Collaboration, Communication, and Learning in a Virtual Community

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INTRODUCTION

The use of the World Wide Web (Web) for teaching and learning in higher education has increased exponentially in the last five years. Traditional universities (e.g., MIT, University System of California) as well as "virtual universities" (e.g., Western Governors University, Kentucky Commonwealth Virtual University) have moved toward offering courses and degrees around the world. Web-driven communication systems have further increased the popularity of Web-based learning. Web-based course-management and communication systems (e.g., WebCT®, Ellumination®) are specifically aimed at using the Web to support students, instructors, and experts in communicating, sharing, and collaborating with each other in the process of learning.

At present, almost any Web-based application may be labeled "collaborative." Web technologies make possible many-to-many asynchronous and synchronous communication, enabling both time and/or place independence. Time and place independence are important because they offer online learning systems the opportunities to move from individualist modes of delivery to group-oriented interactive modes (Davies, 1995). However, Internet tools such as chat, bulletin boards, or e-mail do not organize the interactions for learning (Roschelle & Pea, 1999), nor were they designed for building and sharing collaborative knowledge. Without advanced pedagogical preparation, these applications may not contribute to collaborative learning.

Web-based applications can be empowering, enabling collaborative learning among participants and facilitating the creation of virtual learning communities. However, the underlying theoretical framework to explain how collaborative learning or community building might occur in Web-based contexts does not yet exist. Further, there is little to no agreement amongst researchers related to fundamental concepts associated with virtual communities (e.g., collaboration, communication, or learning) (Lipponen, 2002; Pea, 1996). While this ambiguity can be disconcerting, it is also exciting, reflecting the diversity of emerging field and paradigm for teaching and learning in virtual environments. It is necessary to review this emerging field from multiple perspectives to clarify ambiguity and embrace diversity. Through these efforts, we may be able to suggest new ways of understanding virtual learning communities, exploring what we mean by collaboration, communication, and learning, and thus enable the forward movement of the field.

THE THEORETICAL FOUNDATIONS OF VIRTUAL COMMUNITY

Virtual learning communities are recent additions to the educational landscape. It is therefore important to explore possible theoretical foundations. Koschmann (1996) offers a new way of classifying the changes that can be observed in the field of instructional technology (IT) and related areas (e.g., virtual communities). Suggesting computer support for collaborative learning (CSCL) as a new paradigm in IT, Koschmann divided the historical evolution of IT into four paradigms: (1) Computer-Assisted Instruction, (2) Intelligent Tutoring Systems, (3) Logo-as Latin, and (4) CSCL. Compared with the previous three approaches, the most distinguished feature of CSCL is the notion of learning as a social process (Koschmann, 1996). CSCL breaks with traditional instructional computing that is more individualistic in nature. Further, CSCL uses computer-mediated communication (CMC) to develop a shared knowledge base and promote common understandings.

According to Koschmann (1996), the intellectual heritage of CSCL was built on research traditions of different aspects of the social setting (e.g., language, culture). More specifically, he suggested three theoretical backgrounds of CSCL: socially oriented constructivist viewpoints (i.e., neo-Piagetians), Soviet sociocultural theories (e.g., Vygotsky), and situated/shared cognition (Greeno, 1997; Lave & Wenger, 1991). Studies in these traditions focus on social issues as the

central context, seeking to understand knowledge construction and community building as shared processes.

In this section, we briefly describe two areas contributing to the theoretical foundation of virtual communities from a CSCL perspective. First, we will explore the social process of knowledge construction, seeking to explain how this occurs in a virtual environment. We next describe the concept of "co-inquiry" and how it contributes to the creation of virtual community.

The Social Process of Knowledge Construction: A Situated Cognition Perspective

Researchers and theoreticians have taken a variety of approaches in explaining how learning occurs. For many decades, objectivist perspectives (e.g., behaviorism, cognitive theories) dominated the landscape, emphasizing how to change the actions of an individual in order to enable learning and cognitive development (Driscoll, 2000). Several theories focused on the individual. For example, Piaget's theories of assimilation and accommodation explained how individuals develop understanding about the world around them. Class management techniques and instructional objectives were also topics of focus, with practitioners seeking to improve the learning context for the individual within a group of students.

Other researchers explored knowledge construction from an interactive, sociocultural perspective. Bruner's work in the late 1960s created a foundation for examining the impact of culture on knowledge creation. Vygotsky's work also emphasized the role of context in learning, focusing on social interaction and learning (Wertsch, 1985). Perhaps the most well known concept from Vygotsky's work is the *zone of proximal development* (ZPD). As stated by Vygotsky (1978), "the [ZPD] defines those functions that have not yet matured but are in the process of maturation" (p. 86). It is the interaction between the novice and the more knowledgeable other within the ZPD that enables the growth in the knowledge process.

Constructivism has extended Bruner's and Vygotsky's theories. A basic assumption of constructivist theory is that learners construct knowledge as they make sense of their experiences (Driscoll, 2000). Social constructivism takes it one step further, placing meaning making in a communal context. According to social constructivism, learning occurs as a result of social interaction. Further, social constructivism emphasizes the situated nature of knowing. Pea (1996) has referred to this as "distributed intelligence," where learners work together in a particular context building shared understanding.

These two concepts, situated and shared cognition, have been used as theoretical frameworks to explain knowledge construction. Situated cognition goes beyond working together to achieve a common goal; it enables dynamic construction. Further, it is shared understanding, enabled by dialogue within a group setting (Brown, Collins, & Duguid, 1989).

Perspectives related to situated and shared cognition have gained in their popularity in the last decade, particularly within virtual environments. As mentioned in the introduction, a strength of Web-based technologies is their ability to enable many-to-many communication. This shared communication enables intelligence to be distributed amongst many learners, creating opportunities to build understanding in a global context.

The promises of shared knowledge construction are exciting for many; however, it is important to note that concerns have been raised related to the value of the "solitary learner." Hopper (2003) warns that "groupthink" can have negative as well as positive consequences. He goes on to present a position that it is important to have a balance between collaborative learning environments and learning contexts in which the individual learner can stand independent from the group. Given the diverse population of learners involved in virtual learning, it will be important to keep multiple pedagogical perspectives in mind as we continue to explore learning in online settings.

The Virtual Community as a Community of Inquiry

There are many definitions of "virtual community," and each has its own value. We have found the definition by Woods and Smith (2001) to be informative. "Virtual communities are social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationship in cyberspace; community is based in ongoing communication" (p. 110). According to this definition, community relies on a foundation of commonality, with enough quality and substance to the shared discourse to build and sustain a sense of community. It is important to remember that a participant's sense of belonging to a virtual community is based on CMC; therefore, the interactions are not often immediate (as they are in face-to-face). Other characteristics are important in defining virtual communities, including a minimum level of interactivity, a variety of communicators, common public space, and a minimum level of sustained membership (Woods & Smith, 2001).

One goal of virtual learning communities is to share existing information and knowledge and create new in-