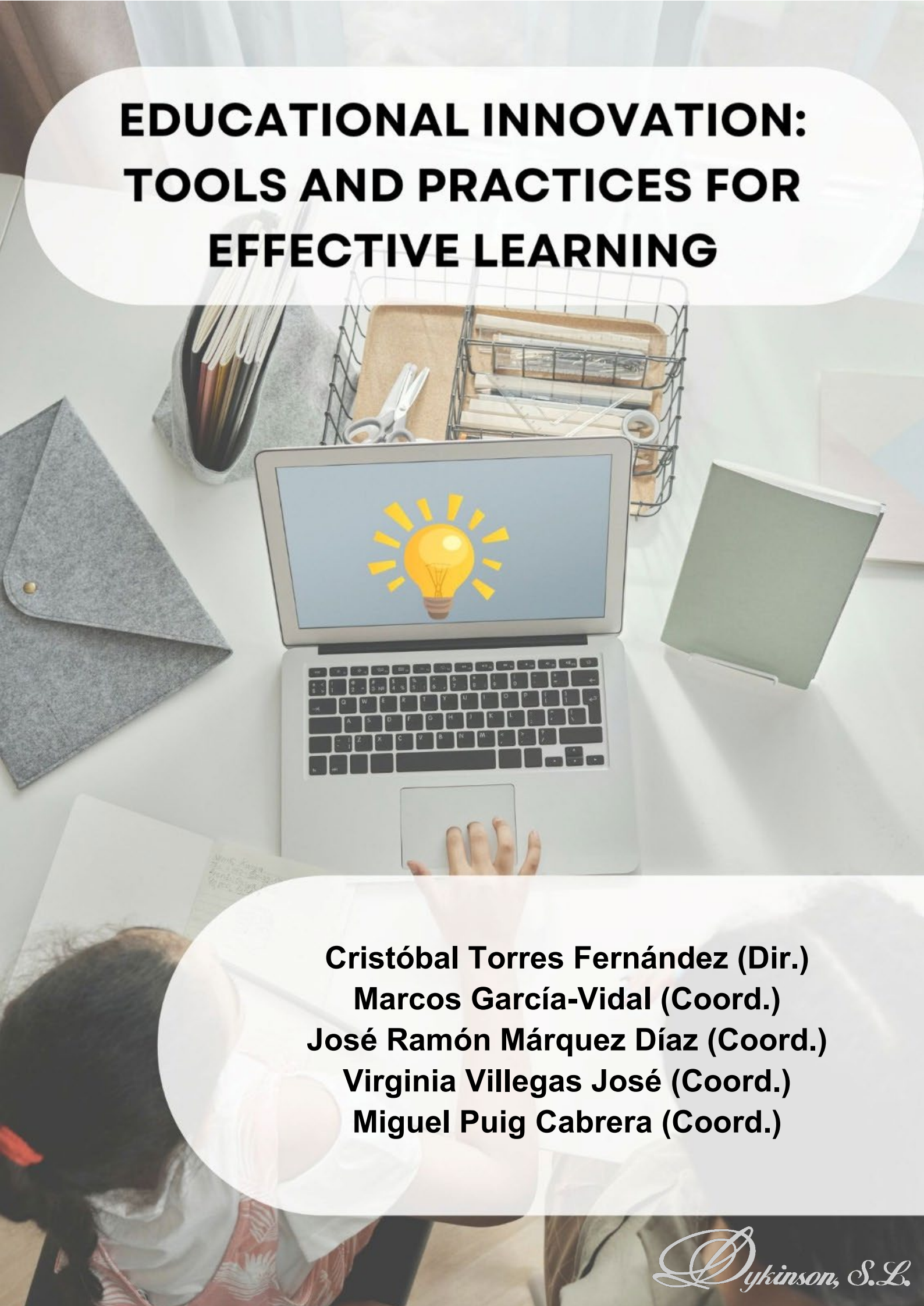
# EDUCATIONAL INNOVATION: TOOLS AND PRACTICES FOR EFFECTIVE LEARNING

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**El presente libro ha contado con el asesoramiento de profesionales en el tema objeto de estudio y ha seguido un proceso de revisión por pares ciegos antes de su publicación.**



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# Prologue

Reading *Educational Innovation: Tools and Practices for Effective Learning* evokes a sense of enthusiasm, satisfaction, and confidence in the possibility of achieving change in education through the application of theoretical, methodological, and practical tools aimed at fulfilling the goals demanded by contemporary educational contexts.

The rigorously scientific yet clear, precise, and accessible language makes this work suitable for any educator interested in transforming their professional practice. The experiences presented are valuable, engaging, and encourage replication in similar environments. The topics addressed are highly relevant and timely, stemming from the needs of teachers, researchers, and students, and aim to address their demands effectively.

One significant idea advocated by the authors is the balance between integrating technology into the teaching-learning process and achieving deep learning in students through collaboration, creativity, and inclusion, supported by an innovative and ethical approach.

The tools presented in each chapter guide not only educators but also researchers and policymakers in the ways, methods, and strategies to transform traditional teaching and construct an innovative process focused on the holistic development of students.

The practices for effective learning outlined by the authors have the distinct merit of being applied across various levels of education and in different countries, broadening the scope of their potential use by a wide range of educators internationally.

The text is thought-provoking, promoting reflection, critique, and transformation. It stimulates educational change, innovative and creative practices, and a commitment to embracing new ways of thinking and acting to meet the goals of contemporary education.

In its opening chapter, the book presents a modern perspective on badges as rewards and incentives for student motivation and creativity in digital learning environments, alongside a reflection on their effective use. The chapter also details experiences and achievements from their implementation in educational platforms like Moodle.

Subsequent chapters explore the application of innovative projects in early childhood and primary education, transforming pedagogical practice through constructivist and interdisciplinary approaches.

The book also delves into secondary education, showcasing sustainable, productive projects aimed at developing intercultural competencies in diverse contexts, such as Barcelona, Spain, and Antioquia, Colombia. Case studies conducted in these countries reveal the potential for generalizing these approaches to other cultural settings.

Furthermore, experiences in higher education highlight strategies for leveraging artificial intelligence in active, reflective, and student-centred learning environments, ensuring academic rigor, ethics, and deep learning.

The implementation of these innovative proposals constitutes a challenge worth undertaking, bringing education closer to meeting the demands not only of the contemporary world but also of the society of the future. In such a rapidly changing and ephemeral world, transformation is imperative—but it must be equipped with solid, essential, and effective tools that maintain relative stability amid ongoing technological and social evolution.

This book provides tools that strengthen the work of educators, preparing them for the challenges of continuous educational change. The team of esteemed specialists, led by Dr. Cristóbal Torres Fernández, delivers a resource that demonstrates the transformative power of innovative educational projects and strategies in student learning and development.

The importance of changes in education lies in their ability to influence the mindset and behaviour of both educators and learners, who are tasked with transforming the physical and social environments around them—ultimately contributing to changing the world. Paraphrasing Mahatma Gandhi, education cannot change the world, but it can change those who will.

This book is a significant contribution to educational transformation, and I recommend it to all educators committed to the learning and development of their students, seeking to align their practice with the demands of the 21st century.

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# Chapter 1. Badges in Moodle. Positive experiences in e-learning in post-Covid-19 times

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## I. Introduction

*"Education is not about learning facts, but about teaching the mind to think."*
*Albert Einstein*

Humanity suffered the terrible pandemic caused by the COVID-19 virus for two years, but among its sequels and legacies was the importance of online and hybrid training, based on the numerous potentialities offered by information and communication technologies (ICT) for the educational process.

Historically and up to the present day, a great deal of research has been carried out that offers innovative alternatives in this sense, at all levels of education and in different modalities (Ramos, 2004); (Vidal Ledo and del Pozo Cruz, 2006); (Espinoza-Freire, 2018); (Falcón, Suàrez, & Mendoza, 2018); (Lombillo Rivero, Nambalo Mulay-Dua, Torres Alonso, & Pérez Hernández, 2018); (Rodríguez & Padrón, 2021); (Cabero-Almenara & Palacios-Rodríguez, 2021); (Hernández, Cubillas & Padrón, 2022). These have been evolving in higher education in correspondence with the progress of Educational Sciences, from the most traditionalist to Virtual Teaching-Learning Environments (VLEE) and other advanced technologies such as virtual and augmented reality, to cite just a few examples.

Following the exceptional situation imposed by the Covid-19 pandemic, higher education in Cuba continued the training process in the distance mode from 2020 (Ministry of Higher Education, 2020b); (Correa, 2020). For this purpose, general adjustments were made to the processes of continuity and completion of studies in the academic years 2019-2020 and 2020-2021, by means of Resolutions 48 and 49 (Ministry of Higher Education, 2020a). With this, the use of Virtual Teaching-Learning Environments (VLEE) became the most demanded context for the management of the teaching-learning process (PEA, from this moment onwards). At the same time, there was an increased demand for the use of social networks, in particular Whatsapp and Telegram chats, as a complement for communication and the development of activities.

But the integration of information and communication technologies (ICT, from this moment onwards) into the PEA requires didactic transformations for the distance mode and challenges for teachers in the management of this educational process (Ministry of Higher Education, 2020a). A different didactic approach is therefore required, far removed from traditionalism and its characteristics, which demand different competences, from unlearning and relearning new conceptions, competences, methods, tools, mechanisms, techniques and instruments, to

ensuring that the student is truly the centre of the training process. In this sense, the ideas of (Morado and Ocampo, 2019) are considered appropriate, when it is recognised that it is of vital relevance in the educational field that teachers can adapt to innovations and adopt technologies in their daily practice in order to foster creative and meaningful learning in students.

In this order of ideas, the positions of the author Emilio Castañeda are defended when he refers:

Daniel Goleman in his book "Emotional Intelligence" defined the core of his work with the following sentence: "... Too often we face postmodern phenomena with an emotional repertoire adapted to the urgencies of the pleistocene. That difficulty forms the core of my work...", earlier Marshall Mcluhan had expressed: "... our age of anxiety is largely the result of trying to do today's work with yesterday's tools...". It seems appropriate to paraphrase both of them to state something different and also transcendent: "The greatest danger for education today is that we pretend to do the same thing we did yesterday, with today's tools..." (Castañeda, 2013).

These challenges, potentialities and results show the way forward; but teachers also recognise a group of dissatisfactions related to the fact that their students are not participative, proactive, critical, reflective, among other aspects. These reasons underline the need for teacher improvement and the search for answers from the didactics that is demanded today. This is especially true if the aim is really to train the student as the centre of the process, based on high levels of participation, collaboration, creativity and commitment; from the integration of all the pedagogical, didactic and advanced technological possibilities (Padrón, Bedregal-Alpaca, Rodríguez & Torres, 2022).

In this sense, the opinion of (Ocaña, 2012) is considered valuable when he states that the teaching media, didactic materials and teaching-learning activities that are planned do not always achieve the strengthening and development of important competences in this sense, do not encourage personal interest, the search for information and the construction of knowledge, and are not designed based on the training needs of the students.

Therefore, an important aspect in online training is the planning of necessary and meaningful activities that allow the achievement of the objectives with the required quality; and at the same time, that motivate students in the interest for study, the development of autonomy and integration in the group. Faced with these challenges, the aim of this article is to propose the use of badges as an important element for motivation and creativity in the online training process.

The main theoretical positions that support the didactic conception defended in relation to badges and their role in strengthening motivation and creativity are outlined.

Finally, the main results obtained in the application of the experience during Covid-19 are shown, in the distance modality, through the virtual teaching-learning environment Moodle, with 5th year students of the Computer Engineering course at Cujae; and the analysis of the value of the proposal, based on its description and the application of techniques such as the PNI and a survey of the students involved (see appendix 1).

## II. Materials and methods

The research was carried out in the context of Cuban higher education, specifically in the Technological University of Havana "José Antonio Echeverría", Cujae. The sample consists of two groups of 5th year students of Computer Engineering, with a total of 71 students. The results of the analysis correspond to the subject "Pedagogy and Didactics in Higher Education" during the academic year 2020-2021.

Theoretical and empirical methods and techniques were applied, such as documentary analysis in the review of various bibliographies. The analytical-synthetic for the determination of the theoretical references on the use of the EVEA in Higher Education and the importance of motivation. The historical-logical for the study of the badges and their actuality. The survey for the assessment of opinions on the subject, its development and impact on students. The indicators to be measured in the survey were:

**Table 1.**
*Indicators to be measured in the survey.*

| Indicator | Description | Unit of measurement |
|---|---|---|
| Objective-content | Whether the objective and the content correspond to the learning needs of the students and their professional profile. | Very suitable (5)<br>Poorly adequate (3)<br>Inadequate (2) |
| Activities | If the planned activities are organised for individual and team development | Very suitable<br>Poorly adequate<br>Inadequate |
| Methods and means | If the methods and means used motivate in distance mode | Very suitable<br>Poorly adequate<br>Inadequate |
| Forms of evaluation | Whether the forms of evaluation make it possible to verify the achievements made | Very suitable<br>Poorly adequate<br>Inadequate |
| Fulfilment of the objective | Whether the objective proposed in the course was met | Very suitable<br>Poorly adequate<br>Inadequate |
| Motivation | Whether the students felt motivated during the course | Muy adecuado<br>Poco adecuado<br>Inadecuado |
| Awards or badges | Whether the use of awards or badges motivated the development of the subject and the achievement of the results obtained | Very suitable<br>Poorly adequate<br>Inadequate |
| Utility and application | Whether the students found the course useful for their professional application | Very suitable<br>Poorly adequate<br>Inadequate |

Source: own elaboration.

For the collection of data and images, the Moodle platform was used in its version 3.10.1. The articles, theses, technical and methodological reports, projects and other bibliographic materials were obtained from institutional repositories (CREA, Cujae); as well as academic and scientific databases (Google Scholar, Sicielo, ERIC, ELSEVIER). The data analysis and tabulation of results are supported by EndNote X9 and Excel 2016 software.

## II. Theoretical Framework

Achieving motivation and creativity in the online teaching-learning process also requires teachers to propose activities that enable a proactive and conscious attitude of enquiry and search for solutions and new knowledge. In this way, learning implicitly involves the integration of the purpose of students acquiring knowledge and developing their intellect, to the extent that they are taught to think, express their ideas, reflect, argue and value what they learn, and can thus operate with knowledge towards new and higher levels of demand that stimulate their development (Baquerizo, Márquez, & Tobar, 2020).

### 2.1. What are digital badges?

They are electronic symbols for documenting performance (Carey and Stefaniak, 2018). In the educational context they are understood as an image or icon that is used to represent skills and other educational achievements, usually in a more detailed way when compared to diplomas, academic degrees or other certification methods (Bowen and Thomas, 2014). It is recently gaining notoriety in education as a tool to promote student engagement, motivation, participation and academic achievement (Facey-Shaw, Specht, Van Rosmalen, Brner, & Bartley-Bryan, 2017).

A digital badge usually consists of a visual representation of the achievement, but also contains metadata about the requirements for the achievement, evidence of the work done by the badge recipient, and information about the person, organisation or entity issuing the badge (Bixler and Layng, 2013).

Specifically in the context of the ASP, the use of digital badges fulfils two functions:

1- To exercise as positive reinforcement for a set of determined actions, carried out by students, which are considered beneficial, exceptional, or in a general way oriented towards the fulfilment of the course objectives.

2- To act as a formal way of certifying one or more of the following criteria:

a) The student belongs to a given group.

b) The learner has fulfilled a set of determined objectives.

c) The student has performed some meritorious action that distinguishes him/her.

d) The issuing institution attests that the student demonstrates the development of competences in a given area.

### 2.2. Advantages and potentials of the use of digital badges in HEIs

Historically, the diploma awarded by universities to their graduates is understood as evidence of the subject's authority and competence in an area of knowledge and the disciplines associated with it. However, nowadays, thanks to ICT, the proliferation of online courses and all the opportunities for distance learning provided by more and more prestigious institutions, it is common for a student to receive their training through a variety of sources using digital badges as a form of accreditation of competence development.

In this regard, (Carey and Stefaniak, 2018) state that as more employers assume such badges as truthful evidence of competence development, university degrees lose value. However, the use of digital badges does not contradict the social function of universities as they can also benefit from their use.

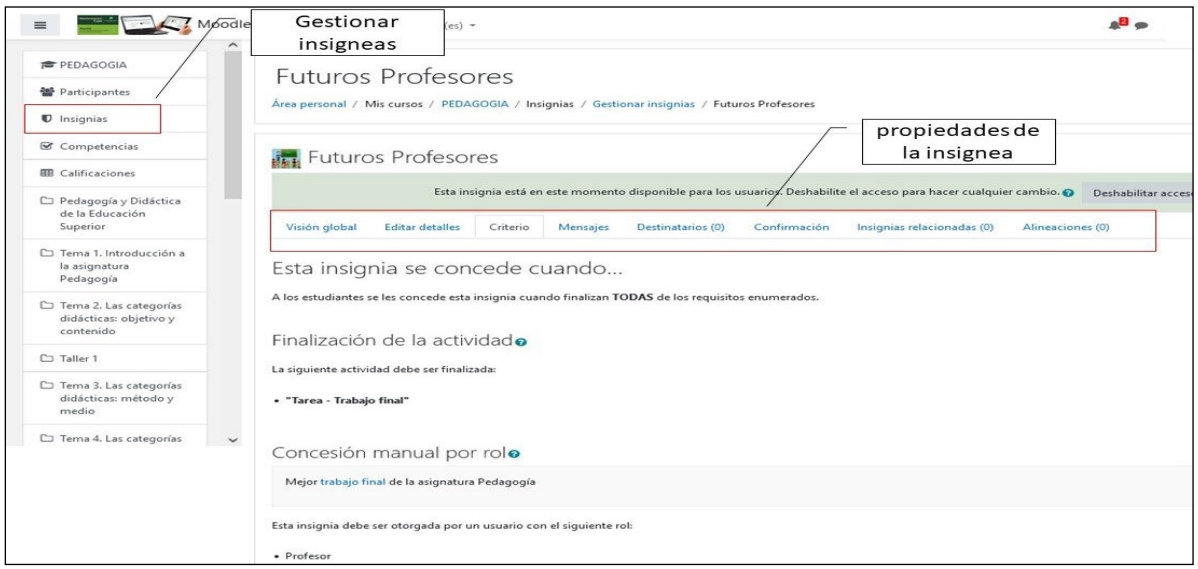
According to (Bixler and Layng, 2013), digital badges can contribute to providing more personalized support as they allow teachers or the institution to better understand the status of students and their level of development. In addition, they enable the accreditation of competences by evidencing the learning pathway followed by the student, as well as the achievements or milestones reached during their OEP.

Thanks to the visibility of badges and their social character in the digital sphere, they can help to promote a university, its professionals and the courses it offers, and to establish commercial and scientific collaboration links with potential employers. Moreover, they are associated with added value thanks to their function as a motivational mechanism as they signal belonging to a certain group and highlight achievements and skills obtained, being sources of motivation for study, participation in activities and skills development (Bixler and Layng, 2013).

