Problems of Constructivism

I want to express my profound gratitude to those who organized the Atlanta conference and to all who agreed to contribute to it. As you know, constructivism is a subject that has occupied my thinking over the years and, as you requested it, I shall comment on some problems I see with it. Before I do this, let me remind you how it all came about.

Radical constructivism arose from a variety of disorderly readings. It was an attempt to fit into a coherent model a number of ideas about knowing that had been disregarded by the philosophical mainstream. This effort would not have been successful, had it not been for my early acquaintance with the work of Silvio Ceccato and a subsequent decade of assimilating parts of Jean Piaget's inexhaustible heritage.

I never thought that constructing such a model would amount to anything but a private quest. I and my research team were originally brought to the United States to con-tinue the line of work in computational linguistics that we had started in Italy. When the funds for the project dried up, I had the good fortune of being offered a position as psycholinguist in the Department of Psychology at the University of Georgia. Epistemology was of marginal interest in that discipline. Whatever reputation I gained there was due to the adeptness with which the chimpanzee Lana used the language I designed for the communication study at the Yerkes Center. Only in the mid-seventies when I began to work with Les Steffe on children's conception of number, was I drawn into a domain where my kind of conceptual analysis found some resonance.

This conference, therefore, is a most welcome occasion for me to acknowledge my debt to Les Steffe, John Richards, Paul Cobb, and Pat Thompson. None of us will forget the intensity of our discussions and the pleasure of forging the agreements that provided the launching pad for the constructivist model in the field of mathematics education. Today, it is immensely gratifying to see that the model has been taken up by so many vigorous, independent thinkers who seem to have found it useful.

The papers collected in this volume show a remarkable consensus on some very basic ideas. Even more interesting, however, they also show a variety of individual perspectives. This is exactly how it should be. Radical constructivism is not a dogma, but a tool that anyone can use as he or she chooses. Above all, it is by no means a finished product. Much remains to be done to enhance its usefulness and to enlarge the range of its applications.

To my mind, there are at present two aspects that need to be developed further. One of them is to find new ways of expressing the fundamental instrumentalist idea in order to make it less prone to metaphysical misinterpretation. The other is to achieve a far more detailed analysis of the complex area covered by the generic term "social interaction".

Forestalling Misinterpretation

Given the vast literature in which Piaget's *genetic epistemology* has been trivialized in order to fit it into the framework of traditional theories of knowledge, it is difficult to convey the fact that I have not called the constructivist position *radical* for political reasons, but because it requires a drastic modification of the concepts of cognition and its products. Although Piaget said dozens of times that, in his theory, "to know" does not mean to construct a picture of the real world, most of his interpreters still cling to the notion that our knowledge must somehow correspond to a world thought to be independent of the knower. This attachment is not surprising. The quest for a "true" representation has been an essential feature of the tradition that has dominated Western philosophy for two and a half millennia. The sceptics, of course, forever reiterated irrefutable logical arguments against this realist conviction, but they did not succeed in shaking it, because they failed to come up with a plausible substitute for the concept of knowing.

Radical constructivism does suggest such a substitute. It holds that knowledge is under all circumstances constructed by individual thinkers as an adaptation to their subjective experience. This is its working hypothesis and from it follows that for a constructivist there cannot be anything like a dogmatic body of unquestionable knowledge. The task is to show *that* and *how* what is called knowledge can be built up by individual knowers within the sensory and conceptual domain of individual experience and without reference to ontology. What matters in the end is that the constructs actually work and do not involve contradictions. Radical constructivism, therefore, cannot be a metaphysical system, nor can it claim to be "true". Indeed, radical constructivists never say: this is how it is! They merely suggest: this may be how it functions.

Alexander Bogdanov, a remarkable forerunner of both cybernetics and constructivism, provided an excellent metaphor in his dialogues on the philosophy of science:

> A. If a tool you are successfully using to work on certain materials turns out to be useless with others, would you throw it away?
> B. No, I would not throw it away as long as I don't have a better one.
> (Bogdanov, 1909; p.26)

A crucial aspect of this metaphor is that there are two ways for a tool to be better than another. It can be more successful in its use on a given set of materials, or it may be useful with a wider range of materials. In both senses a new tool may supersede the old one, but whether it does or does not, depends on a variety of practical and social circumstances.

