

## Dossier “Education and Technology in Mexico and Latin America: Outlook and Challenges”

### ARTICLE

# Pedagogical models, collaborative work and interaction on online undergraduate programmes in Colombia:<sup>1</sup> still some way to go

**Clelia Pineda Báez**

[clelia.pineda@unisabana.edu.co](mailto:clelia.pineda@unisabana.edu.co)

Tenured Lecturer, Education Master's Degree Programme, University of La Sabana, Bogotá, Colombia

**Cristina Hennig**

[cristina.hennig2@unisabana.edu.co](mailto:cristina.hennig2@unisabana.edu.co)

Tenured Lecturer and Researcher, Member of the Proventus Group at the Centre for Academic Technologies, University of La Sabana, Bogotá, Colombia

**Yasbley Segovia**

[hasblady.segovia@unisabana.edu.co](mailto:hasblady.segovia@unisabana.edu.co)

Director, Centre for Academic Technologies, University of La Sabana, Bogotá, Colombia

Submitted in: December 2012

Accepted in: April 2013

Published in: July 2013

---

1. A project undertaken by the following research groups: Education and Educators group in the Faculty of Education, and Academic Technologies-Proventus group at the Centre for Academic Technologies. Funded by the University of La Sabana, Bogotá, Colombia (EDU 28-2009), and co-funded by Colciencias (1230-489-25380).

### Recommended citation

PINEDA, Clelia; HENNIG, Cristina; SEGOVIA, Yasbley (2013). "Pedagogical models, collaborative work and interaction on online undergraduate programmes in Colombia: still some way to go". In: "Education and Technology in Mexico and Latin America: Outlook and Challenges" [online dossier]. *Universities and Knowledge Society Journal (RUSC)*. Vol. 10, No 2. pp. 431-445. UOC. [Accessed: dd/mm/yy]. <<http://rusc.uoc.edu/ojs/index.php/rusc/article/view/v10n2-pineda-hennig-segovia/v10n2-pineda-hennig-segovia-en>>  
<<http://dx.doi.org/10.7238/rusc.v10i2.1739>>  
ISSN 1698-580X

---

---

### Abstract

This article presents the results of a study whose aim was to explore the experiences and perceptions that students, lecturers/tutors and coordinators had of the pedagogical models underpinning online undergraduate programmes in Colombia, and of the application of these models with regard to collaborative work and interaction. The study used qualitative and quantitative techniques to complement and contrast the participants' perceptions. A total of 48 group and individual interviews were conducted, and 288 students and 44 lecturers answered an online survey. The results show that the programmes are based on constructivist principles and tend to use active pedagogies pertaining to that theory. However, the lecturers and students expressed uncertainty about the implementation of collaborative work and the fostering of interaction.

### Keywords

pedagogical model, e-learning, constructivism, collaborative work, interaction

## *Modelos pedagógicos, trabajo colaborativo e interacción en programas virtuales de pregrado en Colombia: Un camino por recorrer*

### *Resumen*

*El presente artículo expone los resultados de una investigación cuyo propósito fue explorar las percepciones y experiencias de estudiantes, docentes/tutores y coordinadores sobre los modelos pedagógicos que sirven de sustento para los programas de pregrado en modalidad virtual en Colombia y sobre la aplicación de esos modelos en relación con el trabajo colaborativo y la interacción. El estudio empleó técnicas cualitativas y cuantitativas para complementar y contrastar las percepciones de los participantes. Se realizaron 48 entrevistas grupales e individuales y una encuesta en línea a la que respondieron 288 estudiantes y 44 profesores. Los resultados revelan que los programas se fundamentan en los principios del constructivismo y tienden a utilizar pedagogías activas propias de esa corriente. Sin embargo, docentes y estudiantes manifiestan incertidumbres sobre la puesta en marcha del trabajo colaborativo y el fomento de la interacción.*

### *Paraules clau*

*modelo pedagógico, educación virtual, constructivismo, trabajo colaborativo, interacción*

## 1. Introduction

Colombia, in the interest of favouring processes of inclusion and equality, has increased its e-learning offerings and now has 28 undergraduate programmes and 26,124 enrolled students (Ministerio de Educación Nacional, 2013). However, analysis of these programmes is in its early stages, which means that there is room to examine their pedagogical dimension and to establish advances and challenges. This article responds to the need to document how the pedagogical models on those programmes have been implemented and to explore the theoretical trends that guide them, and also to get an insight into the students' and lecturers' views of how they cope with collaborative work and interaction, given that these are key to the implementation of e-learning. Although researchers acknowledge the spread and application of massive online open courses (MOOCs) worldwide, this study is an initial approach for reflection on the design and implementation of formal online programmes offered exclusively in Colombia that lead to the award of a professional degree recognised by the National Ministry of Education.

