Virtual classroom to manage degree projects as a digital transformation strategy

Aula virtual para gestión de trabajos de grado como estrategia de transformación digital

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Abstract

In the CONPES report (2019) the national policy for digital transformation and artificial intelligence was socialized, which aims to promote the generation of social and economic value in the country. The main objective of this project was to implement a virtual classroom for the management of degree projects of the Business Administration Program of a University in Colombia in order to manage and control the deliverables submission activities. For the implementation of the virtual classroom, the support of research methodology and disciplinary professors was required. The consultancies in the professional field were guided by professors specialized in ICT, through the use of virtual tools such as Moodle. In conclusion, the implementation helped develop new skills and generate spaces both in experience and in innovation in terms of collective work within the Administration Program.

Key words: *Virtual learning, applied research, Information processing, Information sciences, digital transformation.*

Resumen

En el informe CONPES (2019), se socializó la política nacional para la transformación digital e inteligencia artificial, la cual pretende potenciar la generación de valor social y económico en el país. Con base en lo anterior, el objetivo principal del proyecto fue implementar un aula virtual para gestión de trabajos de grado del programa de Administración de Empresas de una universidad en Colombia con el fin de manejar y controlar las actividades de envío de los entregables del proyecto. Para la implementación del aula virtual se requirió del apoyo de docentes de metodología de la investigación y docentes disciplinares. Las asesorías en el campo profesional, fueron

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orientadas por docentes especialistas en las TIC, a través del uso de herramientas virtuales como Moodle. En conclusión, la implementación ayudó a desarrollar nuevas competencias y generar espacios tanto en experiencia como en innovación en cuanto al trabajo colectivo al interior del Programa de Administración.

Palabras clave: aprendizaje en línea, investigación aplicada, procesamiento de la información, ciencias de la información, transformación digital.

1. Introduction

The National Council for Economic and Social Policy (Conpes, 2019), approved the Colombian National Policy for Digital Transformation and Artificial Intelligence in order to increase the generation of social and economic value through the implementation of innovative digital technologies to be used both in the both public and private economic sectors. On the other hand, the covid-19 pandemic practically forced schools and universities to close their doors, impacting an unprecedented number of students globally (Unesco, 2020), which has accelerated digital transformation, placing it on top of the priority lists of educational institutions.

Over the past decade, pedagogical practices in higher education have undergone a significant move toward student-centered and community-established modes of learning (Rovai & Jordan, 2004). Online educational technologies have changed the classroom in blended-learning and online learning environments, with higher education teaching consisting primarily of online lectures, interactions and activities (Phillips, Maor, Preston, & Cumming-Potvin, 2012).

This study focuses on Moodle. Moodle is an open source Learning Management System (LMS) that allows educators to create an online environment to support teaching and learning activities. LMSs are features such as file uploads, discussion forums, assignment submission functions, calendar entries and grading options. One commonality shared by LMSs is that they are organized in a course-based mode, and linked with course enrollment (Deng & Tavares, 2013).

The university of this study, considering that the use of New Information and Communication Technology in teaching-learning processes are enriching and innovative experiences, which are also important in the digital transformation journey, implemented at the beginning of the second academic term of 2011, a Virtual Classroom on Moodle. This Moodle Virtual Classroom became an educational tool, offering a virtual course for, consulting, developing and tutoring graduation projects, in order to guide students of the Business Administration programs who were taking Graduation Seminar and Degree Project courses.

From the previous approaches, the following question arises: How to Implement a Virtual Classroom for the management of degree projects of the Business Administration Program of a University in Colombia fostering the digital transformation journey for this process?

Through the implementation of a Virtual Classroom for the management of the degree projects of the Business Administration Program of a University in Colombia, as a digital transformation strategy, it will be possible to integrate the activities of a team of professors around the tutoring of research projects that are being formulated and developed by the students.

Therefore, the main objective of the project was to implement a virtual classroom for the management of

degree projects of the Business Administration Program of a University in Colombia as a digital transformation strategy.

2. Theoretical foundations

Through the implementation of virtual tools in the degree work management processes, these processes can be streamlined at the same time as the reception of research-related documents is organized. The research carried out by Jenaro-Río, Castaño-Calle, Martín-Pastor, *et al.,* (2018) entitled "Academic performance in higher education and its association with active participation in the Moodle platform", can be referenced, which analyzes the association between the amount and type of access to the Moodle platform in a Degree Work course in the Psychology Program and the academics results of all students who are enrolled in it.