When this instrumentalist principle is applied to cognition, realists still insist that "better" should be interpreted as "closer to the truth". They refuse to concede that

knowledge can be considered as a *mere* tool in the knower's struggle towards equilibration, because they are unwilling to relinquish the notion that it must somehow reflect the structure of reality. What they choose to believe is of course their affair. But trouble arises when they criticize the constructivist position and ignore the fact that "knowledge" in this context does not have the same representational connotation which they attribute to it in their own realist epistemology.

This stubborn refusal to consider an explicitly stated constructivist definition of knowledge (because it differs from the traditional one) is often reinforced by the spurious assumption that when constructivists speak of experience they intend nothing but sensory experience (e.g. Matthews, 1992). This, too, is an odd interpretation if one considers the great weight Piaget has always given to *reflective abstraction.* It can also be illustrated by the work of Steffe's group on the concept of number. The major emphasis in these writings is on mental operations that generate conceptual structures which are thoroughly abstract in the sense that they do *not* contain sensory elements.

Insofar as these misunderstandings are honest, they seems to be caused by conceptual blinders the traditional epistemology has placed on the readers. As with panicky horses, the blinders shut out perturbing sights and insights. Nevertheless I have not given up the hope that one of us will one day find a way of making the basic points of constructivism so clear that even inveterate realist critics will not be able to misconstrue them.

Phil Lewin, in his contribution to this volume, brings up a related question. Characterizing my point of view,

he says that constructivism concerns nothing but *knowing* and therefore is in no position to grant what he calls a "per-mission to be". To me, this seems the proper interpretation. Lewin goes on to explain that he agrees when constructivism insists on distinguishing experiential reality from an *ontological* one, about which it can have nothing to say. But he would nevertheless like an experiential space that provides some room for *being.* "If that being is not ontological, so be it", he says, "if it is only existential, ... it is still being nonetheless."

I think I understand what he intends. It is an important suggestion. But I would want to formulate it differently —and this presents a difficulty I am not sure how to overcome.

As agents (authors) of our own experiential reality we attribute continuity to ourselves as its constructors. We cannot do otherwise, because the world we come to know is based on the creation of regularities which *we* are able to impose on the flux of experience. Regularities require repetition. An active entity that conserves itself must segment its experience, compare chunks, and institute lasting individual identities. However, from my construc-tivist perspective, it is this very agent who constructs the notions of space and time, and I am therefore reluctant to refer to the agent's continuity as "existence". The words "to be" and "to exist" are far too firmly linked to the philosophers' traditional ontology in which they are intend-ed to describe a world that *is* and *exists* in itself. The continuity I have in mind, in contrast, is a phenomeno-logical construct of the experiencer and, as such, warrants no conclusions about an ontological reality.

In another context (Glasersfeld, 1979, 1993) I have tried to use the notion of experiential sequence as an elementary building block of the concepts of space and time.[1] In the same vein, I would now avoid "existence" and speak of *continuity* as the factor that situates the knower in his or her experiential world. Given this change in the formulation, I fully agree that this continuity "carries ethical commitments with it" and that I have so far failed to produce a model of how these commitments might arise. Such a model is one of the things that need to be worked out; but as far as I am concerned, its construction cannot be guided by Heidegger's metaphor of "thrownness". This metaphorical term inevitably suggests a pre-existing ready-made world, a given structure *into* which all knowers are thrown. From my point of view, the generation of ethics will have to be part of the model we design to grasp our interactions with the experiential constructs we call "others".

The Social Element

The present interest, among educational researchers and philosophically inclined psychologists in social interaction and its role in the process of learning, need not pit them against radical constructivism. This topic certainly requires investigation and its investigation should not be hampered by the unwarranted fabrication that there is a conceptual contradiction between the principle of subjective cognitive construction and the experiential reality of the phenomena that are called social. Constructivism, as has been amply explained, is a theory of knowing that attempts to show that knowledge can and can only be generated from experience. If social constructionists take for granted (explicitly or tacitly) that "society", i.e., the others in our experiential world, are a ready-made ontological given, existing as such and independently of subjective experience, they are making a metaphysical assumption. Though I see no need to make such an assumption, I feel that everyone is free to invent his or her own metaphysics. However, as far as a theory of knowing is concerned, I consider metaphysical assumptions vacuous as long as they do not specify a functional model of how ontology might determine the experiences from which we generate our knowledge. To say that something exists does not explain how we come to know it.