## 2. The role of interaction and collaborative learning in online programmes

One of the pillars of e-learning is social constructivism, which emphasises the role of social and dialogic interaction, symbolic exchange (Araya, Alfaro & Andonegui, 2007), and debate and negotiation, which act as facilitators of knowledge construction. Consequently, there is a need to create synchronous and asynchronous spaces for students to work together on pre-established content, and also to favour collaborative work, which is understood as the type of work in which two or more individuals are involved in creating knowledge (Wessner & Pfister, 2007).

Interaction is the process of communication between the agents of the interactive triangle (materials, lecturer and student), in which confirmation and the pace of learning play a significant role (Hannafin, 1989, cited in Garrison & Anderson, 2003). Interaction generates formative instances based on computer-assisted collaborative learning (Silva & Gros, 2007), and fosters spaces in which, with proper time management, students progress in their learning processes according to their abilities and paces of learning. Coll (2004-2005) points out that, when mediated by information and communication technologies (ICTs), interactivity or interaction allows students to establish a contingent and immediate relationship between education and their own searching and processing actions. In addition, it enables an active relationship with information, strengthens their protagonism, facilitates adaptation to different paces of learning and has positive effects on their motivation and self-esteem.

A basic condition for fostering suitable interaction spaces is the existence of a balance of group and individual work activities and monitoring, which implies fostering spaces and using a reasonable amount of time to attain the learning objectives. Another is to maintain the synchrony of the groups participating in the virtual spaces and to ensure that students work together. This implies monitoring activity frequency and the number of participants per group, as well as regulating the roles, negotiation and responsibilities in group work.

If the above-mentioned conditions are met, groups are formed that work towards knowledge construction, and thus it is possible to talk of collaborative learning. This process favours the performance of activities in which structured, deliberate interaction allows knowledge to be constructed (Thompson et al., 2009). In this type of learning, lecturers intentionally structure activities to engage students in teamwork. Karagiorgi and Symeoyu (2005) point out that collaboration is not restricted to sharing information or reaching consensus, but instead implies examining an object of study from many angles, and analysing and assessing the arguments put forward in order to perform a task.

Reasoned discussion brings considerable intervention to bear in collaborative work and knowledge construction in the e-learning mode (Barberà, 2006). In order to achieve that, it is crucial to have a developed cognitive system that manifests itself in the form of individual contributions (Näykki & Järvelä, 2008), to promote the development of collaborative skills such as collective creativity, leadership and commitment to group tasks (Thompson et al., 2009), and not to restrict it to coordination and communication among students without collaborative skills necessarily being developed among them (Kollar & Fischer, 2010).

The lecturers' role in fostering collaboration and interaction is undeniable, and it is marked by group facilitation; they are responsible for organising activities, encouraging and motivating the students, and creating a pleasant learning environment. In this respect, Salinas (2004) notes that lecturers become guides and cast off their image as absolute sources of knowledge. In general, educators act as facilitators that foster experiences for self-directed learning and knowledge construction, and are characterised by their technical and content-related skills, and by their communicative abilities (Benito, 2009).

An essential aspect of the lecturers' role is the feedback that they can provide, which may derive from their interaction with the content of materials or from communication with students. Feedback is a permanent and systematic formative act that entails identifying the students' strengths, weaknesses and shortcomings so that strategies can be designed to help them achieve the objectives set in a programme (Román, 2009).

Although feedback can be given synchronously and asynchronously, Schullo et al. (2007) suggest giving it synchronously because it allows tutors to establish student characteristics and determine their influence on knowledge appropriation, which in turn allows them to make changes in their instructional strategies to suit their students' profiles. Ham and Davey (2005) support the use of synchronous communication tools and base their suggestion on how comfortable students feel with communication of that type. Irrespective of the moment when feedback is given, the most important thing is its quality. Hence the need to examine what aspects such feedback focuses on. These may be the assessment process, activity guidelines, technology troubleshooting, content queries or personal matters.

### 3. Work description

This study was conducted in 2011 by two research groups belonging to the Faculty of Education and the Centre for Academic Technologies at the University of La Sabana in Colombia. A mixed methodo-

logy was employed to explore the experiences and perceptions that students, lecturers/tutors and coordinators had of the pedagogical models used in some Colombian online programmes. The study included nine higher education institutions that participated voluntarily. However, only six of them answered the online survey designed to elicit their views of aspects connected with the pedagogy and technology used in their programmes. The survey was validated by peer experts and then piloted and modified prior to being implemented online.

A total of 288 students answered the survey (56% female and 44% male). The mean age was 31.8 years with a standard deviation of 8.31 years. The ages ranged from 16 to 59 years, thus indicating a high variability within the group. Regarding the lecturers, a total of 44 (70% male and 30% female) answered the survey. The mean age was 43.16 years with a standard deviation of 10.21 years. In this group, the ages ranged from 25 to 70 years. Of the total lecturers/tutors, 56.8% stated that they worked in public insitutions and 43.2% in private centres.

