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Preserving Authenticity in CoLs and CoPs: Proposing an Agenda for CSCL

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Abstract. This paper reviews the issues of authenticity in learning and educational technologies. Instead of undermining the authenticity of schools or communities of learners (CoLs), we acknowledge schools as having equally legitimate authenticities compared with communities of practice (CoPs). Founded on such an argument, we propose the role of scaffolding learners from CoLs and CoPs. A critical review of approaches to authenticity forms a major part of this paper, and a recommendation of a framework to scaffold learners from CoLs to CoPs with augmentation supports is recommended. We argue that such a process leads to innovation. We recommend an agenda for the field of CSCL to consider.

Keywords: Authenticity, Communities of Learners, Communities of Practice, Scaffolding, Augmentation

COMPUTER-SUPPORTED COLLABORATIVE LEARNING

Computer supported collaborative learning (CSCL) has grown out of an integration of computer supported collaborative work (Ellis, Gibbs, & Rein, 1991) and collaborative learning. CSCL focuses on the *learning* dimensions of what is being communicated and the purpose is to scaffold or support students in learning together effectively. Theories undergirding CSCL include distributed cognition (Hutchins, 1991), Knowledge building (Scardamalia & Bereiter, 1992), Vygotsky's social-cultural theories of the mind (Vygotsky, 1982), cognitive flexibility (Spiro & Jehng, 1991), and other social constructivist forms of learning. CSCL aims at providing both an authentic environment and multiple perspectives that can tie in students' prior knowledge, holding to the underlying assumption that individuals are active agents that they are purposefully seeking and constructing knowledge within a meaningful context. One of the central aims of CSCL is to make learning authentic. In this paper, we argue for the authenticity of both schools and professional practices. We propose an agenda for CSCL to consider how CSCL technologies can bridge between communities through the concept of augmentation supports.

AUTHENTICITY

Authenticity can be observed when students construct meanings and use disciplinary-oriented inquiry processes in their learning (Edelson, 1996). Authenticity from this perspective approximates what the real world is engaged in, that is, the real world of scientists and other kinds of practitioners. Educators have, by and large, deduced from this that learning contexts should be context-rich just as in real world settings (Greeno et al, 1998). Although this is a pedagogically sound end, researchers have been confused with the issue of authenticity being unique in different contexts. We are not denying that perhaps it is into the CoP context that ultimately students would be developed, but this does not give us licence to reject school or CoL authenticity. We argue for the existence of many types of context-community authenticities – CoL-based (school- or university-based community of learners) authenticity and CoP-based authenticity. CoLs are commonly referred to as preparatory communities set up in schools to foster active participation and responsibility for learning goals. By CoPs we mean the actual and 'lived' communities in which practitioners such as scientists engage in their work on issues that have practical implications for society. We contend that these two different types of authenticity serve varying complementary functions and that they are both authentic in their own right.

Constructivist Learning Environments in educational technology (for example, Jonassen 2000, Berman, & Macpherson, 1999) are, in essence, environments where attempts are made to simulate real world scenarios and practices. These environments are also known as practice fields (Senge, 1994). Jonassen (2000) has proposed a framework of 'Constructivist Learning Environments' (CLEs) using communities of practices as activity