Alfred Schütz, one of the deepest thinkers in modern sociology, was quite clear about the fact that the basic problem of how we come to *know* of others is an epistemological problem that would have to be investigated by psychologists (cf. Schütz, 1932). Unfortunately, Piaget's work in that area is all but unknown in the English-speaking world. My own access to it has been very recent, through the Italian edition which the translator sent me (Piaget, 1989). Let me translate a few passages that seem very appropriate to the question of education:

> What has not been acquired through experience and personal reflection can only be superficially assimilated and does not modify any way of thinking. The child acculturates itself in spite of adult authority and not because of such an authority. (Piaget, 1989; p.252)

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[1] This was suggested by Berkeley in the notebook he wrote when, at the beginning of the 18th century, he was a student at Trinity College in Dublin.

... also on the elementary school level the child assimilates only those concepts that correspond to the operatory structures of which he has already acquired mastery, while he remains indifferent to those for which he can find no connections to his "spontaneous" structures.[2] (*loc.cit.*, p.346)

In his discussion of children's socialization, Piaget uses many examples taken from a school setting. He did this, I imagine, because it is easier there to distinguish the two mechanisms he considers primary in social adaptation. One of them he sees in the imitation of certain physical actions or behaviors (which may include speech acts) owing to *coercion*; the other, he specifies as the generation of mutually compatible actions and mental operations as a result of reflection and understanding which take place in the context of *cooperation*. The distinction is a parallel to the one I have been making in the educational context between training and teaching. (The coercion, of course, may be subtle and diffuse, as for example in the case of children's acquisition of the standard number word sequence as an empty verbal routine.)

Earlier in the book, Piaget applied this distinction to the process of linguistic interaction. He begins by asking how a statement uttered by one person could be agreed to by another:

How could such a convergence be established? The two subjects necessarily have different, non-inter-changeable perceptions: they exchange ideas, that is to say, judgments concerning perceptions but never the perceptions themselves! (Piaget, 1989, p.189).

He comes to the conclusion that *meanings* are a matter of "private symbolism" and agreement cannot manifest itself except through reactions due to mutually compatible mental operations.

This is obviously not the place to present Piaget's detailed model of the child's construction of linguistic meanings in the course of interaction with others. However, the passages I have quoted may suffice to show how far ahead he was in the years between 1941 and 1950, when he wrote these essays. He even dealt with the claim, revived today by certain social constructionists, that knowledge and language do not reside in individuals but are preformed in society:

The preformation [of social characteristics] is, as in other contexts, nothing but a common sense illusion consolidated by the Aristotelian philosophy of potentiality and action. (Piaget, 1989, p.340)

The fact that much of the contemporary literature on social interaction targets radical constructivism as an inimical orientation, however, does raise a problem. Since its authors are neither illiterate nor foolish, there must be something lacking in the way we present our ideas. I am not sure what exactly it is, but one particular problem comes to mind. Piaget sometimes mentioned the danger of confusing an observer's view of an organism in its observed environment and the observer's inferences about the view the organism generates within the domain of its own experience. In his own

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[2] As Piaget wrote these essays between 1928 and 1963, he should not be blamed for using the masculine pronoun generically. (The Piaget Society has announced that an English translation of his sociological essays is in preparation.)

writings, Piaget did not always make this distinction clear, and I think that we ourselves quite often do not pay enough attention to it.

Especially in discussing education, we tend to focus on the child or the student as *we* see them, and we may not stress often enough that what we are talking about is but *our* construction of the child, and that this construction is made on the basis of our own experience and colored by our goals and expectations. This is compounded by the fact that we have not yet come up with a sufficiently detailed model of how children may come to *socially interact* with other autonomous entities they have constructed in their experiential world.

My two suggestions can be summed up as follows: the radical constructivist agenda should include an effort to develop viable theoretical models in the areas of ethics and social interaction; and when we describe our constructivist orientation, we should take even more care to stress and repeat that we are constructing a model that should be tested in practice, not another metaphysical system to explain what the ontological world might be like.

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