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ECOSISTEMA DE INNOVACIÓN EDUCATIVA, ECOLAB. LABORATORIO Y PROCESOS DE FORMACIÓN DIFERENCIAL

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Artículos de investigación científica y tecnológica

ECOSISTEMA DE INNOVACIÓN EDUCATIVA, ECOLAB. LABORATORIO Y PROCESOS DE FORMACIÓN DIFERENCIAL

Ecosistema de innovación educativa, ecolab. laboratorio y procesos de formación diferencial

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Abstract: This article reflects on the training experience mediated by new teaching methodologies in Politecnico Grancolombiano's International Business program, it includes a description of the most contemporary concepts about educational innovation and usage of new educational methodologies, structured under the principle of quality education of the Sustainable Development Goals and the inclusion of new methodologies in the virtual classroom.

Education, e-learning, innovation, virtuality, educational innovation, reverse classroom, assertive communication.
https://doi.org/10.15765/pnrm.v13i25.1329
Keywords: Education, e-learning, innovation, virtuality, educational innovation, reverse classroom, assertive communication.

Resumen: Este artículo de reflexión analiza la experiencia de formación mediada por nuevas metodologías didácticas, en el programa de Negocios internacionales del Politécnico Grancolombiano, incluyendo una descripción de los conceptos más contemporáneos sobre innovación educativa y uso de nuevas metodologías educativas, estructurado bajo el principio de educación de calidad de los objetivos de desarrollo sostenible y la inclusión de nuevas metodologías en el aula virtual.

Palabras clave: Educación, E-learning, innovación, virtualidad, innovación educativa, aula inversa, comunicación asertiva.

INTRODUCTION

Constant concern for innovation has been one of the clearest institutional goals at Politecnico Grancolombiano, throughout its existence, the teaching mission has focused on content development for its main educational function (Norman-Acevedo, 2019b). Educational innovation and classroom transformation have been constantly debated in history. This road has led to the appropriation of ICT, supporting teachers' tasks with technological tools. Education needs to be prepared to adapt to the speedy transformations taking place in the sector (Norman-Acevedo, 2018). Resource management in teaching, programmatic content design and virtual environments must respond to network progress; otherwise, there is risk of lagging behind. Mediation

and assertive communication using information and communications technology have also become a key resource for the teacher to appropriate (Tokareva, Smirnova, & Orchakova, 2019). The ECOLAB project was initially conceived for the face-to-face environment, applying reverse classroom and role games; the concept of virtual classroom was incorporated by 2019, more specifically in the international business program at Politecnico Grancolombiano (Norman-Acevedo, 2019a).

This situation evinced the need to explore concepts and methodologies used and applied in virtual classrooms to determine which didactic methods are most frequently used, especially following the precept of quality education (Aloizou, Sobrino, Mones, Asensio-Perez, & Sastre, 2019), the fourth Sustainable Development Goal, and setting up a cognitive infrastructure that considers, as per the UN (2019, p.2):

> Education is the basis to improve life and sustainable development. Aside from enhancing people's quality of life, access to inclusive and equitable education can help provide innovative solutions to the world's most pressing problems.

In virtuality, tools are not just applied through the use of technology; pedagogic and dynamic factors of classes are vital to produce new innovation proposals, along with quality and coherence in the student of the new millennium (Carter & Salyers, 2013; Kantanen, Manninen, & Kontkanen, 2014; Songkram, 2018).

An observation of virtuality and classrooms in the CANVAS platform (Black, Bissessar, & Boolaky, 2019; Carroll, Tchangalova, & Harrington, 2016; McIntyre, 2016; Miranda & Ayoub, 2016; Willness & Bruni-Bossio, 2017) laid down a series of challenges that explain how –through technology– the tutors mediation's objective and learning experience can be measured (Peres & Pimenta, 2009). Change focused on the way of communication that takes place in virtual settings, such as reaching students through e-learning and b-learning, which enable new paradigms in the process of communication and instruction of the tutor in the virtual classroom (Hernandez, Parez-Ramirez, Zatarain-Cabada, Barron-Estrada, & Alor-Hernandez, 2016; Lopez & Camilli, 2014a, 2014b; Manzanares, Garcia-Osorio, & Diez-Pastor, 2019).

