

# Introduction

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## Revolution in Education? Computer Support for Collaborative Learning (CSCL)

¿La revolución de la enseñanza? El aprendizaje colaborativo en entornos virtuales (CSCL)

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The issue of learning has been one of the great debates in Education for the past two centuries. Educational institutions start by questioning how to deal with the teaching process, «educational model», «ideology», «method»... but do they make the same effort when focusing on their students' learning? With the French Revolution the servant became a citizen, and with this concept the school as we know it was born and evolved through the nineteenth and twentieth centuries, but with very few changes, as suggested by Manuel Area. The question of how learning is understood in this period in terms of methodology means that we could extend the classical structure of individual bookish training and banking, to a more open, social and dynamic training group process. The pressure of social change has produced this transformation in philosophy and methodology in the school, because it has evolved in the way we understand learning. Learning theories helped us understand the logic of human development. Vygotsky and Piaget, in their writings on thought, language, maturation and development, show us the complexity of the learning processes associated with the brain's mechanisms for evolving and maturing. From Freinet's pedagogy, Rousseau, Neill, Makarenko and Cousinet and Ferrer i Guàrdia have helped us develop pedagogical models for processes of cooperation and peer learning. They understand learning from the perspective of relationship and cooperation, mainly from interaction, and show how students faced with appropriate tasks can increase their mastery of critical concepts.

These principles have helped us to create a way of understanding and developing educational activity, dynamics and practices of the student's classroom setting. If our brain is able to evolve and pass from instinct to higher thinking processes, we have to help this development by supporting the educational processes to provide greater capabilities. We learn socially from our language learning, so we therefore create models of the world around us in the form of language, concepts that are constructed in reference to what the social group agrees. We also interact to learn, and it helps us to mature and develop concepts, to establish procedures and acquire shared attitudes towards life. Pierre Dillenbourg points out that the word «collaborative» refers to four aspects of learning: the situation needed to enable collaboration between people of the same status (a teacher and his-her students) e.g., the interactions to facilitating collaboration, for example when there is negotiation instead of instruction, the learning mechanisms themselves, supported by dynamic assimilation and accommodation, for example, from the perspective of group agreement on what they have learned, and finally, the effects of collaborative learning which is supported by recording different dynamics of learning and action that build results beyond

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the content that is learned. If we keep this perspective in mind as we build our thinking and learning, we become aware that the dynamics of training must help the peer relationship, improve communication and reach agreements/behavioral concepts in ways that make us equal, responsible, free and respectful of others.

This training might help us reach a synergistic partnership and exemplary society, as it promotes the ideal school and college. These «advances» or theoretical perspectives have clarified school practices during the past fifty years, materializing visions into something more methodologically recognized, accepted and extended in the approaches of the school ideologies, converting words like «group work», «learning by doing» and of course «collaboration», into perfect concepts.

They have also been the basis for innovation in education, sometimes extending to all levels of education, including higher education. A significant example has been the reform of the European Higher Education Area, which has broken with the long tradition of individual banking model of the university.

But, what has happened in education with its new models and collaborative concepts of learning with the arrival of information and communication technologies in the classroom? In essence it has seen a decline since the seventies and eighties from the pedagogical models of the open and collaborative group, returning to individual models where the learning process is like a one-way street focused on training. Clear examples of these models were computer-assisted instruction (CAI) or computer-based instruction (EBO), which see training as a process through the implementation of targeted routines and individual dynamics, which help the learning procedures and concepts through behaviour-shaping mechanisms. In this case, the technology was probably at fault for its inability to facilitate open global processes to the normal grouping work already in operation in schools.

But as the winds of progress blew through schools, with the introduction of technology, we relied on models that did not facilitate the development of a collaborative learning perspective. Practical examples may be found in the school setting in the eighties and nineties of the twentieth century as the basis for the creation of resources for schools; the resources of the National Information and Communication Technology Plan (PNTIC) in Spain were a clear example, as well as dynamic ones which have spread as far as CLIC' RACO ([www.xtec.cat/web/recursos/recursos](http://www.xtec.cat/web/recursos/recursos)).



As a reaction to the unfortunate introduction of technology in education and in an attempt to build tools to make learning and development easier there came «computer supported collaborative learning» (CSCL), in response to the integration of behavioral order models, and taking into account the need to apply technology to dynamics. So in the 90s we begin to consider that technology and all its uses, with collaborative/cooperative aspects, must be incorporated in the methodologies. There then ensued a debate that ultimately ended up with the imposition of «collaborative» as the magic word. It is at this point in the mid-to-late nineties when the first virtual universities and creation concepts appear in the form of online learning, virtual learning environments, cooperative learning in virtual environments, or online collaboration. Consequently, with the works of Dillenbourg, Roschelle and Teasley, Koschmann, Kirschner, Gros and many more authors, a new perspective emerges as the basis of educational processes in which empowerment is pursued in different ways, in terms of concept and methodology, planning and implementation of technology-supported learning processes.

These authors understood the use of technology for learning as a process of resource usage to help us work together in a coordinated and synchronized way. That is the result of a continued attempt to construct and maintain a shared conception of a problem; it helps us to learn, where the responsibility and involvement in solving the problem is a function of the whole group. As Panitz advocates, invoking another of the classics, collaboration as a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including apprenticeships, on the basis of equality and responsibility.