In addition, 48 group and individual interviews were conducted with coordinators, lecturers and students. The interviews focused on the participants' teaching and learning experiences, and lasted for 1 hour 30 minutes each. They were transcribed and then analysed using the ATLAS.ti program. Charmaz's guidelines (2010) were followed to analyse the qualitative data, and methodological triangulation was used to give greater credibility and transparency to the analysis, as proposed by Merriam (2009)

## 4. Main results

One of the aims of this study was to explore the different views of the pedagogical models used in programmes and their implementation in pedagogical practice. Encapsulating the main idea of grouped patterns, several categories emerged from the qualitative analysis. This information was contrasted and complemented with data collected from the survey. Each finding is presented below.

### 4.1. Programmes with a constructivist aspect

The views expressed by the lecturers/tutors and coordinators in the interviews revealed an appropriation of the fundamentals of the pedagogical model used in their institutions. The tendency was to apply constructivist models, all of which placed the student at the centre of the educational act. The coordinators referred to characteristics such as knowledge construction, the lecturer's role in that process, student independence, collaborative work and the importance of timely feedback. All of these aspects form part of the principles of constructivism-based methodologies. The following excerpt<sup>2</sup> from an interview illustrates one of these points:

[...] for this mode, the model seeks to ensure that the student plays a particular role as a collaborator, cooperater. Hence the theories of cooperative, collaborative learning, as a researcher, and in particular

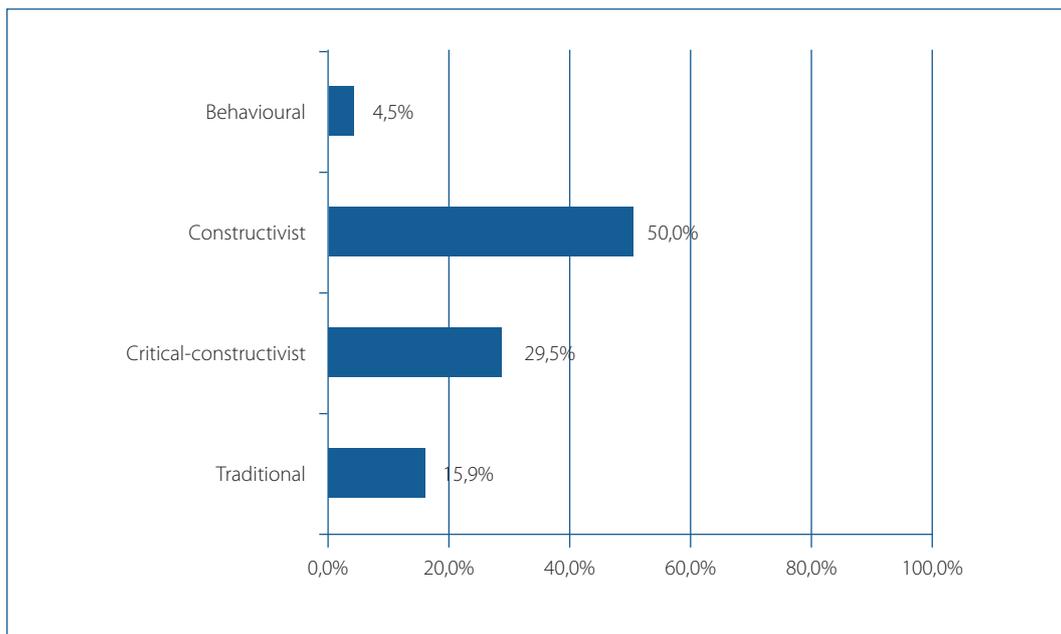
---

2. All of the excerpts were originally in Spanish and have been translated into English.

as an independent [person]. That independence sometimes clashes with the students. (Coordinator, institution 2, p. 11)

The answers were consistent with the data from the surveys. Chart 1 shows that 60% of the lecturers considered that their programmes were based on constructivism, followed by those who believed that there was a critical constructivist stance (29.5%). To a lesser extent, some lecturers considered that they were based on traditional pillars (15.9%), and lastly, some believed that they were based on behaviourist theories (4.5%).

Chart 1. Pedagogical theory on which the programme is based



## 4.2. Constructivism: divides, uncertainties and shortcomings in its application

Some lecturers/tutors acknowledged that even though certain institutions had pedagogical models, such models became ambiguous, were unsatisfactory for guiding lecturers in their pedagogical tasks, and were conceived as ideal or utopian. The ambiguity in the use of terms appeared to stem from conceptual shortcomings and a lack of awareness of models and of the strategies and tools to implement those models. The feeling that these lecturers had coincided with the assertion made by Prendes and Castañeda (2010), who highlighted the role of reflection on lecturers' institutional and pedagogical needs, mainly in relation to their ICT competencies for pedagogical purposes. The following excerpt from an interview illustrates this section:

The pedagogical model [...] is not consistent enough to provide pedagogical tools or guidelines for lecturers to implement. The model is too utopian [...]. As such, the pedagogical model simply gives a

description of the theories; it does not tell lecturers how to adopt it as one of the tools that they can use as part of their pedagogical strategies. (Lecturer, institution 2, interview p. 2)

Likewise, lecturers from other institutions emphasised the inconsistencies between the social-constructivist nature of the model and its application. One of the most important assumptions of social constructivism is that individuals have the potential to produce knowledge by interacting with their peers. However, according to the lecturers, there was still a tendency to favour individual construction, which did not bear any relationship to the intention of pedagogical models that place emphasis on collaborative group work and interaction-based knowledge construction.