The objective of this article is to determine whether or not assertive communication and the use of reverse classroom in the virtual modality – as an alternative with easy access to information– transforms the teaching model, and suggests that the traditional teaching method has become obsolete (Neto & De Lima, 2017). The article explores the way in which it can influence training performance of students enrolled in the international business program at Politecnico Grancolombiano (Osorno & Benitez, 2017), in its branch in Bogota (Colombia). Based on studies such as those by Lopez and Camilli (2014a), with results that show contrast between students' speaking and actual perception, as well as difficulties associated with the use of technology, the importance of learning planning and the need for continuous evaluation supported by tutorship.

For the UN (2019, p.2), "storytelling is an efficient communication tool that allows children to easily remember lessons and qualities they may use in their daily life". This narrative can range between assertive to imposing without modern foundation (Gaviria-Rodriguez, Arango-Arango, Valencia-Arias, & Bran-Piedrahita, 2019). The work of reverse classroom demands planning aided by emerging technologies; and these technologies must be combined with strategies that promote comprehension, skill development and teamwork.

The original condition will focus on studying the tools selected by the laboratory and on integrating and structuring them with the aim of improving education and proposing an inclusive, sensible and analytical language, much needed in the 21st century (Boulton, Kent, & Williams, 2018; Fokides & Atsikpasi, 2018; Ouherrou, Elhammoumi, Benmarrakchi, & El Kafi, 2019).

METHODOLOGY

The document collection and data analysis methodology was qualitative (Hernandez, Fernandez, & Baptista, 2014). A pilot validation test was conducted, and the observation intended to establish in what way, communication and the use of new methodologies can take virtuality to another level of learning, inclusive and dynamic, demanding for the tutor and with important added value: quality and complementary and circular training using technology and the tutor's mediation (Sanchez, 2015).

Firstly, semi-structured interviews were applied to students (Gaikwad, 2017), teachers and experts of the international business program at Politecnico Grancolombiano. Qualitative data (Leandro-França, Giardini, Hershey, & Barbosa, 2016) collected from interviews was coded and analyzed using open and axial coding procedures (Adelman, 2015; Plante & Cox, 2018).

The instrument was applied to 113 students out of the total 221 enrolled in the second semester of the international business program, virtual education modality, who randomly answered the interview; the idea was to focus on what was fundamental and to start generating new changes.

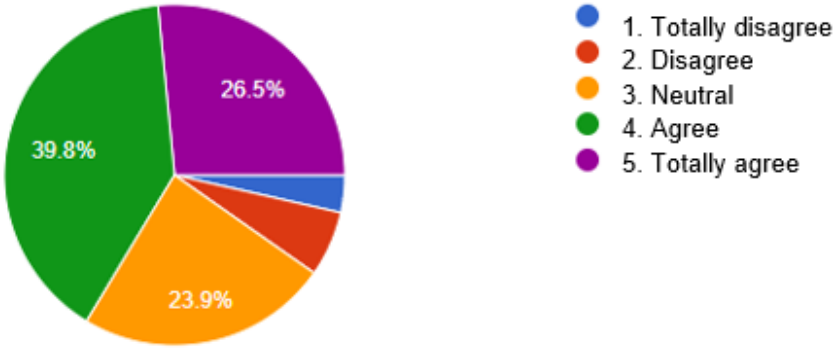
Each step of the methodology implied changing the language using assertive communication in several fronts: the use of examples, for students to interact; the generation of synchronic spaces based on storytelling, visually fun and interactive; in terms of writing, using simple language with daily examples and pleasant reading, to better evince module content, which can be rigid at times (Sanchez, 2015).

Aside from the oral communicative part, this research set up an immediate connection with students, via chat and synchronous meetings; moreover, asynchronous mirror classes were also added to summarize and specify topics in a more specific context (Hernandez, 2016).