## III. Discussion of the results

To design a badge in Moodle, you must have previously created a course on the platform. In the main menu, located in the left column, there is a badges icon that must be selected to create a new one or manage existing ones and define the properties for its configuration, according to the particularities and purpose of its use in the course (see figure 1).

**Figure 1.**
*Design and configuration of a Moodle badge.*




Source: own elaboration.

It is suggested that you plan in advance the types of badges you want to win and which activities. Identify the name, the image that represents it, the activity to which it is associated, the condition for awarding it, the roles of those who are going to assign it, the notification

message to students, among other indicators that are considered necessary. The following sections detail the correspondence between the planned activities and the badges designed in the EVEA.

One of the subjects in the curriculum of Engineering degrees in the country is "Pedagogy", which has evolved to become in some degrees "Pedagogy, ICT and Information and Communication Management (ICTM)" in Cujae. For example, in Civil Engineering, which also has its basic textbook written by the engineer and Dr. in Technical and Pedagogical Sciences Ángel Emilio Castañeda Hevia, entitled: Pedagogy, Digital Technologies and Information and Knowledge Management in Engineering Education. Havana: Félix Varela, (2013).

However, as these subjects are of a more social nature and are taught in the final years of the degree course, they require higher levels of motivation and creativity in order to involve students and achieve a developmental and participative PE, where truly significant and autonomous learning takes place, and which develops important competences for all engineers during their professional and personal lives.

The proposed experience is being developed in the Computer Engineering degree course at Cujae, through the subject "Pedagogy and Didactics in Higher Education", which is taught in the 5th year. In this case, with an enrolment of 71 students in two study groups, during the academic year 2020-2021.

The subject is taught this year in distance mode from the Moodle platform and is also supported by social networks, creating a WhatsApp group with students and the teacher. Among other aspects, teamwork is promoted, for which 11 work teams were organized, five in group 1 and six in group 2, comprising between six and seven students per team. Four activities were organized in which the awarding of badges was planned as a motivating element.

**Table 2.**
*Sequence of activities in the subject "Pedagogy and Didactics in Higher Education" for which the awarding of badges was planned.*

| Activities | Organisational form / Means | Types of badge |
|---|---|---|
| **Workshop 1**. Orientations. Teamwork. Objective: To elaborate the objective of a teaching activity and the content, for the improvement of their thesis, through cooperative teamwork. | Workshop Discussion of doubts in Moodle Forums and WhatsApp groups | **Traditional team**: if they correctly developed the objective (4 structured components) and identified the content of the teaching activity. **Star team**: if they correctly elaborated two objectives with their content. **Atomic team**: if they briefly described the teaching activity and correctly elaborated more than two objectives with their content. |
| **Workshop 2**. Orientations. Team work. Role-playing. Objective: To plan a teaching activity taking into account its structure and components for collective and individual evaluation, through collaboration in teams and creativity. | Workshop 2 Discussion on Moodle Forums and WhatsApp groups | **"Student Assistants".** This badge is awarded to the teams that best perform the co-evaluation of another team in the role of evaluators, taking into account the components in the planning of a teaching activity and the indicators offered by the teacher for the evaluation of the teams. |

| | | |
|---|---|---|
| **Theme 6**. Film debate. Individual homework. Opinions in Forum. Objective: To evaluate the film in its relation to the subject and to their personal experiences in the development of their career in order to improve their training process. | Discussion Moodle Forums and WhatsApp groups | **"Best Film Debate »** This badge is awarded individually to students who carry out a reflective analysis of the oriented film, and its relation to the subject (analysis of the components of the teaching-learning process reflected in the film). Comparison with their personal experiences in the development of their career. |
| **Final evaluation**. Team work Objective: To present the design of a teaching activity, based on the work in the workshops for the improvement of their thesis, through collaboration and constructive criticism. | Evaluation workshop | **"Future Teachers"** This badge is awarded to the teams that have best designed their teaching activity, based on the structure and components given in classes, integrating the results of the previous workshops, according to their thesis topics and with creativity. |

Source: own elaboration.

### 3.1. Results of the activity Workshop 1

The submitted work is assessed by the teacher on the platform. Of the total number of teams (11), three traditional badges, five stars and one atomic badge were awarded. Once the objective has been met, the teacher makes the badges public, assigns them to the teams and the system automatically notifies the students in each team. It is important to note that not all the teams obtained badges, as those who handed in the task with errors that implied grades of 3 and 4 points did not comply with the indicators (two teams).

### 3.2. Results of the activity Workshop 2

For this activity a badge called "Student Helpers" was designed and awarded to 8 teams, which highlights the improvement in the quality of the tasks and the motivation of the students. The subject Pedagogy has the particularity of preparing students in their professional profile as future teachers, among other elements that are related to their way of acting such as constructive criticism, teamwork and self-evaluation. This proposal was attractive, interesting and fun for the students, as they had never before been evaluators of their own peers in a subject.

### 3.3. Results of the Film Debate activity

The activity was given to 57 students out of 71 participants. The activity had a high and very positive impact, which was reflected as feedback in the general opinions at the end of the course. This activity motivated the way of learning from an audio-visual, which transforms the traditionalist scheme of offering textual content.

### 3.4. Results of the activity Final paper

For this activity a badge called "Future Teachers" was designed, taking into account the fulfilment of the given guidelines and the quality of the final work. This badge was awarded to all teams, which also achieved the highest mark in the activity. However, this does not imply that all students achieved the same final grade in the course, as other aspects were taken into account, such as: the results of the partial evaluations, the attitude in the exchanges in the social network groups, access to the platform and consultation of the course bibliography, among others.

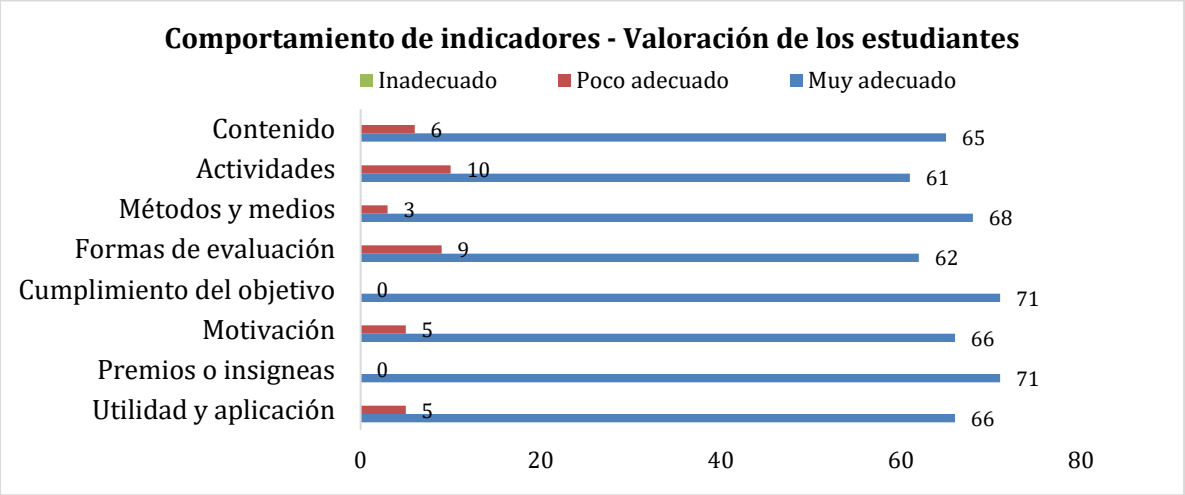
The use of these badges and the variety of activities in the subject allowed the proposed objective to be achieved and motivated the learning of the students, who recognised the importance and practical application for their professional training. This can be seen in the analysis of the indicators evaluated in the survey applied to the students and the opinions received on the subject through the application of the "PNI" (Positive-Negative-Interesting) technique as feedback at the end of the course.

### 3.5. Assessment of opinions on the subject, development and impact on students

A survey was applied to the students in order to find out their opinions on the subject, the development and impact it had had on them, which makes it possible to continue making improvements for future courses and other careers. The behaviour of the indicators shows that, in general, there is a very adequate assessment of the subject in all the aspects evaluated (graph 1).

It is worth highlighting the students' recognition of the fulfilment of the subject's objective, as they consider that they learnt to design and plan a teaching activity, as well as to identify the types of activities and types of classes they can develop. Similarly, they believe that the use of badges or prizes is a resource that the teacher can use to motivate student learning.

**Figure 2.**
*Behaviour of the indicators in the students' assessment.*




Source: own élaboration.

However, some indicators show that more attention by the teacher is required for improvements in the subject. The first is the content, where some students consider that they do not need the theory on pedagogy for their professional development, as "they are not going to be teachers". They suggest planning more practical activities (seminar, practical class, workshop) linked to other subjects in the course. Despite recognising that the methods and media were very appropriate, they suggest using other Moodle media such as instant chats and video conferences. With regard to assessment, emphasis should be placed on other individual activities, since teamwork and distance learning do not always show who really worked.

Motivation was unexpected for the students in this subject as they reported that it was one of the most creative and motivating subjects they have received at a distance, as they considered it "tedious and unnecessary". This shows that the planned activities, methods, means and forms of evaluation contributed to the developmental and independent learning of the students. They think that they had a leading role in the subject, always guided by the teacher. They value the subject as necessary and useful in their training as engineers, as they were able to see its application in their professional work. The result of these indicators is corroborated in the opinions expressed by the PNI technique applied to the students at the end of the course.

### 3.6. Feedback and general opinions of the subject

3.6.1. Positive opinions

*- The course contributed to my training as an integral professional. I have learnt about the different methods and means to be used, about the importance of outlining a well-structured objective, as this is the basis of a good class and any activity to be developed as an engineer.*

*- The subject contributed to our preparation as professionals at the moment of transmitting knowledge depending on the methods and means we use. So that they are the most appropriate to meet a specific objective and motivate others.*

*- I found the content of the different lectures very interesting and important for my life as a professional. I thought that the course would be a bit tedious, but not at all, it was quite the opposite, because the methods used by the teacher to convey the content and put it into practice were excellent and entertaining.*

*- The way in which we worked in spite of the conditions, we were able to achieve the objective and worked in teams in a satisfactory way.*

*- New knowledge about pedagogy was acquired in an organised and detailed way thanks to the planning of the teacher, who made this process as enjoyable and interactive as possible. The application of the subject was studied both in the professional field and in our everyday life.*

*- This course provided us with skills that we will use in both our personal and professional lives, the lessons were very useful.*

*- Through the development of this subject we were able to link pedagogy to the professional field of our career and understand the relationship between the two in a creative and lively way.*

*- We were able to acquire knowledge of the subject and learn how to apply it creatively in the professional field.*

*- It gave us a new perspective and approach to pedagogy and how to make an activity attractive and creative for others. It helped to see it from a professional point of view. The good management and organisation of the subject in Moodle.*

### 3.6.2. Negative opinions

*- I did not find anything negative during the development of the course because despite the fact that it was given in a non-classroom mode, we gained a lot of knowledge and we exchanged opinions and doubts with the teacher.*

*- We were not able to take the course in a blended learning format as it was planned in order to receive the most important contents in a face-to-face way.*

*- I have no negative opinion of how the course was taught, despite the fact that it was not given in person, all the information was given and acquired in a pleasant way.*

*- Unfortunately the course could not be delivered face-to-face, but this was not an impediment at any time.*

*- Setbacks due to the non-face-to-face mode of the course.*

*- Unfortunately, the course was held in a distance learning mode and we would have liked to exchange face-to-face with the teacher.*

### 3.6.3. Interesting opinions

*- The use of different activities such as the viewing of the Three Idiots comedy and the exchange of opinions about it in the forum. The development of a different role to the one we are used to (Workshop 2-Evaluators), made the subject more fun. Likewise, the gifts given by the teacher for the effort put into each task made it more enjoyable and made us put more effort into our work.*

*- The means used for the appropriation of knowledge were innovative, as well as the way in which she motivated teamwork in a non-presential way. In general, the course was pleasant to receive.*

*- I did not know all the different types of classes that exist, as well as the variety of methods to be used in them.*

*- Some of us thought that teaching was just to stand up and start talking, but now we see that it is not, that it takes a very important process in front of it so that everything is of high quality.*

*- Not only did the course cover workshops and lectures, there was also the discussion of the 3 idiots film which turned out to be fun and a different way for the students to assimilate and exchange their opinions and knowledge.*

*- Curious activities such as the 3 idiots movie and its debate.*

*- The activities carried out such as watching the film of the three idiots and the debate about it and the development of workshop 2 where we developed different roles.*

*- The work done with the film of the 3 idiots and the work done as evaluators.*

*- The new distance learning modality was a challenge for both students and teachers.*

## IV. Conclusions

The COVID-19 pandemic brought significant transformations to educational models, compelling the accelerated integration of Information and Communication Technologies (ICT) into teaching. In Cuba, this situation led to the strengthening and development of various strategies to ensure the continuity of the teaching-learning process, maintaining the required quality and addressing the emotional and psychological challenges posed by the health crisis. One such strategy was the implementation of digital badges within the Moodle environment, specifically for the online training of fifth-year Computer Engineering students at the José Antonio Echeverría Technological University of Havana (Cujae).

One of the most notable achievements was the increase in motivation and creativity among students. The use of digital badges not only served as a motivational tool but also encouraged collaborative learning, critical thinking, and autonomy in the context of online education. The badges acted as positive reinforcements by recognizing and rewarding specific achievements, fostering a competitive yet constructive learning environment.

The results obtained through surveys and feedback techniques, such as PNI (Positive, Negative, Interesting), demonstrate that badges were perceived as effective tools for promoting student engagement. These badges not only motivated participants but also evidenced the development of key competencies, improved planning and execution of teaching activities, and strengthened the sense of belonging within the learning group.

The pedagogical design of the course included a variety of activities aligned with learning objectives, fostering active student participation. Workshops, film debates, and collaborative evaluations enabled students to explore new roles, such as peer evaluators, enriching the educational experience. This innovative approach demonstrated that it is possible to transcend traditional teaching frameworks by adapting to the conditions imposed by distance learning.

Despite the general success of the project, students identified areas for improvement, such as the need for more practical activities and a stronger connection between theoretical content and professional applications. Additionally, the lack of face-to-face interaction was highlighted as a limitation inherent to the pandemic context. These observations underscore the importance of continuously adjusting methodologies to meet students' needs and expectations.

The experience of using digital badges in Moodle offers a replicable and adaptable model for other educational contexts. This tool not only complements traditional teaching but also opens new possibilities for personalizing learning and certifying specific competencies. In an increasingly digital world, such initiatives reinforce the role of ICT in higher education, demonstrating that it is possible to maintain high educational standards even in times of crisis.

In conclusion, the use of digital badges in online teaching not only overcame the challenges imposed by the pandemic but also marked a milestone in pedagogical innovation in Cuba. This model promotes more comprehensive, motivating, and 21st-century-aligned training, positioning universities as key players in global educational transformation.

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## Annex 1. Survey applied to students

Objective: to know the students' opinions about the course, the development and impact it had on them, which will make it possible to continue making improvements for future courses and other careers.

Dear students:

In order to continue making improvements in the course and increase the quality of the teaching-learning process, we ask you to answer the following survey that will allow us to know your opinions about the course, the development and impact. Please mark in each question the valuation you consider.

**Do you consider that the proposed objective is in correspondence with the learning needs of computer science students and their professional profile?**

__Very adequate __Slightly adequate __Inadequate

**Were the activities planned in the development of the workshops organized for the individual and group development of the teams?**

__Very adequate __Slightly adequate __Inadequate

**Did the methods and means used by the teacher motivate students' learning in the distance modality?**

__Very adequate __Slightly adequate __Inadequate

**Do the forms of evaluation motivate and enable development?**

__Very adequate __Slightly adequate __Inadequate

**Was the objective of the course met?**

__Very adequate __Slightly adequate __Inadequate

**Did you feel motivated in the training process of the course?**

__Very adequate __Slightly adequate __Inadequate

**Do you consider that the use of awards or badges is adequate to motivate your learning in the subject?**

__Very adequate __Slightly adequate __Inadequate

**Do you consider that the course is useful to apply in your professional development?**

__Very adequate __Slightly adequate __Inadequate

You can comment if you have any opinion or comment on the subject.

Thank you very much for your collaboration.

# Chapter 2. New Perspectives and Innovative Practices in Higher Education in Ecuador

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## I. History of the University–Society relationship. New requirements in the last decades

As a long-standing institution (at the level of states and churches), during its first centuries, the university focused on educational formation for the representatives of the (late feudal) society's privileged groups, where knowledge did not operate as a social value, but as a factor of differentiation and status assurance.

As a result, the transition to a capitalist market society implied that social development began to present major challenges to the social use of knowledge. Nevertheless, for a long period of time, the contribution of universities in terms of knowledge and technologies was still overcome by academies and lyceums of Renaissance Europe, which during the 17th and 18th centuries experienced a strong impact regarding the scientific method of knowledge and its application in the development of experimental science. For that reason, the perspectives of these institutions toward the future were not yet understood within the management and, especially, its responsibility towards society in relation to the integral formation of the future professionals of that time.

During the 19th century, at the height of the Industrial Revolution, the university added the function of research to the well-established training one, but its research processes and results operate mainly for itself as an academic status factor rather than as a social impact one. Scientific and innovation advances continued to be driven by other social institutions, including now the free-market enterprises themselves as economic entities. This led to the fact that in the whole 19th century, theoretical contributions sometimes surpassed the practical knowledge ones within companies, since knowledge occasionally failed to transfer from the university to the society (companies and institutions).

In this regard, the German university took on the lead in this new period with the incorporation of the university research at the University of Berlin in 1810, expanding to other European and North American institutions throughout the 19th century. The positive effects of this new practice were confirmed by the first twenty years of the 20th century, when some German academic researchers were nominated for the Nobel Prize in different scientific fields. They were primarily pure scientific contributions but then would extend to scientific and social practice. This moment was considered the beginning of a new era in the scientific revolution in the universities with innovative practices recognised globally, where the theoretical basis was taken to the testing laboratories.

Throughout the 20th century, other university development models added new forms of management development, and university academic and scientific activity in response to society's demands including new industries. Prominent examples of this were the military-industrial complex programmes. In this regard, it should be noted that, while in certain contexts of more industrialized nations prevailed a university more oriented towards university–society interaction throughout the century, especially towards the university–business link as in the case of the American university, in other institutional contexts, typically found in less industrialized nations and defined as developing nations, was observed a more socio-political sense of commitment or a social responsibility of the university. The last one was the Córdoba Reform (Argentina, since the beginning of the 20th century), which gradually expanded with differing levels of presence and success, during all this century, and up to this day, to other Latinoamerican nations.

