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Constructivism and Christian Teaching

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Introduction

About six years ago, I made my first foray into the Internet. The World Wide Web was hardly what it is today. In fact, it barely existed among a small number of academics at research universities. The popular tools on the Internet at that time were Gopher, Usenet (or newsgroups) and Listserve (email lists). I joined a Listserve group sponsored by my professional association, and entered a discussion which had apparently just begun on something called "situated cognition". I must admit that although I had left graduate school only four years earlier, and had finally completed my degree in instructional psychology only recently, I was not acquainted with the term. So I was curious about this new idea. I was not entirely prepared for what followed.

I was stunned by the vigor of the discussion, and the strong feelings engendered by the network traffic on this issue. Within a few days, there were over 100 responses in my mailbox on this topic, which had by now expanded to related terms such as situated learning and Constructivism – another term that I was only slightly more aware of. It was apparent to me that this subject generated much heat. I wanted to know whether there was any light as well. And so began my investigation into Constructivism.

A few months after my initial introduction to Constructivism, I was privileged to attend a NATO Advanced Studies Institute in Edinburgh, Scotland. The subject was to be the use of technology in learning and instruction. It soon became evident to the participants that we were at a revival meeting and Constructivism was the gospel . There was little effort to justify that view of the world. It was assumed that it was the only one that made sense. It was then that I realized how a world view can shape instruction without any critical analysis of the world view itself.

I was forced to ask: What is the empirical basis of Constructivism? What is its

philosophical foundation? How does it relate to a Christian world view? How can Christian teachers and learning researchers relate to this movement?

This essay will explore the issue of Constructivism both in terms of its theoretical underpinnings and its pedagogical applications. I will begin with a discussion of the philosophical foundations of Constructivism as a framework for teaching and learning. I will then discuss the empirical support for a constructivist framework and its application to learning and teaching. Finally I will discuss a Christian response.

What is Constructivism?

One of the difficulties in defining Constructivism is that the term embraces a variety of loosely associated ideas. The term has been used to describe a constellation of approaches and applications in teaching and learning. In his very useful review of the subject, O'Conner (1998) has identified three streams of thought that can be identified as Constructivist. Let me first summarize these three positions.

Social Constructivism

Social Constructivism is derived from the recent work of sociologists of knowledge seeking to understand how knowledge is created in a society. The position of this group is, firstly, that knowledge is the result not merely of an individual or individuals acting separately, but of individuals acting within a group. Secondly, this knowledge does not exist independently, nor does it in any sense pre-exist knowers. Rather, knowledge is constructed by the collective itself. Proponents of this view suggest that even scientific facts may not be exempt from this process of construction. Facts are socially constructed in that the discovery and presentation of these facts are dependent on agreements among people on how to construe knowledge and how to report it.

Therefore, though reality itself may have independent existence, its presentation as "knowledge" depends on an agreed upon story of how these facts are connected and construed. This view allows that reality exists outside of our constructions, but insists that we are, to use O'Connor's term, "epistemologically challenged". Objectivity, then, is no more than shared agreement among persons regarding allowable constructions.

Individual Constructivism

A second stream of thought in the constructivist movement was based primarily on the influence of Jean Piaget, and is more individual in its orientation. Yet it transcends Piaget.

Piaget presents the learner as an active participant in the learning process, building (constructing, if you will) knowledge incrementally by the processes of assimilation and accommodation, mediated by the drive to equilibrate or to find a balance between the environmental stimuli on the one hand and emerging mental structures on the other. This is a dynamic process in which knowledge is constantly being constructed and reconstructed as the learners' mental representations more and more closely depict the real world.

A basic implication of this view is that knowledge cannot be "given", that learners are constantly acting on data they receive, assimilating from and accommodating to their environment, creating new knowledge structures or "schemes", and building on preexisting schemes. These schemes are unique, built on the learners' idiosyncratic experiences, and bringing to bear the learners' expectations and misconceptions. These misconceptions are often not corrected, but are rather infused into more elaborate schemes, and so on.

Proponents of this view have gone beyond Piaget. More radical constructivists of this variety would reject the view that knowledge represents some independent reality. Whether or

not an absolute independent reality exists, we are unable directly to know it. Further, because each learner's knowledge structure is unique, there is doubt as to how and whether we can truly communicate. In short, what the teacher thinks is being communicated may not be identical to what is received (constructed) by the learner, especially if the world of the teacher and that of the learner do not overlap significantly.