Similarly, the research carried out by Vanina (2021) entitled "An experience of B-Learning (BL) through a virtual classroom (Moodle): The case of the career "Bachelor of Marketing" at a private Argentine university can be referenced. The cited study invites to reflect on how technologies impact learning models, transforming the teaching-learning processes in universities for both professors and students.

The Implementation of the virtual classroom for the management of the degree projects of the Business Administration Program of a University in Colombia, allows to carry out a systematic process of registration of students enrolled in the course, which as an added value of the research carried out by Jenaro- Río, Castaño-Calle, Martín-Pastor, *et al*. (2018), implemented evaluation questionnaires to be answered by the students to know their appreciation about the procedure that was carried out in the management process and their perception related to the tutors assigned and also their perception regarding the jury assigned.

Parallel with the research carried out by Vanina (2021), it also seeks to transform the teaching-learning processes and in this opportunity, the implementation as an added value allows interaction between several professors in order to carry out interdisciplinary work.

This study is of great practical implication since it allows to transform the learning environments by creating virtual ones mediated by ICT, allowing tutorials to be carried out by several professors who have been previously assigned. On the other hand, the jury assigned for the evaluation may also have access to the documentation in a digital form, reducing the use of paper, since no hard copies of the degree projects are required.

The first phase of the implementation was carried out in 2013. Nowadays, due to the covid-19 Pandemic, its use has been optimized and it has been accompanied by Google forms for the evaluation carried out. Each jury is sent a to fill out the form. Once the form is filled out, it is possible to download the results into a spreadsheet. The data gathered will be taken into an account for other results on the digital transformation impact. For synchronous type encounters, the use of the Teams tool for the students' project defense sessions has also become widespread.

2.1 Educational Component

With the growing recognition of learning as an active and social activity, the notion of learning communities has become increasingly prevalent in schools at all levels (Deng & Tavares, 2013). Innovation in education seeks a constant and intentional transformation, which is still the very end of education. Education has to be transformed to adjust to a context that is changeable by nature in order to achieve better results (García-Peñalvo, 2020, p.138).

Professor training models implemented in higher education might be modified according to the recent approaches of the knowledge society (Padierna, 2016), since, at the level of professor training, professors are asked to innovate in their pedagogical practice and transform the learning processes in their students, but unfortunately they are not given the necessary tools to develop the activities and be able to achieve the established indicators (Salazar-Gómez & Tobón, 2018,

p. 18).

Professor training institutions will have to choose between assuming a leadership role in the transformation of education, breaking all paradigms, or falling behind on the path of incessant technological change (Piñas, Ávalos & Ávalos, 2017, p. 939). This is how educational innovation, which comes accompanied by a great media effervescence, appears as the lever of the reforms that will make it possible to overcome the limitations of the training programs offered by most schools, institutes and universities today (Solé Blanch, 2020, p. 103).

2.2 ICT Component

The academic literature points out that education in this century presents an unprecedented turnaround, Information and Communication Technologies (ICT) offer various possibilities to educational processes that require higher education institutions to be at the height of the new socio-digital contexts (Bañuelos Márquez, 2020, p. 70).

The progress of the Internet and its applications determined an intensification of the role of computer-based instruments in the learning process (Oproiu, 2015). The use of Information and Communication Technologies in the teaching-learning process is transforming the way in which teaching is carried out in higher education (Espinosa, Betancur & Aranzazu, 2014).

E-learning is increasingly widespread in the educational world by taking advantage of information, computing and telecommunication technology, together with a wide range of electronic multimedia uses (Caputi & Garrido, 2015). Conceptually, E-learning has many definitions: on-line training, on-line courses, virtual learning, telelearning, distance learning, virtual campus, etc. In this study we will refer to it as the method of learning based on electronic media (Trombley & Lee, 2002).

2.3 Virtual Classroom

Current education, framed in the knowledge society, has allowed administrative, educational and academic aspects to evolve. This evolution has led to call for re-routing in educational institutions, professors and, in general, all those significant advancements in technological development. It is proposed that this innovative process has as its reference axis, informational and digital skills, intended to prepare the future administrator to be an autonomous agent, critical of the culture of the XXI century, culture that is distinguished by the function of the skills to access information, the expression and dissemination of knowledge. This leads to a deep look of the new conceptions of knowledge and the value that Information and Communication Technology may have on their work (Unigarro, 2004).