In addition, at present, this university behaviour and its relationship with society has been transforming due to strong requirements for the fulfilments of its role within the social context as administrators and problem-solvers to economic, political, business, sociocultural and environmental issues. This shows that we are in a context of more integral relationships within a systemic teaching-learning model integrated according to the university social responsibility no longer just theoretical, but also practical.

Everything described above responds to the development achieved in the links between university and society, which has proven to be a type of relationship of permanent adaptability in both directions, in particular, with the adaptations of university institutions to the characteristics and requirements of the social development (Delors, 1996; UNESCO, 2004), and the context in which they operate at national and international level.

It has also been shown that in the relationship between university and society, and the effort to adopt more accurate approaches to university social responsibility, it is crucial that the institutional contributions are integral from a practical and innovative perspective. From the university perspective, a balanced development between theory and practice should coexist within the teaching-learning process. It aims to immediately incorporate the scientific, technologic, innovative and informative advances into the curriculum of the diverse university courses offered in these institutions.

This confirms the significant fact that institutions as the university should not only create good and effective innovative practices for the business sector, but also for other institutions and for itself in each of its functions (Larrán and Andrades, 2013; Larrán and Andrades, 2017; Arias et al., 2021) developing towards their interior and exterior as part of the process academy–research–links. This fact proves that professors and students should be increasingly ready to venture into professional practices in public enterprises and institutions generating and teaching knowledge, as well as learning from the practical experience of their employees. It is this symbiosis that promotes a more integral formation.

On the basis of the above information, a concept reflecting integrality means the commitment that the university assumes with regard to its stakeholder groups, and that generates the change in order to achieve the social, political and economic transformation that society requires towards a more sustainable human development. (Arias et al., 2021)

If the university intends to enter into the sector of contributing to social progress and innovation, it should and can accomplish so from broader conceptual visions with transforming practices and changes that involve major technology advances. Universities need to adopt such criteria as the following:

- Recognize the university social responsibility as the guiding principle of institutional management. This shows that the whole planning, definition of the mission–vision, as well as the monitoring tools and improvement of the university institutional life, are guided by the content and rhythm of the social needs conceived in the global, regional, national, local and institutional levels.

- Associate the comprehension and practice of the university social responsibility to accurate criteria for sustainability and sustainable development of social and university development. The current moment in the understanding of social and institutional ways of development is marked by the abandonment of traditional practices, often not correlated with the logic of human development schemes, but of development as economic growth. It involves observing the first one as persistence in contributing to social and institutional development, even when the costs of activities do not increase. The second one has to be assumed as the appropriate way of working for social and institutional development in accordance to the characteristics of institutional history (each institution has its own evolutionary process and has generated its own strengths based on the type of academic improvement achieved), and to the economic, social and cultural factors of the social context in which it is located (García, 2014; Aleixo et al., 2018).

- Avoid restricting the vision and practice of university innovation, whether educational, research oriented, or socially involved, to products or results corresponding to the most advanced science in the world. Innovations are also needed in these areas that show constant improvements which have a positive impact both on society and on the university community itself (Núñez and Castro, 2006).

- Undertake the university social responsibility away from the patronizing and interventionist criteria that have long characterized them. This is not just a matter of changing the list of names in the relation between university and society, for instance, university extension (community). Location: university social responsibility involves a common social participation of all stakeholders concerned in establishing aims and designing transformation actions, as well as in the implementation of solutions to the university community and the more general community or society problems (Vallaeys et al., 2009).

- Understand that social responsibility is a practice with strong ethical content. This refers to the assumption of diverse duties, especially, the constant transforming of the social context into commitment, mission, and university action in a practical and

ethical way. Vallaeys (2008) identified this institutional line of action as an "ethical duty of internalizing externalities". The author himself warned that it could not remain as an empty entity ("desocialized social responsibility"), a type of chant repeated over and over again on university campuses, but without connections to the transformative social content that the institution should provide (Vallaeys, 2021).

- Take on and put into practice the cultural content of the university social responsibility with a broader understanding and range. On the one hand, regarding institutional involvement in the recovery and strengthening of traditions, customs, spirituality and identities of nations, peoples and communities, but of particular relevance in plurinational nations. On the other hand, as an institution with special conditions to contribute to the debates and decisions on the necessary, general and integral development trends of countries. This latter aspect represents another dimension of culture in society that all institutions should understand and put into practice. It refers to engaging in critical debate about the "must be" of each society for each time and place, a process that, in turn, provides "robust thinking" to enhance decisions and practices for the overall benefit to society itself.

- Apply transparency, accountability, and social communication as essential elements of the university's social responsibility and its contributions. It is not an option, but an obligation due to its own condition as an institution of proven integrality and social impact (it trains, researches, innovates, generates knowledge and technologies, transforms realities, and influences realities of cultural development trends); and due to the huge expectations that inevitably arouse among the other institutions, human groups, and individuals (Vallaeys, 2021).

- It is important to consider that the university can develop responsible innovation in its different functions through research, in undergraduate and postgraduate training processes, and also in the development of society-linked projects. University social responsibility should be understood as a strategy of integral continuous improvement within the higher education institution (especially universities) that encompasses all fields of the organization and that applies science and technology in order to transform reality.

This way, according to the previous information, it is necessary to go further into the perspectives and practices that universities should carry out, regardless of the context in which they operate.

## II. Perspectives and practices in higher education in Ecuador from professional experience

The 21st century was a period of constant changes and transformations in higher education all over the world. Its evolution has been accelerated, in particular, by scientific, technological and innovative advances, but also by the context in which society has been developed after the diverse emerging circumstances resulting from the Coronavirus disease (COVID-19) global pandemic. In this regard, Ruíz and Briceño (2020) consider that, in order to analyse the perspective of the actual and future higher education, it is essential to begin with the idea that the university is the source of human potential. That is why Ecuadorian universities should show resistance to the environment not only in terms of science-technology and innovation, but they should also be able to adjust to changes in their operational and educational approach during emerging times as the previously mentioned COVID-19 pandemic.

In this respect, Ecuadorian university's perspective focuses on improving its physical and technological infrastructure, as well as on enhancing the way in which future professionals are educationally and pedagogically trained in the diverse university courses offered. This is because it seeks integrality from the perspective of knowledge and humanistic values, since it is the approach of self-critical–critical thinking and logical reasoning that allow us to understand and comprehend the behaviour of phenomena in the different areas or fields of science. Its aim is to propose solutions to the problems that society faces in the country, whether at the local, national, or international level.

In relation to what has been described, Ecuadorian universities are working to strengthen their fundamental processes associated with university management, academy, research and links. This way, priority is given to putting into practice the theoretical knowledge acquired in the classroom in the curriculum proposals, so that in the future, the practical aspect of the diverse university courses should be more important than the theoretical one in terms of planning and execution of schedules. This very reason matches with that of Coll and Martín (2021, p, 5) when they reflect that due to changing context and new opportunities of the last decades, new forms of learning are required to be linked to the formation of young university students with more complete competences and skills in the different areas of knowledge. The previous criteria suggest that new opportunities are opening up for future professionals, opportunities that can be developed from the curriculum, and strengthened through diverse learning methodologies in both virtual and on-site modalities. These methodologies include reverse classroom, case studies, problem-based learning, and practical workshops. To this extent, approaches to Ecuadorian university education have to adapt as contexts and their perspectives on university mission and vision change. This happens because there are universities around the world that operate exclusively in on-site modality, others that function virtually with synchronous or asynchronous characteristics, and others that adopt a hybrid approach, in other words, combining on-site and virtual modalities simultaneously.

Therefore, educational training in the 21st century in Ecuador has become more technological. This aspect is reflected not only in the implementation of laboratory practices in diverse courses, but also in the increasing use of digital platforms for teaching and communicating with students, both nationally and internationally. This change has led to a reduction in the excessive use of paper, which until now was used for almost every task. These included assessing students, handing in physical assignments, preparing lectures, exchanging

knowledge between students from different universities and countries; and the possibility for professors to teach from their university to another one in the country or abroad, and the opportunity to develop collaborative research projects with other universities and research centres in other countries at the same time.

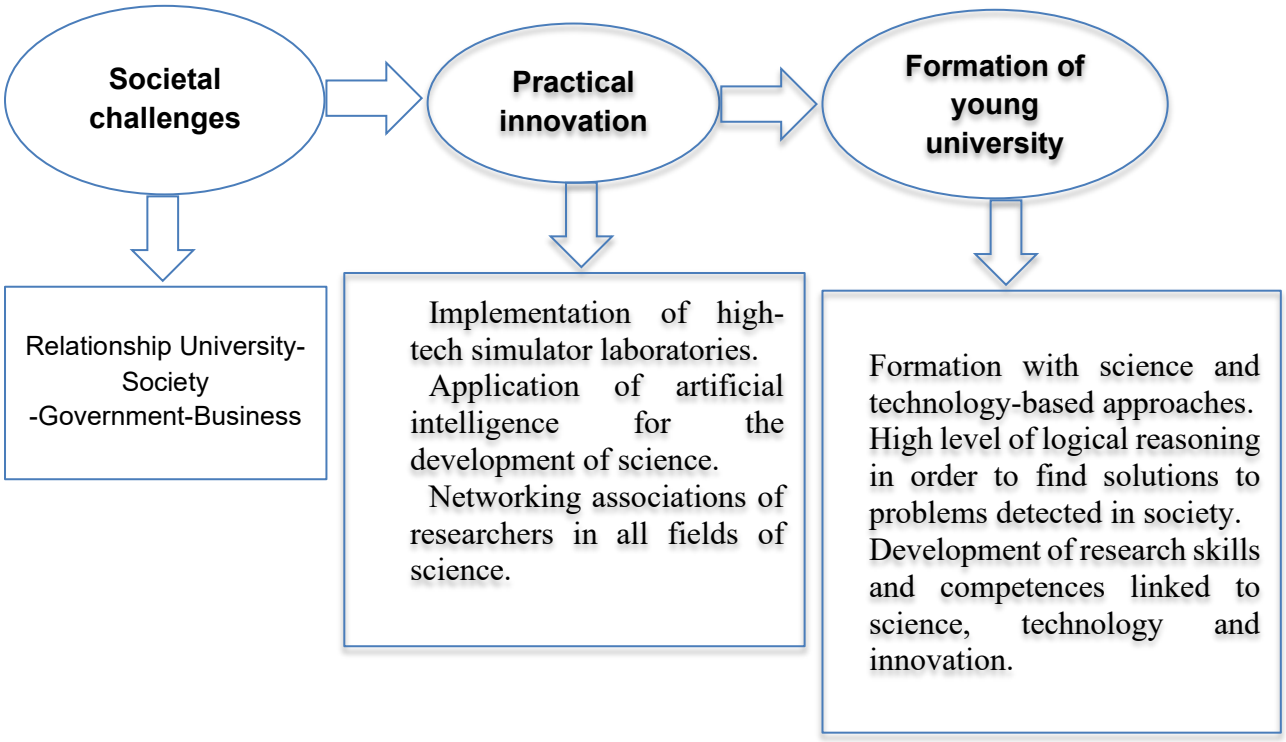
This is in line with Barnett's (2017) description of the different phases the university has gone through. For instance, university 1.0 was characterized by a strong presence and control of spiritual and religious beliefs, later evolving into a liberal arts education. University 2.0 emerged in the context of post-industrial societies and developed with the initiation of research within the university as a driving point for technological advancement oriented towards economic development. University 3.0 refers to an entrepreneurial institution that seeks to optimize its own self-interest or strategy in an increasingly competitive world, becoming more integrated into society through university–society–business interaction.

In this sense, development proceeds without stopping. If we are currently talking about the creation of 4.0 businesses, then Ecuadorian universities should prepare themselves to respond to this demand by training professionals in this perspective. The aim is to face this new challenge of scientific progress, so digital technology should be the key element in the curricula of the various courses in the 21st century, through the development of subjects focused on professionalization. In addition, laboratories will also have to be improved in technological and digital terms, although in this aspect, steps have already been taken with the implementation of simulation laboratories in the different areas of knowledge.

In this context, and in relation to what is described in Figure 1, the challenges faced by Ecuadorian universities in the new perspectives of practical innovation are set out. This implies considering a progressive projection from the student's entry into the institution until their graduation, which allows for an integral training of young university students. This integral training should encompass both professional and humanistic aspects, integrating the values acquired at home by the family with those promoted in the university institutions. Thus, it is expected that, in the future, young people will be interested in the common welfare of society and the community, abandoning individual, selfish and irresponsible behaviour that is sometimes observed, for example, in the business world.

All of this highlights the importance of encouraging teamwork among students from their educational training. This helps young people to adapt and educate themselves in collective work, so that the solutions they propose to the problems they face in their future professional life arise from consensual ideas with the welfare of humanity and social responsibility in mind. This underlines the importance of incorporating role-playing into education both in the classroom and in professional training, simulating business or governmental situations. This is how students can adopt roles of leaders and team members and vice versa, enabling them to understand how to behave in different positions within organizations.

**Figure 1**.
*University challenges in the new perspectives of practical innovation in young university students' formation.*




Source: own elaboration

It should be emphasized that university–society–government–business links show a relationship of continuous adaptability, and their union leads to a better theoretical-practical training of students as future professionals with social responsibility. This is why, during the 20th century and up to the present 21st century, different university models have provided new forms to these relationships, defining the concept of university social responsibility as an important reference of the Ecuadorian university system and its institutions. The focus is given to the fundamental processes of academy, research, links, and management.

All of this contributes to the fact that Ecuadorian higher education systems and institutions should assume their role in the social context as managers and problem-solvers of economic, socio-cultural and environmental problems. Therefore, it is shown a scenario of more integral relations that contributes to analyses of university social responsibility which are linked to the innovative practices in higher education.

For this reason, certain tools should be incorporated into the curriculum of the university courses in order to turn the training of the professionals into an innovative project not only in their specialty, but also in other areas of knowledge that may be focused on authentic learning. For example, studying a language other than the mother tongue should not be exclusively about passing or finishing the subject, but about gaining reading and communication skills, which are often lacking in universities. Other examples could be: handling a variety of advanced software related to their field, performing detailed assessments with personal criteria based on data or information obtained through Big Data analysis, using artificial intelligence as a way to innovate rather than simply replicate, autonomously managing

knowledge to solve real practical problems, using bibliographic management tools so as to generate science through research projects, among other practices, that enrich their training and preparation for their professional career.

In order to achieve the aims analysed in the training of professionals from an innovative perspective in Ecuadorian universities, it is essential to prepare, train and update the faculty in all scientific, technological, and innovative advances. Otherwise, they will not be able to transfer this knowledge to their students, which underlines the need for university management focused on the efficient and competent management of their staff. If students are updated with technology while teachers are not, communication and knowledge transfer will be deficient. Therefore, it is crucial to establish a framework that summarizes innovative perspectives and practices in higher education in Ecuador, particularly in universities. Thus, future management can achieve a process of continuous improvement across all areas (management, academy, links, and research).

**Figure 2.**
*Framework of innovative perspectives and practices in higher education in Ecuador.*


Source: own elaboration

This framework illustrates that universities should focus their training and learning towards the service of society, seeking and suggesting proactive solutions to the social problems that affect humanity, all with a strong commitment to social responsibility. It is well-known that if knowledge is not used for welfare, it unleashes a devastating process in which human beings

are capable of destroying in a few minutes everything that has taken thousands of years to build with scientific, technological and innovative advances. Some examples of this situation have been evidenced by true events on our planet. Here are some of the most shocking: the development of bacteriological viruses, the creation of thermonuclear bombs, nuclear disasters, war conflicts with advanced technology, environmental pollution due to industrial growth without social responsibility, and damage to the flora and fauna ecosystem.

Taking another perspective, if Ecuadorian universities adopt innovative practices in their laboratories with the aim of benefiting society, solutions could emerge contributing to the preservation of the planet and the welfare of humanity. Some illustrative examples include: the development of live-saving vaccines against human-generated viral diseases (such as those developed during the pandemic), the innovation of green technologies to preserve the environment (e.g., ocean clean-up machines), the design of solar panels to reduce environmental pollution (by generating renewable energy), the development of bacteria capable of feeding on toxic elements, the implementation of sensors to monitor and manage water consumption, and the invention of solar-powered toilets that transform liquid waste into disinfected water.

All of this shows the direction that the development of science and innovative practices in Ecuadorian universities should take, starting out with the curriculum in the different fields of scientific knowledge. This criterion demands the immediate incorporation of certain management tools that are innovative and practical when used appropriately, such as the appropriate use of artificial intelligence, which speeds up the academic research and teaching processes for both students and teachers. In addition, the design of interactive platforms simplifies work and communication between students and teachers, while encouraging student research through teacher-led learning materials. These environments allow interaction through chats, personalized tutorials, documentaries based on business or social practices, as well as the provision of academic and research materials that contribute to student learning. These tools accelerate the learning process of students in their pre-professional development stage by promoting the practical application of knowledge in real situations, allowing the student to acquire knowledge and develop skills for effective application in real situations.

Therefore, innovative perspectives and practices implemented in Ecuadorian universities should encourage students to stop focusing on the memorization of content and instead encourage logical reasoning in order to be able to critically analyse and interpret the behaviour of the phenomena they study from a constructive perspective based on science and research. In this way, students' different types of intelligence are stimulated, enabling them to contribute to the advancement of knowledge.

It is also crucial that higher education institutions introduce changes in the system of knowledge assessment, so that students, instead of simply reproducing information in an exam, can apply that knowledge to address problems in real contexts. Therefore, the transformation of higher education is not only limited to the curriculum but includes all the processes involved in the training of students, turning universities into spaces where innovative practices are carried out based on the knowledge generated in the classroom.

In this context, Ecuadorian universities should abandon their commercial approach and their tendency towards ease. It is crucial to rethink whether university courses require five or six years for undergraduate education or whether they need two or three additional years to

graduate to postgraduate education, whether Master's degree or PhD. At present, we are seeing a reduction in the length of courses from five to four years and of Master's degrees from two to one, indicating an unfavorable competition to award professional degrees in shorter periods in order to attract more students.

Hence, this issue undoubtedly affects the quality of the professional.The lack of maturity that should characterize the professional in order to exercise their profession stimulates the tendency to ease, leading them to obtain a degree without the necessary knowledge to stand out in their field. Furthermore, this professional does not receive a complete education, they are not trained in all the subjects they should receive in their course, among other aspects. That confirms that university education, instead of improving its quality, prioritizes attracting a greater number of students in shorter periods of time in order to graduate. This situation gives rise to the deficiencies that students face when arriving at companies and institutions, as they only acquire the basic fundamentals of the profession and do not receive the integral training necessary to become great professionals. Moreover, many opportunities for pre-professional internships, which are needed to consolidate theoretical knowledge, are overlooked. For this reason, in most cases, universities continue to offer traditional teaching rather than adopting innovative and practical approaches.