Socio-cultural Constructivism

Lev Vygotsky, the Soviet psychologist of the 1930s was not recognized in the West until decades after his death. His writings have recently become very influential among educators, and the third stream of Constructivism, though often going beyond his ideas, is primarily indebted to his influence. In this view, knowledge is embedded not in the individual (as in the Piagetian view) or in the collective (the social constructivist view) but in the interaction between the individual and the collective.

There is, as Confrey (1995) suggests, an individual element to Vygotsky's approach. He sees the child's cultural development as both inter-psychological (between teacher and learner) and intra-psychological (within the learner him/herself). Yet Vygotsky seems to do more than merely describe how individual learning is aided by social interaction. O'Connor (1998) suggests a more radical stance in which Vygotsky proposes that higher cognitive functions such as logic, scientific reasoning, argument and memory become primarily collective "inter-mental" activities, and only secondarily or derivatively can they be viewed as being possessed by the individual (p. 39).

Later work in this tradition places learning outside the individual's head and in the participatory activity itself. It is in this sense that learning is said to be "situated" in the activity

where the learning is taking place (Lave, 1991). Proponents of situated cognition and its related concepts are dependent on the views of theorists such as Leont'ev, who, with Vygotsky saw learning as embedded in culture, as well as Dewey's (1916) views of learning as a form of action, and the ideas which emerged from the Woods Hole Conference (Bruner, 1971). More recent work (e.g., Lave, 1991; Greeno, 1989; the Cognition and Technology Group at Vanderbilt, 1990) have also been influential.

Another aspect of this approach to learning is encapsulated in what Vygotsky calls the Zone of Proximal Development (ZPD). This is defined as:

> The distance between the actual developmental level as determined by independent problem-solving, and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

Here again, interpretations may vary from being based on individual learning to more radical positions where the potential development, when achieved, is no longer in the individual but in the context of the collaborative situation (Brown, Collins & Duguid, 1989).

Assumptions of Constructivism

Constructivist approaches to learning, whether they are of the Social, Individual, or Socio-cultural variety, seem to share a few basic assumptions relevant to learning. These are best shown by placing them in contrast to a more traditional "objectivist" epistemology as Duffy and Jonassen (1992) do. Following them, we could summarize the objectivist assumptions in the following points:

a. The world is completely and correctly structured in terms of entities, attributes and relations.

b. Experience plays little or no part in this structuring.

c. The goal of understanding is to come to know the entities, attributes and relations by which the world is structured.

d. The goal of instruction is to help the learner attain a correct understanding of this structure.

e. Knowledge is independent of instruction and can be assessed independently.

By contrast, the constructivist assumes that:

a. The world is real, but

b. Structure is not a part of this reality. Rather, meaning is imposed on the world by our experience.

c. There are many ways to structure the world, thus many meanings or perspectives may be generated on the same data.

d. None of the meanings are inherently correct.

e. Meaning is rooted in experience.

This view of learning has aptly been summarized as follows: "Learning is a constructive process in which the learner is building an internal representation of knowledge, a personal interpretation of experience" (Bednar, et al., 1992, pp. 21, 22).

Implications for Teaching

The principles of Constructivism have been applied in the classroom in a number of ways. In some instances, methods that are already in use have been embraced and included into the constructivist framework. These include student-centered approaches such as discovery and project methods which place more value on the student's unique experiences. Other approaches focus on social interaction implied by the ZPD. Reciprocal teaching and various cooperative learning techniques fall into this category.

A number of innovative approaches have been developed as applications of situated cognition. It should be recalled that situated cognition describes the view that thinking and learning are inseparable from the context (or situation) of the activity in which the learning is taking place. Thus the best and most usable forms of knowledge are gained in the context of their intended use.

This puts in question the kinds of learning traditionally carried out in schools, since the culture of the school is dissimilar from that of ordinary life. It seeks to explain the common inability of students to transfer knowledge learned in school to situations outside the school culture. This knowledge, it is argued, remains inert (Whitehead, 1929). Although it may be recalled when explicitly required (in an examination, for example), it is not spontaneously used in problem solving situations in the real world when such use would be appropriate.

One approach to learning based on this argument is *cognitive apprenticeship*. In this approach, deliberate use is made of the social and physical context in which the knowledge is to be used. *Anchored instruction* is another practical derivative of situated cognition. This method makes use of video-disc technology in order to provide the problem solving environments in which instruction is situated.