In fact, universities are forced to change their teaching processes in order to stay competitive. The advent of information technologies to universities has improved the teaching–learning process. Students can increase their learning skills using information technology (Escobar & Monge, 2012). For those reasons, professors should lead change processes in the different ways they approach and develop their courses. The emergence and implementation of ICT in teaching has had and has a major impact in teaching methods, resulting in what is now known as e-learning (Pérez & Arratia, 2009). As well, new technologies (the Internet, in particular) provide faculty members with the tools for teaching–learning, including the web-based applications known as e-learning platforms (Kaminski, 2005). E-learning platforms have transformed the ways professors teach and students learn (Fillion, Limayem, Laferrière, & Mantha, 2007).

The virtual classroom under study was implemented using the open source platform Moodle. Moodle and other virtual teaching platforms have bolstered the ability and motivation of universities to support distance learning (Arteaga & Duarte, 2010). Moodle is a virtual education system, and a course management system that helps educators create online learning communities. This type of technology platform is also known as LMS (Learning Management System) (Rice & Smith, 2011). Moodle was created by

Martín Dougiamas, a WebCT administrator. Its design is based on collaborative learning, in which the professor creates a student-focused environment that helps students build up knowledge based on their own knowledge and skills, instead of simply posting and sending them information that they are supposed to learn (Arteaga & Duarte, 2010). This open source platform allows the design of virtual learning that energizes and enriches the developed content today, as they interact in the teaching-learning process breaking traditional education paradigms. Moreover, in the online teaching and learning process, students develop and acquire theoretical knowledge and practical skills or tools using those technologies that enable communication through networks (Blásquez & Alonso, 2012).

Most of the undergraduate Business Administration programs require an obligatory degree project to be developed by students at the last year of study. This paper describes the implementation of a virtual classroom to manage the degree projects of the students of Business Administration programs of a university in Cartagena, Colombia. Each student is required to develop a project and write a research report during the ninth and tenth semester of study. Students of ninth semester who take a Degree Seminar course, prepare and present a degree project proposal to be developed either individual or in groups of two or three students. If the proposal is accepted, the research coordinator will assign a methodological tutor and a disciplinary tutor for each project. During the tenth semester, students take a degree Project course. During this course, students develop their project with the advice of the methodological tutor and the disciplinary tutor. The tutors must assist and guide the students through all the phases of the process in order for the students to complete the degree project. To follow up the project, this process demands a continue interaction and communication among: the students and their tutors, the two assigned tutors, the tutors and the students, the students and the research coordinator, the research coordinator and the tutors. At the end of the tenth semester, the designated assessment committee evaluates and grades the students' degree projects according to the paper the students present and how they defend their work. Managing these degree projects post a challenge for all the participants. The objective of this project is to implement a virtual classroom to manage these graduation projects, joining all the participants and facilitating the interaction among them.

3. Materials and method

An exploratory project was developed using synchronous and asynchronous methods of virtual education. In synchronous methods, the virtual platform is used to support classroom teaching-learning process. In asynchronous methods using the virtual platform in completely different stages of place and time.

First, the software requirements were obtained: The institution must have a virtual education platform installed either on its own servers or in cloud hosting.

Second, verify that both professors and students have an email account, which can be either personal or institutional. However, an institutional email account is recommended to be able to take full advantage of the tools that are not available on free access platforms.

Third, training on the different platforms that will be used in the development of both synchronous and synchronous activities must be offered for professors and students as well.

Fourth, a google form with the project defense evaluation rubric was designed. This form will allow jurors to carry out the evaluations in real time and tabulate the results of the students' project defense sessions.

Fifth, book a video camera in the audiovisual department to record the students' project defense sessions as evidence. During the covid-19 pandemic, recordings are being made through the saving option offered by the videoconferencing tool used (Teams).

And finally, a satisfaction survey was designed and applied to measure the degree of students' acceptance related to the degree work procedure.

4. Results

4.1 Graduation Options

A portfolio of degree options and types of projects was developed, so that students would choose, as shown in Figure 1:

Figure 1. Graduation Options. Source: 2020 Graduation Project Coordination Management Report.