This is where I believe that the pedagogical model is one thing and the reality is another. In fact, the accompaniment that lecturers provide is personalised because groups are coming; but you realise that the shortcomings in the groups are individual. After identifying individual shortcomings, lecturers must provide personalised accompaniment. So there is no social constructivism, because what the group actually does is share the setting, yet the cognitive process is clearly individual. (Lecturer, institution 4, p. 10)

The data from the interviews were consistent with those collected from the survey. The lecturers and students were asked about learning activities. A high percentage of the students (55%) and lecturers (50%) said that the programmes promoted individual activities. Of particular note is that 9% of the educators said that they never carried out group activities (Table 1).

Table 1. Frequency of activities carried out on the courses

		<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Hardly ever</i>	<i>Never</i>	<i>Total</i>
Individual activities	Students	55%	29%	11%	4%	1%	100%
	Lecturers	50%	36%	11%	3%	0%	100%
Group activities	Students	20%	22%	26%	18%	14%	100%
	Lecturers	34%	32%	20%	5%	9%	100%

It was found that while the online programmes were based on constructivist models, their application in practice created uncertainty because there was still a tendency to favour individual activities; although these are necessary, they are not enough to generate knowledge. As pointed out by Powell and Kalina (2009), there should be a balance between constructivist strategies, pedagogical practices and student-lecturer communication to produce an effective lesson.

#### 4.3. Is it possible to talk of favourable conditions for collaborative work and interaction?

One of the pillars of social constructivism is interaction, which depends on the type of structuring that tutors propose. In the first instance, the questionnaire asked about the frequency with which

roles were assigned for group tasks to be carried out. Table 2 shows that 43.2% of the lecturers said that they always or often assigned roles, whereas 18% said they never assigned any. In contrast, the students said that they were hardly ever (21.8%) or never (27.8%) given any instructions to play roles, which may have impacted on the interaction dynamics and on carrying out group work.

**Table 2.** Inclusion of instructions for students to assume roles to carry out group activities

	<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Hardly ever</i>	<i>Never</i>	<i>Total</i>
Lecturers	9 (20,5%)	10 (22,7%)	10 (22,7%)	7 (15,9%)	8 (18,2%)	44 (100%)
Students	44 (15,3%)	51 (17,7%)	50 (17,4%)	63 (21,8%)	80 (27,8%)	288 (100%)

In the interviews, interaction management was studied in greater depth, and the students were asked about the strategies used. It was found that group work was infrequent, and that when it was proposed, the lack of guidelines for effective interaction led to dissatisfaction among the students:

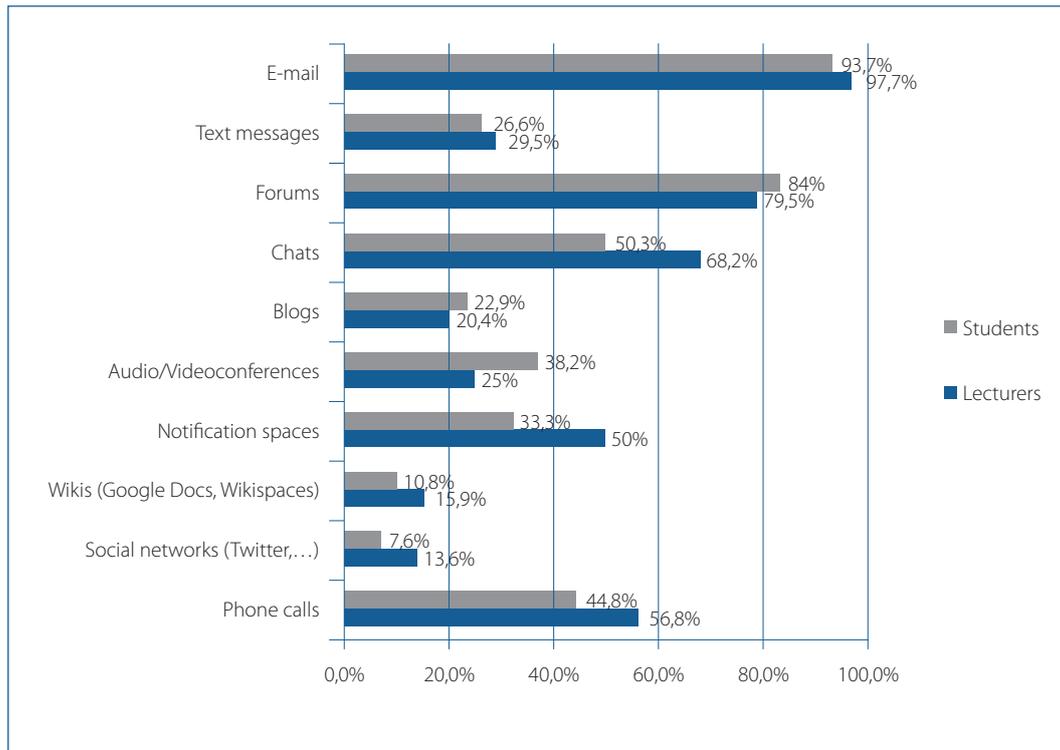
Some fellow students don't know how to answer and have a different way of thinking, so that's where we noticed a gap, a shortcoming in that part. There aren't enough channels for interaction between lecturers and students. (Student, institution 1, interview p. 2)