Constant dialog with students was included in the study, as well as the value of ethics and the importance of having quality education through the learning platform.

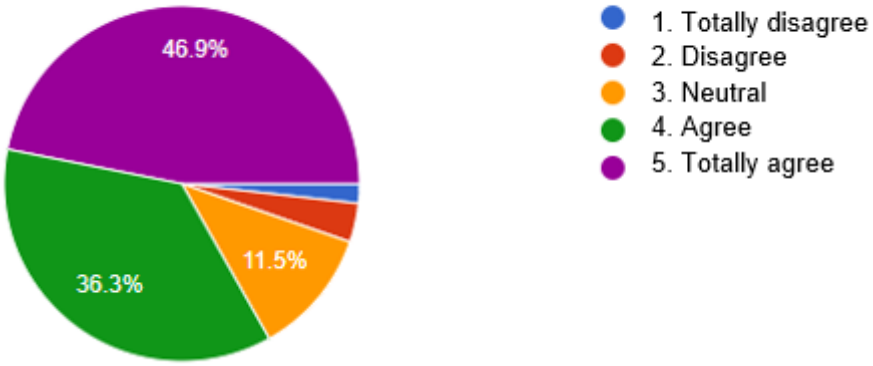
RESULTS

The most important results of the validation pilot test provided preliminary data that helped the construction of measurement tools and provided an important understanding of the population to be impacted with the proposed laboratory:



Graph1

Not finding content quickly and with agility makes the tutor's work complex. Politecnico Grancolombiano's virtual education at has evolved its platforms, making them more agile and attractive for students, from LMS such as Moodle, Epic, and now Canvas (Buć & Divjak, 2015; Zhuang *et al*., 2017), content visualization is a constant challenge for higher education institutions (Raicu & Raicu, 2015; Tobon, Tobon, Veytia-Bucheli, & Escudero, 2018; Zhuang *et al*., 2017). Students can also benefit from this daily use of e-learning technologies, upon closer observation of current trends of e-learning technologies, some possible applications and tools used by the institution were analyzed.

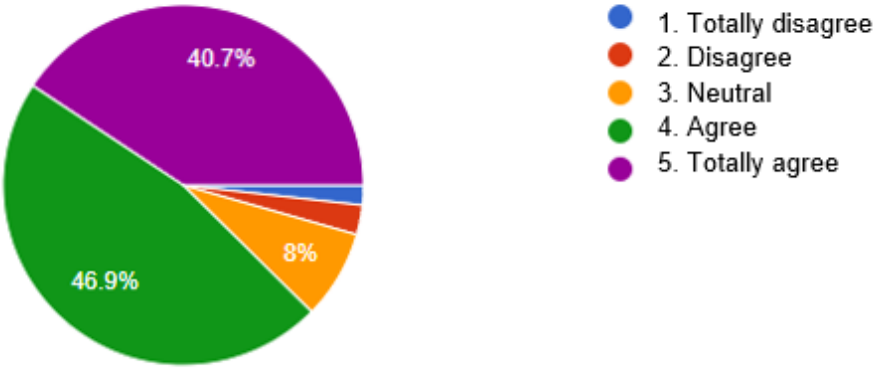


Graph2

This demonstrates that a shift from the role of instructor tutor to a role with more mediation (using real life examples, making more enjoyable content, changing language descriptors and the way in which learning dynamics are established, and mediated by ICT) implies a transformation of the rhetoric and dynamic of the meetings and of the way in which a synchronous session is conducted (Kantanen *et al*., 2014; Kárpáti & Dorner, 2008; Loogma, Kruusvall, & Ümarik, 2012; Michelini, Santi, & Stefanel, 2013; Stevens, Kärkkäinen, & Lampela, 2009; Su, Tzeng, & Hu, 2016).

