

**EDUHEM 2018**  
**VIII International conference on intercultural education and**  
**International conference on transcultural health: THE**  
**VALUE OF EDUCATION AND HEALTH FOR A GLOBAL,**  
**TRANSCULTURAL WORLD**

**THE ROLE OF COLLABORATIVE WORK IN BLENDED  
LEARNING**

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*Abstract*

This research was carried out at the School of Social Sciences of the Universidad Nacional of Costa Rica using a pre-experimental descriptive study. Blended learning was applied in three groups, all of whose members had university degrees. Teaching-learning strategies oriented towards collaborative work were analyzed from a hermeneutic perspective, using a mixed methodology to obtain a better understanding of the object of the study. The data analyzed was obtained from students and professors who participated in the pre-experiment, through a survey, an interview, and a focus group. The criteria of scientific rigor are based on the validity of the content and the construct used in the instruments, as well as on the analysis of internal consistency, and, in the case of qualitative data, on issues of credibility and transferability. The results show that collaborative work is the result of correlated factors, such as autonomy, and the attitude of key actors (professors and students) in the educational process, based on key elements such as curiosity, planning, organization, and discipline, as well as attitude, commitment, intellectual capacities, the use of ICTs, knowing how to analyze, think and reflect, and working individually and in a team. This study therefore provides sufficient scientific support to undertake a quasi-experimental study about the impact of collaborative work on blended learning among university students.

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**Keywords:** Collaborative learning, blended learning, pre-experiment.



## 1. Introduction

Par excellence, university education is one of the processes in which students experience a substantive phase of their formation to confront the challenges of a productive society, allowing them to acquire knowledge that they will make use of during their integration into a professional environment. It is therefore very important to go beyond traditional forms of teaching, and open new virtual spaces to overcome limits on access and improve the quality of higher education.

Theoretical and methodological changes in teaching are part of the role of professors, although there is still a tendency towards systems in which contents are conveyed based on techno-centered approaches, which turn students into passive subjects who simply receive ideas, reducing their chances to develop capabilities for critical analysis and to become active in the transformation of society.

These capabilities can be developed through social and collaborative work that fosters educational environments in which creativity and dialogue are promoted. Likewise, growth and openness of professors to new strategies that promote greater participation of both students and professors are fostered by the implementation of a balanced education that strengthens the development of their individual, social, and emotional capacities, with a general focus underpinned by four fundamental pillars: learning to know, learning to do, learning to live, and learning to coexist (Quesada, Cedeño, & Zamora, 2001).

Various studies have related collaborative work to the development of meaningful learning by students, and highlight the social, psychological and academic benefits students receive (So & Brush, 2008; Marjan & Seyed-Mohammad, 2012; Morales & Navia, 2017).

Collaborative work in blended learning (BL) improves the autonomy of students, their ability to carry out individual and shared tasks, and their commitment to self-learning (Garrison & Vaughan, 2011). This autonomy must be complemented by the guidance and advice of professors to achieve learning objectives, generate knowledge, and teach how it can be produced, incorporating the frameworks and concepts of complexity, recursion, hypertextuality, contextualization, collaboration, distribution, and diversity (Morales & Navia, 2017; Carranza & Caldera, 2018).

From the perspective of the use of BL in university education, it is important to consider providing new opportunities through the use of ICTs, the interaction between pedagogy and technology, the use of in-person and virtual classes, and their relevance beyond the context of the classroom. These interrelated factors imply the need for changes in the use of traditional communications media towards more innovative approaches that act as keystones for educational development.

The pedagogical model of the Universidad Nacional of Costa Rica highlights the principles of university education, generating respect and commitment with equal opportunities among students through the creation of team synergy, the formation of professors that are solidary and committed to general well-being, flexibility in participation through the incorporation of in-person and virtual activities (both synchronic and asynchronic), possibilities for critical intra-group discussions, creativity and continuous improvement (Universidad Nacional of Costa Rica, 2007).

In this sense, collaborative work has an effect through introducing collective behavior into tasks which were previously carried out individually, with heterogeneous groups that allow discussions, clarifications, the presentation of arguments and proposed solutions based on the content of what is being learned. During the implementation of these techniques, the professor takes on a motivating and facilitating

role, either in the classroom or via Web conferencing. This allows the development of critical and reflective thinking, as well as mutual support, and promotes deeper thinking (So & Brush, 2008).

Based on the above, scientific research was carried out to analyze teaching and learning strategies oriented towards collaborative work in BL, with empirical observations made in three groups in the School of Social Sciences of the Universidad Nacional of Costa Rica; the method and results are detailed in the following sections.