In order to implement this process at the university, a previous research project was developed, which result was a virtual scenario to manage Business Administration students' degree projects, where documents related to management, guides for drafting and presentation of Projects, guidelines and evaluation rubrics were hosted.

4.2 Virtual Platform Environment

The platform with the virtual environment is shown is Figure 2.

Figure 2. Virtual Platform Environment. Source: University´s Virtual Classroom

Tutors and students access this environment during the research process since it allows both, methodological and disciplinary tutors, to access the different projects submitted by students.

4.3 Project defense platform

Figure 3 shows the synchronous meetings of the methodological and disciplinary tutors, professors who are juries, the coordinator of the degree work process and the administrative staff of the program that takes place. The projects defense meetings are recorded and become part of a repository which will allow subsequent consultations to continue with the study or formulate new ones based on them.

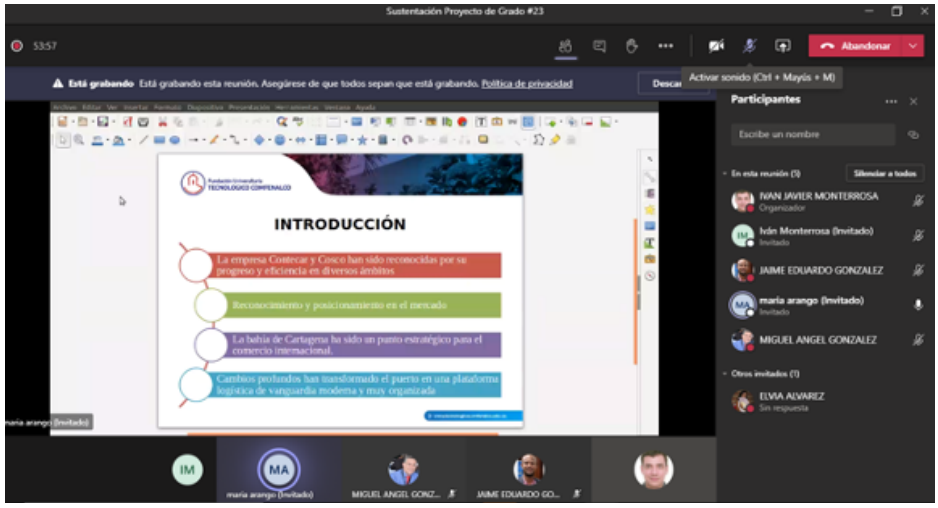

Figure 3. Project defense platform. Source: Elaborated using Microsoft Teams.

4.4 Project Defense Rubric

As it can be seen in Figure 4, the instrument used for the evaluation of the project defense sessions was elaborated using Google Forms. This tool allows juries to complete the rubrics in a remote and simultaneous way. Besides, results are obtained immediately, which streamlines the processes, which are also carry out in a transparent way. Juries are also able to provide feedback efficiently.

Figure 4. Project Defense Rubric. Source: Elaborated using Google forms.

Since its implementation in 2012, the following statistics have been recorded (Table 1):

Table 1.
Source: 2011-2020 Degree Project Coordination Management Report

Year	Members	N° of methodological tutors involved in degree projects	N° of disciplinary tutors involved in draft	N° of jurors assigned	N° of students in Degree Project courses
2012	2	4	8	6	156
2013	1	7	8	5	105
2013	2	6	15	16	133
2014	1	3	15	14	119
2014	2	3	23	21	118
2015	1	4	19	21	92
2015	2	4	23	25	109
2016	1	4	20	25	108
2016	2	5	26	24	146
2017	1	5	26	22	154
2017	2	6	28	23	198
2018	1	5	26	14	141
2018	2	5	26	12	142
2019	1	5	5	6	43
2019	2	4	11	11	82
2020	1	4	8	8	71
2020	2	5	10	11	104

The following statistics have been recorded from degree projects presented since 2011 (Table 2):

Table 2.
Total per year. Source: 2011-2020 Degree Project Coordination Management Report

Year	Totals
2011	45
2012	56
2013	65
2014	69
2015	93
2016	98
2017	148
2018	128
2019	54
2020	69
Totals	**825**

Statistics related to project students' choices are shown in Table 3:

