophers have only interpreted the world, in various ways; the point, however, is to change it* (Marx, 1969, *thesis no. XI,* author's emphasis). This statement is not making the ethical judgement that causing revolutions is a more worthwhile occupation than armchair theorising, it is making the epistemological point that I have to change the world in order to know it. For Lukacs (1974a):

Marx clearly defined the conditions in which a relation between theory and practice become possible. 'It is not enough that thought should seek to realise itself; reality must also strive toward thought '.

For example, to verify Snell's law for the refraction of light, a light-box must be physically constructed so that a parallel beam of light can be produced - a parallel beam of light did not exist in nature prior to its invention. A parallel beam of light is an invention, or creation, required by theory to explain refraction as a physical phenomenon. *It is precisely the alteration of nature by men, not nature as such, which is the most essential and immediate basis of human thought* (Engles, *Dialectics of Nature;* quoted in Vygotsky, 1978. Emphasis given). It is in the light of this Marxist epistemology that we can begin to understand Vygotsky. Vygotsky's approach was called the 'experimental-developmental' method *which calls for an experimenter to intervene in some developmental process in order to observe how such intervention changes it. Again the primary motivationfor doing this is to observe genetic processes: 'Our method may be called experimentaldevelopmental in the sense that it artificially provokes or creates a process of psychological development. This approach is equally appropriate to the basic aim of dynamic analysis. If we replace object analysis by process analysis, then the basic task of research obviously becomes a reconstruction of each stage in the development of the process: the process must be turned back to its initial stages (Vygotsky)* , (Wertsch,1985). In a child's zone of proximal development, ifwe are to understand the child's cognitive abilities as a *process* then we have to instigate that process by interaction with the child. It is in this sense that the 'social' cannot be separated from the 'individual'. If a child can successfully complete a task unaided, then prior knowledge of the abilities required to complete the task will enable us to say what abilities the child has. However, we would be looking at the child's abilities that have already matured in the child - we would be looking at a 'snap-shot' of the maturation process as an end-product. To understand the maturation process as a process then

we would have to facilitate the child's completion of a task that she or he cannot do unaided. How a child responds to the mediation in completing a task enables us to explain the abilities of the child as they mature, rather than simply describe the abilities that have already developed.

Although all forms of thought may be considered as originating from social relations and interactions, nonetheless it would seem unlikely that Vygotsky (or Marx:) would have denied that forms of thought can also be evaluated in separation from their social roots. The truth of the theorem of Pythagoras or the validity of the Newtonian system is independent of the social relations that existed at the time of Ancient Greece or the research programme of the renaissance Gust as art can be aesthetically judged independently of the considerations of the historic and social conditions that gave rise to the art): .....*the relations between origin and validity are much more complex here than in the case of the forms of the objective spirit. Marx saw the problem clearly: 'But the difficulty does not consist in realising that Greek art and epic are bound to certain social forms of development. The difficulty is that they still give us artistic pleasure and that, in a sense, they stand out as norms and as models that cannot be equalled.* ' .....*just as it is clear that Copernican astronomy was true before Copernicus but had not been recognised as such.* (Lukacs, 1974b). In much the same way, the Vygotskian perspective considers all higher mental functions originating from the interaction between human beings - but the functions themselves can transcend the context from which they originate. A student's understanding of mathematics may be evolving such that the understanding is still specific to the examples given and the way the subject is taught. A fully evolved understanding of mathematics, at any leve~ is independent of the specific examples used, and the approach taken, by the teacher.

3. The Constructivism Controversy Placed Within the Context of Three Approaches in the Philosophy of Science.

All forms of thought originate from social relations and interactions, but the products of thought can be evaluated independently of their social origins. A position adopted can be evaluated within the context of its adoption, but the logic or validity of the position can also be evaluated independently of its origins or social context. For Lerman (1994), however, no such separation should be made:

Positions adopted carry with them much more than 'ideas'; indeed it would contradict my support for the assertion that knowledge manifests in practices were I to claim that those ideas are independent of social practices.

Lerman's position seems to be a *consensus* one: that the best theories will be those that best meet the standards and needs of an academic community.

According to Chalmers (1978), there are three approaches to the question ofthe nature of scientific knowledge: the *subjective* approach, the *consensus* approach and the *objective* approach. In the consensus view, the beliefs of individual scientists are subservient to those of the scientific community. The consensus approach is a valid one, but it is severely limited because it considers the social group the primary notion and the actual science itself: including its practice, as the secondary one. However, a particular community mayor may not practice a legitimate science; and different social set-ups have created different legitimate contributions to a single physics (e.g. Galileo's Italy and Newton's England, or the United States and the Soviet Union). For the objectivist approach, this implies the existence of physics as an autonomous practice, independent of individual or consensus opinion, that constitutes the activity involved in its development. Although the development of scientific theory is dependent on the participation of the individual scientist and of the community, nevertheless, scientific theories bear a relationship to each other and to available evidence independently of whether or not the individual or the community realises it. In the subjective approach, scientific knowledge is held by individual scientists whether it be derived from sensory experience, intuition or reasoning.

Radical constructivism is a subjective approach because it places the emphasis on individual cognition. For von Glasersfeld (1995), scientific knowledge is a question of 'viability' that employs 'fictions' , such as gravity, that are useful as a substitute for something that is inaccessible ('ontological reality'). Such fictions *can explain anything you want to explain,* and should be *recognised as tools for the rational organisation of experience and not mistaken for phenomena that are real in the sense that they themselves could be experienced.* This is an admitted Instrumentalist position (von Glasersfeld states that *Radical constructivism is uninhibitedly instrumentalist.* Page 22) that does not square with the history of science. According to Chalmers (1978), it is an embarrassment for instrumentalists that theoretical fictions can be seen almost 'directly' through electron microscopes, or be seen colliding with smoke particles in the phenomenon of Brownian motion, or that the fields of Maxwell's electromagnetic theory can be produced in a 'visible and almost tangible form' (Hertz).

According to Chalmers (1978), the product of scientific practice is the maze of theories that make up a science. At a particular historical juncture the maze of theories will constitute a *problem situation* that will have an objective, autonomous existence. Scientific theories can and often do have consequences that were unforeseen and unintended by the original proponents of the theory. These consequences exist as properties of the theory that are there to be discovered by further scientific practice. For example, when Maxwell introduced the concept of a displacement current to Faraday's concept of an electric field, he was unaware of the far reaching consequences of such a move, namely, that it predicted a new kind of phenomenon, radio waves. This consequence was not realised until two years after his death. That problem situations provide objective opportunities helps to explain the many examples of simultaneous discoveries in science, such as the law of conselVation of energy by several independent workers in the late 1840s.

5. Conclusion

By analogy with science, we may regard mathematics as an autonomous objective practice that creates problem-situations the validity of which are independent of individual cognition or social acceptance (despite its fallible and mutable nature). This is important in the teaching of mathematics from a Vygotskian perspective, that it is the teaching of decontextualised concepts that enables the facilitation of cognitive growth. If the validity of mathematical knowledge is confused with its origin, or if knowledge is emphasised with experience, then the concepts taught will no longer be decontextualised. For Vygotsky, learning precedes development and so it is by the teaching of decontextualised concepts that the student's cognitive framework comes to life. The subjective or intersubjective approach to the teaching of mathematics may result in the denial of the student's full intellectual development.

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