Computer-supported collaborative learning

Aprendizaje colaborativo en entornos digitales

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ABSTRACT

In line with the requirements of a transformed industry, higher education has incorporated practices and tools allowing its students to apply technology to their professional practice. However, university commitment goes beyond facilitating technical skills, given that without a humanistic basis, those skills alone are not sufficient to meet the true challenges of the 21st century. Collaborative learning involves training for technology-mediated collaboration, and its pedagogical approach considers both the improvement of individual learning in contact with the group and the development of a culture of collaboration. The ability to collaborate is, in itself, typical of the 21st century. Both the field of higher education and the corporate environment recognize that collaborative learning tools are one of the three communication technologies that contribute most to university teaching. The challenges that go along with this involve training teachers, whose competencies conflict with university students' growing interest in making use of a technologically-mediated collaborative culture. Therefore, working collaboratively is particularly important when institutions, or teachers individually, want to adopt a humanistic culture in digital formats, proposing a documented framework supported by scientific evidence that addresses the intersection of knowledge, pedagogy and the group's socio-emotional level.

Keywords: collaborative learning; higher education; distance education; humanistic approach; group interactions.

RESUMEN

La educación superior, en coherencia con las exigencias de una industria transformada, ha incorporado prácticas y herramientas que permiten a sus discentes aplicar la tecnología a su práctica profesional. Sin embargo, el compromiso de la universidad va más allá de facilitar las competencias técnicas, dado que estas, sin una base humanista, son incompatibles con los verdaderos desafíos del siglo XXI. El aprendizaje colaborativo implica el entrenamiento para la colaboración mediada por tecnologías desde un abordaje pedagógico que se plantea tanto la mejora del aprendizaje individual en contacto con el grupo, como el desarrollo de una cultura de colaboración. En sí misma, la habilidad de colaboración es considerada como típica del siglo XXI y tanto el ámbito de la educación superior como el entorno corporativo, reconocen que las herramientas de aprendizaje colaborativo constituyen una de las tres tecnologías de la comunicación de las que se espera mayores aportes en las enseñanzas universitarias. Los retos que se presentan pasan por la capacitación docente, cuyas competencias entran en conflicto con el interés creciente de los alumnos universitarios por hacer uso de una cultura colaborativa mediada por tecnologías. Por tanto, el trabajo colaborativo toma una especial relevancia cuando las instituciones, o, individualmente, los docentes, desean adoptar una cultura humanista en los formatos digitales, proponiendo un marco documentado y sustentado en la evidencia científica que atiende a la intersección del conocimiento, la pedagogía y el nivel socioemocional en el grupo.

Palabras clave: aprendizaje colaborativo; educación superior; educación a distancia; enfoque humanista; dinámicas de grupo.

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INTRODUCTION

The paradigm of digital culture in the 21st century has brought about profound changes in how we organize ourselves as a society. These changes include the digitalization of economic and business practices that, nourished by the raw material of industry 4.0—data and information—have progressively reached into all areas of communication, including the private sphere (Srnicek, 2018; Saito, 2022).

Learning, and specifically learning in higher education, cannot be exempt from these practices, given the commitment to incorporating the professional dynamics of the systems in which graduates will be working. This means taking on the challenge of communicating, educating, and transferring knowledge in a different way to how it was done only 30 years ago. In line with the times and with the requirements of a transformed industrial sector, higher education has had to incorporate practices and tools that will allow graduates to apply technology to their professional practice. This transition is far from over, much work remains to be done, with studies indicating the current gap between informal and formal education, the clear challenge of continuing to train teachers, and students' growing interest in using social networks and collaborative videogames as educational tools in their university courses (Gómez-Aguilar et al., 2012; Pereira et al., 2019).

Furthermore, it is precisely those traits underlying contemporary digital society—linked to the mass, continual use of technology in all areas of activity—that require educational proposals combining a humanist approach with the technical skills that students already develop as part of their communication and learning culture. In this context, collaboration has become extremely important, and many authors have investigated its potential benefits and the conditions it needs. There is also broad accumulated experience of implementing it in various levels of education and for learning various materials and content (Piki, 2022; Yeşilyurt & Vezne, 2023).

Computer Supported Collaborative Learning (CSCL), in which small groups of 3 to 5 students tackle a complex challenge involving interaction over a limited time, incorporates the aforementioned aspects: the use of tools and collaboration with a humanistic approach. Considering how technology has acquired a prominent position in current educational proposals, CSCL no longer refers only to the virtual, but is instead found in hybrid and in-person teaching. Perhaps the initialism needs to be updated to reflect technology's prominence in education, broadening it out beyond exclusively virtual modalities and including other devices which are being used more and more often than computers. In any case, the key idea is to determine the many possibilities technology offers to provide collaborative learning, and in this regard, analyze the various components from design, execution, and evaluation of educational proposals. In addition, it is important to examine the various requirements that must be met (*technological*, related to the tools and applications to use; *pedagogical*, related to instructional design; and *relational*, dealing with formal and informal interactions along with the norms and relational culture produced) and the dimensions to consider (*cognitive*, related to the learning that takes place; *metacognitive*, referring to the possibilities of learning to learn that may arise; and *emotional*, to examine evaluations, feelings, and emotions at individual and group levels) (Asif Qureshi et al., 2021; Garrison et al., 2010).