contexts. A problem is commonly related to situations within real communities of practice (CoPs). The problem can be represented in the form of a story or simulation with the aim that it should be as interesting and appealing to the learners as possible. Jonassen argues for a problem where the learners can affect the problem situation thus enabling it to be more intrinsically motivating. Such a problem would have a context that depicts the social-cultural and organizational context surrounding the problem. A description of the actors, beliefs, goals, organization climate, historical and cultural constrains implicit in the context are described. In the same way, CLEs are simulations because they attempt to transfer problems and processes from CoPs to the classroom. One major problem with any of the above simulation approaches is that a simulation approach is fundamentally a *simulation*, and is therefore not intended to be the same as the actual real world. However, Petraglia (1998) has pointed out that these *a priori* designs – that is, simulation approaches – of constructivist learning environments (CLEs) have missed the in-situ epistemological underpinning of situated cognition (Brown, Collins, & Duguid, 1989). He argues that educational technologists have been preauthenticating learning materials and environments to correspond to the real world rather than fostering learners to interact with it. In essence, only the cognitive dimensions of CoPs are possibly modeled or 'mirrored' into CoL contexts. Recognizing the epistemological significance of Petraglia's work, researchers (for example, Barab, Squire, & Dueber, 2000) have tried to argue for a *participation* approach – that is, instead of bringing the real world into classrooms (that is, simulation approaches), students are brought to the real communities of practices (CoPs) to be enculturated in their learning processes with the central participants of that community (Lave & Wenger, 1991). Thus, from this radical perspective, 'simulating' authentic learning experiences other than through enculturation in the actual full and situated context is an oxymoron with regards to situated cognition.

From a different perspective of practice fields and participation approaches which assume the stability and authenticity of CoPs, relativist approaches address the issue of authenticity from the theoretical groundings of situated cognition. Situated cognition emphasizes the *in-situ* occurrence of meanings in authenticity. In other words, in-situ approaches do not focus on CoLs or CoPs per se, but rather on the processes occurring within the respective communities. Authenticity, in this sense, is judged by the nature of interactions rather than on the 'real-ness' of reality as from CoPs. In-situ approaches spring from situations where two or more parties, for example, learners and practitioners are engaged in mutual co-construction of meanings and understandings. Authenticity therefore emerges from the in-situ processes between parties such as practitioners and learners. The in-situ approaches emphasize that knowing and context are irreducible and co-constituted, and thus learning is conceived of as fundamentally constitutive of the contextual particularities in which it is nested (Davis, Sumara, & Kieren, 1996). Their concern is not with how the cognising agent comes to know the world, but with how learner-and-learned, knower-and-known, self-and-other, personal-and-social, experienced-and-narrated co-emerge, co-evolve, and are co-implicated (Bakhtin, 1981; Davis, Sumara, & Kieren, 1996; Heidegger, 1962; Merleau-Ponty, 1962; Vygotsky, 1978). Both learners and practitioners are seen as *part* of the context (e.g., CoLs) rather than *in* a context. Concomitantly, Merleau-Ponty (1962) has studied patterns of interacting, describing the relationships among persons engaged in conversation as a coupling. This concept has more recently been described by biologists as structural coupling (Maturana and Varela, 1987), co-emergence (Davis & Sumara, 1997), or mutual specification (Varela, Thompson, & Rosch, 1991). Knowledge-in-action (the situated, relativist view) is contrasted to knowledge-as-objects (the dualistic, objectivist view). One example is when K-12 school leaders (as learners) come to the University and co-engage with professors (in the University as a CoP). Much of what emerges in the interactions is a synergy of practical experiences of school leaders (from schools) and the wealth of educational and theoretical knowledge from University professors (as CoP practitioners). Both kinds of knowledge co-determine each other and can result in manifold directions. University professors bring constructivist epistemologies while school leaders are experienced with the possibilities of implementation in practice. In this case, in-situ interactions of meanings occur because University professors recognize their limitations in terms of understanding actual school practices, while these school leaders lack newer theoretical understandings and perspectives. In our discussions above, we have tried to highlight that the in-situ approach, as in co-interactions, occurs in both CoPs and CoLs. In this sense, the relativist-process orientation fits into the authenticity of both CoLs and CoPs. Since both CoLs and CoPs are "equally" authentic, they should exist and not be compared with each other with respect to authenticity. Instead, our proposition is in considering how we can scaffold learners across communities – from CoLs to CoPs.