In relation to these aspects, it is necessary to specify which should be the directions in which Ecuadorian universities should orientate the perspectives in the training of students, focusing on practical and innovative approaches in the context of the 21st century, highlighting the following:

- Modify the curriculum of subjects in every course, in order to include a 30% theoretical component and a 70% practical.

- Proposing research areas to enterprises, and public and private organizations from the first years of the course so as to find solutions to the problems that affect institutions.

- Redesign the curriculum to integrate subjects with a strong focus on technology and innovation in order to develop training projects integrated with professionalizing subjects.

- Strengthen subjects through the use of practical cases drawn from real-life situations in the business and social reality with the aim of encouraging students' ability to carry out critical analysis and logical reasoning, working in teams to seek different alternative solutions.

- Encourage practical classes through the application of the inverted classroom methodology, where students take an active role in the teaching-learning process.

- Increase case studies with simulation methodologies, so that students can explore different ways to find solutions, applying self-management of knowledge and using computer tools and software.

- Promote the personalized development of the intellectual skills of students oriented towards the realization of practical and innovative activities, seeking motivation towards research from the academy.

- Increase the forms of learning in the learning-unlearning, know-do, and develop-propose relationships.

- Incorporate the faculty into the research-innovation process for the continuous improvement process of their classes throughout the whole training stage.

- Organize conferences, events and scientific seminars for students so that they have the opportunity to present the results of their research during their professional training.

- Create areas for business people to be involved in activities where students present and defend their research projects that are carried out in enterprises and institutions.

- Manage meetings with researchers and students, both national and international, that promote collaboration in research projects and networked innovation.

- Allocate economic, technological and infrastructural resources for the development of innovative practical activities for teachers and students. One example would be the creation of experimental production plants.

- Promote in universities the participation of students and professors in postgraduate programmes, especially at doctoral level, with the aim of strengthening the research and innovation-practice aspects.

After presenting the projection of the prospects for Ecuadorian universities in the current century, the conclusions derived from the study are detailed below, based on the criteria of the authors consulted and those of this work, backed up by professional experience.

## III. Conclusions

The introduction of innovative practical perspectives in higher education in Ecuador lies in the social responsibility of the rectors and middle management who run these institutions. They are the ones in charge of guaranteeing the constant updating of the curricula of the various courses offered. These modifications should be aligned with the existing relationship or link between university, business, government, and society.

Research and innovative practices within the teaching-learning process should be aligned with the real needs of the community, territory, country, and at international level.

University managers should ensure the economic, technological and infrastructural resources to implement the innovative practices proposed in the curricula of the courses. This will allow students to reinforce their theoretical knowledge by demonstrating the skills and competences acquired in the different stages of training.

The experts consulted agree that the new perspectives of the university are shaped through the development of the course curricula. Therefore, teachers should update their teaching methodologies according to the advances in science, technology and innovation.

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# Chapter 3. Educational innovation projects in Early Childhood and Primary Education from the academic literature: a systematic review using the PRISMA approach

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## I. Introduction

Schools face a continuous flow of demands to address the changing needs of society (Rosa Rosselló et al., 2024). Likewise, we are witnessing the ongoing emergence of new challenges stemming from technological advances that question the very foundations of the traditional school institution, historically structured around the control of knowledge (Fernández Enguita, 2023; García-Peñalvo et al., 2024). In response to these challenges, schools exhibit unequal approaches, with reactive perspectives focused on maintaining traditional structures that prioritize knowledge reproduction and rote memorization—practices that negatively impact students' motivation and educational engagement (Tiramonti, 2015; Vázquez-Toledo et al., 2021)—coexisting alongside proactive approaches that embrace the need to adapt to changes and propose innovative solutions (Parejo et al., 2022; Río Fernández, 2023; Trujillo Sáez et al., 2020; Valverde-Berrocoso et al., 2023).

Educational innovation, as a highly contextualized response to the educational needs that arise in a specific context, represents a multidisciplinary field where diverse areas of knowledge and visions converge to define what innovation in schools truly entails (Fullan, 2002; Río Fernández, 2023). Nevertheless, many voices argue that innovation should be considered part of a process aimed at improving learning outcomes. In this sense, we find ourselves within a conceptual framework that allows for clearer distinctions between a mere change, an update, or a genuinely innovative process (Gimeno, 2013). Accordingly, innovation can be conceptualized as a form of change with an educational intent—planned, sustained over time, and oriented toward improvement (Carbonell, 2001; Fernández-Navas, 2016).

Indeed, research that has explored the phenomenon of innovative practices in schools highlights learning ecosystems that are substantially different from those rooted in traditional teaching. These studies advocate for diverse proposals that, to varying degrees, share several common traits: grounding in constructivist principles (Parejo et al., 2022); being structured around global and interdisciplinary approaches (Martínez-Bonafé, 2022); stimulating active learning (Fernández et al., 2021); fostering the participation of various stakeholders within the educational community (Garrido-Fonseca et al., 2024); paying special attention to addressing diversity and promoting the inclusion of students (Manghi et al., 2020); and incorporating technology to optimize its pedagogical potential (Ríos-Cabrera & Ruiz-Bolívar, 2020), among others.

Different studies have investigated the innovative processes developed in schools. In this regard, Trujillo Sáez et al. (2020) conducted research involving 100 interviews with teachers from 17 innovative schools in Spain. The conclusions of the study provide a characterization of innovative schools based on several dimensions, such as their openness to the community, the existence of knowledge transfer processes, the promotion of novel learning strategies where technology acts as a facilitator, and, ultimately, the development of a new type of teacher and student linked to the concept of agency.

Similarly, Martínez-Maireles et al. (2022) conducted a study based on focus groups with 18 charter schools in Catalonia participating in an innovation project centred on cooperative learning, interdisciplinarity, and the promotion of competencies. The focus groups included teachers, students, families, and school management team members. The study focused on six dimensions, yielding various insights and challenges: teacher training and support, types and nature of learning, management and organization of teaching practices, teacher sentiment, space and furniture, among others. Among the main contributions of the study, the importance of implementing co-teaching to structure classes cooperatively is highlighted. Another key finding emphasizes the need for coordination and collaboration among teaching staff to develop innovative processes and professional development. However, achieving this requires strengthening the role of school management teams to organize, plan, and expand spaces for coordination and training among teachers and across schools.

One of the many challenges related to educational innovation lies in the development of research processes capable of addressing the complexity of the phenomenon at the school and classroom levels (Stevenson et al., 2019), as well as determining its impact and transferability to improve educational practices (Feixas & Martínez-Usarralde, 2022).

The gap between academia and schools, which perpetuates the classic dichotomy between theory and practice (López López et al., 2024; Popkewitz, 1990), further limits the development of research on innovative practices in schools. This is partly because, in many cases, such practices are implemented without being publicly documented, evidencing a disconnection between researchers and education professionals (Pattier & Olmos Rueda, 2020). Moreover, the insufficient dissemination of innovation project results at the academic level restricts the availability of an adequate theoretical framework on this topic and limits the resources available to teachers for supporting their own projects (Azorín, 2017).

Other voices are based on Stenhouse's (1975) conception of the teacher as a researcher who must subject their practice to observation and experimentation to aspire to curriculum change. However, the complexity of implementing these proposals in teaching practice means that research remains a minority activity among teachers (Ion et al., 2022). Indeed, consulting results from scientific literature is an infrequent activity among teachers, who tend to base their professional practices on their own experience or that of their colleagues (Mintrop & Zumpe, 2019; Olmos-Rueda & Pattier-Bocos, 2023).

If, as outlined, the educational innovation developed in schools is not researched by the practitioners who implement it, the question arises: who researches it and how? Hence, the following questions are pertinent: What types of innovative processes are documented in educational research? What are the themes around which innovation takes place in schools? What are the characteristics of innovative processes? What are their objectives? What results are achieved? What challenges and facilitators are observed in their development?

To address these questions, a systematic review was conducted with the following objective: to perform a systematic PRISMA-based review of the state of academic publications documenting educational innovation projects in Early Childhood and Primary Education in Spain.

## II. Methodology

### 2.1. Initial Search

Initially, systematic searches were conducted using a combination of the following terms: "innovation projects," "Primary Education," "Elementary Education," and "Spain." This search yielded a total of 22 articles in Scopus and 6,214 in WoS.

### 2.2. Systematic Search

The systematic search was carried out between March and April 2024 in the following databases: Scopus and WoS. The terminology was refined by applying specific inclusion and exclusion criteria: Social Sciences, Arts and Humanities, Education, and Music; open-access articles; and a time frame from 2017 to 2024, resulting in more precise outcomes. The following search strings were established for the systematic search:

- Scopus

TITLE-ABS-KEY (innovation AND projects) AND TITLE-ABS-KEY ("Primary Education") OR TITLE-ABS-KEY ("Elementary Education") AND TITLE-ABS-KEY (Spain)

- WoS

Innovation project (Topic) and Primary Education (Topic) or Elementary Education (Topic) and Spain (Topic)

Subsequently, inclusion and exclusion criteria were established to screen the located records:

- **Inclusion Criteria**

Studies conducted in the context of Early Childhood or Primary Education; studies with a sample scope limited to Spain; open-access articles; studies conducted within the framework of an Educational Innovation Project.

- **Exclusion Criteria**

Studies analysing and/or investigating the context of Higher Education; systematic reviews or documentary analyses; closed-access articles.

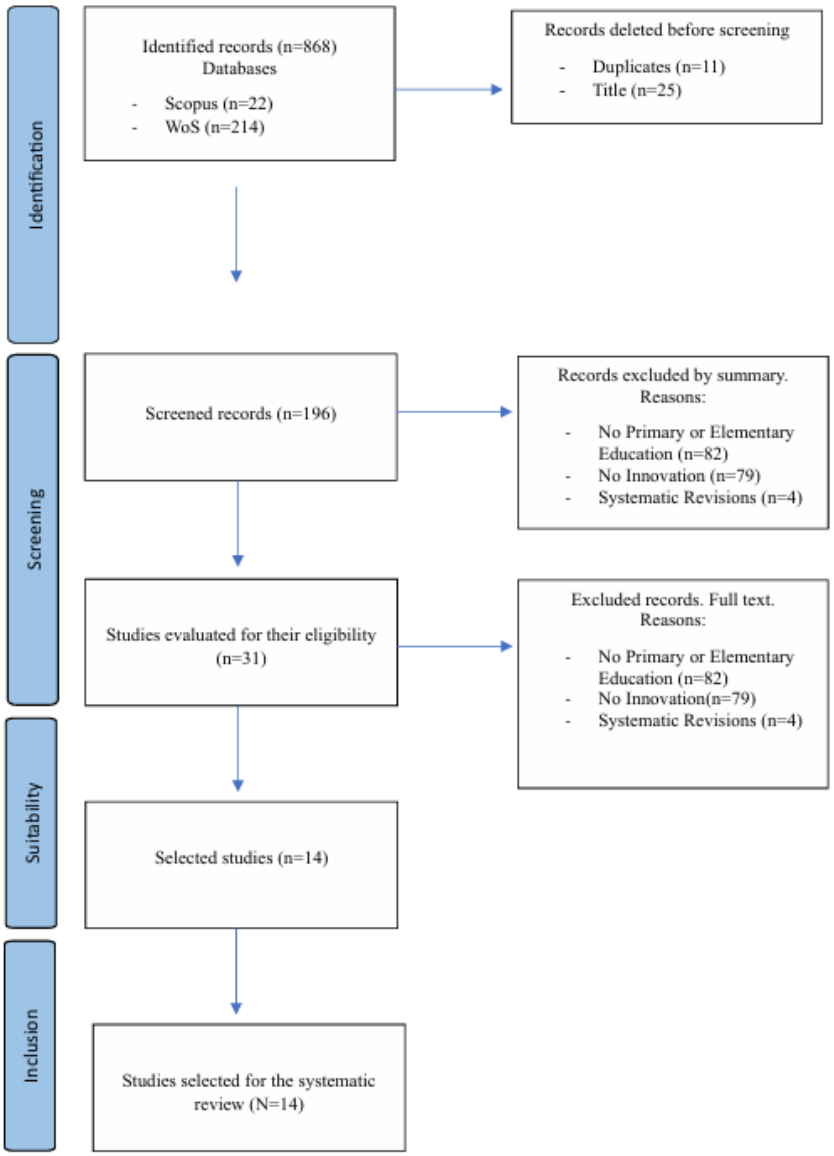
These criteria were established to identify the transfer between scientific research and educational innovation in Spain. Therefore, the focus is exclusively on Early Childhood or Primary Education, ensuring that while the application of projects in the form of educational research is considered, the process of Educational Innovation is also briefly detailed.

Articles in the context of Higher Education, as well as systematic reviews and documentary analyses, will also be excluded, as they do not provide relevant information for the transfer being investigated.

The search conducted in both databases yielded a total of 236 documents, distributed between Scopus (n=22) and WoS (n=214). The identified studies are national in scope, providing relevant data on the state of the transfer of Educational Innovation Projects within Spain to the framework of Educational Research.

Based on the inclusion and exclusion criteria, and after an initial screening by title and abstract, 9 documents were selected from Scopus and 20 from WoS. Subsequently, after a thorough review of the full text of these documents, a total of 14 articles were selected. The review process is illustrated through the established flowchart (Figure 1).

**Figure 1.**
*Flowchart.*




Source: own elaboration.

## III. Results

Following a thorough reading and analysis of the 14 selected articles, the results were organized into a table format. The table provides information on the following: authors' last names, year of publication, thematic focus, objective, description, and findings (Table 1).

**Table 1.**
*Review summary.*

| Author(s) and Year | Thematic Focus | Objective | Description and Findings |
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| Ávila-Meléndez (2024) | ICT in Disadvantaged Rural Schools | Analyse the implementation of an innovation project focused on ICT integration in rural areas through an ethnographic study. | An ethnographic study focused on analysing the implementation of an innovation project carried out in 28 multigrade schools in Mexico (externally designed and funded by the Government of Mexico). Information was collected from six schools through observation visits and interviews, with one selected for in-depth ethnographic analysis. Among other aspects, the study examined the following: lesson planning, team activities, student participation in the selection and treatment of academic content, and materials and products resulting from learning activities.<br>The teachers in the analysed school developed multimodal learning activities using ICT. The project proposed integrated activities across various subject areas, utilizing technology as a resource to address challenges. It fostered a deregulated, process-centred interaction model between teachers and students, aligned with the tradition of multigrade schools in Mexico, where students enjoy autonomy and relative flexibility in classroom interactions. Despite internet access limitations, various activities proposed in the project were implemented, such as recording a radio program to achieve a curriculum-based communicative task.<br>The article concludes by emphasizing that teachers' positive attitudes toward the local context are key to the meaningful integration of ICT. |
| Azorín (2017) | Reading and Inclusion: Peer Reading | Analyse the effects of a peer-reading program on students and their levels of inclusion. | The experience was conducted in a school located in the city of Murcia, serving students from lower-middle-class families, with a high percentage of immigrant students.<br>The project was implemented during the 2015/2016 academic year as part of a reading initiative. A total of 97 students participated in the experience, 48 as readers (fifth and sixth grade) and 49 as listeners (second and first grade). A website was provided containing a repository of materials and documentation on the project's development. The project was initiated by the school's teaching staff.<br>The results demonstrate the positive reception of the project by both the mentors and the mentees. The project successfully strengthened socialization among students, individual and group work, and the development of critical awareness. Among the mentors, a sense of protection and support for their younger peers emerged, with a particularly positive effect observed among the most disruptive students. |

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| | | | The perceived positive impact on students has encouraged the teaching staff to continue working along these lines. |
| Caballero-González & García-Valcárcel (2019) | Computational Thinking | Evaluate the achievements of young students participating in computational thinking and programming activities. | The study involved 44 students (22 boys and 22 girls) and 2 teachers from the third level of Early Childhood Education in a charter school in Salamanca, Spain. The students' ages ranged from 5 to 6 years. The research utilized a pretest-posttest design without a control group. Two types of interfaces were used: a physical or tangible interface (Bee-Bot® robotics kit) and a graphical interface (web emulator of the Bee-Bot® robot).<br>The activities consisted of solving problems through challenges by constructing basic and medium-complexity sequences. The complexity of the sequences was defined by the number of required movements and whether or not turns were included. A total of 26 hours were allocated, including pretest and posttest measurements and the development of the intervention itself. The data collection instrument consisted of a rubric, and both teachers and students completed a questionnaire.<br>The use of different technologies, both tangible and graphical, strengthened students' sequencing skills, a feature associated with the conceptual dimension of computational thinking. The results showed that students had positive experiences using both technologies. However, performance values achieved by children using the Bee-Bot® robot (tangible interface) suggested better outcomes and a higher tolerance for this tangible interface compared to the graphical one. |
| Del Barrio et al. (2019) | Diversity through Music Therapy | Assess the impact of a music therapy project on students with Special Educational Needs (SEN). | The research presents the results of an innovation project titled "The Practice of Music Therapy: An Educational Proposal for Addressing Diversity in Early Childhood and Primary Education." The project was conducted by a music therapist at the school and involved 32 students with Special Educational Needs (SEN) over five academic years. Various data collection techniques were employed to assess the project's impact, including participant observation, a field notebook with descriptive session analyses, results from attention evaluation tests (Trail Making Test, TMT-A and TMT-B), the Wechsler Intelligence Scale (WISC-R), and the analysis of meeting minutes, among others.<br>The results highlighted the project's impact on administrative and educational management, facilitating the development of the innovative process at the school and improving the response to the needs of students with SEN. The project was recognized for fostering the emergence of specific student skills through the activities developed in the workshops. As a result, the school was proposed as a preferred educational centre for students with Autism Spectrum Disorder (ASD).<br>In terms of family-school relationships, the project strengthened bonds between families and the school, improving the exchange of information processes and leading to a reduction in negative behaviours. The project also achieved significant improvements across |

