Collaborative Learning: Research Simulator

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ABSTRACT

What: This paper reports on the results of participative action research by multiple teams of participants who played various roles and fostered the evolution of an integrated research and business simulation environment by sharing data, making decisions visible and discussing solutions in both a competitive and a collaborative environment.

Why: Collaborative Networked Learning is needed for the training of effective management and operation of global corporate entities and in understanding the value of integrating information systems between organizations that collaborate and compete with each other in different times and markets. This is necessary since competition, in business today, is between supply chains of competing collectives of organizations, each seeking a larger market share and bigger profits and where changes in partnerships come at an ever increasing pace.

Who: Managers, students, tutors & administrators of classroom, online courses, and boardroom based professional development programs.

When: During the period July 2003-December 2005 using the simulator located at www.sccori.com

Where: In online courses, residential programs, in bricks and mortar classrooms and in the boardrooms of major corporations.

How: Using an internet browser-based online business simulator and internet communications tools allowing participants to play the roles of Retailer, Wholesaler, Distributor and Manufacturer in a number of business simulations with variable parameters. Participants experience simulations and learn by doing, build problem solving skills, develop strategies, plan, negotiate, share, build trust and implement solutions.

Results: The networked management learning business simulator improves the systems dynamics models from MIT and the Systems Dynamics Society by at least two orders of magnitude. Results indicate that participants move from an individualistic competitive stance to a collaborative team-based solutions focus to threats and problems faced by their supply chain during increasingly challenging business simulations.

Keywords

Action learning, action research, change management, collaborative networked learning, communications, coopetition, management learning, organizational behaviour, participative action research, role-playing, simulations, social and dialogical creation of meaning, strategy, team building

INTRODUCTION

Networks have been increasingly used to provide learning opportunities to managers supported by information and communications technology (ICT) used to connect learners with other people (learners, teachers/tutors, mentors, librarians, technical assistants etc.) as well as learning resources and information of various kinds and types (Hodgson & Watland, 2004), inexpensively and with high reliability. With the increasing capacity and speed of networks and the Internet a self directed learner doesn't have to rely on a slow or delayed means of communications for providing collaboration opportunities in distance learning situations. Social groups combining their efforts to achieving a common learning objective are far more powerful than individualistic or competitive learning.

Consequently, collaborative networked learning has become one of the best ways to manage and learn in the age of information overload. The idea is that knowledge is grounded in conversations amongst like-minded members of knowledge communities. Collaborative Networked Learning is both a method and philosophy that

would be extremely useful within the Information Systems (IS) or Information Technology (IT) management community and is being practiced with varying degrees of success.

Increasingly, the learner does not have to face the problems of visually communicating learning problems or receiving tutor solutions to learning problems using slow or limited media. Full audio, data and image sharing can be accomplished easily using internet conferencing services with many simultaneous users. Immediate messaging today is providing for multiple simultaneous conversations and being effectively managed by those engaged with and possessing such devices.

The availability of a cost effective means of electronic distribution, which permit voice, video and text communications between learners and learning groups, suggests that a self-directed learner, in a group setting, can productively learn and create an personal understanding of complex subject matter in the home, workplace or any remote location equipped with a portable computer and telephone, satellite or broadband Internet service. Thus we may consider that communications media affects both the quality and value of learning in ever expanding ways.

In considering the impact of communications on learning, the following statement is useful: 'Understanding comes to fruition only in the response: understanding and response are dialogically merged and mutually condition one another; one is impossible without the other' (Bakhtin, 1981). The implication being that dialogical construction of meaning is a basic characteristic of all communication. "Workplace collaboration of various forms is important for all types of organizations. Productive collaboration requires structural changes in the organization, an understanding of control processes as they currently operate, and communication systems that can make the opportunity for productive participation a reality. …. Greater collaboration is important for both the economic health of organizations and critical for meeting the complex conflicting needs of society" (Deetz, 2003). Corporations are political sites, political in process and outcome. Different cultural norms pervade corporate practices in different countries and in the interconnected world these value laden practices are shared, and dominate based on political and economic power that they bring to the participants.

Within this complex environment networks of managers must build strategies, manage, communicate and build skills that allow for shared decision-making and continual guidance of critical operations. "In the domain of business education, decision-making skills including analytical and problem solving skills and communication skills are seen as critical. We might therefore speculate that methods requiring interaction and student involvement would be preferred over traditional methods. Thus, the informating up or transforming technologies with the corresponding collaborative or constructivist models might be ways to improve the quality of business education" (Leidner and Jarvenpaa, 1995). So although one can surmise that the incidences of networked management will grow exponentially, there is little published research in this area. This is confirmed by Hodgson and Watland (2004) who state that "networked management learning is likely to increase in importance and relevance, but to date its discussion and research in the management education and learning literature is surprisingly small".