SCAFFOLDING ALONG THE CONTINUUM OF COLS AND COPS

By adopting Lave and Wenger's (1991) model of legitimate peripheral participation, which is a model grounded on scaffolding and enculturation, we recognize that the above three models can be seen as a CoP learning continuum. With effective scaffolding, we envisage the learner treading from simulation to in-situ interactions. We argue for the need to advance learners through the continuum by appropriating augmented supports through the learning process, yet preserving the construct of authenticity. The concept of scaffolding facilitates the

learner within the context of a community moving from legitimate peripheral participation (simulation) to central participation (in-situ) (Lave & Wenger, 1991). In the same vein, as the learner moves along this continuum, the community – which is composed of the learners – similarly evolves along this continuum (Figure 1). The learner has the possibility of progressing from being a novice to finally become an active contributor. These categorizations will be elaborated in the later sections.

An example of a learner being scaffolded along such a continuum could be seen from the perspective of a doctor whose training begins at the University where he or she works with non-life practice fields. On the later years of training, the trainee-doctor begins to contribute alongside qualified doctors in hospital wards, probably engaged in participation with doctor-practitioners in daily activities. Subsequently, after graduation, the full-fledged doctor is now ready for *in-situ* interactions with other doctors as they engage in their own medical cases and research into the frontiers of medical sciences. Other examples could include pilots under training in flight-simulators, pilots subsequently as observer-participants in cockpits, and finally as co-pilots in actual flights. In a similar sense, *scaffolding* is a systemic approach to supporting the learner (Jonassen, 1999), focusing on the task, the environment, the learner, and other instructional persons such as tutors, teachers, etc. That is, scaffolding provides structures and frameworks to support the learning process and students' performances beyond what is currently possible (Griffin & Cole, 1984).

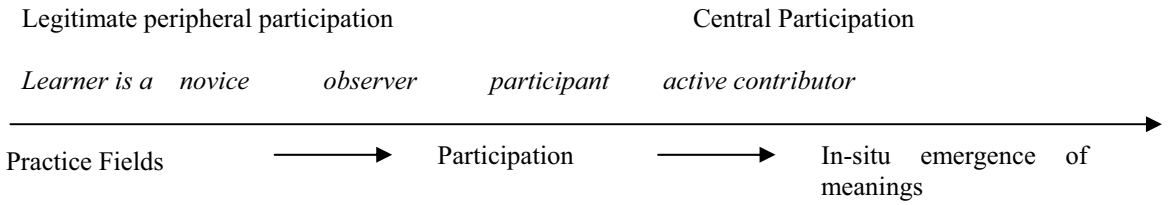

Figure 1: The scaffolding continuum

A scaffold adapted to the level of the learner ensures success at a task difficult for the learner to do on his or her own. Scaffolding envisages a learning structure and framework for a learner to gradually move along a continuum. Scaffolding usually involves the notion of gradual fading and removal of supports. Tools or resources are initially needed and may gradually be internalized as learners progress in the learning continuum. Again, one needs to differentiate between the supports afforded by scaffolding and those that are used to augment the learner's capabilities. Once the learner is fully immersed in the professional culture of the community, these tools resources can be gradually removed. In retrospect, the design of simulation-oriented learning environments is complementary to real communities and not a replacement for them. Obviously, the real context (non-simulation) with its embedded nuisances would probably be the best. However, we recognize that it is not always feasible to have full participation with communities of practice from the initial stages of the learning process – it defies the peripheral to central participation concepts of learning within communities (Lave & Wenger, 1991).

