Knowledge-Building through Collaborative Web-Based Learning Community or Ecology in Education

Percy Kwok
Logos Academy, China

INTRODUCTION

Because of the ever changing nature of work and society under knowledge-based economy in the 21st century, students and teachers need to develop ways of dealing with complex issues and thorny problems that require new kinds of knowledge that they have not ever learned or taught (Drucker, 1999). Therefore, they need to work and collaborate with others. They also need to be able to learn new things from a variety of resources and people, and to investigate questions and bring their learning back to their dynamic life communities. There have arisen recent *learning community* approaches (Bereiter, 2002; Bielaczyc & Collins, 1999) and *learning ecology* (Siemens, 2003) or *information ecology* approaches (Capurro, 2003) to education. These approaches fit well with the growing emphasis on lifelong, lifewide learning and knowledge-building works.

Following this trend, the Internet technologies have been translated into a number of strategies for teaching and learning (Jonassen, Howland, Moore, & Marra, 2003) with supportive development of one-to-one (e.g., e-mail posts), one-to-many (such as e-publications), and many-to-many communications (like video-conferencing). The technologies of computer-mediated communications (CMC) make online instructions possible and have the potential to bring enormous changes to student learning experience of the real world (Rose & Winterfeldt, 1998). It is because individual members of learning communities or ecologies help synthesize learning products via deep information processing processes, mutual negotiation of working strategies, and deep engagement in critical thinking, accompanied by an ownership of team works in those communities or ecologies (Dillenbourg, 1999). In short, technology in communities is essentially a means of creating fluidity between knowledge segments and connecting people in learning communities. However, this Web-based collaborative learning culture is neither currently emphasized in local schools nor explicitly stated out in intended school curriculum guidelines of formal educational systems in most societies. More than this, community ownership or knowledge-construction in learning communities or ecologies may still be infeasible, unless values in learning cultures are necessarily transformed after technical establishment of Web-based learning communities or ecologies.

BACKGROUND

Emergence of a New Learning Paradigm Through CMC

Through a big advance in computer-mediated technology (CMT), there have been several paradigm shifts in Web-based learning tools (Adelsberger, Collis, & Pawlowski, 2002). The first shift moves from *content-oriented* model (information containers) to *communication-based* model (communication facilitators) and the second shift then elevates from *communication-based* model to *knowledge-construction* model (creation support). In knowledge-construction model, students in Web-based discussion forum mutually criticize each other, hypothesize pretheoretical constructs through empirical data confirmation or falsification, and with scaffolding supports, co-construct new knowledge beyond their existing epistemological boundaries under the social constructivism paradigm (Hung, 2001). Noteworthy, only can the knowledge-construction model nourish learning community or ecology, advocated by some cognitive scientists in education like Collins and Bielaczyc (1997) and Scardamalia and Bereiter (2002). Similarly, a Web-based learning ecology contains intrinsic features of a collection of overlapping communities of mutual interests, cross-pollinating with each other, constantly evolving and largely self-organizing members (Brown, Collins, & Duguid, 1989) in the knowledge-construction model.

Scaffolding Supports and Web-Based Applications

According to Vygotsky, the history of the society in which a child is reared and the child's personal history are crucial determinants of the way in which that individual will think. In this process of cognitive development, language is a crucial tool for determining how the child will learn how to think because advanced modes of thought are transmitted to the child by means of words (Schütz, 2002). One essential tenet in Vygotsky's theory (1978) is the notion of the existence of what he calls the "zone of proximal development (ZPD)." The child in this *scaffolding* process of ZPD, providing non-intrusive intervention, can be an adult (parent, teacher, caretaker, language instructor) or another peer who has already mastered that particular function. Practically, the *scaffolding* teaching strategy provides individualized supports, based on the learner's ZPD. Notably, the scaffolds facilitate a student's ability to build on prior knowledge and internalize new information. The activities provided in scaffolding instruction are just beyond the level of what the learner can do alone. The more capable peer will provide the scaffolds so that the learner can accomplish (with assistance) the tasks that he or she could otherwise not complete, thus fostering learning through the ZPD (van Der Stuyf, 2002).

In Web-based situated and anchored learning contexts, students have to develop metacognition to *learn how to learn, what, when and why to learn* in genuine living contexts, besides problem-based learning contents and studying methods in realistic peer and group collaboration contexts of synchronous and asynchronous interactions. Empirical research databases illuminate that there are several levels of Web uses or knowledge-building discourses ranging *from mere informational stages to co-construction stages* (Gilbert, & Driscoll, 2002; Harmon & Jones, 2001). To sum up, five disintegrating stages of Web-based learning communities or ecologies are necessarily involved in Table 1.

Noteworthy, students succeed to develop scaffold supports via ZPD only when they attain *co-construction* levels of knowledge-construction, at which student-centered generation of discussion themes, cognitive conflicts with others' continuous critique, and ongoing commitments to the learning communities or ecologies (by having constant attention and mutual contributions to discussion databases) emerge. It should be noted that Web-based discussion or sharing in e-newsgroups over the Internet may not lead to communal ownership or knowledge-construction (Kreijns, Kirschner, & Jochems, 2003)

Key Concepts of Communities-of-Practice

Unlike traditional static, lower-order-intelligence models of human activities in the Industrial Age, new higher-order-intelligence models for communities-of-practice have emerged. Such models are complex-adaptive systems, employing self-organized, free-initiative, and free-choice operating principles, and creating human ecology settings and stages for its acting out during the new Information Era. Under the technological facilitation of the Internet, this new emerging model is *multicentered, complex-adaptive, and self-organized*, which is founded on the dynamic, human relationships of equality, mutual respect, and deliberate volition. When such model is applied to educational contexts, *locally managed, decentralized marketplaces* of lifelong and lifewide learning take place. In particular, both teacher–student partnerships are created to pursue freely chosen and mutual agreed-upon learning projects (Moursund, 1999), and interstudent co-construction of knowledge beyond individual epistemological boundaries is also involved (Lindberg, 2001). Unlike working and learning are alienated from one another in formal

Table 1. Five disintegrating stages of Web-based learning communities

Disintegrating stages	Distinctive features
Informational Level	Mere dissemination of general information
Personalized Level	Members' individual ownership in the communities
Communicative Level	Members' interactions found in the communities
Communal Level	Senses of belonging or communal ownership built up
Co-construction Level	Knowledge-construction among members emerged