Team Learning Systems as a Collaborative Technology for Rapid Knowledge Creation

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INTRODUCTION

This article reports on a new breed of tool that supports both higher-level thinking and, more importantly, human-to-human interaction in the form of team learning (Elliot, Findlay, Fitzgerald, & Forster, 2004; Findlay & Fitzgerald, 2006; Fitzgerald & Findlay, 2004). We argue that developing tools to support team learning is no longer merely desirable, but is now essential if humans are to productively engage with the increasing complexity and uncertainty that arises from accelerating technological and social change. The article begins by developing a case for the development of technological tools that support the collaborative creation of new knowledge. It then overviews the Zing team learning system (TLS) and reports on its development and use over the last 14 years. It concludes by identifying some of the emerging features of collaborative knowledge creation processes.

Tools for Thinking

It is generally accepted that when used well, information and communication technologies (ICT) can function as powerful tools that mediate thinking and promote higher order learning (Jonassen, 2000; Salomon, 1990; Underwood & Underwood, 1990). Embedding these tools in authentic teaching and learning contexts that foster a dialogue between learners and teachers can further enhance learning and conceptual change (Laurillard, 2002). However, it is our contention that many of the uses of ICT are still too focused on individual and reproductive learning and are not of the scale and dimension required to prepare the next generation of learners for a more complex and rapidly changing world. The first reason is that they do not sufficiently promote what Crook (1994) described as mediational collaboration for the creation of "…communities of shared understanding" (p. 193). The second reason is that they are not adequately focused on knowledge creation, or what is becoming known as the process of "knowledge enabling" (Von Krogh, Ikujiro, & Kazuo, 2000). Lessons from business are showing the importance of collaborative or team learning (Senge, 1990) to help transform inert organisational knowledge into meaningful actions (Von Krogh et al., 2000). These shortcomings in the current uses of ICT are even more pronounced for today's youth because many of the ICT activities they engage in outside of formal education (e.g., computer games) are highly collaborative and involve significant social learning (Gee, 2003). In these activities, they are not only *users* of technology, but they are also establishing themselves as *producers* of knowledge. Recent research has shown that 57% of American teenagers who use the Internet can be considered active content-creators (Fallows, 2005). They are writing blogs, developing Web pages, re-mixing, and sharing media; they are effectively shaping and re-shaping their (and their peers) Internet experience.

According to the social constructivist school (cf. Vygotsky, 1978), learning and development are mediated by social tool use. A new capability first appears externally and is then internalized, where it becomes more automatic. The role of the teacher (or parent) is to scaffold or provide a bridge through the zone of proximal development (ZPD) from what the learner *currently* knows to what they *could* know, and in this way develop the learner's independence. Tools can also scaffold learning and development in the ZPD (Salomon, Globerson, & Guterman, 1989) through pre-structured content and in-built cognitive supports that sequence or guide the flow of the activity. They both focus attention on a general area of interest and direct attention to related concepts in interesting ways.

What we are seeing today is young people increasingly turning to Internet-based technologies as their preferred scaffolds. The result is that youth culture is accelerating away from the adult world, with school only temporarily applying the brakes. For many adults who were socialized into human society at the end of the Industrial Age or in the early stages of the Information Age, the world inhabited by young people initially seems a foreign land. Unfortunately, by the time many of these children become adults, their early potential has been circumscribed, and their role in the adult world is now just as limited as their parents, only they are in a worse situation, because the work opportunities for which they have been acculturated have evaporated, and they are ill-equipped for the kind of world that is emerging. While many educators advocate constructivist approaches, the reality is that the practice does not match the rhetoric (Windschitl, 1999). The majority of teachers today continue to employ a "knowledge-telling" pedagogy based on the belief that the teacher's role is to instruct or pass on existing knowledge to students that has been generated by experts outside the school. Preparing students for a world in which "…work, knowledge and communities are being radically and constantly transformed" (Downes et al., 2001, p.16) is now necessary if human society is to deal with growing disaffection and estrangement amongst those living within the cities and towns of the developed world, but effectively with conditions and opportunities more closely resembling the Third World.

BACKGROUND

The Zing TLS has evolved from a family of tools known as group decision support systems (GDSS) developed for the management and information sciences (cf. DeSanctis & Dickson, 1996; DeSanctis & Gallupe, 1985). For more extensive reviews of GDSS, see relevant articles in this handbook. The Zing system differs from many GDSS in three important ways. First, the TLS provides a shared conceptual space in which all participants are able to simultaneously view and contribute to all of the participant's ideas as they are created. Many group decision support systems do not give participants the opportunity to see what others are writing. Second, the TLS facilitator is able to easily take participants ideas, such as suggestions for questions and/or ways of solving the problem, and integrate

them into the current session. These ideas can function as thinking processes that direct the course of a session. This makes it possible for these ideas to become psychological and cultural tools to be incorporated into the system, and then used within the same flow of activity. Third, the manner in which the TLS is used is determined by an etiquette that facilitates the formation of effective groups or teams, even when the skills of the facilitator are not well developed. The combined effect of the thinking process and the established etiquette makes it possible for novices to use the tool almost as effectively as the originator of the learning or decision-making method.

MAIN FOCUS OF THE ARTICLE

The TLS consists of a computer with 12 keyboards attached via a USB hub and connected to multiple monitors or a video projector to display a common image to all participants. The Internet version uses a network of computers connected to a server to conduct online meetings. Users have a keyboard and access to a shared display that simultaneously shows both team and individual contributions. A person is designated as the facilitator and takes responsibility for managing the meeting, which might involve setting out the meeting process, selecting agenda items, or summarizing the main ideas raised during the session. A feature of the system is that all participants are able to contribute and view each others ideas dynamically in the area referred to as the team "playspace." They respond synchronously to a sequence of questions that act as a guide or scaffold for thinking. All sessions follow a similar format: When each question is presented, the participants talk in small groups for a few minutes, type their ideas, read the ideas aloud, and then with the help of the facilitator, identify common themes. We refer to this process as the Talk-Type-Read-Review etiquette. This etiquette has a similar function to the Think-Pair-Share structure (Kagan, 1992), where the learner first thinks alone before next discussing it with a neighbour, followed by the whole class. The etiquette shapes the way participants behave towards each other (Findlay, 2007) by encouraging discussion and reflection before the sharing/writing process.

The TLS is a system developed by Zing Technologies (www.anyzing.com) founder John Findlay and a group of business partners to help businesses and

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