Another aspect that emerged from the interviews was that even though the tutors offered their students feedback, and stressed the importance of it because it allowed them to identify aspects that needed improvement, no evidence of any synchronous communication among students being encouraged was found. This finding is important because it brings to light a shortcoming in the structuring of peer interaction and feedback, which, as mentioned by Falloon (2011), serves as a support for clarifying doubts about topics covered on a course.

In the study, the lecturers and students were also asked about their use of tools to encourage communication. Chart 2 shows that e-mail was used by nearly all the lecturers (97.7%), followed by forums (79.5%) and chats (68.2%). The least used were Twitter, Facebook and Hi5 (13.6%) and wikis (15.9%). These trends were also found in the students' answers, who said that e-mail (93.7%) and forums (84%) were the tools they used most, while social networks (7.6%) were the ones they used least. It is important to note that despite having a variety of tools at their disposal, phone calls strongly prevailed as a means of encouraging communication.

From the results shown in Chart 2, it is possible to infer that there were shortcomings regarding the lecturers' familiarity with the use of certain Web 2.0 tools. This was also apparent in the interviews. For example, the lecturers made no reference to the use of social networks or tools such as wikis or blogs. For their part, the students were resolute in pointing out the lack of an "online educator profile":

Chart 2. Communication tools used on the courses

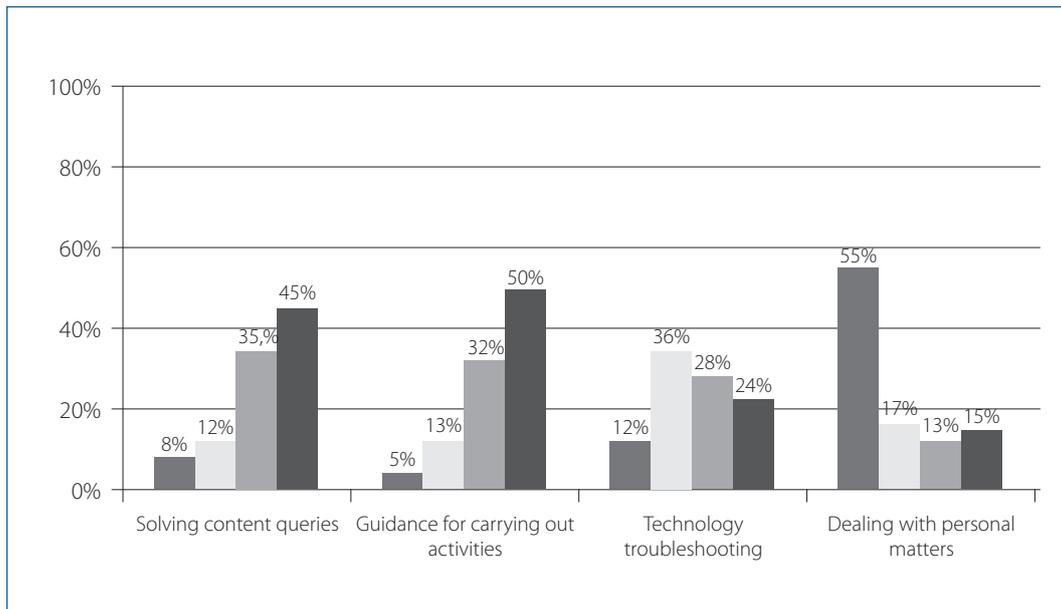


It is important to point out that variety in the pedagogical use of certain tools was not found; the lecturers and students both said that efforts were made to foster reasoned discussion in the forums, as was the capacity to encourage further exploration of certain topics. But even in these spaces, the work was understood as a distribution of tasks and searching for and presenting information, which was generally left up to a single member of the group:

... we do group work on a topic. [...] so each of us researches the part that we are responsible for, depending on the topic. At the end, what I do is bring it all together. (Student, institution 1, p. 3)

Finally, students were asked about communication with the lecturers. Most of them pointed out that their interactions with the lecturers revolved around guidance for carrying out activities (50%), followed by solving queries about course content (45%). To a lesser extent, communication focused on technology troubleshooting and on dealing with personal matters (16%).