Table 3.
Total per option. Source: 2011-2020 Degree Project Coordination Management Report

Type	Totals
Business plan	153
Strategic diagnosis	353
Others	136
Academic route	70
Case studies	113
Totals	**825**

Related to the platform administrative aspects, it shows the students' assessment of the virtual face-to-face project defense processes:

- Attendance of disciplinary and methodological tutors to the degree projects defense

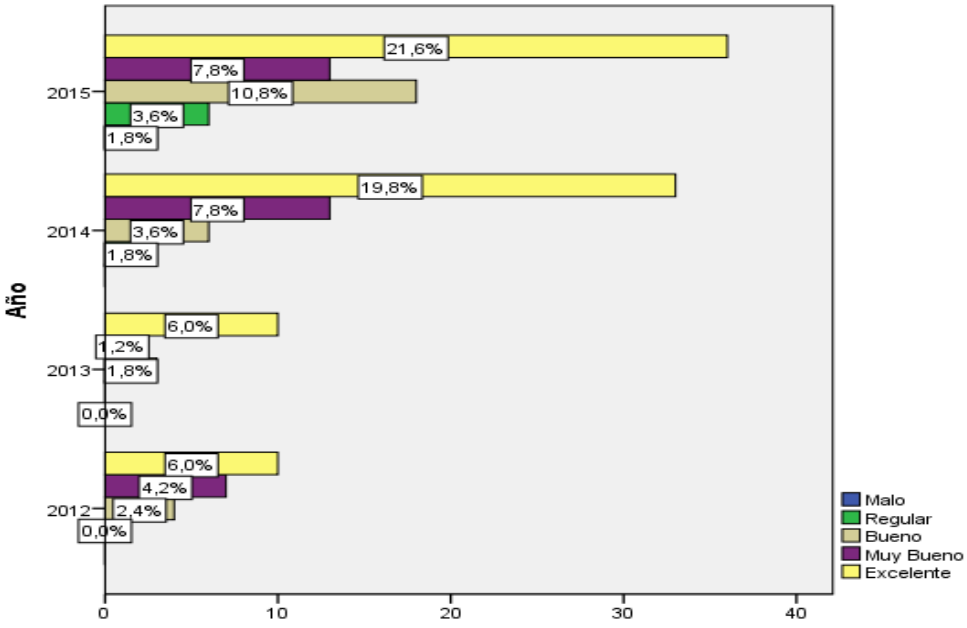

Figure 5. Attendance of disciplinary and methodological tutors to degree projects defense.

Source: Surveys answers by students from 2011 to 2015.

As it is shown in Figure 5, most students consider the attendance of disciplinary and methodological tutors to degree projects defense Excellent, indicating the level of acceptance of this pedagogical tool by the students.

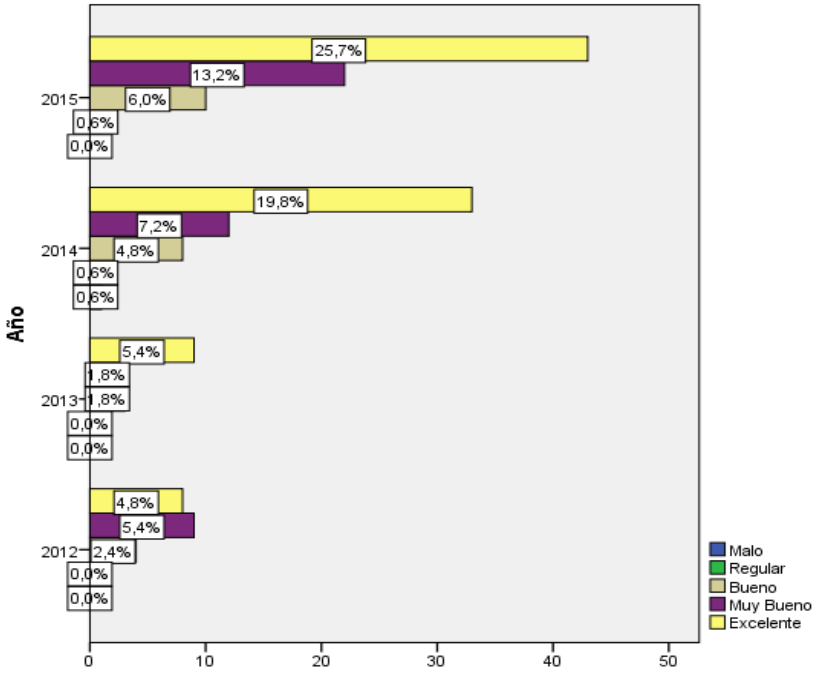

Figure 6. Defense jurors' interest.

