



# University Educational Experience in a Virtual Environment in Times of Covid-19

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**Abstract.** This article shows the result of the implementation of a work plan designed at PUCE, for students of the master's degree in Educational Innovation, carried out virtually. The experience takes place in the reality of the propagation of Covid-19, in the social and institutional context that determines the teaching praxis and the Ecuadorian student development. The pandemic resulted in an opportunity for the learning process of the master's students. The design of a didactic intervention was proposed to the students, based on the integrative project methodology and incorporating new educational digital tools. The designs had as a requirement the observation of a real and immediate educational reality. In this work, an analysis of the resulting integrative projects is carried out. First, the various components of the designs, the problem detected, the proposed solution and the digital tools involved are verified. It highlights that the response of the master's students to the challenge presented by the pandemic is positively evaluated, which can result in a tool for future teaching performance.

**Keywords:** Virtual Education · Didactic Intervention · Integrative Project · Covid-19

## 1 Introduction

This article shows the result of the implementation of a work plan designed at the Pontifical Catholic University of Ecuador (PUCE), for students of the master's degree in Educational Innovation. The plan is based on two needs that should and should be addressed urgently. In the first place, it is essential to incorporate the approaches and methods that, from the constructivist perspective, have proposed innovations for classroom work. Secondly, the unavoidable incorporation of advanced information and communication technologies in social dynamics means that their use cannot be postponed in the educational field.

These two points are located in the reality that took teachers and students by surprise in March 2020: the expansion of the Sars-Cov2 virus and the spread of the disease it causes: Covid-19. The pandemic meant in Ecuador, as in a large number of countries in the world, the closing of the doors of the schools, keeping open the responsibility to continue with the educational processes. In this way, the online educational modality

was imposed in a clear and inescapable way, which until that moment was under discussion, experimentation or evaluation. Suggest to novice educators, in the process of specialization, to make a crossover of the use of innovative educational models, incorporation of ICT and work in online modality was, then, the fortunate consequence for the Fundamentals of Educational Innovation subject.

Now, this opportunity for the subject does not occur in a vacuum. It is located in a social and institutional context that determines teaching praxis and student development. Resistance to transcend traditional teaching methods; lack of preparation of teachers in ICT; lack of adequate technological resources in schools; contradiction between the laws, policies and plans of the State, and their actual implementation; limitations of connectivity and internet access by a significant part of the student population; new problems and challenges arising from the urgent establishment of online education, apparently do not build a very encouraging scenario.

However, the sum of the problems in education that have been taking place in Ecuador and the challenges that arose during the pandemic, became an extraordinary opportunity in the learning process of the master's students. They were proposed to design didactic interventions, based on the Integrative Project method, using an innovative methodology or technique, to carry out online learning activities, taking into account the concrete, real reality of an Ecuadorian educational institution.

The objective of this article is to present the result of this university pedagogical experience. The integrating projects generated by the students were positively valued in the institutional framework. In this work they are analyzed in order to describe the level of integration of the three elements indicated. A verification of the components of the didactic intervention designs, the problem detected, the proposed solution and the digital tools involved is carried out. *What have been the university educational experiences of the students of the master's degree in Educational Innovation in a virtual environment in times of Covid-19 at the Pontifical Catholic University?* It is important to note that the response of the master's students to the challenge presented by the pandemic is evaluated, which can result in a tool for future teaching performance.

## 2 Development

### 2.1 Online Education and Pandemic

The incorporation of information and communication technologies (ICT) in education leads the actors of the system to precisely conceive educational paradigms in harmony with technological change. With this, the drawing of new forms of schooling becomes essential [1, 2]. Certainly, ICTs result in tools to overcome traditional teaching methods. They contribute to achieving forms of meaningful learning, such as collaborative, active and participatory. Its incorporation in the classroom compels constant technological updating and the solidification of digital skills [3, 4].