Chart 3. Aspects on which communication with the lecturers focused



\*On the scale, 4 = often, and 1 = not often.

## 5. Conclusions and discussion

The online undergraduate education programmes explored in this project were based on constructivist principles and acknowledged that students were the active agents of their learning processes. The language used by the lecturers hinted at a familiarity with characteristics such as independence, collaborative work, interaction and accompaniment. However, there was a lack of appropriation of the theoretical frameworks in which the academic proposals were grounded, which led to shortcomings and uncertainties in the staging of programmes, and generated ambiguity with regard to carrying out collaborative work and to fostering interaction.

The analysis of the data collected by means of surveys and interviews revealed that collaborative work was a field in need of development. It was understood in a very limited sense, being associated mainly with the formation of work groups and the distribution of tasks, in which each student individually searched for information and shared it with fellow students. Collaborative skills, which Kollar and Fischer (2010) regard as positive interdependence and group process, were not necessarily generated.

A grasp of collaborative work concepts could encourage the generation of suitable and intentional learning activities among peers in such a way that they would engage in group work to attain the proposed learning objectives. According to Barkley, Cross and Howell (2007), this implies meeting three key conditions: (1) an intentional structure; in other words, learning activities with clear aspirations, (2) a grasp of what collaboration means; in other words, an equitable and participatory commitment to what is being done, and (3) teaching that targets the attainment of set learning objectives. If these conditions are met, collaborative work will have a positive influence on

group regulation processes, as well as on their cohesion and satisfaction (Dewiyanti, Brand-Gruwel, Jochemsa & Broers, 2007).

Another priority is that collaboration should get students actively involved in critically examining the object of study (Karagiorgi & Symeou, 2005). This aspect has serious implications if it is considered that, irrespective of the mode, education ought to prepare students for professional life by means of teamwork; a requirement for the attainment of group objectives in a variety of social spheres.

Encouraging people to work with others requires a critical examination of the methodological alternatives and of the strategies that are promoted within the programmes. Forums, chats and other interaction spaces should be scrutinised in order to examine the types of discussion proposed, the content of those discussions, ways of working together, and the distribution of roles and responsibilities. Several studies have pointed out that interaction frequency in distance education is a way of analysing participation and academic achievement, while avoiding aspects such as participation quality (Yang, 2012). In turn, that quality is not limited solely to students, as it involves lecturers too. In this respect, Barberà (2006), and Näykki and Järvelä (2008) point out that the forms of interaction promoted by programmes influence the fostering of reasoned discussion for knowledge construction.

E-learning in higher education institutions in Colombia undeniably requires a more categorical use of the potential that Web 2.0 tools offer. Characteristics such as their dynamics, interactivity, volatility and adaptability, among others (Brown, 2012), offer infinite possibilities to cognitively and creatively stimulate Colombian students, promote individual reflective processes and foster interaction and collaborative learning (Laru, Näykki & Järvelä, 2012; Kesim & Agaoglu, 2007).

On the other hand, the use of forums should continue to be encouraged because they are a fundamental component of collaborative work in Colombian e-learning. Ensuring that students remain engaged in online discussion is crucial because it encourages collaborative learning, increases constructive dialogue and provides opportunities for sharing. Unlike face-to-face classes, where gestures and visual and/or verbal signs can give instructors an idea of their students' motivation and level of interest, in e-learning mode it is not easy to assess the participants' level of motivation and engagement, so this must be taken into account.

However, it is essential not to overlook a number of fundamental aspects such as the idea that, irrespective of the tool or activity used, lecturers must have an educational background that puts the attainment of objectives first. The reflective capacities of designers, of topic experts and, above all, of lecturers must prevail in order to decide on the applicability and utility of those tools and activities. Likewise, it is essential to ensure that educational agents do not allow themselves to be 'seduced' by novelty, but instead give priority to accompaniment and scaffolding in the learning process (Azevedo & Jacobson, 2008).

## References

ARAYA, V.; ALFARO, M.; ANDONEGUI, M. (2007). "Constructivismo: Orígenes y perspectivas". *Laurus*. Vol. 13, No 24, pages 76-92.

