The L2C Project: Learning to Collaborate through advanced SmallWorld Simulations

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Abstract. L2C - Learning to Collaborate - is an ongoing research project addressing the design of effective immersive simulation-based learning experiences supporting the development of collaboration competencies both at the individual and organisational level. The key characteristic of such advanced learning tools consists in the integration of psychological, motivational, cognitive, organizational, cultural and technological factors affecting the success of collaboration into the modeling of a set of virtual characters with whom learners can interact dynamically within a challenging and realistic collaboration scenario (SmallWorld Simulations). This paper provides an overview of the project, the conceptual basis, key design principles and expected pedagogical impact of this new type of immersive simulation-based learning experiences.

1. Introduction

Effective collaboration dynamics are fundamental to learning, knowledge exchange and development/innovation processes in a wide variety of educational, economical or societal contexts. In spite of the attention that the subject of collaboration has attracted over the last years in fields like organisational dynamics [1, 2] management [3], and education [4], no traditional or computer-enhanced approaches and learning solutions have emerged to-date to address efficiently and effectively the development of collaboration competencies from an inter-disciplinary perspective, including:

1. Individual psychological and motivational factors determining knowledge seeking and sharing behavior of people involved in collaborating
2. Group, organizational and inter-organisational factors conducive or detrimental to collaborative behavior
3. Cognitive and behavioral mechanisms to support effective knowledge exchange processes to seek for and integrate knowledge from diverse sources taking into consideration their contextual embeddedness
4. Opportunities and pitfalls of technologies aimed at supporting distributed collaboration

5. pragmatic aspects resulting from best/worst cases of collaboration patterns in different contexts (mergers, alliances, as well as other initiatives by global teams of business, educational or social entrepreneurs and distributed communities of professionals).

In fact, in today's global environment, a very large number of collaboration initiatives fail to deliver the value expected [5, 6], as collaboration complexity is significantly increased by the diversity and the distributed nature of the people, groups, and knowledge sources, by the ICT technologies and e-Collaboration platforms involved to support such distributed processes, as well as by the complexity of the knowledge integration processes involved.

2. Addressing the Collaboration Challenge

If, under the best conditions, collaboration can be successful in "traditional" settings in which people and organizations are either co-located (such as in centralized R&D centers) or distributed but involved in "simple/highly structured" collaboration processes (such as software developers operating within open source communities [7]), we are reaching today a "Collaboration Frontier" (see Figure 1).

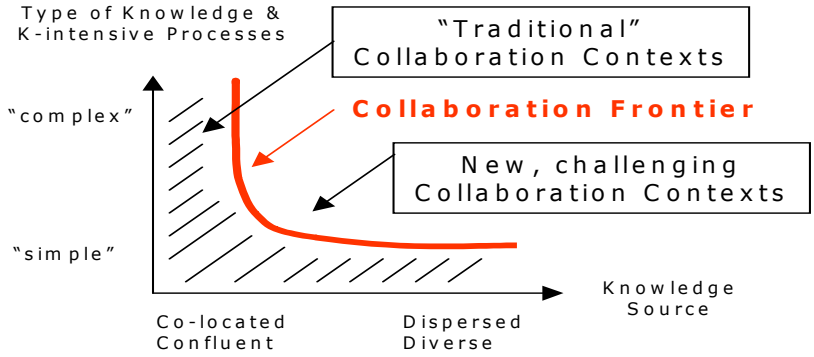

Fig. 1. Collaboration and Knowledge Integration Frontier

Our ultimate objective, however, is to acquire the competencies to move beyond the current "Collaboration Frontier" into contexts in which highly distributed and diverse groups are able to successfully collaborate on complex types of knowledge exchange and knowledge creation processes. This emerging need is calling for innovative approaches to design and deploy effective learning experiences aimed at stimulating and facilitating the acquisition and continuous development of collaboration and collaboration management competencies.

It is with this objective in mind that the project "**L2C: Learning to Collaborate**" was launched as an EC co-sponsored collaboration among European academic institutions and industry partners.

3. The "L2C: Learning to Collaborate" Perspective

The ongoing work on the L2C Project is progressively aiming at the design of immersive simulation-based learning experiences supporting the development of collaboration competencies at the individual and organizational level. The key characteristic of the project consists in the adoption of validated design principles (*SmallWorld Simulations* or SWS [8]) underlying the development of simulations which are currently extensively used in top business schools (such as MIT, Stanford, etc.) in managing change and innovation in different types of organizational contexts [see e.g. 9 and 10].

A concrete example of a learning experience which can be classified as a *SmallWorld Simulation* is the so-called 'EIS Simulation" [11, 12, 13, 14] which has been widely adopted over the last few years to substitute or complement traditional ways of teaching change management competencies. In this type of simulations, learners (operating in small teams) are projected into a realistic scenario in which they have to play the role of "change agents" sent into a company with the mission of introducing a major innovation (a new Information and Reporting System). Over a period of six simulated months their task is to get to know and convince more than 20 simulated characters (representing the top management of the simulated organization) to adopt the innovation by using different communication and intervention tactics and address different forms of resistance to change, by understanding and leveraging the formal and informal/social networks among the simulated characters, taking into consideration the specific culture of the target organization.