The incorporation of ICT has meant building the online or online education modality. It is a variant of the well-known distance education, implemented since the 19th century and which had and still has great importance in terms of social inclusion [5]. It offers a sector of the population the possibility of overcoming the difficulties of time and space,

since the student does not have to go to the school every day, but rather, with the materials provided, manages their learning process when and where they are available.

Online distance education also allows the overcoming of the space-time barrier, but the deployment of technologies available to it means that the possibilities are extended to all types of population, level of learning, disciplinary region. The variety of instruments, platforms, programs, applications, etc., are useful for creating virtual learning environments, synchronous or asynchronous [6]. In addition, it is also possible to work in the classroom, in the face-to-face mode, using ICT as teaching resources.

During the physical closure of schools, as a result of the spread of Covid-19, the world education system found itself with the urgent need to incorporate, improve or deepen the use of ICTs and, in some cases, assume education at distance online totally. During the pandemic, it was the option to overcome social distancing and give continuity to the teaching-learning processes. But, it was also an imposition for teachers, students, directors and family members, who were not fully prepared and had to take it on as a challenge [7].

The virtual modality blurred the line that separates the teacher's work in the institution and his domestic life; the relationship between the teacher and the students took a new turn [8]; the students went from a dynamic and established work habits to a type of learning that was established without due preparation; families were involved in pedagogical work without being instructed to do so and, in many cases, without having appropriate digital skills [7]. Dwelling a little on this panorama leads one to anticipate that the return to face-to-face attendance would be difficult and that the school system would have to face school continuity with solid tools.

In Ecuador, the Ministry of Education activated the plan We Learn Together at Home, with the aim of continuing academic activities from students' homes, and the plan Together We Learn and Take Care of ourselves, which focuses on educational continuity, school permanence and the progressive use of educational facilities [9]. These plans correspond to two phases of the State's action to attend to the education of the population during the peak period of the pandemic and in the future reincorporation in face-to-face mode.

Studies indicate some conditions in which the educational system was found and certain problems that arose in the country during the implementation of virtual classes. Institutions and even the Ministry of Education are not prepared to plan and direct online education, a large part of Ecuadorians living in rural areas where the connection is insufficient, weakness of the institutions in terms of technological equipment [10], teachers with difficulties in the use of technology or who conceive it as a complement and not as an innovation, students without training in the use of computers and other electronic devices [11], were conditions prior to the pandemic.

With the closure of schools and the implementation of online distance education, parents and representatives, who did not have to know and master the use of educational platforms, are requested, explicitly or implicitly, to participate in the school activities with their children. Additionally, there was a collapse of the platforms [12] and, in the case of disadvantaged sectors, distance education had to be incorporated with the delivery of physical materials to the students, by the educational institution [13].

The possibility of returning to physical school, given the dissolution of the pandemic, is an opportunity that Ecuador must take advantage of to strengthen the education-technology relationship. Undoubtedly, it is necessary to expand and optimize the equipment of educational institutions, in order to make maximum use of new technologies, without losing sight of the task of recovering the quality and quantity of knowledge [14]. But, alongside this, there is a responsibility to rethink the place where new technologies are placed, beyond the attractive novelty, and the place from which teachers assume perspectives around them.

First, institutions and teachers must know and consider the possibilities and limitations of students and their communities; In addition, include in the education plans purposes aimed at technological and digital literacy. But it is urgent to overcome the instrumental nature and give way to reflection on learning from innovative theories [15]. In short, the training of teachers is imposed so that, once the urgency determined by the pandemic has been overcome, the skills achieved in terms of the use of technological resources are enhanced.

## 2.2 Didactic Intervention in Pandemic

During the closure of educational institutions, the PUCE suspended attendance at regular training programs, but continued with the educational commitment and opened the possibility of continuing both the educational process of future professionals and the investigative work of their teachers. The existence of the Virtual Learning Environment was very useful for the rapid transition to the online education modality. Courses were opened for teachers in order to train them in the use of virtual classrooms, the use of technological tools and the creation of digital educational resources.