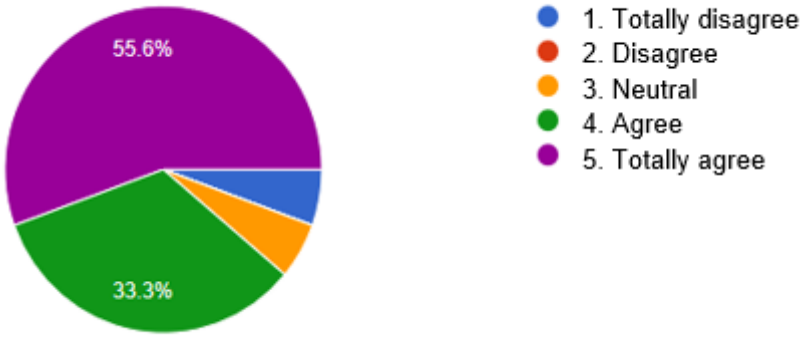
Perception of different types of deficits that hinder the use of this kind of education are intended to be solved with the so-called innovative e-learning, implementing novel and usually innovative solutions in the technological and organizational spheres, which help overcome the existing limitations providing more flexibility of accessing e-learning proposals by potential participants, as well as more adaptation to individual needs (Kaleta, 2015).

However, results highlight a preference for accessing the classroom and finding innovative answers with different argumentation. Data matrixes have been created and prepared for the process of discovering meaningful relationships and links between students' answers to the preliminary questions and to the answers of knowledge tests, ways of doing and results obtained (Dimić *et al*., 2018):



Graph3

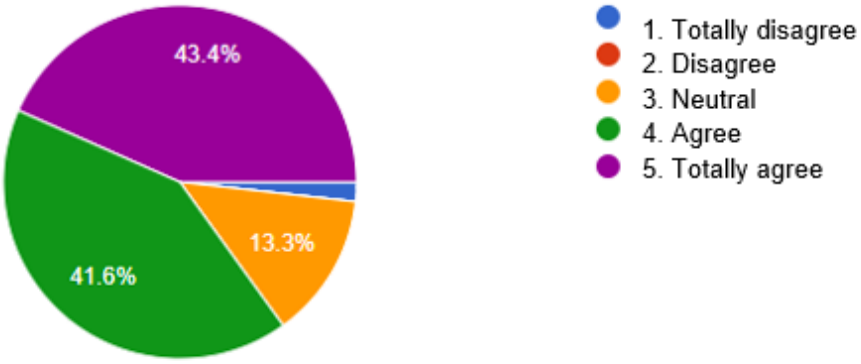
Nevertheless, the following answers show that ECOLAB –from the virtual perspective– is clearly on the right track towards a path of analysis and exploration, which gradually focuses on educational purposes of quality. One of most important challenges of virtual education is sustaining student enrollment and preventing desertion (Bergsteiner & Avery, 2014; Konak, Clark, & Nasereddin, 2014).



Graph4

In a friendly environment and interacting with others and the teacher, students have better capacity to achieve success. Therefore, the relationship between teacher and students is a major factor for class environment (Talebi, Davodi, & Khoshroo, 2015).

Results by this study lead the way to important modifications of existing programs, which in turn would contribute to increase the quality of teacher communication and the cultural relevance of the study plan (Crea & Sparnon, 2017).



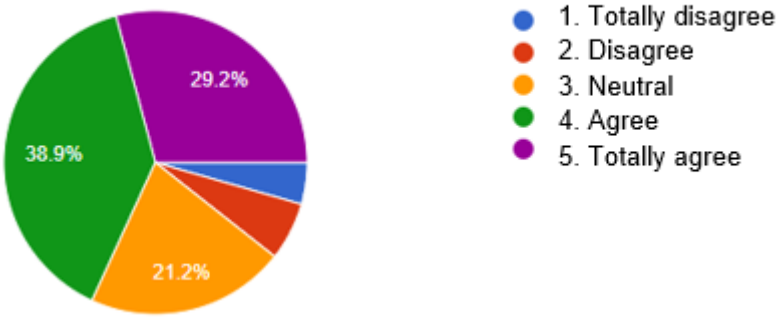
Graph5

Strategies led by the tutor are positively related to performance, but the association tends to be negative when the tutor applies high levels of instruction (Caro, Lenkeit, & Kyriakides, 2016).