## **2. Problem Statement**

What are the teaching-learning strategies oriented towards collaborative work within a Blended Learning model in the context of the courses of the School of Social Sciences of the Universidad Nacional of Costa Rica?

## **3. Research Questions**

Costa Rica. The analysis of teaching and learning strategies oriented towards collaborative work was based on a hermeneutical perspective (Tadeo, 2011), and a blended methodology was used to achieve a better understanding of the subject matter, implementing the BL methodology (Hernández, Fernández, & Baptista, 2014).

The study population consisted of three groups (with an average of 34 graduate students per group). Data were gathered through a survey, an interview, and a focus group.

The criteria of scientific rigor for quantitative data were based on the validity and reliability of the content and the construct used in the instruments, as well as on the analysis of internal consistency, which was verified using Cronbach's alpha, for which values greater than .75 were obtained. In the case of qualitative data, the criteria used were credibility and transferability, during both the process of data collection and during their analysis (Lacave, Molina, Fernández, & Redondo, 2015; Campo & Oviedo, 2008; Latorre, Del-Rincón, & Arnal, 1996; Hernández et al., 2014).

The information gathered through the surveys was systematized using online technological tools (Google Drive) and was tabulated in spreadsheets and further analyzed using the PSPP data analysis program. Both spreadsheets and PSPP were used to carry out the descriptive statistical analysis of frequency and variability tables, and for comparisons of mean values between variables and groups. Qualitative data were analyzed using the codes found in the IT Atlas. Proposed and emerging categories were contrasted with the theory, and results were interpreted based on the objective of the analysis.

## **4. Findings**

Results of the analysis show that the factors of collaborative work to improve learning that underlie the context of this study are related to teaching and learning strategies and institutional technological resources, including portable computers, video projection equipment, material resources (stationary items, printed material, etc.), rooms for meetings with other professors, audiovisual equipment (television, still or video cameras, recorders, sound equipment, etc.), adequate classrooms, computing laboratories (with

desktop computers), offices or cubicles for student assistance, videoconference rooms and digital whiteboards, and mobile computing laboratory (with portable computers).

With respect to the use of online technological resources in university and personal activities by professors and students, the following ones stand out: Internet-based media and management tools, such as electronic mail, forums, chat, mobile telephones, Whatsapp, social networks, Moodle mobile; on-line collaborative resources such as Google Drive, Writeboard, YouTube, and electronic music, books and journals; on-line purchases and services, as well as the growing use of electronic materials by professors, such as digital content and multimedia, video tutorials, and software for supporting teaching techniques and research).

The Internet is the basis for the use of technological tools in learning, and high-quality connections play a leading role in enabling students and professors to take advantage of its potential in new learning environments which may be integrated into the formal dynamics of teaching and learning (Shaidullin, Safiullin, Gafurov, & Safilullin (2014) and Siew-Ling & Anak (2015).

The Universidad Nacional of Costa Rica uses the Moodle platform, which is well known to professors and students, as a virtual learning environment; it also uses some open-source virtual technological tools for in-person courses with technological support, in BL courses, and in virtual courses.

In short, the School of Social Sciences has the appropriate infrastructure, equipment, and technological resources, and their use has increased notably. However, professors do not make sufficient use of some online teaching and library materials – a factor that may improve through training, given their availability in the University.

According to professors, applied Didactics has five dimensions: learning, changes in teaching, didactic models that involve virtuality, use of ICTs, and effective professor-student communication. These should be oriented towards the development of professional abilities and with a perspective on learning centered on the person who learns:

- Self-regulated and collaborative learning.
- A sense of responsibility and commitment to comply with in-person and virtual tasks.
- Virtuality for individual and group study, and physical presence for guiding individual and group work.
- Use of web and ICTs tools (simulation, games, videoconferences, on-line forums, conceptual maps, etc.).
- Ubiquitous and Mobile learning.
- New interactions between participants (student-professor, organizations, institutions outside the university).

In terms of student skills, autonomy is important for in-person, BL, and virtual education. Among the students who participated in the study, 65% consider themselves autonomous in their studies; however, some of them relate this autonomy to independence from the guidance of professors during their learning process, while others relate it to maturity, responsibility, critical sense, etc., and indicate:

*“I am autonomous, but it is always necessary to know the point of view of a professional in the subject matter because sometimes what you learn by yourself has complications, and it is not always possible to find the appropriate answer” [A2-3.1-47].*

*“Yes, I am autonomous. I investigate in a systematic manner to obtain the information that I need to know and read it critically” [A2-3.1-63].*

*“I have to assume responsibility for everything I need to do, and I look for ways to solve everything” [A2-3.1-145].*

Student learning takes place under the leadership of professors; therefore, the skills of both parties should be discussed by professors because of the standards demanded under the new professor-student relationship in BL teaching; as it has been noted: “Changes in the pedagogical model, educational strategies, and university programs are necessary to strengthen a new vision of educational methodologies” [GD-3]. Both professors and students are aware that the teaching-learning process requires working together for learning and improving every day.