Fig. 2. Screens from different versions of the EIS Simulation

The EIS Simulation (see Figure 2) provides a concrete example of how the know-how of a specific complex domain (in this case: change and innovation management in organizations) can be embedded in a dynamic, computer-based simulation to provide a rich, intensive, and realistic game-like learning experience considered superior to more traditional ways of teaching such a complex subject [12].

4. Designing SmallWorld Simulations for Collaboration Competencies Development

The design challenge of SmallWorld Simulations addressing collaboration competencies development follows the structured process illustrated in Figure 3. The first step consists in identifying and selecting a set of models, dynamics and insights reflecting state-of-the-art academic literature (the "Knowing" dimension), current pedagogical approaches and learning objectives (the "Learning" dimension), and insights from collaboration practice (the "Doing" dimension) to be gradually embedded in simulation-based Learning Experiences.

As mentioned in the first part of this paper, the specificity of the targeted simulations is to integrate models of: (i) **individual behavior** (to allow learners to come into touch with different types of individuals displaying different types of attitudes), (ii) **group interactions** and **relationship network dynamics** (e.g. influence networks affecting the diffusion of attitudes in a group), (iii) **organizational contexts** and **dynamics** (e.g. specific cultures reflecting a given industry, a family business or an SME context), and (iv) **intervention dynamics** (e.g. what happens when the learners try to intervene in the simulated context using different approaches and tactics).

Key design guidelines also include a realistic scenario, a challenging management mission, a set of believable characters, a range of managerial actions and a realistic role for the players (operating typically in teams to strengthen the collaborative learning dimension of the simulation-based learning experience, [12])

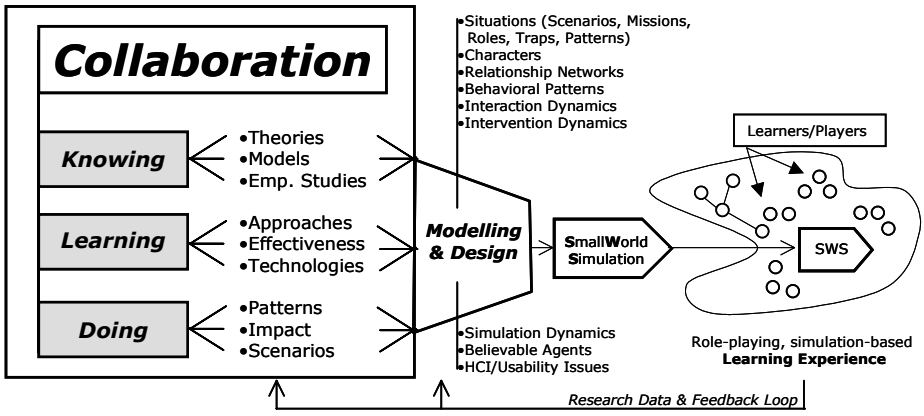

Fig. 3. L2C Simulations Design Process (adapted from [8])

In addition to **design guidelines**, the L2C Project is producing **pedagogical guidelines** describing the ideal educational settings and processes in which L2C Simulations can be deployed in universities or organizations. This is particularly important, as (1) L2C Simulations have the primary objective to stimulate and facilitate learning, and (2) the "learning-by-playing" approach employed [10] is not the

currently dominant model for adult learning. The key role of games in triggering learning, knowledge structuring and cognitive change in children has been extensively analyzed in the work of Piaget and Vygotsky [15, 16]. In adult education, and particularly management development, computer games have been employed successfully over several decades. However, the successful deployment of "games" in organizational learning contexts remains a challenge in most cultures and organizations.

The key hypothesis we aim to test through the resulting L2C simulations is the extent to which ICT-based systems can be used to: (1) model cognitive and behavioral processes related to collaboration dynamics, (2) embed such processes in interactive game-like learning experiences, and (3) help individuals and organizations to diagnose and learn how to address cognitive and behavioral barriers (at both the individual and organizational level) to effective collaboration and knowledge sharing.

5. Conclusions

In the modern hyper-competitive business and social environment, effective collaboration competencies are emerging as a key condition for productive and sustainable value creation at the individual, team, organizational and inter-organizational level.

L2C Simulations, the design of which has been discussed in this paper, address the area of collaboration from a multi-disciplinary perspective, integrating insights and models from social sciences, knowledge management, collaboration-oriented ICT, and experiential, computer-enhanced learning.

Research-wise, our objective is to demonstrate how individual cognitive and behavioral processes and relevant organizational dynamics can be modeled using simulation technology in a way that is realistic enough to trigger experiential learning about the factors determining the success or failure of collaboration in organizational and inter-organizational contexts. This line of research will hence contribute to extend our understanding of how to best design and deploy learning-oriented simulations of social interaction contexts [9, 10, 17, 18, 19, 20].

The ultimate objective is to provide: (i) the community of educators with a new technology-enhanced approach to the effective development of relevant collaboration competencies, and (ii) the community of instructional designers, learning technologies experts and researchers with tools, components and a conceptual and design framework enabling them to design and deploy their own collaboration scenarios, simulations, and learning experiences.

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