Source: Surveys answers by students from 2011 to 2015.

It is shown in Figure 6 that the number of students who graded the projects defense jurors' interest variable as Excellent is greater. It indicates how this virtual tool has made some progress and has gained attendance.

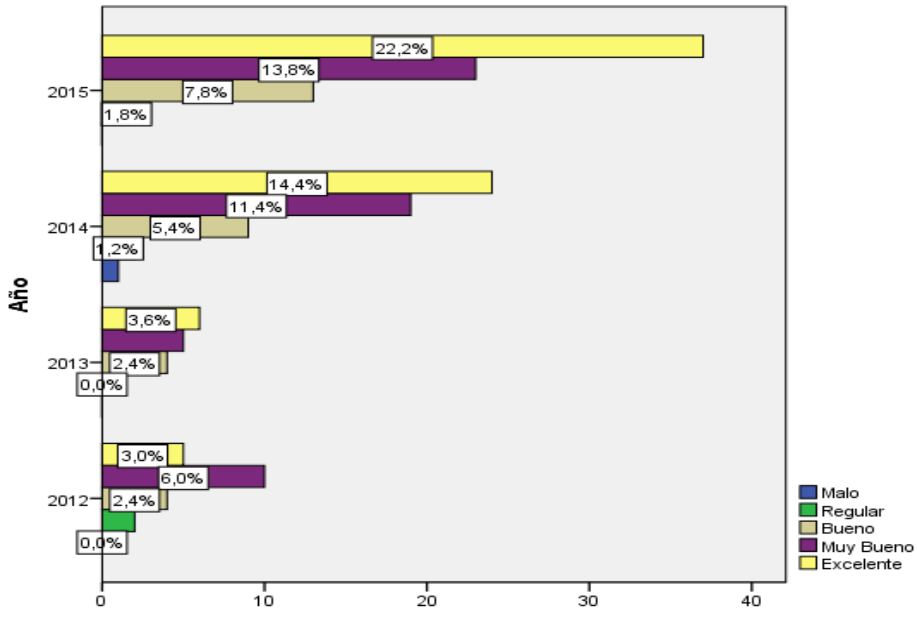

Figure 7. Questions objectivity. Source: Surveys answered by students from 2011 to 2015.

Related to questions objectivity. It is shown a 22, 2% increase in 2015 in comparison to 2014 (See Fig.7).