- AZEVEDO, R.; JACOBSON, M. (2008). "Advances in scaffolding learning with hypertext and hypermedia: a summary and critical analysis". *Education Technology Research Development*. Vol. 56, pages 93-100.  
<<http://dx.doi.org/10.1007/s11423-007-9064-3>>
- BARBERÀ, E. (2006). "Collaborative knowledge construction in highly structured virtual discussions". *The Quarterly Review of Distance Education*. Vol. 7, No 1, pages 1-12.
- BARKLEY, E.; CROSS, P.; HOWELL, C. (2007). *Técnicas de aprendizaje colaborativo. Manual para el profesorado universitario*. Madrid: Ediciones Morata, S.L. 236 pages.
- BENITO, D. (2009). "Aprendizaje en el entorno del e-learning: estrategias y figura del e-moderador" [online article]. *RUSC. Universities and Knowledge Society Journal*. Vol. 6. No 2 [Accessed: 10 August 2012].  
<[http://rusc.uoc.edu/ojs/index.php/rusc/article/view/v6n2-benito/v6n2\\_benito](http://rusc.uoc.edu/ojs/index.php/rusc/article/view/v6n2-benito/v6n2_benito)>
- BROWN, S. (2012). "Seeing Web 2.0 in context: A study of academic perceptions". *Internet and Higher Education*. Vol. 15, pages 50-57.  
<<http://dx.doi.org/10.1016/j.iheduc.2011.04.003>>
- COLL, C. (2004-2005). "Psicología de la educación y prácticas educativas mediadas por las Tecnologías de la Información y la Comunicación: una mirada constructivista". *Sinéctica*. No 25, separate section.
- CHARMAZ, K. (2010). *Constructing grounded theory: A practical guide through qualitative analysis*. New York: SAGE Publications. 224 pages.
- DEWIYANTI, S.; BRAND-GRUWEL, S.; JOCHEMSA, W.; BROERS, N. (2007). "Students' experiences with collaborative learning in asynchronous computer-supported collaborative learning environments". *Computers in Human Behavior*. Vol. 23, No 1, pages 496-514.  
<<http://dx.doi.org/10.1016/j.chb.2004.10.021>>
- FALLOON, G. (2011). "Making the connection: Moore's theory of transactional distance and its relevance to the use of a virtual classroom in postgraduate online teacher education". *Journal of Research on Technology in Education*. Vol. 43. No 3, pages 187-209.
- GARRISON, D.; ANDERSON, T. (2003). *E-Learning in the 21st century: A framework for research and practice*. New York: Routledge Falmer. 167 pages.  
<<http://dx.doi.org/10.4324/9780203166093>>
- HAM, V.; DAVEY, R. (2005). "Our first time: two higher education tutors reflect on becoming a virtual teacher". *Innovations in Education and Teaching International*. Vol. 42, No 3, pages 257-264.  
<<http://dx.doi.org/10.1080/01587910500168017>>
- KARAGIORGI, Y.; SYMEOU, L. (2005). "Translating constructivism into instructional design: Potential and limitations". *Educational Technology and Society*. Vol. 8, No 1, pages 17-27.
- KESIM, E.; AGAOGLU, E. (2007). "A paradigm shift in distance education: Web 2.0 and social software". *Turkish Online Journal of Distance Education*. Vol. 8, pages 66-75.
- KOLLAR, I.; FISCHER, F. (2010). "Peer assessment as collaborative learning: A cognitive perspective". *Learning & Instruction*. Vol. 20, pages 344-348.  
<<http://dx.doi.org/10.1016/j.learninstruc.2009.08.005>>
- LARU, J.; NÄYKKI, P.; JÄRVELÄ, S. (2012). "Supporting small-group learning using multiple Web 2.0 tools: A case study in the higher education context". *Internet and Higher Education*. Vol. 15, pages 29-38.  
<<http://dx.doi.org/10.1016/j.iheduc.2011.08.004>>