An important point is generating these differentiating scenarios in the virtual classroom in order to allow students and tutors to build spaces of co-creation through participative actions, changing and dynamic classrooms that foster development of less static content considering the new society (Uskoković, 2018). Moreover, the co-creation model is open to the inclusion of instructions, hand in hand with the aspect of building the ideal way of acquisition and creation of knowledge in community.

The sample allowed to observe very important things: answers through the messaging communicator (Mon, 2010) were abundant; synchronous meetings (live meetings throughout the module's eight weeks, which is divided in four units, a meeting for each unit) forced most of the students to frequently access the platform and actively participate in the meetings.

The intention of learning processes questions a teacher's daily tasks, the value of each minute with students and the enjoyment of the job performed, this includes a training path that leads to quality, good service and to working with the heart.



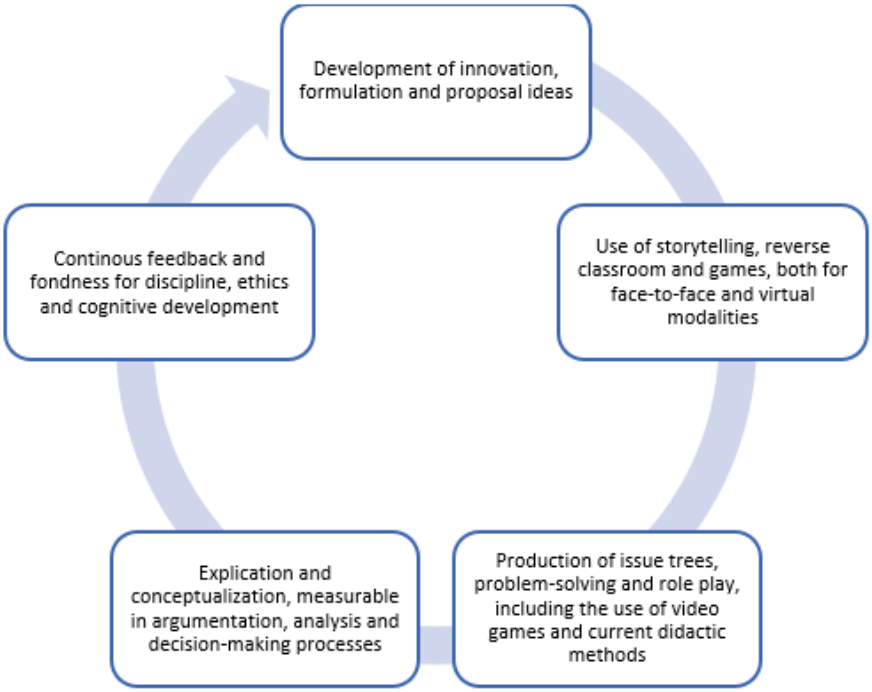
Graph6

Tutorial strategy changes with time, it should transform not into sequences and processes but into understanding the involvement of human beings and the need to consider humans as comprehensive units. When there is over 30% of the Totally agree answers and 40% of the Agree answers, there is a positive challenge towards how to conduct synchronous meetings and to develop virtual content, it is about handling more updated tools without losing the inspiration of storytelling and association.

Regarding the study's conclusions, new spaces to work in virtual education were found applying a socio-training approach to enable students and tutors to develop the teaching-learning process from a perspective that strengthens the use of cross-cutting and collaborative projects (Tobon *et al*., 2018).

The important aspect of this idea is sustaining assertive communication and implementing tools with additional videos, explaining with storytelling style, and a more affectionate and dynamic attitude, with quality and well-prepared topics, dynamic aids and a more strategic learning environment (Kantanen *et al*., 2014).

ECOLAB includes the following system, which is circular due to the fact that it changes constantly, developing and finding continuous improvement.