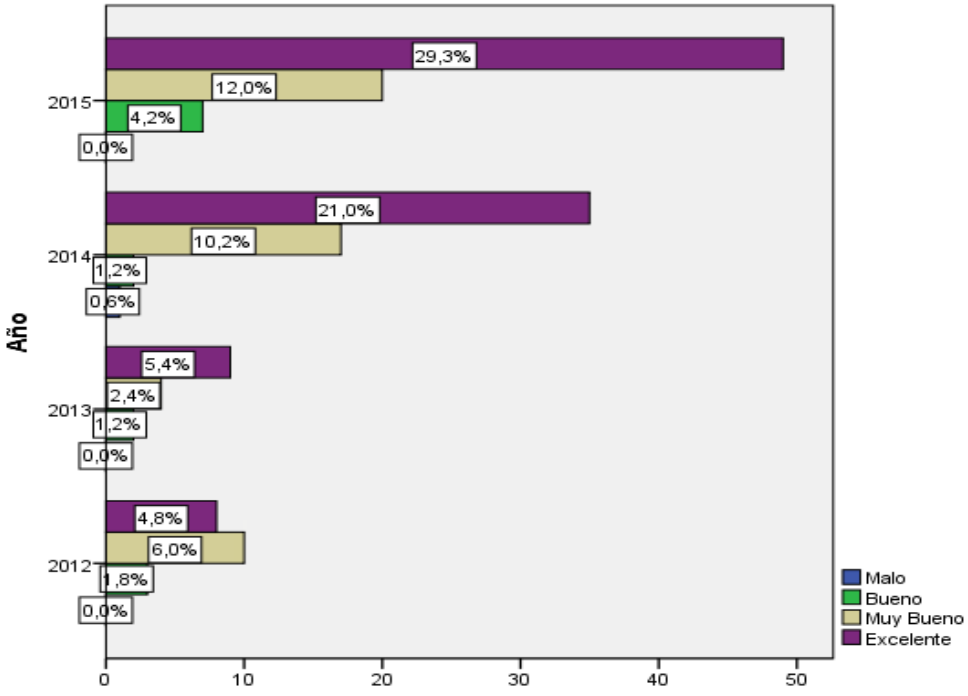

Figure 8. Coherence between academic training and degree project. Source: Surveys answered by students from 2011 to 2015.

It is shown in Fig. 8, that the coherence between academic training and the degree project variable was graded as Excellent. This confirms how successful this tool has been for students, professors, and administrative staff.

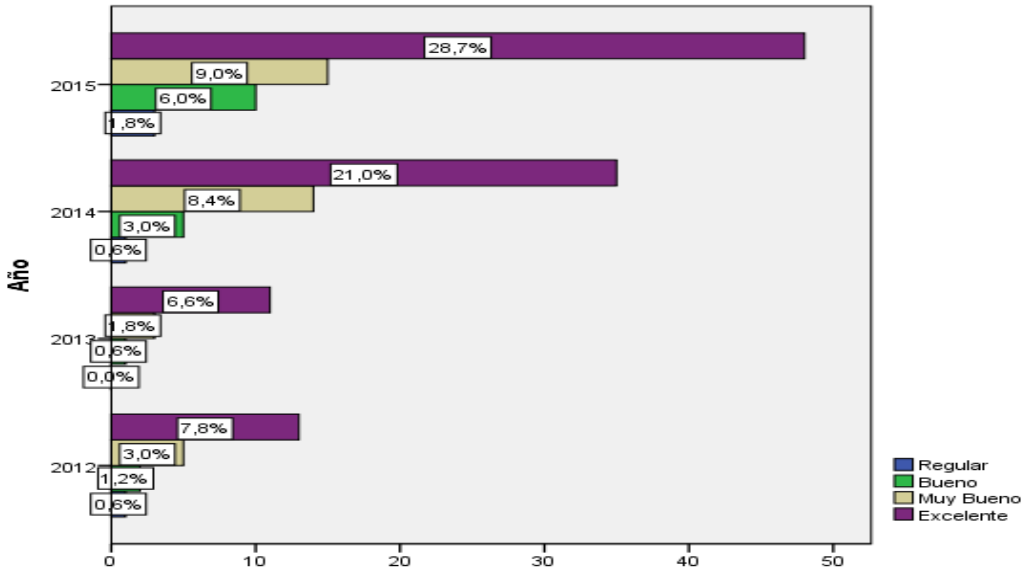

Figure 9. Tutoring.

Source: Surveys answered by students from 2011 to 2015.

It is shown in Fig.9, in relation to the Tutoring variable, that 28.7% assure that it is Excellent. This confirms that the tool has a positive impact in tutoring. Furthermore, it is possible to follow-up methodological and disciplinary tutors' tutoring according to the roles that have been assigned.

5. Conclusions

The development of this project allowed to draw the following conclusions:

The university of this study designed and implemented a virtual classroom to manage the degree projects of the Business Administration Program, which provides an educational scenario where both, professors and students, can develop their academic and research activities.

The virtual classroom to manage the degree projects facilitates interaction and communication between student and professor, where students develop several actions that facilitate the development process of their degree project. In addition to obtaining educational material, reading documents, asking questions, and discussing specific topics. This allows professors to have a better plan for their tutorials, teaching materials, bibliographies, evaluations, among others.

The virtual classroom to manage degree projects allows a greater use of educational resources by the participants since it is possible to access guidelines and documents everywhere.

The use of Information and Communication Technology to support teaching-learning processes is greater every day.

The implementation of this virtual classroom has led the degree project management process of the Business Administration Program of this university in Colombia, to the digital transformation journey, transformation required in all educational contexts

nowadays, and even more while the COVID-19 pandemic continues to keep education from face-to-face environments and places a greater emphasis on remote learning strategies and hybrid educational models, where both synchronous and asynchronous methods are used.

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