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| | | | various developmental areas, including motor, cognitive, social, emotional, and musical development. |
| Del Valle et al. (2020) | PBL and Technology | Examine the effects of traditional vs. PBL methods in teaching mathematics and students' perceptions of these methodologies. | A study was conducted to determine whether fifth-grade Primary Education students working on specific mathematical concepts using the Project-Based Learning (PBL) methodology achieve greater learning outcomes compared to students addressing the same content through traditional direct instruction. The study's results provided evidence of higher learning gains among students who engaged with the content through the PBL methodology, as well as greater motivation. |
| Gil-Quintana (2019) | Mobile Learning | Explore the use of mobile devices as tools for motivating learning. | The article examines the impact of the innovation project "Villalpando 2.0," implemented during the 2015/2016 academic year at the Villalpando Early Childhood and Primary Education School (CEIP) in Segovia, Spain. Questionnaires were administered to students (150), families (130), and teachers (13), along with observation grids.<br>The main findings of the study indicate that the use of mobile devices in classrooms enhances and motivates the learning experience for students, a perspective shared by the entire educational community. According to families, mobile devices expand learning opportunities in classrooms and reinforce student engagement. However, concerns were raised about the genuine commitment of the teaching staff to engage in professional development and acquire new technological and methodological competencies. |
| Gómez Escobar & Simón-Medina (2022) | Service-Learning Projects | Showcase the design, development, and outcomes of an innovative university Service-Learning project for elementary students. | An extracurricular workshop, “Fun Math,” was organized by four university students and attended by 13 children from 1st to 4th grade in Primary Education. The workshop aimed to generate micro-learning experiences in a playful manner. To assess the university students' evaluations, two pre-existing questionnaires were used, while a custom ad hoc scale was applied for the Primary Education students.<br>The results showed high scores in the evaluation items for both learning and service aspects. All three questionnaires assessing learning recorded very high scores. Regarding the service aspect, the positive impact of the Service-Learning (S-L) workshop was confirmed, with participants stating that they had learned in a playful and engaging way. |
| González-Patiño et al. (2017) | Experiential Learning (Participatory Action Research) | Cooperatively transform teaching and learning methods in two primary school groups. | The article describes the process of creating an innovation project linked to make culture in a secular charter school in the Autonomous Community of Madrid, serving students from middle-class families.<br>Students participated in a prototyping process to reconceptualize personal classroom furniture. The platform Pinterest was used to collectively share ideas for the proposed designs.<br>Contributions were made to educational research within the framework of a collective digital creation project characterized by a critical and participatory nature.<br>The project was structured around discovering digital manufacturing technologies, empowering all participants as researchers, energizing participatory |

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| | | | design processes, developing self-construction workshops, and producing and evaluating a final prototype of classroom furniture.<br>From a methodological perspective, the study concluded that involving non-participating researchers in case studies is appropriate to balance the analysis. |
| Jiménez-Ruiz et al. (2020) | Multisensory ICT Tools in Inclusive Settings | Analyse how professional development programs on multisensory ICT tools impact teacher attitudes toward their adoption. | This innovation project targets active Early Childhood and Primary Education teachers. It consists of three phases, divided into different sessions.<br>The intervention yielded positive evaluations from teachers regarding the adoption and use of multisensory digital tools. However, it also highlighted their concerns about practical aspects, such as the application of these tools in alignment with the school curriculum and the management of the necessary infrastructure at the institutional level to integrate them effectively into school life. |
| Martínez-Hernández & Herrada (2023) | Musical Stimulation for Students with ASD | Examine the benefits of a musical stimulation project for students with ASD aged 6 to 12 years. | The experience was conducted as a pilot project in a charter school in the Autonomous Community of Madrid, initiated by the TEA team (Specialist in Therapeutic Pedagogy, Social Integrator, and Counselor) and has since been fully integrated into the school's framework. The teachers responsible for implementing the project actively participated in its execution.<br>The project was carried out during the academic year with seven students with Autism Spectrum Disorder (ASD) enrolled in various grades of Primary Education. Data collection methods included direct observation during sessions, interviews with school professionals, and questionnaires completed by families.<br>Key findings from the project's development include the following: improvements in expression, interaction, and participation in activities; enhanced peer relationships and more adaptive behaviours and attitudes; a reduction in restrictive behaviours; the need for greater training for school staff involved in such projects; increasing the number of session hours to amplify impact; and involving students with other Special Educational Needs (SEN) in the project. |
| Morón-Monge & Daza-Navarro (2021) | Role of Women Scientists | Highlight educational activities promoting the contributions of women scientists to inspire gender equality in science. | The experience conducted in schools consisted of two main activities: an itinerant exhibition of women scientists and workshops-talks from the field of Educational Sciences.<br>For the first activity, 14 posters were designed, arranged chronologically as a timeline, showcasing contemporary women scientists and their contributions. The workshops included participation from a scientist from the Cell Biology Laboratory, who informally narrated her daily work. The session concluded with the presentation of the exhibition and a video created by researchers from the CSIC in Seville.<br>The results highlighted that children commonly associate the concept of a scientist with "people in lab coats working in laboratories using scientific equipment." The women scientists who stood out most to the children were María Sybilla, Hedy Lamarr, and Margarita Val. |

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| | | | Thanks to this innovation initiative, students reviewed basic life concepts, emphasized the role of women in science, reflected on cancer research, observed fluorescent cells, and demystified the stereotype of women scientists as solitary figures, instead highlighting the collaborative nature of research work. The experience benefited the school and strengthened the school-university connection. |
| Mulero & San Martín (2020) | Gender Stereotypes | Analyse student productions before and after activities linked to International Day of Women and Girls in Science. | The project was initiated by two Primary Education teachers at the school who teach science subjects and are committed to renewing the school laboratory and improving scientific practices conducted in the classroom.<br>The proposed activities aimed to highlight the role of women in the development of science and contribute to equality across all areas. These activities were carried out by 465 students at the school as part of workshops featuring three active scientists from different specialties, supported by the school's teachers and researchers.<br>A multiple case study was conducted using various research instruments, including observations, unstructured interviews, experience evaluation questionnaires, and analysis of student tasks.<br>The workshops led to improvements at different levels:<br>• At the organizational level: Increased teacher attendance at project coordination sessions, heightened student enthusiasm for distributing murals throughout the school, and a 30% increase in library loans related to science and women scientists.<br>• At the classroom level: High levels of student interest and motivation for classroom activities at all grade levels. Student satisfaction reached 94.8%, with a particular interest from girls inspired by the testimonies of women scientists, motivating them to consider a future in science. |
| Toledo-Morales & Sánchez-García (2017) | Augmented Reality and Learning Effects | Investigate whether augmented reality (AR) as a teaching tool enhances learning outcomes. | A project consisting of five phases was carried out, contrasting teaching methods by using augmented reality (AR) and omitting its use. Augmented reality improved students' grades and perceptions during the classes where it was implemented.<br>Despite the students' positive perceptions, the main issues were related to technical aspects involving teachers' actions, such as the use of technology and errors encountered with the digital tools. A lack of training in content creation and the appropriate use of software and hardware required for the method was also identified. |
| Yunta-Ibarrondo & Romero-Pérez (2022) | Emotional Education | Develop students' socio-emotional competencies and promote an educational environment that supports | This innovation project involved 869 Early Childhood, Primary, and Secondary Education teachers from the Autonomous Community of Madrid. The project implemented socio-emotional programs for students to develop their socio-emotional competencies and promote educational environments that support social and emotional learning.<br>The innovation project applied in Early Childhood and Primary Education was titled "Growing in Health." The |

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| | | emotional and social learning. | project's curricular planning and development were realistic and appropriate, employing suitable teaching strategies and setting adequate timeframes.<br>Several facilitators were identified, including: The school culture, characterized by cohesion among the leadership team, teaching staff, and the educational community; Transformational and distributed leadership focused on improving educational processes and outcomes; and Collaborative work networks.<br>However, the barriers identified were associated with bureaucracy, lack of resources, and inadequate leadership in certain schools. |

Source: own elaboration.

## IV. Discussion and conclusions

A systematic review of educational innovations implemented in Spain between 2017 and 2024 revealed a wide range of articles, many of which—after an initial screening—corresponded to educational innovation projects conducted in Early Childhood and Primary Education settings. Based on this premise, the conclusions are addressed through four emerging dimensions: a) characteristics of innovative processes; b) participation of teachers, students, and families in the innovation processes; c) externalization of research on educational innovation; and d) research perspectives.

### 4.1. Characteristics of innovative processes

The development of innovative experiences stems from modifying conventional teaching and learning processes by introducing multidisciplinary, active, and functional activities that contrast with traditional class sessions. These innovations show connections with progressive pedagogical movements (Beneyto-Seoane & Simó-Gil, 2023).

Regarding the type of activities, the creation of didactic sequences oriented toward promoting meaningful learning in students becomes evident. These experiences align with active methodologies, prioritizing competency development and the application of acquired knowledge. They reflect a shift from a traditional educational approach to one centred on knowledge construction (Muntaner Guasp et al., 2020).

Another prominent feature of many innovative experiences is the use of technology, which consolidates teaching practices based on active methodologies. These practices effectively enhance students' engagement with their own learning (Provenzano, 2024). Technology is integrated into pedagogical approaches such as project-based learning, problem-based learning, and gamification, where the selection of resources and applications serves pedagogical functions to aid in content acquisition and competency development (Drost, 2024).

The analysed practices highlight transformations at both the didactic and organizational levels within schools, breaking with traditional school models to promote deep learning among students (Rivas, 2017).

As teaching processes evolve, new skills and abilities emerge among students, which would otherwise remain unnoticed. The development of innovative practices in schools could positively influence the reconceptualization of students' potential, enhancing teachers'

expectations of their abilities. These expectations significantly impact students' academic outcomes (Hattie, 2015).

This underscores the importance of innovation in reshaping educational practices to foster student success and elevate the overall quality of learning experiences.

### 4.2. Participation of teachers, students, and families in innovation processes

The innovation developed in educational institutions appears to benefit from strong support from teaching staff, a conclusion consistent with previous research on innovation processes (Martínez-Mairele et al., 2022; Solheim et al., 2018; Travé González et al., 2024). However, some experiences document innovative momentum driven by only a small number of teachers committed to change. These teachers are often capable of energizing school-wide initiatives with significant declared impacts on teaching and learning processes. Positive outcomes from these experiences encourage teachers to continue developing such proposals.

Nevertheless, certain challenges remain. For instance, teachers involved in innovation projects often highlight gaps in their training, revealing insecurities related to their lack of expertise in specific topics. Once the projects begin, teachers become more aware of the need to implement training processes to optimize results and achieve better outcomes (Taylor, 2020).

On another note, innovation projects allow schools to tap into their existing potential and resources, especially when families and other stakeholders are invited to participate. Students have shown interest and motivation in all analysed experiences, with improvements in learning outcomes linked to the different themes addressed, varying by case. Moreover, many analysed practices incorporate initiatives, strategies, and proposals that connect schools with their communities and foster family participation (Pozuelos-Estrada, 2023). These projects integrate a community perspective to varying degrees of proximity and transferability, depending on the intended goals (López-Yáñez & Sánchez-Moreno, 2021).

### 4.3. Externalization of research on educational innovation

Research on innovation processes in schools is typically conducted by external researchers. Analysis of educational innovation studies reveals that their authors are external researchers rather than the teachers who implemented the innovations. To address this, it is necessary to promote research processes within teaching teams, creating the appropriate conditions for teachers to participate (Ion et al., 2022). This would facilitate the systematization and potential transfer of knowledge to other contexts, generating evidence-based educational practices (Pozuelos-Estrada & Rodríguez-Miranda, 2021).

Existing limitations and gaps in documenting innovation processes restrict the availability of research results and resources on specific themes, such as peer-reading programs (Azorín, 2017). While peer reading is a common practice in many schools in Spain, there is little specialized literature to guide teachers in developing their own experiences and grounding them in prior research.

Given that many innovation processes are studied through case studies, the need for non-participant researchers is emphasized as a strategy to enhance the credibility of the research

processes and outcomes. A key conclusion from this systematic review is the need to rethink research processes surrounding innovative practices (Stevenson et al., 2019).

### 4.4. Research perspectives

Innovative experiences are developed in diverse contexts subject to complex and interrelated factors. As a research perspective, it would be relevant to conduct studies aimed at analysing the key conditions and minimum requirements that enable the maximum impact of innovative experiences in schools. Such studies should evaluate the effect size of these interventions, their cost-benefit ratio, and their sustainability over time.

Additionally, future research processes should focus on deeply analysing the impact of innovative practices on students' competency levels compared to traditional teaching practices, determining to what extent these innovative experiences influence student learning outcomes.

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# Chapter 4. Analysis of Teaching Practices and Attitudes Towards Innovation in Higher Education

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## I. Introduction

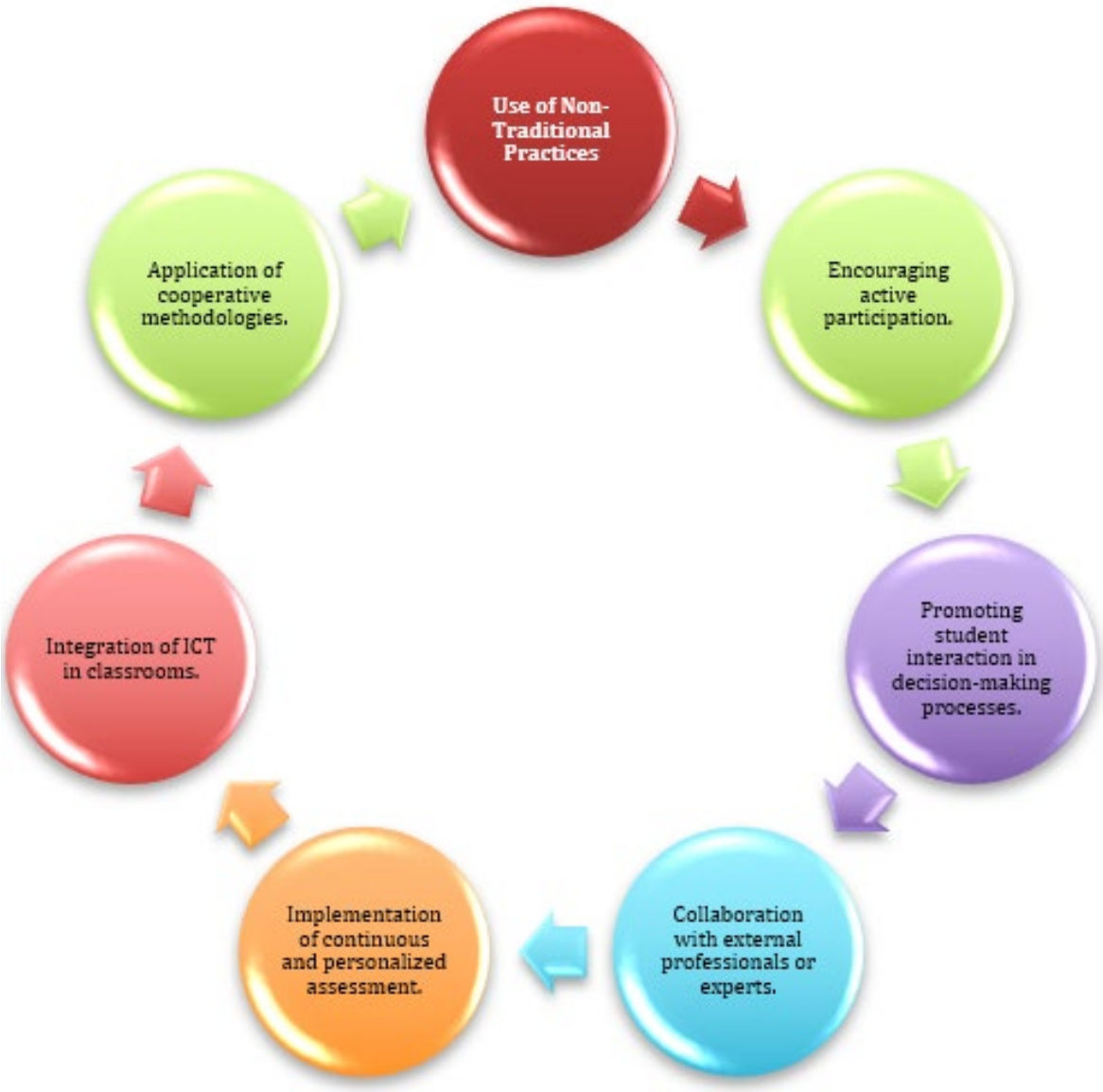
In the landscape of higher education, we have been addressing concepts related to digital competencies for years, such as TIC-TAC-TEP. The first of these, Information and Communication Technologies (ICT), are linked to the incorporation of technological devices (computers, projectors, digital whiteboards, mobile devices, etc.) in the Teaching-Learning process, enhancing both its face-to-face and virtual dimensions through changes in roles, environments, and routines (Área et al., 2017). The Learning and Knowledge Technologies (TAC) focus on exploring technological tools for learning and knowledge acquisition, guiding the pedagogical use of ICT. The Empowerment and Participation Technologies (TEP) promote collaboration within a framework of interaction, reflection, and the construction of learning (Mayorga, 2020). However, it was not until the spring of 2020 that the digital transformation was implemented, where university professors, guided by the regulations arising from the global COVID-19 pandemic, began to engage with the use of recordings as part of their own teaching practices, resulting in the design of a virtual teaching modality. From this point, teaching efforts were intensified towards the use of technology, while also deepening the development of digital competence among students (Almendingen et al., 2022).

In this changing context, the incorporation of ICT has a direct impact on higher education, which requires a flexible and open curriculum that fosters active student participation through reflective thinking, based on the creation of new spaces and active learning experiences (Gonzales, 2022). In these environments, educational innovation plays a crucial role, as teachers must advocate for active teaching methodologies with transformative strategies, involving students in their own learning, promoting dialogue, creativity, and responding to current demands (Fernández-Batanero et al., 2022).

A clear example of all the transformations occurring in recent years is the consolidation of Artificial Intelligence as a tool that has immersed us in an unknown world of possibilities, both in the educational and research fields (Prendes & Cordón, 2023). However, this scenario has generated great controversy, and while it is true that new technologies have captured attention from an innovative perspective, it is also worth asking: what methodologies are being implemented by educators or researchers to apply them? It is important to remember that the increasing use of ICT does not necessarily imply a modification or updating of teaching practices or the incorporation of new learning factors. Therefore, we must be clear that innovation does not arise from the mere incorporation of technologies into classrooms, but from the teacher's interest in prior pedagogical training, their understanding of the potential

use and applicability of these tools in the classroom (Cicero, 2018). Innovation among university educators is associated with the improvement of teaching-learning quality through the creation of new knowledge, perspectives, methodologies, and resources for subsequent application. In this way, teachers who fit into the innovative pedagogical model can be identified by the presence of the characteristics shown in Figure 1.

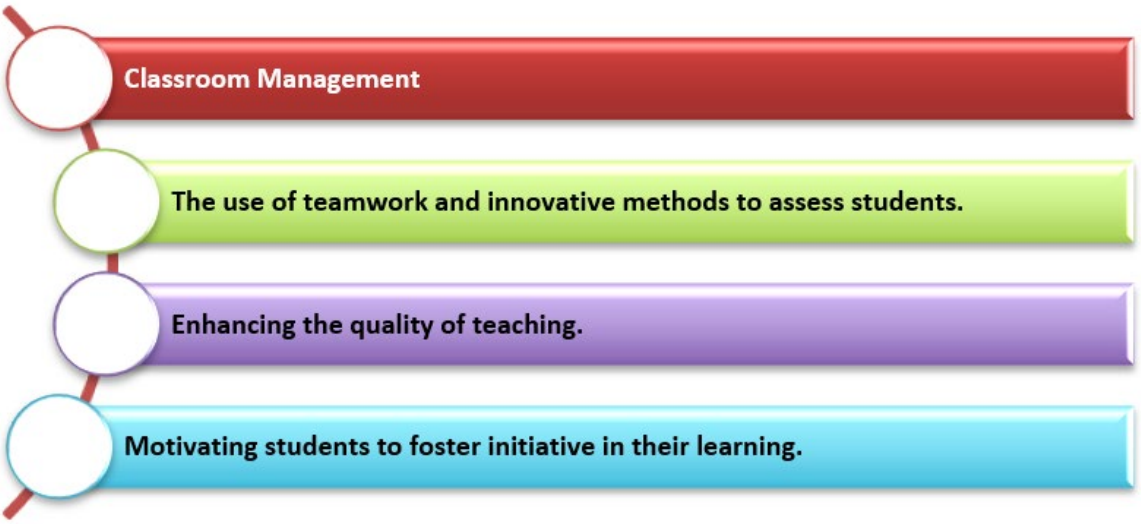
**Figure 1.**
*Characteristics of an innovative professional.*




Source: own elaboration based on Prendes and Cordón (2023).