Graph7
Source: compiled by the authors, 2019.

The virtual modality confirms that using technology and leveraging the platform, new strategies deriving from new LMS, and especially the role of the tutor, entails top pedagogic and discipline quality.

DISCUSSION

Education innovation laboratories are frequently changing the learning process; therefore, document collection is required to verify pedagogical strategies that are under development in the world, with education innovation models, and the concepts under which they are being developed in virtual education. For the UN (2019, p.3) "education is also essential to encourage tolerance between people, contributing to the creation of more peaceful societies". All of the information in the virtual educational platform may remain open, and communication between participants can be extended, so we may talk about creating and sustaining a community of graduates, an association with them and a constant community update (Raicu & Raicu, 2015).

Colombia's most important process is underway, and it involves peace, coexistence, respect for differences and quality education accessible to all Colombians, so that incorporation to civil life results in a training process for Colombians who had never thought about studying and that had never had the choice of educating themselves and working (Liao & Lu, 2008; Loogma *et al*., 2012; Michelini *et al*., 2013; Raicu & Raicu, 2015; Songkram, 2018).

This is a challenge for universities in the country, opening the space for quality education to be inclusive for all. According to Largo (2014), the creation of new methodologies, especially to leave traditional ones aside, and incorporating new methodologies to update content and turn education into something changing and innovative. Likewise for Silva (2017), who discusses the use of these methodologies and calls them E-Activities, which encompass games to attain empowerment in the module and turn it into a playful process, following national and international entrepreneurial realities. Therefore, we advocate for the use of the term "luditization" to emphasize that transforming a situation into a game does not consist of elements that look ludic, it is more a non-essentialism vision of play, generating a metaphor around the situation to build reflexive spaces that modify the nature and meaning of interactions (Baptista & Oliveira, 2017; Bozkurt & Durak, 2018; Devisch, Poplin, & Sofronie, 2016; Dymek, 2018; Sanchez, Young, & Jouneau-Sion, 2017; Vanolo, 2018).

The use of social networks, including platforms such as Facebook, was also a great challenge taking into consideration the time students spend in their cellphones; in didactic logic, as expressed by Antoli (2015), the use of social networks in the virtual classroom is frequent, but in some cases students must be classified in groups to avoid personal contact and for the group to strictly focus on the module being taught (Moghavvemi, Paramanathan, Rahin, & Sharabati, 2017; Moghavvemi & Salarzadeh, 2018; Moore-Russo, Radosta, Martin, & Hamilton, 2017).

Yet not every platform allows it. When large classrooms, such as Moodle, were created, didactic instruction took place through forums, comparisons, links, games that were incorporated in the system, but the visual aspect is also important, as well as the mix between virtuality with synchronous meetings that are filled with information and analysis (Martinez-Cerda & Torrent-Sellens, 2017).

The methodology that is applied the most in the explored documents is reverse classroom; e.g., Fernandez (2017), Mingorance (2017), and Fernandez (2019) state that it is necessary to incorporate technologies into teacher/tutor mediation and incorporated them to face-to-face methodologies as part of teachers' training, since without a teacher to properly use ICT the road can be curtailed. Faundez (2016) also emphasizes the use of reverse classroom, its results were reflected in improved student grades, a great indicator of success.

According to Fernandez (2017), the use of reverse classroom and gamification attained full results in the laboratory, this allowed making changes in the form of the education and incorporating quality into education.

Fuentes (2016), Suelves (2018), and Curto (2019) mention that play is necessary to develop the material, as well as to encourage dialog between actors in the classroom (Trujillo, Velandia, Quiroz, Malangon, Duarte, & Rubio, 2019), with the implementation of the Kahoot learning platform. Development of play fosters new ways of learning in the classroom (Alba, 2015).

For Vega (2015), learning is based on competences that can be contributed by the platform and on how the use of VLOs. may drive major changes in how to study and how to teach. And for Moreira (2018), each different methodological scenario evinces the need to change and innovate with the aim of guaranteeing educational quality.