There are four basic characteristics in these processes which condition technology so that this functionality exists; the resources should allow students:

To work to develop a dynamic that fosters positive interdependence among members of the working group or class group. This means that work must be organized in such a way that if there is that level of responsibility and respect among students, it will be effective and carried out properly. Moreover, it is critical that resources enable planned activities and processes to produce face-to-face interaction. It is essential that training dynamics be organized so that students have to generate a proper relationship and organization of their work, a relationship that forces them to develop the activity. To achieve this, educational activities must promote individual and group responsibility. Learning is a process that makes our brain function, but we do it as a community; if we want to avoid inequalities in access to learning, we cannot lose sight of achieving an important level of individual and group responsibility. And so, as we generate educational plans that require the learner to develop this series of social skills, they learn to live and work in community. It is essential that the tasks and results be organized as a process that involves the internal dynamics of organization, conduct and conclusion of the negotiations to help build the knowledge to be acquired by students.

These conditions in which to produce a type of collaborative learning require that when technology is used to achieve this, the machines must not only be reactive but be mindful of the demands of space, process and storage that these dynamics need. So this becomes a call to technology to configure 'machines' in the sense of allowing these types of processes to become reality. But in terms of the birth of CSCL, we can now say that we are changing the model or even paradigmatic concept, because although the training processes are focusing on learning about collaborative planning, technology is changing its role. During the birth of CSCL as a concept of technology usage, technological resources enable dynamic support for training but in many cases they do not integrate the dynamics themselves. An example from the nineties is the use of the BSCW platform. Many of us participated in experiences which included technologies that allowed collaborative dynamics where the system helped and supported cooperation training, but group processes, relationship and collaboration are developed face-to-face beyond the resource, which only served to support shared documents or explore the relationships between members of the classroom through their interactions (reading documents, comments, etc.).

Today this is changing, and technological resources enable more comprehensive uses, and learning dynamics occur within the resource. What happens, then, when technology becomes a transparent element that is present in all actions? Nowadays, technology has developed ubiquitous systems which allow the user to perform actions in a totally transparent way and without receiving the technology that supports it. The actions are carried out with applications that integrate all the actions that the user needs to

perform collaborative learning processes. This collaborative learning in the network is defined by the Network of Collaborative Learning in Virtual Environments (RACEV) as «a shared process, coordinated and interdependent, in which students work together to achieve a common goal in a virtual environment. Collaborative learning is based on a process of activity, interaction and reciprocity among students, facilitating joint construction of meanings and individual advancement to higher levels of development» in which technology appears only as a work environment; the most profound technologies are disappearing, and the presence of learning processes related to the contributions made by the networks to new ways of learning are the most vivid example of collaborative processes.

In this sense, this monograph provides evidence of the evolution that collaborative learning processes have undergone in digital environments, focusing on different dimensions and facets of the uses of technology, innovative experiences of good practices developed and methodological contributions in the elaboration of this collaborative revolution. Thus, CSCL in the university is the topic that features heavily in the first five papers in this issue, specifically the first three deal with the methodological aspects of collaboration. The article by Pérez-Mateo, Romero and Romeu (Barcelona), entitled «Collaborative Construction of a Project as a Methodology to Acquire Digital Competences», discusses the importance of the methodological definition of CSCL processes and how methodology for collaborative projects enables the acquisition of ICT competences by students and their perception of a virtual university such as the UOC.

The second, «Planning Collaborative Learning in Virtual Environments» by Hernandez, Gonzalez and Muñoz (Madrid, A Coruña and Lugo) highlights the importance of planning in CSCL, planning that is both technological and methodological in terms of the configuration of working groups in order to encourage exchanges and community learning.

The third aims to experiment with teaching methods such as VLE integration and PLEs, and analyzes developments in the construction of PLE by students, with special emphasis on building a personal learning network. On the other hand, «Environments and personal learning networks (PLE-PLN) for collaborative learning» by Marin and Perez Negre (Balearic Islands), examines strategies that facilitate and promote collaborative learning. The fourth, entitled «Audioblogs and Tvblogs, tools for collaborative learning in Journalism», Lopez and Gonzalez (Valladolid and Madrid) analyzes how blogs promote abilities and individual and group skills, in order to determine the advantages and challenges of collaborative learning in the virtual environment of the blogosphere from a college experience. Meanwhile, Gewerc, Montero and Lama (Santiago de Compostela) present an analysis of the impact of social networks for collaboration and communication processes at university, entitled «Collaboration and social networking in higher education».

The next block includes three items related to collaboration at the level of primary and secondary education. The sixth article, entitled «ICT in collaborative learning in elementary and secondary classroom», García-Valcárcel Basilotta and Lopez (Salamanca), analyzes the contributions of technology in collaborative work processes in the classroom, from the point of view of teachers in primary schools. Olive and Paiva Arancibia (Chile) present the results associated with the processes of meaning that teachers and students built from the basis of their participation in the staging of a project design implemented with the use of collaborative learning with ICT, entitled «Meaning Processes mediated through a Protagonists' Collaborative Learning Platform». The study of this block, entitled «Exploring Student and Teacher Perception of E-textbooks in a Primary School», by Oliveira, Camacho and Gisbert (Tarragona), uses an exploratory study to examine the practices of meaning-building by students and their perceptions, as well as those of their teachers, while they interact in learning activities with an electronic textbook. The ninth paper, «Communities of practice: an intervention model from collaborative learning in virtual environments», by Fernandez and Valverde (Cáceres), takes place in the field of non-formal education and presents a study on the creation of a community of practice; the subjects are gipsy women for contextualization and subsequent design, followed by the implementation and evaluation of training with e-learning on equal opportunities and social leadership. This edition ends with a work by Leinonen and Durall (Finland) on «Design thinking and collaborative learning» as an alternative approach to develop research on collaborative learning by means of technology.