In one of those "few" research studies Levy (2004) specifies "the four broad, interconnected developmental processes – orientation, socialization, communication and organization and the impact of these on the nature and quality of engagement with the *networked management* learning environment and tasks". There is much room for research towards confirming the usefulness of these processes and developing new ones. For example, Bork (2000) believes that "we must look for a new paradigm of learning that is not based on the movement of information from one source to the other, and argues that we are at the end of the usefulness of that learning paradigm. In my research I propose to assess emerging processes and develop a possible model for this new learning paradigm sought by Bork.

Laurillard & McAndrew (2002) commented that 'new technology turns teaching into a conceptual challenge, so our approach to teaching must take on the characteristics of research'. Since we don't have a map to follow, we must try new concepts and formulate an environment that encourages experimentation with the known and unknown situations that emerge, learn from the experience and incrementally improve or create differential models to encourage the development of various learning and research situations.

A related area of research is that of knowledge management. "A knowledge management system should support communication processes with the objectives of: 1) transforming tacit knowledge into explicit forms, and 2) to facilitate "inspiration"/knowledge creation/idea generation. A knowledge-based innovative organization takes care of individual learning and knowledge sharing processes and is a 'community of communities', where people are used to, and encouraged to launch, new ideas to innovate processes, practices and products" Albolino, S., Distratis, M., Schael, T., Sciarra, G., (2003). It is frequently stated, however, that more research is needed to understand the issues and potential benefits for education and learning that are offered by learning

technologies in general. It is also frequently suggested that research about technology for teaching and learning has not asked the right questions. Ehrmann (1995) argues that too much research has attempted to see if learning is better achieved by using technology than not. This is often stated as the case for much of the research that has or is being done within the area of networked management learning. Collaborative Networked Learning (CNL) was explored and rooted in the 1980's during work by Charles Findley on designing the classroom of the future for knowledge workers. However, the psycho-social aspects of collaboration, those with far-reaching human implications, are rooted in social development theory and social constructionist epistemology. These are rounded off with social learning theory, and constructivist theory of learning: as seen in the writings of Jean Piaget (1896-1980), Lev Vygotsky (1896-1934), John Dewey and Ulrick Neisser (as reported by Henning, 2003) who form the basis of the constructivist movement in the last century. Both Piaget and Vygotsky also fall under the umbrella of cognitivism.

All these theories; ideas, concepts, practices – are they all the same? Are they of the same heritage? Indeed, most of what seems to be described above, as distinct concepts, has the common thread of the constructivist movement. More specifically, *social* constructivism underlies the various interpretations or nuances. Three discerning and governing philosophies are: the *behaviourist* view; the *cognitivist* view; and the *constructivist* view. In each philosophy there are strengths and weaknesses and they still don't tell us if we are asking the right questions. Behaviourism for example disregards the activities of the mind; mental cues and responses; recognition of new language patterns by children; adaptation by animals of their existing mental patterns to new situations such as changed maze layouts. Cognitivism may reinforce patterns that limit the emergence of new ideas, so that we mentally confine ourselves from new concepts in trying to stay efficient, safe and carrying out what is believed to be already the 'best' practice. Constructivists state that no knowledge can be transferred intact from one individual to another. Each individual colours and shapes the knowledge to fit within their frame of reference and thus the criticism is that non-standard knowledge emerges and how can we assess if any learning took place? Ultimately, how can we research learning outcomes with any rigour, confidence and repeatability?

Within this context, the networked management learning simulator has been developed to provide a research environment to study learning in the globalization and integration of business and its interconnected yet remote management. I started off with the primary question: "What are simulators and simulations and why would they interest learners, teachers, participants, and researchers?" The following statement helped me in this regard: "People love to pretend and to watch others pretending. From story-telling to plays to movies to virtual reality, we keep getting better at making people feel like they are watching imagined places and events. We also keep getting better at role-playing, i.e., creating environments where several people can see what happens when they all pretend they are different people in another time and place. Eventually such role-playing simulations may get so good that people will often forget that it is just a simulation." (Hanson, 2001). So I built the networked learning simulator with the intent of letting participants play various roles in business.

I wanted to start from a global standard that was well established with a solid body of research supporting its construction and then improve on that standard by at least one order of magnitude. The business simulations created for the research environment were more complex versions of models developed and tested at the Sloan School of Management, Massachusetts Institute of Technology (MIT) by Dr Jay W. Forrester. Those simulations and system dynamics methods have been continuously researched and improved since the 1960s.