Taking into consideration these attributes attributed to teachers, it would also be worth asking ourselves, accordingly, what competencies are necessary for them to be trained in to carry out educational innovation in higher education? To answer this question, various studies that have delved into this matter propose the following (Figure 2):

**Figure 2.**
*Innovative competencies in higher education.*



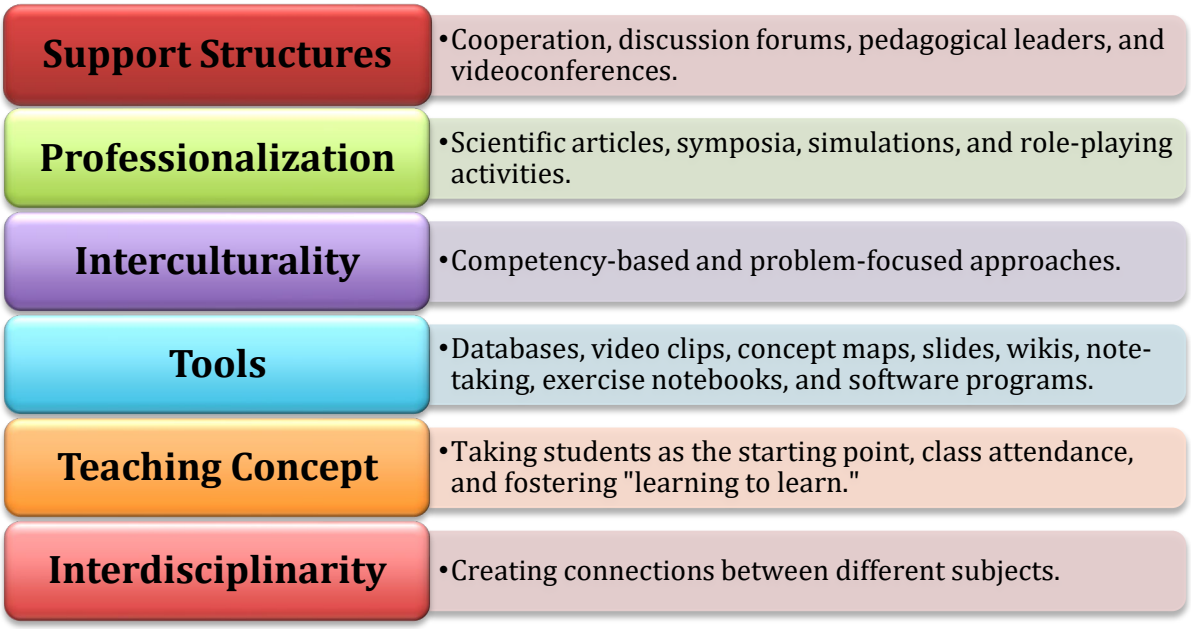

Source: own elaboration based on Salajegheh et al., (2020).

Thus, the teaching role focuses on acting as a guide for students to achieve autonomous learning, promoting their cognitive and personal development through activities and strategies aimed at enabling critical and interdisciplinary thinking of information; while ensuring they build their own professional knowledge, avoiding passive teaching and memorization (Vela, 2019).

On a national level, this process aligns with the principles established with the development of the European Higher Education Area (EHEA), which presents an opportunity to transform the traditional teaching model (still prevalent in many educational spaces within Spanish universities) and shift towards a model that focuses on the competence of "learning to learn," as well as the development of skills in students that allow them to construct their own knowledge from various contexts and address learning challenges (Vandeyar, 2020).

Ultimately, teachers must become mediators, designers of learning environments, and promoters of students' autonomous learning, with the aim of transitioning from a traditional model focused on the teacher's oratory and the unidirectional transmission of content in the classroom, to a cooperative, innovative model based on interaction, focused on student learning, where students not only learn the lesson but also gain awareness, thereby increasing their ability to apply it to social reality. For this, continuous teacher training is a key element on the path towards educational innovation (García & Stipcich, 2020). Finally, the following Figure 3 highlights several innovative pedagogical activities:

**Figure 3.**
*Innovative pedagogical activities*.




Source: created by the authors based on Walder (2017).

Based on all the above, we raise two questions to which we will provide answers throughout this research: How do university professors carry out their teaching practice? And what attitude do university professors have towards the implementation of innovative activities?

## II. Methodology

### 2.1. Objectives

The development of this work is based on two general objectives defined as follows:

1. To deepen the analysis of the teaching practice of the faculty at the University of Huelva through their opinions.

2. To analyse the attitude of the faculty at the University of Huelva towards the use of innovative learning activities.

### 2.2. Method and Sample

To respond to the objectives outlined above, this work relies on a survey-based methodology with a cross-sectional approach, descriptive, and correlational in nature.

The research focuses on the teaching staff at the University of Huelva during the 2023/2024 academic year. The sample consists of an incidental group of 118 higher education professionals (54.24% men and 45.76% women), with an average age of 47.2 years and an average experience of 17.58 years. Table 1 displays the distribution of the faculty across different professional categories, all of whom are part of 33 areas of knowledge, representing the 9 faculties in which these professionals carry out their teaching duties.

**Table 1.**
*Professional Categories of University Faculty.*

| Category Name | Percentage |
|---|---|
| Assistant Professor | 3.4 % |
| Associate Professor | 11.0 % |
| Senior Lecturer | 35.6 % |
| Full Professor | 10.2 % |
| Substitute Faculty | 28.8 % |
| Associated Faculty | 7.6 % |
| Faculty in Training | 2.5 % |

Source: own elaboration.

Other types of data that help complete the sociodemographic and academic profile of the sample participating in the study, and that help refine the research objectives, are presented below:

a) 89.8% acknowledge participating in training courses to improve their teaching practice and update their knowledge.
b) 79.7% acknowledge implementing innovative teaching practices in their classes.
c) 70.3% state that they do not use artificial intelligence in their classes.
d) 86.4% agree that artificial intelligence is an innovative tool supporting university teaching.
e) 51.7% affirm that they use artificial intelligence as a support tool in their research.

Based on these results, we observe a sample of faculty members who acknowledge updating their teaching practices and introducing innovative elements. However, within the context of artificial intelligence, its inclusion in teaching practice is still somewhat distant from its intended purposes (in research, there is a greater balance in the responses provided), although they do recognize it as a tool that supports university teaching.

### 2.3. Instrument

For data collection, the questionnaire by Santos Rego et al. (2017) on teaching practices and faculty attitudes towards innovation (CUPAIN) was used. This instrument, originally composed of 3 subscales, was modified to include two subscales with 12 and 11 items, respectively.

The first scale synthesizes a wide variety of teaching strategies employed in higher education. Faculty members were asked to rate on a scale from 1 to 5 the frequency with which they use each strategy in their teaching, with 1 being never and 5 being always. Based on the psychometric properties identified by the authors mentioned above, 12 of the original 18 items were selected, as they provided the best factor loadings. This subscale includes 3 factors:

a) Factor I: External engagement in teaching, which includes activities that the professor uses in their subject to extend learning beyond what is covered in class (items: 2, 7, 8, 12).
b) Factor II: Focuses on the role that students play in the teaching process (items: 4, 5, 6, 11).
c) Factor III: Refers to the strategies or methodologies that the instructor uses in the classroom (items: 1, 3, 9, 10).

The second subscale synthesizes a series of learning activities used in higher education, and faculty are asked to rate their level of interest in these activities on a scale from 1 to 5, where 1 is not at all and 5 is very much. Based on the psychometric properties from the same authors, this subscale includes two factors (for this study, the same items from the original scale are used):

a) Factor I: Defined as the set of learning activities used by faculty that are student-centred (items: 1, 2, 3, 4, 5, 6).
b) Factor II: Includes a set of learning activities focused on interactions (items: 7, 8, 9, 10, 11).

Thus, the instrument consists of 23 items related to the professional development of teaching and interest in innovative practices. It has been previously validated in studies such as those by Lorenzo et al. (2019) and Verea et al. (2018). Psychometrically, the Cronbach's Alpha statistic was applied to the full scale, obtaining a value of $\alpha = .89$. It was also applied to each subscale, with the first subscale obtaining $\alpha = .82$ and the second $\alpha = .85$, confirming that the instrument, composed of two subscales, has high reliability.

Additionally, an analysis procedure was developed to assess the normal distribution of the data concerning skewness and kurtosis (recommended value ±1), yielding optimal values.

### 2.4. Procedure and Data Analysis

The application of the instrument took place during the months of February and March 2024, via the institutional email associated with the faculty at the University of Huelva. To reach the maximum possible number of participants, the instrument was adapted to a Google Forms template, where the research objectives were initially explained, as well as the anonymous and voluntary nature of the study, ensuring the application of ethical principles such as confidentiality of responses.

For the analytical treatment of the obtained data, the SPSS software (version 21) was used. Descriptive procedures were applied concerning central tendency and data dispersion, and correlational statistics were employed to explore potential associations between the scores obtained in each of the subscales or with some of the sociodemographic variables of interest to the study.

## III. Results

### 3.1. Descriptive Analysis: Teaching practice subscale

First, the descriptive analysis of the data is conducted. The mean and standard deviation of the items are calculated, and each section is presented based on the previously described factors. Note that in this scale, the frequency of use of the practices expressed in the items is evaluated.

- Factor I: External engagement in teaching and activities aimed at extending learning beyond what is covered in the classroom (items: 2, 7, 8, 12).

As shown in Table 2, those items (2, 8) related to the organization of activities by the instructor, either inside or outside the classroom, have a lower mean than those focusing on promoting more independent and responsible student work, which is not directly related to being organized by the instructor. It is also noteworthy that a high standard deviation is observed across all items.

**Table 2.**
*Descriptive Statistics for Factor 1.*

| | N | Minimum | Maximum | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| 2. I usually invite external professionals to the university to present their work. | 118 | 1 | 5 | 2.47 | 1.099 |
| 7. I recommend my students visit exhibitions or attend events related to the subject. | 118 | 1 | 5 | 3.57 | 1.098 |
| 8. I promote and organize extracurricular activities outside of class hours (e.g., visits, conferences, etc.). | 118 | 1 | 5 | 2.56 | 1.173 |
| 12. I encourage my students to attend activities or seminars from other subjects. | 118 | 1 | 5 | 3.40 | 1.071 |

Source: own elaboration.

• Factor II: Focused on the role played by the students in the teaching process (items 4, 5, 6, 11). This dimension shows high average scores for the frequency of use, except for the item in which the students' experience is used as a strategy to integrate it into the course content (although this should be considered with caution due to the high standard deviation) (Table 3).

**Table 3.**
*Descriptive statistics for Factor 2.*

| | N | Minimum | Maximum | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| 4. The students actively participate in my classroom sessions. | 118 | 1 | 5 | 4.03 | .811 |
| 5. I promote activities that encourage critical thinking (debates, class questions, etc.). | 118 | 2 | 5 | 4.24 | .747 |
| 6. I use the students' experiences to relate them to the subject matter. | 118 | 1 | 5 | 3.75 | .905 |
| 11. I strive to maintain a good interpersonal relationship climate in my classes. | 118 | 1 | 5 | 4.57 | .722 |

Source: own elaboration.

• Factor III: focused on the strategies or methodologies used by the instructor in the classroom (items: 1, 3, 9, 10).

The mean scores are also positioned in the middle of the frequency scale, indicating that the use of the strategies outlined in Table 4 is occasional (a significant standard deviation is once again observed).

**Table 4.**
*Descriptive statistics for Factor 3.*

| | N | Minimum | Maximum | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| 1. I analyse and present practical cases as support for students' learning. | 118 | 1 | 5 | 3.89 | .932 |
| 3. I conduct continuous assessment (essays, reports, portfolios, etc.). | 118 | 1 | 5 | 3.83 | 1.127 |
| 9. I use teamwork as a teaching strategy. | 118 | 1 | 5 | 3.75 | 1.078 |
| 10. I use technology to promote student participation and interactivity (online tutoring, virtual classrooms, forums, etc.). | 118 | 1 | 5 | 3.62 | 1.093 |

Source: own elaboration.

### 3.2. Descriptive analysis: Subscale interest in teaching innovation

As in the previous section, the descriptive analysis of the data is conducted; the mean and standard deviation of the items are used, and each section is presented based on the factors previously described. It is important to note that this scale assesses the degree of interest toward the items presented.

• Factor I: Focuses on the set of learning activities used by faculty that are student-centred (items 1, 2, 3, 4, 5, 6).

From Table 5, it is noteworthy that item 6 has the lowest mean, indicating that faculty members are more indifferent when organizing activities that connect students with the community (SD = 1.03), while the rest of the items show a high level of interest.

**Table 5.**
*Descriptive statistics for factor 1.*

| | N | Minimum | Maximum | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| 1. Activities that promote a problem-solving methodology. | 118 | 2 | 5 | 4.31 | .748 |
| 2. Activities that encourage student participation. | 118 | 2 | 5 | 4.52 | .637 |
| 3. Activities that develop students' critical thinking skills. | 118 | 3 | 5 | 4.61 | .524 |
| 4. Activities focused on methodological updating. | 118 | 2 | 5 | 4.09 | .857 |
| 5. Activities that foster autonomous learning. | 118 | 2 | 5 | 4.31 | .663 |
| 6. Activities that promote community engagement. | 118 | 1 | 5 | 3.81 | 1.037 |

Source: own elaboration.

• **Factor II**: integrates a set of learning activities focused on interactions (items 7, 8, 9, 10, 11).

In the last dimension (Table 6), the items related to activities concerning environmental issues, communication in a foreign language, and the promotion of leadership or entrepreneurship show lower mean scores, although with a high standard deviation. On the other hand, the faculty demonstrates significant interest in lifelong learning and interdisciplinary work (items 7 and 9).

**Table 6.**
*Descriptive statistics for Factor 2.*

| | N | Minimum | Maximum | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| 7. Activities that promote lifelong learning. | 118 | 2 | 5 | 4.15 | .833 |
| 8. Activities that encourage communication in a foreign language. | 118 | 1 | 5 | 3.24 | 1.286 |
| 9. Activities that promote interdisciplinary work. | 118 | 1 | 5 | 3.97 | 1.097 |
| 10. Activities that enhance employability, leadership, initiative, and entrepreneurial spirit. | 118 | 1 | 5 | 3.66 | 1.080 |
| 11. Activities that develop sensitivity toward environmental issues. | 118 | 1 | 5 | 3.74 | 1.173 |

Source: own elaboration.

### 3.3. Correlational analysis

The dataset was examined to identify significant correlations between the sociodemographic variables under study and the content of the employed subscales.

First, a low but statistically significant correlation (φ = .21) at the 95% confidence level (p = .02) was observed between gender and the implementation of innovative teaching practices in class. Notably, based on the direction of the statistic, women tend to favor these innovative teaching practices more than men (Table 7).

**Table 7.**
*Correlation between gender and the implementation of innovative teaching practices in class.*

| | | | I implement innovative teaching practices in my classes | |
|---|---|---|---|---|
| | | | Yes | No |
| Gender | Woman | Count | 48 | 6 |
| | | Expected count | 43.0 | 11.0 |
| | Man | Count | 46 | 18 |
| | | Expected count | 51.0 | 13.0 |

Source: own elaboration.

Additionally, a low but statistically significant correlation (φ = .20) at the 95% confidence level (p = .02) was found between the valuation of artificial intelligence (AI) as a classroom tool and its perception as an innovative resource supporting teaching (Table 8).

**Table 8.**
*Correlation between the use of AI in class and the perception of AI as a teaching support tool.*

| | | | **Artificial Intelligence is an innovative tool to support teaching.** | |
|---|---|---|---|---|
| | | | **Yes** | **No** |
| **I implement the use of Artificial Intelligence in my classes.** | **Yes** | Count | 34 | 1 |
| | | Expected count | 30.3 | 4.7 |
| | **No** | Count | 68 | 15 |
| | | Expected count | 71.7 | 11.3 |

Source: own elaboration.

On the other hand, we found a moderate association (phi = .40) and significant at the 99% level (p = .00) between those who use artificial intelligence in their classes and those who employ it as a tool to support their research (Table 9).

**Tabla 9.**
*Correlation between the use of AI in classes and its use in research.*

| | | | **I use Artificial Intelligence as a support tool in my research.** | |
|---|---|---|---|---|
| | | | **Yes** | **No** |
| **I implement the use of Artificial Intelligence in my classes.** | **Yes** | Count | 29 | 6 |
| | | Expected count | 18.1 | 16.9 |
| | **No** | Count | 32 | 51 |
| | | Expected count | 42.9 | 40.1 |

Source: own elaboration.

Therefore, based on the previous findings, a low (phi = .21) and significant association at the 95% level (p = .02) is also identified when establishing that those who value the use of artificial intelligence as support for research also consider it an innovative tool to support teaching (Table 10).

**Table 10.**
*Correlation between the variable use of AI as support for research and its conception as a tool for teaching support.*

| | | | Artificial Intelligences are an innovative tool to support teaching. | |
|---|---|---|---|---|
| | | | **Yes** | **No** |
| **I use Artificial Intelligence as a support tool in my research** | **Yes** | Count | 57 | 4 |
| | | Expected count | 52.7 | 8.3 |
| | **No** | Count | 45 | 12 |
| | | Expected count | 49.3 | 7.7 |

Source: own elaboration.

## IV. Discussion and Conclusions

After presenting the results obtained in the previous section and considering the two dimensions examined in this study, several ideas emerge for discussion:

Firstly, it has been observed that, in the scale related to the teaching practices carried out by university faculty, the promotion of initiatives connecting teaching with external frameworks is infrequently employed. When such initiatives are occasionally implemented, they often involve inviting students to independently attend various events of interest related to the course content. This finding contrasts with the data gathered in the study by Verea et al. (2018), where external engagement is identified as the most frequently employed teaching practice (Walder, 2017).

