Constructing Knowledge through Online Bulletin Board Discussions

Adams Bodomo
University of Hong Kong, Hong Kong

INTRODUCTION

Within the field of education, and in particular educational technology, dominant paradigms of instruction include active, interactive, constructivist, and student-centered approaches as opposed to passive and teacher-centered approaches to learning and teaching. There is hardly much argument as to the relevance of such constructivist approaches in the contemporary world. It is no more a question of whether we have enough information, but of what critical and analytical skills we need to sift out relevant information from the huge barrage of information churned out of the pervasive information communications technologies (ICTs) of our time, and how to construct meaningful knowledge to enhance human life. Within such constructivist learning environments, digital ICTs are deployed to enhance the best possible methods. This article aims to provide an overview of the meaning and theories of constructivism, and to further illustrate the concept with a case study of using an online bulletin board in a university undergraduate course.

WHAT IS CONSTRUCTIVISM?

To construct, literally, means to build or to create something by combining different parts. In the field of education, the idea of constructing knowledge and meaning is highlighted. This philosophy of constructing knowledge and meaning is often called *constructivism*. The central idea of constructivism is that learners construct their own knowledge of the world. Learning is, therefore, a process of creating meaning by the learners themselves, and the instructor simply serves as a facilitator in this process.

An Overview of Constructivist Learning Theories

Theories of learning within education and related fields such as psychology and cognitive science have proliferated over the years. New pedagogical methods based on these theories are turning away from passive methods of teaching, which require no action on the part of the student beyond listening and taking notes, to interactive delivery methods, which enable the student to control and manipulate the instruction environment. These active approaches to instruction may be situated within the framework of what may be called constructivist theories of learning. The following subsections outline various views and theories of constructivist learning, including Piaget's cognitive constructivism, Dewey's theory of experiential education, Bruner's theory of active learning, and Vygotsky's social constructivism.

Piaget

The Swiss psychologist Jean Piaget is considered to be one of the earliest proponents of constructivism. Piaget's theory of cognitive development in the field of epistemology has greatly influenced today's theories of learning and child development. According to Piaget (1955, 1973), children's abilities to acquire knowledge are attributed to the fact that they are born with the ability to adapt to the environment. This adaptation is achieved through two processes: assimilation and accommodation. Piaget's views provide the foundation for many instructional models. Pedagogically, Piaget's theory implies that children learn naturally through their interaction with the environment they live in, but not through information given by the teacher.

Dewey

John Dewey's educational theory (Dewey 1913, 1956, 1963) also focuses on the fact that knowledge is created by the learners themselves, but unlike Piaget's theory that mainly stresses cognitive development, Dewey stresses the importance of society in the process of acquiring knowledge. As stated in Dewey (1956), learning is an active process that involves reaching out of the mind and organic assimilation starting from within. It is the learner and not the subject matter that determines both quality and quantity of learning. For Dewey, the learner plays an extremely integral role in the learning process, where knowledge is constructed by the learners themselves through their experience of the real world.

Bruner

The theoretical framework of Bruner is similar to that of Dewey. Learning, for Bruner (1966, 1983, 1986, 1990), is an active process in which learners construct new ideas or concepts based upon their current and past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. As far as instruction is concerned, the instructor should try and encourage students to discover principles by themselves. The instructor and student should engage in an active dialog (i.e., Socratic learning). The task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding. The curriculum should be organized in a spiral manner so that the student continually builds upon what he or she has already learned.

Vygotsky

Another theory of much relevance to constructivist learning approaches is the social development theory as conceptualized by the Russian psychologist Lev Vygotsky. In his work (e.g., 1934, 1978), Vygotsky further expands on Piaget's view and emphasizes that social interaction plays a fundamental role in the development of cognition. Another aspect of Vygotsky's theory is the idea that the potential for cognitive development is limited to a certain time span, which he calls the "zone of proximal development" (ZPD). Furthermore, full development during the ZPD depends upon full social interaction. The range of skills that can be developed with adult guidance or peer collaboration exceeds what can be attained alone.

SUMMARY OF MAIN TENETS OF CONSTRUCTIVISM

Based on the various views presented above, the main tenets of constructivism can be summarized as follows.

1. The learner plays an active role in the learning process. (Bruner)
2. Learners build their own knowledge through experience, but not through "given" information. (Piaget, Bruner)
3. Instructors should only serve as facilitators and encourage students to discover new knowledge by themselves. (Bruner)
4. Learning is a social activity that takes place in an environment that stresses the role of the cultural context. (Dewey, Vygotsky)

These tenets are considered influential to today's theories of constructivist learning, particularly in the area of computer-based learning (Bodomo, 2001, forthcoming; Bodomo, Luke, & Anttila, 2003; Bryson & Scardamalia, 1996; Duffy & Jonassen, 1992; Scardamalia & Bereiter, 1999). According to Blurton (1999, p. 9), "[M]odern constructivist education theory emphasizes critical thinking, problem solving, 'authentic' learning experiences, social negotiation of knowledge, and collaboration—pedagogical methods that change the role of the teacher from disseminator of information to learning facilitator." The author further describes constructivist methods of learning as involving "self-paced, self-directed problem-based…learning processes" (Blurton, 1999, p. 9). In the 21st century and the age of information technology, the issues and questions then are about how we can best make use of technologies to achieve such an active and learner-centered environment. What techniques can a teacher develop and deploy at the beginning of a new class in order

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