I have taken that body of work as the base and developed a research environment which is comprised of an internet based online business simulator that facilitates role playing experimentation within an international setting. Within this simulation environment the discussions of various teams can be stored linked to their simulation performance. The performance of different teams and the different strategies may be compared to identify varying patterns of behaviour, discussion and choices made by the group.

From the above discussion we can see that Bork encourages us to ask different questions in researching ICT; Levy suggests a model improving the quality and nature of the engagement in networked learning; Laurillard & McAndrew suggest that teaching and learning should take on the characteristics of research to be effective; Findley encourages us to explore the design of the classroom of the future for knowledge workers; Leidner and Jarvenpaa suggest that we use information, transformation, social construction and collaboration to improve the quality of business education. By taking all of the above into consideration my thesis initiates investigation into those areas with the following questions:

1. How well did groups of participants orient themselves to the networked management learning business simulator?
2. How readily did the participants dialogue within the learning environment?

3. What kind of socialization occurred and what kind of organization emerged within the groups?
4. How different were the experiences of the remote networked management learners to the experiences of networked management learners in a classroom?
5. What impact do socialization, culture and gender have on the learning by participants within the business simulations?
6. What understanding and learning did participants gain and how do they gain this?
7. What impact, if any, did the researcher/instructor's learning plan have on the learning achieved?
8. Are researchers able to access and use the information within the research environment for a variety of research purposes?
9. What kinds of initial or additional information models do learners want to access during the simulations and their related learning?
10. What kind of classroom practices evolved in the physical classroom and how did they differ from those in the virtual classroom?
11. What changes did the participants to simulations suggest and why did they make those suggestions?
12. What kind of decisions did groups make and how did they change with cyclical learning, discussion and dialogue?

The participant group included 216 people, and continues to grow as the research proposal is refined. It consists of graduate, undergraduate and non-traditional students plus 16 purchasing managers who took part in 11 different studies from August 2003 to Dec 2005. The students were required to run increasingly complex simulations either as part of a residential program, or classroom-based course, or as a work-based professional development activity or as remote students in an e-learning graduate level course. For most of the participants this was a new type of learning experience. My role in the research was to develop flexible, changeable and differential lesson plans around the simulator initially during the evolution of the simulator as a research tool and learning environment and later during different course deliveries in various business and technical programs. I embarked on this research with the aim of improving my teaching practice in e-learning and personal professional development by understanding the learner's perspective in collaborative networked learning.

Modern action research originated in two independent research programs with the development of action-based social psychology in the 1940s. Kurt Lewin developed a field-theory version of action research at the University of Michigan Research Centre for Group Dynamics in order to study social psychology. The Tavistock Institute independently developed an operation research version of action research. The Tavistock Institute used action research to study psychological and social disorders among veterans of battlefields and prisoner of war camps. The two developments converged when Lewin joined Tavistock. In addition to Lewin, a British researcher named Eric Trist (1970) also helped pave the way for AR in post-World War 2 Europe. Trist's initial social research involved trying to solve the problem of the civil repatriation of German prisoners-of-war.

Action research was explicitly introduced to the information systems community as a purely research methodology by Checkland 1981, Kaasbol and Smordal 1996, Wood-Harper 1985, Mathiassen et al. 1996 (Tolvanen, 1998). Wood-Harper incorporated action research concepts into an action-based systems development methodology called Multiview. My interest is to start from that primary model and improve on it during this thesis.

Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration of researcher and client and thus it stresses the importance of co-learning as a primary aspect of the research process. Consequently, I have taken an action research methodology approach towards this objective focusing specifically on participative action research (PAR) methods.

Results indicate that all of the students and managers were able to learn to functionally use the simulator and its collaboration tools, within a few minutes of starting their simulations. Online text was minimally used in classroom situations unless specifically directed to as part of the simulation, so we could capture the discourse. When participants were not in a face-to-face situation the ease of orientation was equally evident and the groups managed to rapidly pick up how to use the simulator and its collaboration resources for communications. When

those communication tools became unavailable, participants developed strategies to use alternate e-learning strategies and communications' vehicles.

I felt that in my initial action research cycle that further exploration is needed in the nature and quality of student's engagement with the learning environment and designed tasks, how positive experiences contributed to positive engagement and how negative experiences placed constraints on productive engagement; and which factors shaped learner's experiences in these areas. Motivation to learn and learning material outside of "what is necessary to do for marks" during the use of the simulator varied greatly dependent on the individual and academic level of the group.

The initial results suggest that the "Collaborative Networked Learning Simulator" could provide an effective research environment to study networked management learning. The research questions as specified above and the theoretical grounding of those questions may consequently impact collaboration, communications, understanding, negotiation, team building, motivation, group discipline, change management, professional development, socialization, gender and cultural studies.

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