Specifically, the factors of collaborative work are analyzed based on didactic organization: skills and objectives, learning units, methodology, teaching and learning techniques and instruments, and strategies for evaluation, whose didactic processes were distributed in blocks: informative, modular, or thematic distribution, study materials, activities that require physical presence and virtual activities: synchronic and asynchronic, with practical and self-evaluation exercises.

The BL model developed in the three groups was implemented through a combination of in-person classes at the campus with virtual sessions using the UNA Virtual platform. During implementation of the BL model in the three groups, participation, and individual and group production with an emphasis on the relationship between theory and practice stood out. The teaching-learning and evaluation strategies used are compared in Table 1.

**Table 01.** Didactic elements of the BL model applied during the pre-experiment. Source: Adapted from Araya (2017)

	<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>
<b>Teaching and learning strategies</b>	In-person classes with presentations by the professor about theoretical contents and practical use, with an emphasis on the use of real cases as examples. Exercises with models from business. Activities: role play simulating situations in the professional world and a learning portfolio involving continuous interaction between the participants. Virtual sessions differentiated by subject matter, clarifications, directions, practical exercises, and revision.	Workshop with previous readings, explanatory materials. Open magisterial presentations with opportunities for questions and discussions, and practical exercises. Analyses of cases of the subject matter in the national context. Student Presentations and group dynamics. The virtual sessions carried out were a virtual forum, a questionnaire, and tasks (were delivered through three virtual sessions interspersed with in-person sessions, as continuations of the in-person classes).	In-person and virtual classes are delivered based on presentations and practical exercises (theory and practice). Work is carried out based on models of documents used in businesses, with students preparing new documents based on theory and the models. Individual and group activities are carried out to understand the subject matter; students prepare a portfolio of products of their activities inside and outside of the classroom.

<b>Evaluation strategy</b>	Evaluation as a process, aimed at development skills. Techniques: final written exam (theoretical and practical knowledge); research and classwork (with a variety of practical exercises).	Evaluation as a process, aimed at the development of skills. Evaluated through: practical exercises in each of the sessions (in-person or virtual), case studies, written exams, research work and presentations.	Evaluation as a process for guiding improvement and judging results. Techniques used: theoretical-practical tests, research, portfolio of final products of student activities (revised during the course of the school year).
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According to the information in Table 1, the teaching approach applied in the different groups is related to constructivist theories, as shown in the individual and group work, contextualized activities, and permanent, effective guidance by professors during the processes carried out. On the other hand, the evaluation strategy involves several cognitive levels, including digital actions or activities (Krathwohl, 2002; Churches, 2009; Bliuc, Ellis, Goodyear, & Piggott, 2011) and interactive learning components of these factors were also evaluated (Preceel, Eshet-Alkalai, & Alberton, 2009; Carman, 2005).

Professors and students had access to several tools of the University's Virtual Classroom, including:

- Student follow-up (personalized transcripts with immediate recording of ongoing and final evaluations).
- Synchronic (chat, videoconference) and asynchronous (mail linked to the student's particular e-mail, frequently asked questions, different types of forums) communication.
- Evaluation and self-evaluation questionnaires.
- Administration of information and didactic contents (documents, audiovisual material, links, etc.).

In some cases, the techniques that professors used the most often are those which students regard as being most helpful in assisting them to learn. Among these, case studies, presentations and readings stand out. The preferences indicated by each group are: summaries, conceptual maps, reading, educational games, listening to the professor, exercises with practical cases, figures and graphics, questionnaires (list of questions and...) and talking to a classmate.

Information was also gathered on the style of use of virtual resources – information that professors used initially as an input in presenting educational materials and adjusting learning activities. The students were categorized as participative, searchers and researchers, those who are more structured and oriented towards planning, and those who are oriented towards production (Vieira, 2011). These orientations are reflected in the types of activities they prefer.

The ways in which students use virtual space has an effect on teaching in BL classes, specifically in the case of virtual sessions. As noted by Vieira (2011), it is necessary that professors and students understand the virtual space, how to use it and how it modifies methodology, resources, and interactions that take place in that space. Likewise, Goulao, Vieira, Miranda, & Morais (2012) state that a methodology can be complemented by taking into account students' styles of use of virtual spaces in order to take advantage of the possibilities of collaborative work.