The subject Fundamentals of Educational Innovation, of the Educational Innovation master's degree, of the Faculty of Education Sciences, throughout 2020 and 2021, was taken completely at a distance, with the use of the Virtual Environment. Thus, the design, development and implementation of a pedagogical project was carried out, in order to imbue the participants in the complexity of the teaching practice, taking into account the integration of theoretical knowledge, observation of reality and experience. Individual Course participants were asked to design appropriate didactic interventions in the Ecuadorian educational context, specifically in an educational institution in Quito, the city where the master's course is held.

Two essential guidelines were indicated for the design of didactic interventions: implementation of the Integrative Project method and use and incorporation of digital tools. The students were also asked to organize themselves in groups, in order to add the practice of collaborative learning to their training, which they themselves will implement in their professional development.

The Integrative Project is a methodology based on the contributions of William Heard Kilpatrick from the first decades of the 20th century and developed by Sergio Tobón [16]. This Mexican author speaks of a Training Project to propose the integration of skills and knowledge, ethics, research and problem solving, in classroom work [17, 18]. In other words, the Integrative Project "is a didactic strategy that, based on a thematic core, seeks the convergence of various areas for problem solving, the integration of knowledge and comprehensive training" [19].

Taking into account the importance of knowing the context in which the pedagogical action takes place, the developers of the integrative projects were asked to consider the Ecuadorian educational reality, the particular educational situation in times of pandemic, the institutional dynamics and the capacities and knowledge acquired from the students for whom the didactic intervention is designed.

Subsequently, the specification of the pedagogical problem was requested, which could be intervened didactically. With the framework resulting from these previous considerations, they took on the task of devising an integrating project, using digital tools and incorporating them into the activities proposed to the students.

In total, thirty-eight students of the subject were grouped to address nine educational institutions, as can be seen in Table 1.

The nine integrating projects have the following structure:

- Description of the problem detected (causes, effects, affected)
- Description of the beneficiary population
- Description of the proposal: objectives, justification, context
- Theoretical support: pedagogical approaches, learning approaches, methodologies and work techniques in the classroom, ICT and education, concepts associated with the problem detected.
- Activities to be carried out during the didactic intervention: specific objective, detailed description of the activities, time and resources, disciplines involved

The problems detected by the authors of the integrative projects, through various instruments, can be seen in Table 2.

The didactic interventions designed had as a requirement to devise a proposal for a solution to the problem detected. Each of the proposals can be seen in Table 3.

As indicated above, one of the essential guidelines for the design of educational interventions was the use and incorporation of digital tools. Below (Table 4) is a list of the resources proposed both to be used by teachers in the design of activities and by students in their development.

### **2.3 Integration Observation, Formulation and Technology in the Didactic Intervention**

The didactic interventions the observation of a real problem of the immediate educational situation, a proposal to approach the problem and the incorporation of technologies both for the preparation of the intervention and for the use of the students to be intervened.

The first integrating project, Extra Corona 3, proposes to use the ClassDojo school communication platform, to promote a class dynamic that encourages student attention. The members of the project observed that during the pandemic there were differences between teachers and students during online classes. This has its antecedents in a problem of multiple scenarios in Ecuadorian education: the lack of skill of teachers in the use of digital tools that can contribute to the efficiency of distance education. Therefore, it highlights the convenience of designing a methodology for teachers that supports them in the virtual class dynamics in order to regain attention and create a favorable learning environment.

**Table 1.** Integrative projects, authors and institutions of the students of the subject Fundamentals of Educational Innovation (PUCE). Source: Own elaboration (2022)