- MERRIAM, S. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: John Wiley & Sons. 320 pages.
- Ministerio de Educación Nacional-MEN. (2012). *Sistema Nacional de Información de la Educación Superior, SNIES, estadísticas sectoriales de educación superior-matrícula por metodología* [online material]. [Accessed: 28 January 2013].  
<http://www.mineducacion.gov.co/sistemasdeinformacion/1735/w3-article-212400.html>
- NÄYKKI, P.; JÄRVELÄ, S. (2008). "How pictorial knowledge representations mediate collaborative knowledge construction in groups". *International Society for Technology in Education. JRTE*. Vol. 40, No 3, pages 359-387.
- POWELL, K.; KALINA, C. (2009). "Cognitive and social constructivism: Developing tools for an effective classroom". *Education*. Vol. 130, No 2, pages 241-250.
- PRENDES, M. P.; CASTAÑEDA, L. (2010). *Enseñanza superior, profesores y TIC. Estrategias de evaluación, investigación e innovación*. Bogotá: Ediciones de la U. 166 pages.
- ROMÁN, C. (2009). "Sobre la retroalimentación o el feedback en la educación superior online" [online article]. *Revista Virtual Universidad Católica del Norte*. No 26. [Accessed: 14 February 2012].  
<http://redalyc.uaemex.mx/redalyc/pdf/1942/194215516009.pdf>
- SALINAS, J. (2004). "Innovación docente y uso de las TIC en la enseñanza universitaria" [online article]. *RUSC. Universities and Knowledge Society Journal*. Vol. 1, No 1, pages 1-16. [Accessed: 5 July 2011].  
<<http://www.uoc.edu/rusc/dt/esp/salinas1104.pdf>>
- SILVA, J.; GROS, B. (2007). "Una propuesta para el análisis de las interacciones en un espacio virtual de aprendizaje para la formación continua de docentes" [online article]. *Revista Electrónica Teoría de la Educación y Cultura en la Sociedad de la Información*. Vol. 8, No 1, pages 81-106. [Accessed: 3 May 2012].  
[http://campus.usal.es/~teoriaeducacion/rev\\_numero\\_08\\_01/n8\\_01\\_silva\\_gros.pdf](http://campus.usal.es/~teoriaeducacion/rev_numero_08_01/n8_01_silva_gros.pdf)
- SCHULLO, S.; HILBELINK, A.; VENABLE, M.; BARRON, A. (2007). "Selecting a virtual classroom system: Elluminate Live vs Macromedia Breeze (Adobe Connect Professional)". *Journal of Online Learning and Teaching*. Vol. 3, No 4, pages 331-345.
- THOMPSON, J.; HESS, G.; BOWMAN, T.; MAGNUSDOTTIR, H.; STUBBS-GIPSON, C.; GROOM, M.; MILLER, J.; STEELMAN, T.; STOKES, D. (2009). "Collaborative graduate education across multiple campuses". *Journal of Natural Resources & Life Sciences Education*. Vol. 38, pages 16-26.
- WESSNER, M.; PFISTER, H. R. (2007). "Points of cooperation: Integrating cooperative learning into web-based courses". In: *The role of technology in CSCL. studies in technology enhanced learning*. New York: Springer. Pages 21-46.  
<[http://dx.doi.org/10.1007/978-0-387-71136-2\\_3](http://dx.doi.org/10.1007/978-0-387-71136-2_3)>
- YANG, C.-H. (2012). "Fuzzy fusion for attending and responding assessment system of affective teaching goals in distance learning". *Expert Systems with Applications*. Vol. 39, No 3, pages 2501-2508.  
<<http://dx.doi.org/10.1016/j.eswa.2011.08.102>>

### About the authors

*Clelia Pineda Báez*

[clelia.pineda@unisabana.edu.co](mailto:clelia.pineda@unisabana.edu.co)

Tenured Lecturer, Education Master's Degree Programme, University of La Sabana, Bogotá, Colombia

Clelia Pineda Báez holds a doctorate in Education (Southern Illinois University, SIU, Carbondale, United States), a master's degree in Teaching English as a Foreign Language (SIU) and a bachelor's degree in Philology and Languages (National University of Colombia, UN). She is a tenured lecturer on the Education master's degree programme at the University of La Sabana, and a researcher in the Education and Educators group in the Faculty of Education. Her lines of research focus on the higher education system in Colombia.

*Cristina Hennig*

[cristina.hennig2@unisabana.edu.co](mailto:cristina.hennig2@unisabana.edu.co)

Tenured Lecturer and Researcher, Member of the Proventus Group at the Centre for Academic Technologies, University of La Sabana, Bogotá, Colombia

Cristina Hennig is a psychologist and holds a master's degree in Education awarded by the University of La Sabana, where she is a tenured lecturer and researcher. She is a member of the Proventus group at the Centre for Academic Technologies and a specialist in educational guidance and human development for El Bosque University, Bogotá. Her lines of research focus on e-learning in Colombia, particularly in teacher training and higher education.

*Yasbley Segovia*

hasblady.segovia@unisabana.edu.co

Director, Centre for Academic Technologies, University of La Sabana, Bogotá, Colombia

Yasbley Segovia Cifuentes holds a master's degree in Information Technologies Applied to Education (National Pedagogic University, UPN, Bogotá) and a certified public accountant qualification (Saint Thomas Aquinas University, USTA, Bogotá). She is currently the director of the Centre for Academic Technologies at the University of La Sabana, and an active member of the Proventus research group. Her work focuses on the strategic incorporation of ICTs into education institutions and virtual learning environments.

Universidad de La Sabana

Campus del Puente del Común, Km. 7, Autopista Norte de Bogotá

Chía, Cundinamarca, Colombia

53753 Bogotá

Colombia

<http://www.unisabana.edu.co/>



The texts published in this journal are – unless indicated otherwise – covered by the Creative Commons Spain Attribution 3.0 licence. You may copy, distribute, transmit and adapt the work, provided you attribute it (authorship, journal name, publisher) in the manner specified by the author(s) or licensor(s). The full text of the licence can be consulted here:

<<http://creativecommons.org/licenses/by/3.0/es/deed.en>>