This is the perspective from which the challenges identified in the paradigm of digital culture are addressed. Training for technology-mediated collaboration comes from a pedagogical approach that aims at both improved individual learning in contact

with the group, and the development of a culture of collaboration. The ability to collaborate, in and of itself, is typical of the 21st century (Sobko, 2020), and various conceptual approaches—such as social constructivism; situated, shared, or distributed cognition; activity theory; and the sociocultural approach—support and sustain collaborative learning by fostering "constructed knowledge" as the result of joint reflection to agree and shape common meaning. The European Higher Education Area (EHEA) recognizes the need to develop skills for working in teams, for adapting to the flexibility of the job market, and increasingly group-based formats for projects, mediated by technology (Noguera et al., 2018). In addition, the report "The future of higher education: How technology will shape learning," sponsored by The Economist Intelligence Unit (Glenn & D'Agostino, 2008), which involved 189 higher education managers and 100 business managers, highlighted that collaborative learning tools were one of the three communication technologies that they expected to provide the most benefits to improving higher education.

The available research suggests that providing collaborative learning in virtual environments requires careful design of the technology-mediated collaborative experience, selection of a suitable project, proper use of the supporting technology, definition of the rules for collaboration or a collaboration guide, and an e-evaluation during and after the process. A well-executed design will encourage the groups to be able to self-direct their learning process, using the teachers as an additional means for consultation and support (Hernández-Sellés et al., 2014). However, achieving common goals requires the production of fruitful relationships and a fluid framework of interaction that contributes to creating and maintaining a united group. In this regard, studies indicate that social presence, in other words respect, recognition and intra-group emotional support, is as fundamental as the cognitive presence provided by each member's analysis to the group construction of the solution or the response to the problem (Borge et al., 2018; Xiulin et al., 2023). Hence the importance of taking care of the mechanisms for collaboration, agreeing on suggestions, sharing responsibilities, and envisaging common goals with regard to each team member's contributions and condition. The interaction must be considered from multiple perspectives (Hernández-Sellés et al., 2020): *cognitive* interaction, derived from working with the content, and the construction of knowledge between the students, as well as with the teacher; *social* interaction, between students and with the teacher; and *technological* interaction, with the interface, formal learning tools, or those chosen by the students (Wen, 2022).

Nonetheless, despite the abundant research about CSCL and the benefits of collaboration in learning contexts, implementation is still a challenge for universities. One of the challenges is teacher skills, as it is they who are responsible for putting these actions into practice, and because according to the CRUE and JRC analyses from the European Commission, as many as 41% feel they have insufficient digital skills. Added to that is the average age of university teachers, which the ministry responsible for universities puts at a mean of 55.8 years old. This suggests that higher education institutions face a significant challenge to adapt to their students' educational needs and learning styles.

In the specific case of collaborative working, the studies highlight the variety of roles teachers have to play in technology-mediated education. In addition to acting as subject-matter experts, their traditional role, they also have to play other roles that encourage deployment of skills for cooperation in a digital environment and which lead to the stipulated learning results. They must be teachers, evaluators, technical experts, guides/mediators, organizers/managers, they have to manage the social aspects of the

group, and they have to provide a personal touch (Hernández-Sellés et al., 2023, Martin et al., 2021).

Working collaboratively becomes particularly important when institutions or the teachers individually want to adopt a humanistic culture in the framework of digital or technology-mediated education, proposing a documented framework backed by scientific evidence to combine curricular aspects, considering the intersection of knowledge, pedagogy, and socio-emotional level.

CONTRIBUTIONS TO THIS SPECIAL ISSUE

This special issue presents seven studies that address online collaborative working from various perspectives. The article entitled "Modelo de trabajo colaborativo online desde la perspectiva socioemocional", ["A model for online collaborative working from a socio-emotional perspective"] by Montalvo-García, Ávila and Longo, researchers from the Universitat Autònoma in Barcelona and the EAE Business School, uses a validated model to understand some of the factors that allow us to understand the dynamic work processes working in a team using a socio-emotional approach.

Martínez De Miguel López (Universidad de Murcia), Bernárdez-Gómez (Universidad de Vigo), and Salmeron Aroca (Universidad de Murcia) conclude, from a qualitative and phenomenological perspective, that integrating online collaboration tools among postgraduate students for academic activities underscores the importance of virtual environments in shaping meaningful interdisciplinary educational experiences and socialization; a factor that has been especially amplified during and after the pandemic.

From the Escuela de Posgrado Newman and the Universidad Nacional Jorge Basadre Grohmann in Peru, teachers Chura-Quispe, García Castro, Limache Arocutipa, and De La Cruz examine the creation and validation of a techno-pedagogical design with inverted learning and collaborative writing, indicating important factors about both aspects.

The researchers Reyes and Meneses provide an interesting view of collaborative learning from an inclusive approach in an online university —the Universitat Oberta de Catalunya (UOC)— unpicking the aspects that identify whether collaborative learning encourages inclusive processes.

From the Universidad de Santiago de Compostela, CSEU La Salle, and the Universidad de A Coruña, the researchers Muñoz-Carril, Hernández-Sellés and González-Sanmamed use a partial least squares model to analyze the factors that affect collaborative learning.

In an article entitled "Andamiaje docente para la construcción del conocimiento en el aula de investigación educativa" ["Teaching scaffolding for the construction of knowledge in the educational research classroom"], teachers from the Universidad de Granada Gutiérrez-Braojos, Rodríguez-Chirino, Pedrosa Vico, and Rodríguez Fernández, use a mixed methodology to look at the concept of "Collaborative Knowledge Building", digging into the understanding of teaching scaffolding that supports student knowledge building, as well as the strategies applicable to a range of collaborative constructivist learning environments.

Finally, UOC members Guitert Catasús, Romeu Fontanillas, Romero Carbonell, and Baztán Quemada, establish the validation of the ABPCL model for collaborative, online project-based learning.

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