	Integrative Project	Authors/Work team	Institution
1	Extra Corona 3	Andrea Padilla, Fernando Sánchez, Verónica Morales, Adriana Chico, Byron Cadena - 5 members	Unidad Educativa Particular Paul Dirac
2	Pedagogical Proposal to Strengthen Linguistic Knowledge from Gamified Environments	Adalberto Ávila González, Tomás Ayala Esteban Beltrán, Nancy Cabrera- 4 members	Unidad Educativa Fiscal Dr. José María Velasco Ibarra
3	Family educational co-responsibility through ICT	Irina Chauca, Darío Nepas, Adriana Chinlli, Fabiola Santillán - 4 members	Unidad Educativa Cardenal Spinola (Fe y Alegría)
4	Ragnarok	David Báez, Mónica Márquez, Yuliney Perdomo, Cristina Quispe, Jonathan Tafur - 5 members	Unidad Educativa Fiscal Club Árabe Ecuatoriano
5	Entered the Game of the Whole. Interdisciplinary Construction of a Transmedia Method for the Development of Attention in Tenth Year Students	Santiago Camacho, Martha Monta, Alexandra Guachamin, Lizbeth Gallegos - 4 members	Unidad Educativa YYY
6	Improving internal communication and processes with an application called Vamos a Juglar	Erika Chávez, Lidia Guaras, Ana Rodríguez, José Luis Leal - 4 members	U.E. Frau Klier
7	Ñuca Kawsay	Daniela Perugachi, Ligia Buñay, Edwin Inca, Anthony Flores - 4 members	Unidad Educativa Juan de Salinas
8	Playful Musical Workshop to Improve Language in Children	Nathaly Arequipa, Raúl Benavides, Jennifer Yáñez, Mishel Wajarai - 4 members	Centro de Educación Inicial Primero de Mayo
9	Socialization Campaign for Boys and Girls of Initial Education from the Gamification Approach	William Veloz, Adriana Ruiz, Sonia Guasumba, Mayra Jiménez - 4 members	Centro de Desarrollo Infantil Abejitas

For its part, the Pedagogical Proposal to Strengthen Linguistic Knowledge from Gamified Environments observed the strengthening of an old problem during the pandemic: students' shortcomings in the area of Language and Literature. The development of young people's language skills is slowed down by the continuity of inefficient teaching

**Table 2.** Pedagogical problems detected by the students of the subject Fundamentals of Educational Innovation (PUCE). Source: Own elaboration (2022)

	Problems
1	Within the virtual classes during the pandemic and within the I Learn at Home plan, there have been differences between teachers and students, which diverts attention and does not promote an adequate learning environment.
2	The impact of the pandemic accelerated the shortcomings in the area of Language and Literature, and the obsolete teaching methods that remain do not allow the student to develop cognitive skills.
3	Failure to deliver assignments and papers on the Classroom platform.
4	During the pandemic, teachers are unmotivated to teach virtual classes, have long working hours, are unaware of virtual environments, follow inappropriate methodologies to guide synchronous and asynchronous classes, all of which has generated a loss of authority and control.
5	Loss of attention and concentration of students due to overexposure to the abundance of distractions in the computer world, and lack of a dynamic educational methodology in the virtual classroom together with the work overload of teachers.
6	The inadequate management of communication, characterized by a lack of clarity, has a negative impact on the relationship between the members of the educational community and the deterioration of the educational environment.
7	The alienation of students from the values of other cultures and the loss of maintaining their own cultural identity.
8	Children's difficulties in phoneme pronunciation.
9	The closure of schools has a negative impact on the development of social skills, which implies that in face-to-face environments it is difficult for children to socialize, it is difficult for them to interact, some isolate themselves, do not play with others in their free time, do not share material, they do not express feelings or thoughts towards others.

methods for the current context. So proposing an innovative methodology such as gamification results in a proposal to strengthen reading comprehension, writing, vocabulary and pronunciation. Proposal that gains value during the closure of educational institutions, given that the use of digital tools, such as the platforms for teamwork Microsoft Teams and for sharing YouTube videos, the Zoom video conference application and the Google Meet video communication service, allow an efficient development of online distance education.