The use of ICTs and multiple tools can contribute to teaching at different cognitive levels – knowledge, understanding, application, analysis, and evaluation (Bloom, Englehart, Furst, & Krathwohl,

1956). As it has been noted, “Forums are very useful, but beyond forums, there are other useful Web 2.0 options such as trello.com for organizing projects; calameo.com for publishing documents, journals, etc.; and *inviertejugando.com* for learning about investments in the Stock Market” [GDPP-10].

Technological tools are not used to facilitate the evaluation of learning, which continues to be carried out in a traditional way; professors prefer evaluation without input from students (73% of professors almost always evaluate students in this way), while self-evaluation and co-evaluation are used to a lesser extent. Among students, 30% prefer evaluation that does not involve their own input, while 57% prefer a combination of the three types of evaluation (evaluation by others, self-evaluation, and co-evaluation).

Area & Adell (2009) emphasize that BL is a fusion of teaching methods which involves modification of the ways in which work is carried out; communication has a relevant and permanent effect, and guidance and orientation by professors is fundamental. These didactic elements are correlated with the development of social skills and help regulate one’s own behavior as well as that of others (Shunk, 1997; Marchesi & Martín, 2014). In university education these skills are developed in parallel with the discipline factor based on collaborative and autonomous work (Hinojo & Fernández, 2011, p. 166), as shown in the activities of the different groups.

The relationship between learning and evaluation activities, and specific procedures, times, criteria, and indicators, as well as the objective according to the epistemological level students are expected to achieve. In these processes, the planned virtual environment of Moodle, through properly planned and organized sessions which take into account the styles of students, allows the students to take advantage of technological resources in significant ways (Churches, 2009; González, 2006; Barragán, García, Buzón, Rebollo, & Vega, 2009; Hinojo, Aznar, & Cáceres, 2009; Cheung & Hew, 2011; Martín, García, & Muñoz, 2014; Garcés, Zermeño, & Ortega, 2015; Moskal, Dziuban, & Hartman, 2013; Goulao, Vieira-Barros, Miranda & Morais, 2012).

## 5. Conclusion

This work shows that there are didactic planning and development factors, as well as cognitive and emotional aspects of both professors and students, that must be analyzed to better understand the relationship between collaborative work and learning.

In the BL teaching approach, it is therefore important to emphasize that the culture of virtuality is a way to tech, not only about the use of Virtual Classrooms and other technologies, but also about their responsibility to complete the assigned work, their autonomy and commitment to learning (Sangrà, 2002), and the intrinsic motivation they must develop during their university studies.

Student autonomy therefore has an effect on collaborative work, in the sense that individual commitment strengthens group synergy, as well as professors’ skills, whose work in supporting student learning goes hand in hand with the design of the course, the work plan, and each of the learning activities. These factors are evident in works by Marjan & Seyed-Mohammad (2012) and Mora-Vicarioli & Hooper-Simpson (2016).

The previous comments do not imply a completely individualized monitoring of students, but rather that given the assumption of their autonomy, rather than planning activities for dependent students, these activities should be designed to free students so that their academic work will allow them to develop their

creativity, either individually or in a team. Teaching therefore requires planning that takes learning styles into account, to relate learning to teaching styles, methods, and techniques, thus allowing students to achieve the levels of learning that are expected from them. This analysis is supported in studies of Cabero (2003, 2004) and Carranza & Caldera (2018), among others.

BL teaching is therefore pertinent when considering the most relevant theoretical proposals for university education. It is necessary to strengthen the incorporation of contextual elements of the professional profile which is being formed (Zabalza, 2009). In this sense, Lloréns, Espinoza, & Castro (2013), discuss the importance of proportionality in terms of times, technological resources, and tutorial support for individuals and groups that are also evident in the activities of the three groups, and that according to Kintu, Zhu, & Kagambe (2017) are elements of a sound teaching design that are significant predictors of the development of student skills using BL teaching models.

In brief, autonomous work is the basis for collaborative work, and significant learning and through that interaction, significant learning takes place for the future professionals and their life; therefore, efficient planning of teaching using BL will take students beyond individual reading and problem-solving exercises in the classroom and in virtual sessions, towards a process of reflection on the content of and for these cross-cutting themes and their application in local, regional or global contexts.

Based on this case study, the theoretical and practical value of collaborative work is confirmed and there arise new questions that require quasi-experimental research to demonstrate the impact on the students' learning.

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