Any application of situated cognition requires that the learning situation be *authentic*. Two levels of authenticity can be identified. First, the objects and data used in learning should be the same as those used in the real world. Thus, if students are learning about the weather, real data from a weather station must be utilized. Second, authenticity refers to the tasks themselves, that is, the students must be engaged in tasks similar to the real world. The conversation in the class cannot be contrived, but must closely reflect the real problem-solving situation. The sorts of

decisions to be made and the problems to be solved must mirror the real world.

All of the teaching approaches labeled as "Constructivist" or "situated", have in common the assumptions described above. In addition, Brooks and Brooks (1993) outline five principles which guide Constructivist teaching. They suggest, firstly, that Constructivist teachers pose problems of emerging relevance to students. Though they are not arguing that all problems posed by the teacher be seen by students as relevant from the outset, they argue that relevance can emerge in a process of mediation with the student.

A second principle of Constructivist pedagogy is one that values holism in the questions posed and ideas presented. A common approach is for small discrete facts to be presented to the students who then must make sense of these facts, and build them into a whole, integrated concept. The preferable approach, they argue, is for concepts to be presented as wholes which the students, on their initiative can then break up into parts that they can see and understand. This reference to student initiative anticipates the third and fourth principles, which place emphasis on seeking and valuing the point of view of the student, and adapting the curriculum to address student suppositions. Both of these principles highlight the assumption that meaning is rooted in the unique experience of individual, whether teacher or student.

The final principle proposes that learning is best assessed in the context of teaching. This principle discourages the attitude that answers be labeled as "right" or "wrong". Doing so, it is argued, ruins creativity, and short-circuits the process by which the teacher can foster the construction of new knowledge on the part of the student.

To many, these principles of pedagogy seem intuitively to conform to good teaching practice. To others, they may appear to encapsulate precisely the relativism and lack of rigor that

seem to be what is wrong with education in our current culture. How can this conflict be adjudicated? The rational approach would be to seek evidence to support the principles proposed or justify the assumptions made. It is reasonable to ask whether evidence exists to support the Constructivist approach.

Evidence for Constructivism

Methodological Issues

One of the difficulties of answering the question regarding evidence is that criteria of support are not universal. Rather, the criteria are embedded within the world view of the particular theory. In order fairly to evaluate a theory, the evaluator and the theory to be evaluated must have common benchmarks.

Yet, as was demonstrated above, the epistemological assumptions of Constructivism are in conflict with those of Objectivism – the traditional framework of the scientific method. Constructivist views, by contrast are more consonant with a post-modern world-view. Such a world-view has its own approach to evidence – a naturalistic research methodology such as that proposed by Lincoln and Guba (1995). This approach is qualitative rather than quantitative, interpretivist rather than objective, open to multiple perspectives rather than a single reality, seeking *a* truth rather than *the* truth. Thus we have the case of each camp making up the rules by which their perspective is to be judged. This makes it difficult for the two camps even to communicate in the same research language.

Empirical evidence

If we leave aside this methodological problem, we can still ask whether by Objectivist criteria we can find empirical evidence to support a Constructivist learning theory.

A fundamental claim of Constructivists, on which the whole structure of Constructivism is built, is the assertion that knowledge is constructed by the learner, not transmitted to him or her. Several lines of research have lent support to this claim. I will mention only two here.

Elizabeth Loftus and others have examined the nature of memory as it is demonstrated in eyewitness testimony. In a program of experimental research spanning more than 25 years, Loftus (1975) and her colleagues have demonstrated that the memory (or knowledge) of an event is influenced by a variety of factors including the wording of questions asked of the witness, the witness' biases, expectations and prior experience. Further, the acquisition of knowledge of an event may be influenced prior to or after the particular events, prior to or after initial questioning.

To use specific examples, questions about how "frequently" headaches occurred received significantly higher answers than questions using the word "occasionally". How fast a car was traveling when it "bumped" into another was reported to be significantly lower than when the same car in the same event was said to "smash" into the other. In other studies of this genre, nonexistent barns were clearly remembered and placed in landscapes, nonexistent street signs were placed on street corners, nonexistent children were observed entering a school bus, nonexistent experiences of being lost in a shopping mall were remembered. In each case, the knowledge was not an objective recording of the events, but rather a subjective reconstruction influenced by the situation of encoding or recall.