Similarly, it has been noted that valuing students' prior experience or knowledge is a practice occasionally used, though it is less prevalent than other student-centred practices such as active learning, fostering critical thinking, or creating a positive classroom environment (Salajegheh et al., 2020). These results are consistent with those reported by Verea et al. (2018), which also emphasize the predominance of practices aimed at enhancing interpersonal relationships. Finally, we encountered faculty members who frequently employ other effective strategies for university teaching, such as the use of case studies, teamwork, continuous assessment, and the integration of technology (Verea et al., 2018).

This aligns with the findings regarding the high level of interest in developing innovative, student-centred practical activities (Fernández-Batanero et al., 2022; Salajegheh et al., 2020). Conversely, a more moderate interest was observed in implementing innovative activities or initiatives focused on establishing interactions with other realities or contexts that transcend the immediate scope of the course content (Walder, 2017). This is also reflected in the low scores obtained in variables associated with Factor I of the scale on teaching practical activities (Verea et al., 2018).

Given the above, it could be cautiously affirmed—considering the data's dispersion—that university faculty tend to use less frequently those teaching practices that require organizing activities beyond the predefined classroom framework, possess a cross-disciplinary nature, or are directly associated with students' prior experiences as a connection point with the curriculum (Área et al., 2017).

Regarding correlations, it was observed that female faculty members demonstrate a greater propensity to initiate and promote innovative practices in the classroom. Additionally, those who utilize artificial intelligence (AI) in their teaching also integrate it into their research and perceive it as an innovative tool for supporting teaching (Liu & Yao, 2022). This highlights the existing uncertainty surrounding the use of AI tools in higher education teaching and research, as no formal policies are in place yet, and significant efforts are being made to promote their use from a constructivist and positive perspective (UNESCO, 2021).

The limitations of this study are directly related to the representativeness of the sample obtained, which may affect the extrapolation of the findings to other similar contexts and realities.

For future research, it would be advisable to include other stakeholders involved in the teaching and learning process in higher education. This would help broaden the perspective obtained from university faculty and provide a more comprehensive comparison.

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# Chapter 5. How to ensure learning and academic integrity in university students in the face of artificial intelligence use? Approaches from case methodology in virtualized environments

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## I. Introduction

In contemporary times, educational settings are undergoing a substantial metamorphosis as they transition from physical to digital paradigms (Chirumamilla & Sindre, 2019; Kulikova & Yakovleva, 2022). This shift urgently necessitates the development of strategies to facilitate the transition from analogue to digital in the teaching process and knowledge construction. The global pandemic marked a turning point, as the digital dimension of society experienced forced prominence, resulting in accelerated development with both benefits and challenges, exposing gaps and needs that were immediately reflected in the educational sphere (Gil-Fernández et al., 2021; Marzal-Felici & Casero-Ripollés, 2023). At that moment, reality revealed an educational landscape with fewer technological resources than required and limited capacity to manage learning networks (Diez-Gutiérrez & Gajardo-Espinoza, 2020). However, other authors, such as García-Peñalvo et al. (2020), presented a more optimistic outlook, assuming that face-to-face universities had achieved a reasonably acceptable transition to virtualization. This scenario has now become permanent, and within the university landscape, each institution, and the areas or departments comprising it, has adopted different responses depending on their instructional design, the digital competencies of their teaching and research staff, available resources, and feedback from students.

This transition involves not only a transformation of resources and platforms but also the adaptation of methodologies to ensure the effectiveness of the educational process in this new reality. In this context of transition, collaborative learning emerges as an essential component for fostering interaction and collective knowledge construction in digital environments (Gil-Fernández & Calderón-Garrido, 2022; Männistö et al., 2020). Therefore, digitalization represents not only a technological evolution but also a new reality that presents specific challenges for higher education in two fundamental areas: the effective construction of learning and the maintenance of academic integrity.

Currently, technology-mediated educational environments constitute the most significant space for interaction (Gil-Fernández et al., 2023). This cyberspace is embedded within a media culture that encompasses not only educational settings but also the broader digital society (Aguaded et al., 2021). In today's educational landscape, whether the teaching model is face-to-face, hybrid, or online, media environments represent critical spaces for development, facilitating the creation of virtual learning environments for innovative proposals.

On one hand, constructing learning in collaborative digital environments (Davis, 2023; Setiana et al., 2023) is a process shaped by dynamic interactions among students, faculty, and educational policies and resources. Through this digital collaboration, learning experiences transcend physical barriers and foster the collective construction of knowledge. Scientific literature has analysed these virtual learning environments, identifying recommendation techniques, personalization parameters, models, algorithms, and evaluation metrics for content recommendation systems (Raj & Renumol, 2021), considering the characteristics of connected learning. These environments form a techno-social reality representing the socio-material framework through which individuals learn (Dabbagh & Castañeda, 2020), continually presenting new challenges.

Thus, learning tools in a digital environment play a key role in ensuring effective knowledge construction and maintaining academic integrity. Within this framework, the case methodology (Cahen & Borini, 2020) facilitates the recreation and analysis of real-life situations, enabling students to develop critical professional competencies for their future careers.

On the other hand, academic integrity (Alarcón, 2020) encompasses the values that define ethical academic behaviour, fostering a community dedicated to learning and the exchange of ideas. For a university, the integrity of its community (students and staff) is essential for maintaining a solid reputation (Holden et al., 2021). An academic transcript, degree, or certificate gains universally recognized meaning, reflecting specific knowledge and skills in its holder. Understanding these fundamental values of academic integrity within a university community establishes a shared framework for professional work, emphasizing the importance of mastery in knowledge, skills, and abilities. However, academic integrity faces a new challenge in the digitalized society: the proliferation of tools such as large language models (LLMs) like ChatGPT. These introduce significant complexity and require specific strategies to preserve academic integrity (Bin-Nashwan et al., 2023; Khaddage et al., 2023). At the same time, it is crucial not to disregard advancements and new realities but to integrate them into instructional designs in an optimized manner to generate and enhance skills and competencies.

The adoption of generative artificial intelligence tools by society has significantly impacted education, eliciting mixed feelings among stakeholders, as reflected in the scientific literature. While some view these tools as an opportunity to improve learning, personalize education, and enhance teaching resources, others express concerns about ethical and legal implications (García-Peñalvo, 2024). Among educators, there is evident skepticism toward the misuse of these tools and ethical issues related to authorship (Gašević et al., 2023), alongside concerns about their potential to diminish the development of critical thinking skills (Thurzo et al., 2023).

The objective of this study is to propose and test a teaching experience based on the case methodology as a means to ensure academic integrity and foster meaningful learning among university students in collaborative virtual environments. This approach addresses the increasing prevalence of students improperly using large language model tools, such as ChatGPT.

## II. Theoretical Framework

### 2.1. The Case Methodology as a Catalyst for Competency Development

The case method (Cahen & Borini, 2020) is a working methodology developed by the Harvard Business School, aimed at enhancing students' analytical and managerial skills (Hammond, 2006). This concept is intrinsically linked to the business-oriented projection of teaching content across various disciplines. Initially designed for corporate-related subjects, it has gradually extended to other fields of study, as analysing specific problems encountered by companies and learning from the experiences of contemporary business leaders prove to be highly educational across diverse areas (Núñez-Tabales et al., 2015; Ramírez & Hervis, 2019).

This methodology involves presenting theoretical knowledge, fostering a student-led discussion about the case under the professor's guidance, and engaging in group work to solve the case. As in real life, there is no single solution to a case, encouraging the exploration of innovative resolutions. The benefits of these procedures are vast: students must identify the central issues in the case, apply learned theory, listen to differing viewpoints, work collaboratively, and evaluate the impact of decisions made (Brinkerhoff, 2003; Miranda et al., 2021).

One of the key aspects of the case methodology is the development of transversal competencies. Beyond strengthening field-specific competencies, it also fosters generic instrumental competencies (such as oral and written communication, organizational skills, decision-making, and problem-solving), interpersonal competencies (such as recognizing diversity and multiculturalism, teamwork, critical thinking, commitment, and ethical reasoning), and systemic competencies (such as adapting to new situations, understanding other cultures and customs, and leadership) (Arias-Gundín et al., 2008).

This study is situated within the context of a fully online university. It is therefore crucial to reflect on both digital and media literacy competencies. Starting in the first decade of this century, it became evident that these competencies were interdependent, leading to the proposal of dimensions that established the foundation for a new integrative approach (Pérez-Rodríguez & Delgado-Ponce, 2012). In 2009, the European Commission introduced a recommendation on media literacy—Recommendation 2009/625/EC on Media Literacy in the Digital Environment—calling for the integration of educational initiatives aimed at incorporating a critical media component into digital competencies (Marzal-Felici & Casero-Ripollés, 2023).

In the context of digital education, the application and analysis of results, as well as the methodology as a whole, should not differ significantly from its application in face-to-face teaching. From the analysis and explanation of the case to its resolution, digital tools enable an approach comparable to that achieved in traditional classroom settings (Quezada-Castro & Dios-Castrillo, 2020).

### 2.2. The Case Methodology for Academic Integrity

Digital teaching, particularly with the introduction of large language models (LLMs), is facing new challenges concerning academic integrity. In 1999, the International Centre for Academic Integrity (ICAI) published *Fundamental Values of Academic Integrity*, summarizing five core values of academic integrity: honesty, trust, fairness, respect, and responsibility. In 2014, a sixth value—courage—was added. The primary aim was to promote ethics and integrity in academia and society. Historically, academic dishonesty primarily involved cheating during exams or plagiarizing assignments. However, the advent of LLMs has expanded the possibilities for dishonest practices (Sabzalieva & Valentini, 2023). These practices may be even more pronounced in digital education settings, according to Villarroel (2021).

To mitigate such practices, some universities offering digital education through non-face-to-face, virtual models employ tools to monitor students during exams. These include requirements such as keeping both front and rear cameras on during the test, facial recognition, environment monitoring, disabling text copying, preventing students from opening additional tabs or browsers, setting strict time limits, keeping the microphone active at all times, and ensuring students do not communicate via instant messaging. Ironically, these tools, known as “proctoring software,” leverage artificial intelligence to monitor and supervise users (Njuguna, 2022). Despite these measures, instructors still face the challenge of making decisions about potential evidence of dishonesty, such as reviewing recordings and photographs of students during exams (Dendir & Maxwell, 2020). These difficulties extend beyond exam design to include the evaluation and correction of assignments, further complicating efforts to deter dishonest practices.

The risk of dishonest practices has always been a concern, prompting educators to redesign activities and assignments to combat these behaviours. However, the introduction of LLM tools, which are often freely accessible, represents a turning point, presenting educators with new challenges (Manso & Mesa, 2022). In this context, the case methodology can play a significant role in addressing these issues. Real-life scenarios provided as cases for resolution, along with preparatory classes, activity discussions, teamwork, and public presentation of solutions, offer educators various tools to design activities in ways that make it challenging to find the necessary information for completing the tasks using such tools.

## III. Method

This study presents an exploratory and propositional investigation of a designed experience aimed at ensuring learning and best practices among students in collaborative digital environments, considering the potential use of LLM tools such as ChatGPT.

The research examines the outcomes derived from implementing the case methodology within the context of virtualized university teaching. To illustrate this approach, the *Master’s in Cultural and Natural Heritage* at the International University of La Rioja (Spain) is taken as a reference. This program transformed its content, methodology, and evaluation to incorporate the case methodology. Through an analysis of results from a cohort of students and a study of the teaching experience, a comprehensive evaluation of the challenges and opportunities this methodology offers in a virtual environment is conducted. The application of this

methodology is explored within a student cohort, assessing the obtained results and outlining future instructional design perspectives.

Based on the study's objectives and its theoretical framework presented earlier, the following hypotheses are established:

- **$H_1$**: The case methodology in a virtual environment fosters student learning.
- **$H_2$**: The case methodology reduces the likelihood of improper use of tools such as LLMs, contributing to ensuring academic integrity.

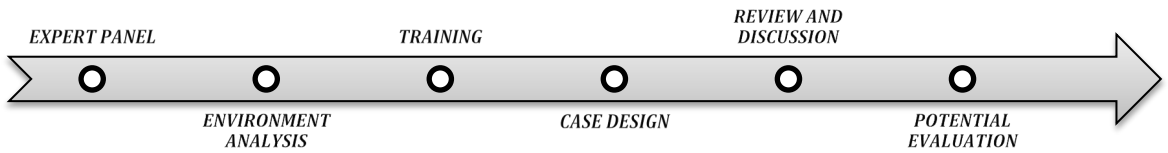
### 3.1. Scope of the study, sample and instruments

This study is based on a tested experience within an official postgraduate program in cultural and natural heritage management, delivered entirely online. The study spans three courses and involves a total of 191 students.

### 3.2. Design and testing of the analysed experience

The following section outlines the various methodological phases for implementing the case methodology in a virtual environment as a tool to ensure academic integrity and foster effective learning.

**Figure 1.**
*Flowchart of the Design and Testing of the Experience.*




Source: own elaboration.

#### *3.2.1. Phase 1. Creation of the Expert Commission for ensuring academic integrity*

The first phase of our methodology involves the establishment of an Expert Commission, a highly qualified group specializing in the specific area of study. These experts were meticulously selected based on their experience, academic credentials, and critical skills to assess academic integrity. This commission was required to comprise individuals capable of applying objective criteria to evaluate the suitability of assessment instruments (exams or evaluable practices) implemented in the tested courses, ensuring the alignment of academic integrity with learning promotion within the course content framework. Their contribution is essential to guarantee the quality and rigor of the case studies.

The selection of experts must consider diverse perspectives and approaches within the field of study. The commission acts as a collegiate body that lends credibility and expertise to the process. They were provided with a clear description of their roles and responsibilities, including the in-depth review of case studies to evaluate academic integrity, identify potential plagiarism, and verify the originality of the cases. Additionally, clear and objective criteria were established to guide the evaluation of academic integrity. These criteria not only serve as a

guide for the commission but also ensure consistency and objectivity throughout the review process.

*3.2.2. Phase 2. Analysis of the digital environment*

This phase involved conducting a detailed analysis of the specific characteristics and dynamics of the digital environment where the case methodology was planned to be implemented. This included identifying and evaluating available tools and platforms to optimize student interaction and participation. In this regard, Canvas was selected as the implementation platform, ensuring both asynchronous and synchronous mechanisms for supporting and discussing cases during the subsequent implementation of the case methodology.

*3.2.3. Phase 3. Comprehensive Teacher Training*

The comprehensive preparation of teachers responsible for creating cases is a fundamental step. This training specifically addressed the particularities of the digital environment, including modules dedicated to the effective use of artificial intelligence for crafting unsolvable cases and strategies for adapting theoretical content to its applicability in practical cases. The selected instructors for the five tested courses underwent a total of 10 hours of training for this purpose.

*3.2.4. Phase 4. Designing case studies in the digital environment*

The criteria for creating case studies for each course were agreed upon by the instructors responsible for the pilot courses and members of the expert commission. Firstly, it was agreed upon the necessity of clarifying the learning objectives. This involves precisely establishing the educational outcomes intended to be achieved through the case methodology in the digital environment and aligning them with specific competencies expected to be developed by students.

Additionally, the case studies required the inclusion of realistic situations and current issues, fostering critical thinking and the application of knowledge by students. Interactive activities were considered essential to capitalize on the digital environment's capabilities. These include elements such as online discussions, simulations, and virtual collaboration, ensuring these activities promote student participation. Each case study included in the respective pilot courses featured a synchronous presentation by the instructor, an initial discussion of the case, a virtual coffee session for discussing and addressing essential questions posed by students during case resolution, and a final resolution discussion where student groups demonstrate their ability to address the problems presented in each case study. The implementation of each case study may last three to four weeks, depending on its complexity and the instructor's discretion.

*3.2.5. Phase 5. Review and Discussion of Case Studies with LLMs: individual and group scale*

Once each case study was created by the instructors responsible for the tested courses, a discussion using LLMs like ChatGPT was conducted to test their potential resolution through these tools, identifying areas for improvement and adjustments.

Additionally, the final versions of each case study were sent to the expert commission to evaluate both academic integrity (through their discussion with LLMs) and the suitability of the course content to a practical dimension in the situations and problems presented for student resolution. The final outcome of this stage involved integrating improvement aspects and considerations proposed by the expert commission.

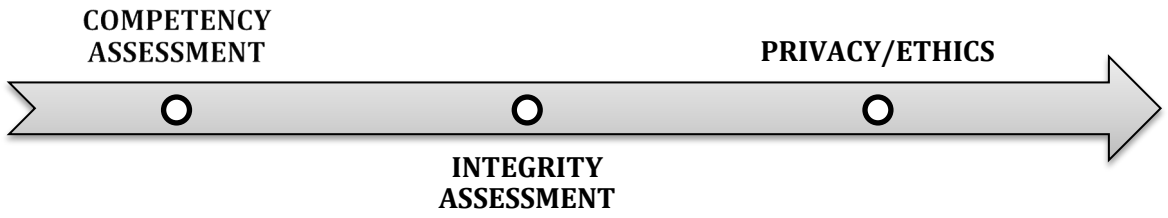
*3.2.6. Phase 6. Peer Review among other instructors to evaluate LLM response potential*

The final stage involves distributing cases among other instructors for a peer review process. This process not only evaluates the quality of the cases from various perspectives but also serves as a mechanism to assess the potential of AI-generated responses, specifically from ChatGPT.

Reviewing instructors were guided on using ChatGPT in evaluating the cases. They were asked to identify strengths and areas for improvement in the AI-generated responses. This collaborative and peer-review approach ensures that the cases are rigorous, challenging, and suitable for digital environments.

### 3.3. Implementation of the Case Study and Comparability with Previous Scenarios

**Figure 2.**
*Flowchart of the implementation.*




Source: own elaboration.

The evaluation of the implementation of the case study methodology in the virtual environment considered two fundamental aspects: learning construction and academic integrity.

To evaluate learning construction, this study focused on the acquisition of competencies within the framework of each of the tested courses, using a sample of 191 students divided into a control group and an experimental group. This approach allowed for a comparison between students exposed to the case study methodology and those who were not.

On the other hand, to evaluate academic integrity, the analysis considered grades obtained in cases solvable with artificial intelligence versus those unsolvable, using the same sample of 191 students.

*3.3.1. Evaluation of the Case Study Methodology for Competency acquisition*

For assessing student learning through the implementation of the case study, the study evaluated the acquisition of competencies within the tested courses. Two distinct subsamples were used to conduct a comparative evaluation of the effectiveness of the case study methodology in the digital environment. These subsamples included a group of students not exposed to the case study methodology (referred to as the "control group") and another group that experienced its implementation (referred to as the "experimental group"). The two groups were compared using an analysis of variance (ANOVA).

To perform the comparison, learning outcomes were evaluated at the end of each scenario defined in the study. The first scenario corresponds to the phase before implementing the case study methodology ("pre" scenario), where students in the experimental group had not yet been exposed to this methodology. The second scenario ("post" scenario) was conducted after the case study methodology was implemented. In both scenarios, learning outcomes were assessed to measure differences in performance between the control group and the experimental group, providing a comparative evaluation of the effectiveness of the case study methodology in the digital environment. These evaluations enabled a specific analysis of the methodology's impact on achieving the established learning objectives, as well as offering practices to ensure academic integrity in higher education.