Other prominent authors are Diaz (2010), Roig-Vila (2016), Maquilon (2017), and Moreno (2018), who discuss how interaction with new technologies, such as augmented reality, may generate a more dynamic teaching process, aided by ICT. For instance, actions channeling the use of video games in classrooms, with innovation and always verifying the quality of education, as affirmed by Del Moral (2015), and Marin (2016).

Among innovation spaces, the virtual classroom represents an essential part of the new way of educating a society that lacks time, and in some cases, resources, which urgently needs the quality factor, which in turn demands continuous improvement to guarantee the content being the same; the thing that changes is the teacher or tutor's perspective, emphasizing on the use of assertive and creative inclusive language.

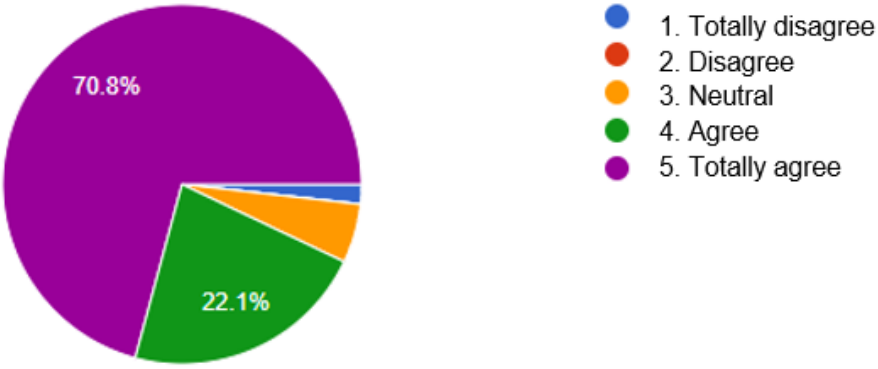
> In education, it is necessary to take an important qualitative leap in terms of equity and quality in different levels of the system; it is important to keep in mind that this implies addressing the dimension of governance of the system itself and its articulation with the other sectors, applying approaches in multiple sectors. (UN, 2018, pag.15)

The aforementioned includes actions by higher education institutions concerning the design of quality and innovation policies.

Many documents have been found covering the topic of methods and didactic methods, including play, reverse classroom and video games, this also includes the use of new platforms and the incorporation of students and tutors in quality virtual education; in terms of the experience with the virtual international business program, based on observation and more interaction through assertive communication, it achieved spaces of growth and gratitude by students and the feeling of a job well done, as well as a fulfilled tutor/teacher mission.

The creation of the ECOLAB economics laboratory intends to continuously incorporate these dynamics and methodologies aimed at quality, and to establish a significant contribution to students of international business in the country; the laboratory, which is both virtual and face-to-face, offers the options of innovative education while sustaining consistency with educational quality.

With over 80% of the sample shows satisfaction and changes in their lives, the tutor's role becomes more and more interesting and its responsibility is enhanced, this entails updates and opening the mind to change the chip towards modern education.



Graph8

Evidently, more educational innovation models are required, but these need to head toward quality, both of students and of tutors, and to be reflected in the State tests and on competitiveness in the international market. As Martinez (2017) indicates, university quality standards depend on the degree of innovation and application of tutor's quality and of an assertive learning process (Ramirez-Triana, Pineda-Escobar, Cano-Niño, & Mora-Pardo, 2020).

Education in Colombia has changed as consequence of the peace process. New communities are making an incursion into education, and these type of strategies can change the way of teaching, of approaching the community and substantially improve a region's education, leading the country to peace with education.

Educational inclusion is not just about transmitting knowledge and data, it is about valuing and identifying people in different economic, emotional and cultural contexts; war has left behind not only death and devastation, but emotional wounds, which can only be changed through inclusive, quality and warm education.

Institutions, especially Politecnico Grancolombiano, have to commit and contribute with education's quality and coverage, taking into account adaptability and respect for our country (Florez-Trujillo, 2019).

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