Another piece of research also demonstrates how memory of events are better explained by a construction model. Neisser (1981) compared the testimony of John Dean, then Counsel to President Nixon, with the tape recordings of events in the Oval Office during the Watergate Scandal in the early 1970s. These data are significant, because Dean presumably tried to tell the

truth and was complemented during the hearings for his detailed answers demonstrating "photographic memory". But Dean was not aware that there existed independent corroboration for his testimony in the form of contemporaneous secret tape recordings.

Neisser's examination of this case study shows that although many of the details of Dean's testimony were accurate, he often reconstructed events to conform with what he expected, hoped he had done, or knew to be the usual practice. What is also noteworthy is that accuracy of testimony bore no relation to Deans confidence in that testimony.

Other evidence on the persistence of misconceptions, and the performance of children in math in given situations (see for example Lave, 1991) also seem to lend support to the basic tenets of Constructivism.

Conflict: Epistemology v. empirical evidence

An analysis of the basic assumptions of Constructivism presents for the Christian some challenges. There is the denial of objective truth. Although all but the most radical positions admit the existence of a reality, this reality has no inherent structure. Whatever structure we find in reality is imposed by our experience. And since our experiences are varied, there can be no single correct view of reality. Reality has no single independent meaning, only meanings imposed by varied experiencing beings.

This is incompatible with the Christian view that God created all of reality and he did so with a purpose, thus infusing independent structure into the real universe. Thus, not only is reality structured, that structure is singularly meaningful. Any experience, then, must be in reference to an objective set of facts (i.e., entities, attributes and relations) that make up the structure of the universe.

Yet, as I demonstrated above, evidence exists to support the fact that differing experiences do provide for different constructions of reality. There are multiple ways of experiencing the same facts. While the assumptions of Constructivism seem contrary to a Christian world view, the data seem to support those assumptions.

An additional difficulty is that many of the methods implied by the constructivist approach seem consonant with the teachings of Christ. Christ's method often involved questioning rather than telling, the cognitive apprenticeship, of learning by doing the activity, learning by discovery, and an adaptability to the uniqueness of the student. The evidence presents us with a potential problem. How can an approach based on faulty assumptions still be true?

Resolution – A Christian response

An inherent weakness of post modern assertions in general is what appears to be the self-contradiction of its basic position. Can it be said in truth that reality contains no inherent truth? As Anderson, Reder, and Simon (1995) put it, "radical constructivists cannot argue for any agenda if they deny a consensus as to values. The very act of arguing for a position is to engage in a value-loaded instructional behavior". More particularly, Constructivism (ironically) suffers from the absoluteness of its claims. As Anderson, et al (1995, 1996) clearly outline, most of the claims made by constructivists regarding ideal conditions of learning may be partially true, but often fail because of the radical nature of the claims, and the misconceptions that they display. (For a more extended critique of post-modern world-view from a Christian perspective, see Land (1998)).

Yet the conflict identified above still must be addressed. How can we account for the empirical evidence? And can we validate Constructivist approaches? A Christian approach must

assert clearly that God created a real structured world. A Constructivism that recognizes that basic fact can be proposed based on the following:

a. We are fallen creatures who can only see a portion of the picture. We see "through a glass darkly".
b. We were created unique beings, with different perspectives and different experiences, thus this dark vision is different for each of us. We construct reality differently, not because reality has no inherent structure, but because we each have an incomplete and distorted perspective.
c. It is naive to expect any objective view of reality to be entirely accurate.
d. We cannot take the radical view that objective reality is nonexistent, though it may be somewhat inaccessible.
e. Most important for the Christian, one day we shall come to know "even as we are known". This helps us to rise above radical Constructivism.
f. Even as we remain imperfect, we have insights into that perfect knowledge in Scripture.

Thus the practice of Constructivist teaching is not exclusively dependent on post-modern assumptions, but can be supported by Christian assumptions as well.

Conclusion

Constructivism is a theoretical framework that has gained prominence in education in recent years. It is clear that this frameworks is based on premises not acceptable within a Christian world view. However the methods implied by this framework are in most cases consonant with good Christian teaching. Although the Christian teacher cannot accept the assumptions, there are modified premises which are consistent with the Christian world view This

may explain why a framework apparently so contrary to Christian thought may still produce an acceptable approach to teaching.

In addition, it is important to separate philosophical assumptions from empirical observations. Empirical results may be predicted by more than one set of assumptions. The fact that particular assumptions support empirical data is not proof of those assumptions. Accordingly, although teachers should be aware of the assumptions underlying a set of practices, a pragmatic approach is recommended. Teachers should use whatever methods they find which enhance learning, so long as principles of justice and fairness are maintained.

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