An example of a learning environment which can scaffold between CoLs and CoPs is *ChemSense*. *ChemSense* can be seen as a tool bridging learners from CoL to CoP. Kozma's (2003) *ChemSense* allows learners to see chemistry concepts, such as chemical bonds, in multiple representations because the research findings showed that expert chemists are able to see chemistry meanings in multiple representations. On the other hand, novices or students are constrained in their ability to visualize and are generally not able to recognize chemical meanings in multiple forms, for example, between bond-structures and actual laboratory chemical experimentations. The background of to such an environment is the recognition that students think "chemistry" rather differently from "experts" or practicing chemists. In other words, the way students learn chemistry in schools or CoLs differs from the way chemists "see" meanings in CoPs. Hence, ChemSense, although not intended to be a bridging CoL-CoP tool can serve this function. *ChemSense* would augment the novices thinking by displaying alternative representations to novices – chemical equations, real-time graphs representing phenomena, molecular animations, and videos of lab-based experiments (Kozma, 2003). If *ChemSense* is also used in real CoPs where chemists can benefit from, the bridge between CoLs and CoPs is augmented. In this sense, *ChemSense* can be used as an augmenting support that helps to facilitate interactions across both communities. In other words, *ChemSense* can be used in both CoLs and CoPs and as a mediator between both communities. Basically an augmentation support mediates the interactions between two or more communities. At this stage, we want to conceptualize on the concept of augmentation supports. To our minds, augmentation supports, unlike scaffolds, do not fade away as students are scaffolded from CoLs to CoPs. ChemSense for example, can be appropriated by both CoLs and CoPs – used by both students and experts. We hypothesize at this stage that there can be environments which span both CoLs and CoPs and these environments should be intentionally designed as augmentation supports. In other to preserve the authenticity of

both CoLs and CoPs, we recommend that the field of CSCL consider how augmentation supports can be an integral part of its agenda.

SETTING AN AGENDA FOR CSCL – AUGMENTATION SUPPORTS

The work of bridging between communities can be a fruitful agenda for CSCL. We propose that CSCL consider the work of supports which *do not fade away*. Augmentation is contrasted with scaffolding. Scaffolding is depicted by a process where supports are provided to the learner to achieve a certain goal without which the individual would not be able to attain to. These supports generally fade away after the learner appropriates the skills and knowledge required. The learner grows out of dependency on these supports. We conjecture in this paper that there are supports which do not necessarily fade away in the learning process, which we term as augmentation supports. We propose educational technologies and learning environments where supports are "superimposed" onto the learning experiences. For example, the learner is engaged in the real authentic problem case with supporting tools and resources. We see a potential in using simulations (including VR oriented cognitive tools and information resources) to assist the less experienced to effectively engage themselves in the community. Such augmentation supports 'assist' rather than 'instruct'. *Instead of fading away, augmentation supports go with the learner as he or she transits from one form of community, for example home or school, to another form such as communities of practice (CoP). We make the assumption that learning is progressive when learners progress from schools to CoP-forms of understanding.*

Augmentation can be in the form of tools, artifacts, and even "persons". Augmented tools are basically instruments and models which are used by practitioners in communities of practice (CoPs), for example, the microscope, the various measuring devices, etc. Other kinds of augmented tools include specific instruments for domain related activities such as devices which compute data for certain forms of activity. Augmentation tools can also be in the form of supporting personalized knowledge representations in the context of social spaces in online collaboration -- personalized representations can be superimposed/augmented onto social and collective representations. Augmented artifacts are cases, living stories, accounts, and ideas which literally occurred in real CoPs which can be used in schools as illustrations and resources where students can refer to as examples in their pursuit for understanding. Current knowledge management literature strongly promote the use of real case testimonies and stories as situated examples for learning. Learners need access to relevant cases or stories pertinent to them as they engage in context-dependent situations. Researchers and designers believe that instructional materials supporting ill-structured problem-solving skills should incorporate cases that represent (as close as possible) real-world cases and problems in that particular domain (Jonassen, 1999). The use of stories or cases in problem-solving education increases problem-solving skills, helps address misconceptions, and contributes to the changing of attitudes. Augmented persons are practitioners who can go into schools and communicate with students. These augmented persons act as consultants and experts, mentoring the learners by modeling expert-thinking and behaviors. These augmented persons also help to bridge the gap between schools and CoPs as the learners move into the context of practices and real work communities. The augmented persons do not fade away and continue to be a strong influence to the learners from schools to CoPs.

To summarize, augmented tools are cognitive and physical instruments which learners *work or think with* in relation to their authentic learning experiences; augmented artifacts are materials – both conceptual and physical – which learners *work and think upon* as exemplars; whereas augmented persons are facilitators and experts which learners *work and think alongside.*

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