Third, Family Educational Co-responsibility through ICT observed that students do not punctually carry out the activities proposed to them on the Classroom platform to manage online classrooms. It is understood that the education of young people is based on co-responsibility, that is, the institution, teachers, students and parents or representatives participate in order to achieve the desirable goals. The Learn Together at Home plan implies that parents take part in their children's training activities during the pandemic, so this didactic intervention proposes training them in the use of Classroom. The intervention activities include the use of platforms to create Educaplay multimedia educational

**Table 3.** Proposals of the students of the subject Fundamentals of Educational Innovation (PUCE). Source: Own elaboration (2022)

	Proposal
1	Design a methodological proposal that enhances the dynamics of the classes to favor attention in the students, using an educational platform to carry out recreational activities.
2	Strengthen reading comprehension, writing, vocabulary and pronunciation through the use of gamified environments, in distance classes, using various digital tools.
3	Develop technological skills in parents, train them in the use of the Classroom platform, so that they accompany their children in remote learning.
4	Design an innovative and interactive workshop, with practical and simple guidelines, to teach synchronous and asynchronous virtual classes.
5	Develop a transmedia educational methodology that, through game mechanics, recovers contact, involvement and participation of students through digital media.
6	Design a plan of recreational activities with the Let's Go Juglar application, to facilitate multilevel communication and the work environment.
7	Develop a game environment to arouse interest in knowing the traditions of Ecuador.
8	Design a playful and participatory workshop.
9	Carry out a socialization and family orientation campaign to mitigate the lack of communication between boys and girls in Initial Education.

**Table 4.** Digital tools considered in the didactic interventions of the students of the subject Fundamentals of Educational Innovation (PUCE). Source: Own elaboration (2022)

	Digital tool
1	ClassDojo.
2	Teams, Zoom, Google Meet, YouTube.
3	Classroom, YouTube, Educaplay, Kahoot, Zoom, Puzzle, Teams, Google forms, Power Point, Genially, Quizizz, Pizarra interactive, Mentimeter, Nearpod, Gmail, Puzzle, Padlet.
4	Moodle, Genially-Trivial, Educaplay, Puzzel, Mentimeter, Padlet, Kizoa, Online Quiz Creator, Jamboard, Kahoot, Liveworksheets, Canva, Quizizz, Liveworksheets.
5	Power point, Social Networks, Lapbook.
6	DEMO, Social Networks.
7	Social networks, Virtual portfolio, Google drive, Pixtón, Google Drive, Virtual portfolio, Power point, Canva, Genialy, Quiziz.
8	Creation of a program or application (software), Instagram social network.
9	Canva, Mobbyt, Zoom, Factice, Mobbity.

activities, for learning based on Kahoot and Quizizz games, for Mentimeter interactive presentation, to create collaborative murals Padlet, Nearpod, Classroom, YouTube



and Teams; the program to create Power Point presentations, the tool for infographics Genially; Puzzle and Zoom apps.

The problem observed in the Ragnarok project consists of the loss of authority and control of the students, during the virtual classes. The work overload of the teachers, plus their lack of knowledge of virtual learning environments, led them to demotivation in online work, which caused, in turn, lack of control in the students. Ragnarok proposes to train teachers to carry out synchronous and asynchronous virtual classes. It takes into account that it is necessary to give practical and simple guidelines, since teacher training in the use of digital tools in education in many cases must start from scratch in Ecuador. In this way, it stands out that an innovative and interactive workshop has been designed using multiple tools: LMS Moodle platforms, to create interactive guides Liveworksheets, for graphic design Canva, Educaplay, Mentimeter, Padlet, Quizizz, Kahoot; the Genially-Trivial tool; the Kizoa and Puzzel video montage applications; Online Quiz Creator quiz software and Jamboard interactive whiteboard.

The fifth Integrative Project is Entered the Game of the Whole. Interdisciplinary Construction of a Transmedia Method for the Development of Attention. It also focuses on the problem of loss of attention and concentration of students, caused in the same way by the lack of a dynamic educational methodology in the virtual classroom, but also observes the overexposure of young people to the abundance of distractions of the computer world. So, it is necessary to train teachers in technologically innovative methodologies, but also in the control of the use of devices and information that are made available. The game mechanics are proposed to recover the contact, involvement and participation of the students, with a transmedia methodology through digital media and the use of social networks.

Another project consists of improving internal communication and processes, with an educational video application on YouTube called Vamos a Juglar<sup>1</sup>. Part of the observation of inadequate management of communication, characterized by lack of clarity, in an educational institution. This negatively affects the relationship between the members of the educational community, deteriorating the educational environment. The disagreement between the various actors in the system has a negative impact on educational processes. Facilitating multilevel communication in the school environment through a plan of recreational activities is a proposal that, if effective, will contribute to the achievement of the fundamental goal: the formation of the human being. In addition, carrying it out in a virtual environment, entering the DEMO website (domain [www.vamosajuglar.com](http://www.vamosajuglar.com)) and using social networks, results in the development of digital skills.

Ñuca Kawsay is a project that addresses an old and current social problem in Ecuador: the alienation of young people to the values of other cultures and the loss of maintaining their own cultural identity. This is a problem that contributes to discrimination and exclusion and has been taken into account by various institutions and government agencies. In addition, in the educational field, a project that points to a substantial solution is relevant: the recovery of one's own value. Ñuca Kawsay develops a gamified environment to arouse interest in the traditions of Ecuador, for which a web page is created. The

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<sup>1</sup> Translator's note: In Spanish "Jugar" means to play and "Juglar" means a minstrel. "Vamos a Juglar" means Let's Minstrel.

designed activities include the use of social networks, Google Drive file storage and synchronization service; Power Point, Canva, Genially and Quizizz, along with the Pixton comic creation tool and the virtual portfolio resource for monitoring and evaluation.

Early childhood care and education is of the highest interest in Ecuador. All aspects related to the physical, emotional and cognitive development of children is a priority occupation. Language skills are based on the early stages of the child's interaction with the world around him. The school is in charge of this interrelation when it comes to formal learning. In this way, a Musical Play Workshop to Improve Language in Children, proposed in one of the integrating projects, contributes to overcoming difficulties, detected in children, for the pronunciation of phonemes. The project launches the creation of a program or application (software) with which several elements can be filtered, such as age and phonemes, to stimulate and provoke correct pronunciation through musical games.

Finally, the Socialization Campaign for Boys and Girls in Initial Education from the Gamification Approach addresses an obvious problem derived from the social distancing measure that led to the closure of schools: socialization difficulties. Confinement has a negative impact on the development of social skills, which implies that in face-to-face environments, children's socialization is difficult, they have stumbling blocks to interact, some isolate themselves, do not play with others in their free time, do not share material, do not express feelings or thoughts towards others. Thus, the team proposes a socialization and family orientation campaign to mitigate the lack of communication between the boys and girls of Initial Education, before the imminence of returning to school. With a combination of face-to-face and online activities, that is, with the b-learning modality, and using the educational video game platforms Mobbyt and the creation of video games Factile, plus Canva and Zoom, they promote skills to overcome the main socialization problems.

Without a doubt, all the integrative projects built for didactic interventions imply the use of electronic devices, such as computers, smartphones and tablets.

### **3 Conclusion**

It is observed in the integrative projects analyzed that young teachers are committed to their profession and develop interactive pedagogical proposals, with innovative strategies, to overcome difficulties. This is a small sample that it is possible to overcome the old problems that Ecuador carries and that became more than evident in the health situation of the years 2020 and 2021.

In 2022, with the strength of the pandemic dissipating, it is time to make use of all the learning that teachers urgently acquired, certainly, but with professionalism. In the post-pandemic educational environment, it will be possible, inevitable and desirable to have the experience, the challenges, the advantages that were experienced with the online modality.

The educational experience carried out in the Fundamentals of Educational Innovation subject reached the design of the didactic intervention, with the integration of the integrative project methodology and the incorporation of new technologies. Their implementations are yet to be carried out, they can be applied in the institutions that inspired

them or in others with similar characteristics in Ecuador. On the other hand, and finally, they remain as an example and material to be used by other education professionals.

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