*3.3.2. Evaluation of the Case Study Methodology for Academic Integrity*

To evaluate academic integrity, grades obtained in solvable and unsolvable cases were analysed, considering the activities and assessments completed by the 191 students in the sample. The cases were classified into two categories: solvable through artificial intelligence and unsolvable, based on discussions with an LLM to determine whether each activity or assessment could achieve a minimum grade using the results generated by the tool. Additionally, the grades obtained by students were cross-referenced with this dichotomous categorization.

The method for analysing academic integrity relied on Pearson correlation analysis.

*3.3.3. Privacy and Ethical Considerations*

Ethical measures were implemented to safeguard the privacy and confidentiality of participants. It was ensured that the evaluation of academic integrity and participation in the control and experimental groups complied with ethical standards.

This integrated methodology not only assessed academic integrity in cases solvable through artificial intelligence but also analysed performance differences between the control and experimental groups, providing a holistic understanding of the effectiveness and integrity of the case study methodology in the educational environment.

## IV. Results and Discussion

### 4.1. Statistical Results of Testing the Case Study Methodology in a Digital Environment

First, an ANOVA was conducted to compare the means of competencies achieved between the experimental group and the control group, both in the pre-phase and the post-phase. For this purpose, the acquisition of competencies for each of the tested courses was measured by the responsible instructors, using a numerical equivalence scale of 1-10.

Regarding the results of the case study methodology on competency acquisition, Table 1 presents the comparative results of competency acquisition between the experimental group and the control group:

**Table 1.**
*ANOVA: comparison between groups for the tested methodology on competency achievement.*

| | Phase | Mean | N | F | Sig |
|---|---|---|---|---|---|
| Experimental group | Pre | 65,2 | 50 | | |
| | Post | 78,6 | 50 | | |
| Control group | Pre | 62,8 | 41 | | |
| | Post | 65,4 | 41 | | |
| | | | | 42,79 | < 0.001 |

Source: own elaboration.

The ANOVA analysis reveals that there are statistically significant differences between the groups regarding competency achievement after the implementation of the case methodology. The significantly high F-value (42.79) suggests that the variation between groups is considerably greater than the variation within groups, supporting the idea that the case methodology has a significant impact on competency achievement. This result strengthens the hypothesis that the case methodology can be an effective tool for improving competencies compared to a control group not exposed to this methodology, thereby confirming Hypothesis 1, in alignment with other studies highlighting the need for effective learning tools in these ecosystems (Martin et al., 2020). The low probability associated with the significance level (< 0.001) further reinforces confidence in the statistical significance of these findings.

Regarding the results of the case methodology for academic integrity, this phase of the study evaluated academic integrity based on the grades obtained by students and their potential resolution using artificial intelligence tools such as ChatGPT.

Table 2 shows the difference between activities and assessment tasks that can be resolved using AI:

**Table 2.**
*Categorization of activities based on their potential resolution using AI.*

| | N | % |
|---|---|---|
| Resolved through AI | 132 | 36,6 |
| Not resolved through AI | 200 | 55,5% |
| Discarded | 28 | 7,77 |

Source: own elaboration.

In the phase of categorizing activities and evaluation tests based on their potential resolution through AI, 55.5% of activities were classified within an "academic integrity" scenario, as they could not be resolved using ChatGPT, compared to 36.6% were engaging with ChatGPT could result in at least the minimum passing grade. Additionally, 100% of the activities included within the framework of the case methodology fell into the second category, as they could not be adequately resolved through ChatGPT, aligning with the methodology previously described. Similarly, the case methodology accounted for 55% of the items in this latter category.

According to Table 3, a linear correlation analysis between the academic integrity of the 360 activities and evaluation tests based on their potential resolution through ChatGPT and the grades obtained by students in the five tested subjects is presented:

**Table 3.**
*Correlation analysis between grades obtained and academic integrity.*

| | N | Correlation Coefficient. | Sig |
|---|---|---|---|
| Grades obtained and academic integrity | 360 | 0,72 | < 0,001 |

The results revealed a significant Pearson correlation coefficient (r) of 0.72 ($p < 0.001$).

In the correlation analysis between students' grades and the response potential offered by AI, a significant Pearson correlation coefficient of 0.72 ($p < 0.001$) was found. This value indicates a strong positive correlation, suggesting that as the number of activities and evaluation tests that can be solved using tools like ChatGPT increases, students' grades also rise. This finding confirms Hypothesis 2, aligning with other studies (Bašić et al., 2023; Vázquez-Cano et al., 2023).

On one hand, it demonstrates how the design of an activity or evaluation test that can be resolved through AI might contribute to higher academic grades. However, this could lead to a potential breach of academic integrity, thereby reducing the effectiveness of higher education institutions in fostering meaningful learning that can be reliably assessed through valid evaluation instruments.

On the other hand, this study also reveals that the case study methodology in a digital environment enables the assurance of academic integrity in various evaluation tests and activities integrated into a course.

### 4.2. Discussion of results and recommendations

The traditional approach in the Master's program in Cultural and Natural Heritage Management at UNIR during previous academic years focused on designing various proposals with an impact on heritage management. This traditional approach often allowed for interpretative and imaginative liberties. Students rarely understood limitations or assessed management risks. Furthermore, since assignments were submitted individually and only shared with the instructor, it was challenging to develop instrumental, systemic, and interpersonal competencies. The activity budgets in management proposals tended to lack precision, as they were not based on concrete cases but were instead created by the students themselves. The outcome was a wide variety of creative and surprising ideas, though occasionally detached from reality.

The implementation of the case study methodology across all courses in the program has focused on developing various student skills through three primary objectives. First, it aims to prepare students for future presentations, honing their ability to deliver concise public presentations via Zoom. This tool, widely used internationally for online conferences and webinars across disciplines, must be understood and mastered. Delivering presentations through Zoom requires practice and digital competencies. By submitting activities through the

case study methodology, students are trained for this purpose, learning to share their screens, display videos, and develop visual presentations.

Second, the methodology prepares students for producing robust academic work. With a 1,000-word limit, assignments must adhere to APA 7 citation standards, include bibliographic references in at least two languages, and follow a structured format with a summary, keywords, title, introduction, development, and conclusions.

Finally, the methodology equips students to handle media communications related to heritage, which may involve controversial topics. Examples include discussions on whether to destroy Roman lead artifacts to provide coatings for particle physics experiments (Perez-Alvaro & Gonzalez-Zalba, 2016) or addressing the manipulation of heritage for political purposes. For a heritage manager, it is crucial to know how to use appropriate language in future press interviews regarding archaeological discoveries, museum openings, or responses to government management inquiries (Heritage, 2002).

Additionally, the case study methodology requires students to engage in thorough reading, ensuring their work is not purely a product of imagination or past experiences. This approach discourages the misuse of artificial intelligence tools like ChatGPT, as responses must align with highly specific prompts (Khaddage & Flintoff, 2023), given that cases are carefully selected by instructors to minimize reliance on unverified sources.

The teaching team has held roundtable discussions to compare the implementation of the case study methodology with other methods that do not focus on the student.

On one hand, significant improvement has been observed in various academic skills, such as public speaking, writing academic articles, and applying acquired knowledge to real-world situations. This progression suggests an anticipated enhancement in the defence of final degree projects, as students have practiced presenting their work using digital tools and addressing a professional audience. Exposure to practical contexts has resulted in more confident responses and more interdisciplinary approaches by students. The need to, for instance, review legislation and consult bibliographies in foreign languages reflects a deeper understanding and application of knowledge.

On the other hand, focusing on real-world cases has promoted the development of systemic competencies among students. Problem-solving with a practical focus has stimulated creativity, adaptability to new situations, and sensitivity to diverse cultures and customs. This approach has also acted as a motivator for excellence, as students have been driven by the quality of their own contributions.

Moreover, the methodology has fostered interaction and collaboration among students from diverse sectors, encouraging the exchange of solutions and feedback with both instructors and peers, whether through chat or microphone use. This cross-sectoral approach has enhanced students' interpersonal skills, promoting interdisciplinary teamwork and providing an international context for their experience.

Additionally, teaching has been directed toward fostering confidence in students' ability to conduct quality research. This confidence has led to the formation of a network of student-

researchers spanning all regions where the university operates. By enhancing decision-making, problem-solving, and analytical and synthetic skills, students become reliable resources for conducting fieldwork. This strengthening of competencies contributes to building robust teams, grounded in the supervised learning experiences of students.

## V. Conclusions and implications

The introduction and application of the case study methodology in a master's program previously established with a more declarative instructional design initially posed several limitations. For instance, on the teaching side, this methodology required significant adjustments in time management. Regarding syllabus development, it now necessitates not only teaching the material but also investing effort in explaining and resolving the case. These sessions are fundamental to achieving success in the final exercise. As a result, theoretical sessions have become more specific and tightly structured, which, while not diminishing their quality, demands a very clear execution plan.

The case study methodology also presents other limitations. For instance, new cases must be reviewed and designed for each cohort of students. If students upload resolved cases to online browsers, artificial intelligence tools like ChatGPT can collect this data (commonly referred to as "Machine Learning") and reproduce the information in future queries. Therefore, it is essential to design well-established cases for each cohort, ensuring they are either real or hypothetical but not widely studied or recognized (Brinkerhoff, 2003). Additionally, instructors must verify in advance using LLM tools that the case cannot be resolved through a simple online search.

Another limitation associated with digital environments is the lack of face-to-face experience for students. Although virtual presentations provide students with valuable skills for online conferences, in-person experiences differ significantly from digital ones. However, no impediments have been observed in terms of the ability of digital teaching through the case study methodology to foster student competencies. Despite the potential challenges posed by group work and case presentations on virtual platforms, the post-pandemic corporate world extensively uses these platforms for meetings, conferences, and teamwork, which provides students with an added layer of realism. A feasible prospect could be organizing annual regional in-person seminars to enhance the benefits of students gaining experience in public speaking.

This analysis has demonstrated that applying the case study methodology in digital environments equips students with a set of fundamental instrumentals, systemic, and interpersonal competencies for professional life, thereby confirming Hypothesis 1. These competencies include problem-solving through information analysis and synthesis, general computer literacy, entrepreneurial spirit, respect for diverse perspectives, interdisciplinary and intercultural teamwork, and the ability to analyse the impact of decision-making. The potential of the case study methodology in digital education environments is virtually limitless. It could involve diverse virtual tools, more technical oral presentations, and different teaching platforms, allowing students to practice presenting their projects to demanding audiences across various virtual settings. Additionally, cross-disciplinary projects foster connections among instructors and subjects, offering students multiple perspectives on the same case, which emulates the interdisciplinary approach real-world business problems require.

Moreover, Hypothesis 2 is confirmed, demonstrating that the case study methodology reduces the likelihood of inappropriate use of tools like LLMs, contributing to ensuring academic integrity. This methodology enables the selection of case studies with limited online information. It also provides opportunities for activities such as the triad of oral presentations of the work, article preparation, and media dissemination, which help prevent the misuse of artificial intelligence tools. For instance, oral presentations demand highly personalized work.

This study proposes and validates the case study methodology as an applicable tool in collaborative digital environments to ensure effective learning construction and uphold academic integrity. Future research should focus on identifying complementary teaching tools that enhance the case study methodology, promote academic integrity, and address the challenges of transitioning education from traditional to digital environments. The case study methodology can help ensure greater academic integrity in digital education, allowing students to strengthen specific field-related competencies while also developing essential generic instrumental, interpersonal, and systemic skills. These skills are crucial for their professional futures, contributing not only to the practice of working in multidisciplinary and international teams but also to the enhancement of their oral and written abilities.

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# Chapter 6. Towards Deep Learning using Immediate Response Systems (IRS) in online university environments

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## I. Introduction

Digitization and technological advancements have opened a vast range of possibilities in education over the past decades, expanding the availability, methods, and opportunities for learning. While the transition to online studies accelerated due to the COVID-19 pandemic, its exponential growth suggests that this modality is here to stay, as evidenced by the current high demand (Toro-Dupouy, 2022).

Distance higher education offers numerous advantages over traditional in-person classes, including flexible schedules, accessibility from any location and physical condition, a wide variety of available programs, personalized learning opportunities, cost and time savings in transportation, the development of digital skills, and the promotion of self-regulation and metacognition, among others. These benefits make online education an attractive and viable option for many students seeking a university degree. Consequently, distance education has gained popularity in recent years as a viable alternative to traditional in-person education, attracting an increasing number of university students. According to the latest study published by OBS Business School (Toro-Dupouy, 2023), 84.3% of respondents would recommend online education, considering it a highly efficient model (69.2%) that contributes to academic performance (67.3%) and increases student motivation (55.6%).

At first glance, online education might seem less interactive than face-to-face learning. However, this educational model offers numerous opportunities for interaction and engagement, though these have been less explored so far. Online learning platforms are typically equipped with various tools that foster collaboration, such as discussion forums, live chats, and group work functions. Students can share ideas, collaborate on projects, and actively participate in virtual discussions. Communication with instructors often takes place via email, forums, or video conferencing, allowing for direct and personalized interaction. Ultimately, the quality of this interaction depends not on the communication channel but on the involved participants.

Moreover, online universities provide students with the opportunity to attend real-time online sessions, offering live interaction with instructors comparable to the in-person experience. Additionally, students often have the added benefit of accessing recorded lectures, which they can review at any time. This flexibility allows students to adapt to different schedules and learning paces while ensuring access to all content as often as needed. As a result, online university education fosters autonomy and self-discipline, essential skills for the academic and professional success of future graduates.

In summary, supporting students in their university studies requires a methodology that understands and adapts to their priorities, diverse learning rhythms, and needs. The online university environment offers numerous possibilities to achieve this goal.

## II. Deep Learning

The so-called Deep Learning was described in 1976 by Marton & Säljö in contrast to surface learning. As part of their research on the learning process, these authors concluded that deep learning generates transfer, that is, it provides students with the ability to apply the knowledge acquired in different contexts and situations. This approach recognizes the importance of adapting education to the individual needs and preferences of students, as well as providing them with learning opportunities that are relevant to their context and experience. Furthermore, it seeks to foster students' active engagement in their learning process by involving them in practical and meaningful activities that enable them to develop skills applicable to various areas of their lives. Thus, according to Furman (2021), we can say that a student has deeply learned about a topic if they can explain it in their own words, give examples, and apply that knowledge to solve problems or create something new. Additionally, they should be able to relate a new concept to prior knowledge or their personal reality, pose their own questions, represent it with images or metaphors, explain its importance and establish connections, teach it to others, and feel confident about that new knowledge.

Fullan et al. (2017) go a step further by asserting that deep learning represents a new educational paradigm, whose goal is for students to acquire a profound and meaningful understanding of learning content and develop critical skills to face the challenges of the modern world. According to these authors, deep learning would revitalize students' enthusiasm for learning across all age groups, promoting a new educational culture for all stakeholders (students, teachers, school leadership teams, and families).

Deep learning therefore entails a significant emotional dimension. Students feel comfortable with the knowledge they have acquired, perceiving it as an integral part of their identity and abilities (Furman, 2021). This helps improve students' self-concept and expectations for achieving their learning goals.

It is evident that this approach requires a renewal of educational practices and the development of new competencies at all levels, from teachers to entire educational systems. The four key elements of deep learning that should be addressed in a coordinated manner are as follows (Quinn et al., 2021):

- Learning Partners: This involves collaboration between students, teachers, and others, both within and outside the school environment, including families, experts, and the broader community. These partnerships expand learning opportunities and connect students with authentic experiences at local, national, and global levels.

- Learning Environments: This refers to the learning environment, which encompasses two fundamental aspects: creating a learning culture that motivates both teachers and students and designing physical and virtual spaces that optimize skill acquisition.

- Leveraging Digital Resources: This element emphasizes the importance of effectively using technological resources to enhance deep learning. It is less about the digital tools themselves and more about the role that interaction with them can play in facilitating meaningful partnerships and enabling students to take control of their own learning.

- Pedagogical Practices: Teachers face a wide variety of options regarding the methodological strategies of their educational practices. There is no single way to design deep learning, but it is essential for teachers to start from students' prior knowledge and remain open to identifying and adopting new practices that enhance learning. This includes both proven effective practices and innovative practices that are being collaboratively developed and shared. These new models focus on the student and strive to offer individualized, relevant, and engaging educational experiences aimed at generating meaningful and lasting learning and skills.

The goal of deep learning, according to Fullan et al. (2017), consists of six Global Competencies: Citizenship, Creativity, Collaboration, Character, Critical Thinking, and Communication, which encompass a range of areas, from cognitive skills to socio-emotional abilities, and are considered essential for adapting to an increasingly complex and globalized world.

As mentioned at the beginning of this article, online higher education is evolving towards more authentic and meaningful learning models centred on the student, which aim not only to impart knowledge but also to cultivate relevant and useful skills and competencies for life. This objective aligns perfectly with the pursuit of deep learning.

**III. Immediate Response Systems (IRS)**

Immediate Response Systems (IRS) in educational settings, also known as Student Response Systems (SRS), are technological tools that facilitate interaction and feedback, enabling instructors to collect and analyse data in real time during live sessions or at any time afterward. They integrate flexibly into face-to-face, hybrid, or fully online learning environments, both synchronous and asynchronous. These tools allow for quick and accurate responses to questions or prompts posed by the instructor. Additionally, they offer the possibility of gathering responses from students who choose to watch the class later, after the live session has ended.

These tools originally emerged as wireless voting systems for in-person sessions. Initially, they required the installation of specific software and the use of physical devices such as cases or clickers. After 20 years of research and practice in face-to-face classes incorporating student participation through clickers, IRS have proven effective in maintaining engagement and focus, improving student participation, fostering collaboration, and providing instant feedback (Goldstein & Wallis, 2015).

Today, IRS are cloud-based software tools (SaaS) that are easy to use, with user-friendly interfaces accessible from any internet-connected device (mobile phone, tablet, or computer). Most IRS offer a freemium version, providing basic services for free, with the option to integrate more advanced features in a paid version. Examples of IRS include digital platforms such as Wooclap, Vevox, Mentimeter, PearDeck, Socrative, and Nearpod, among others. Students can choose to respond from the same device they are using to view the live session or use a different device, such as a mobile phone, easily accessing the IRS by scanning a QR code, with the only requirement being an internet connection.

These systems can accommodate a variety of question-and-answer formats, including multiple-choice options, open-ended questions, numerical approximations, opinion polls, locating points on an image, labelling a figure, and more. Participants receive immediate feedback on the validity of their responses and those of their peers, enabling a bidirectional interaction between users and the system in real time. This not only greatly facilitates student participation and engagement but also offers significant advantages for the teaching and learning process itself. Instructors can choose to configure IRS participation anonymously or with identified users, allowing them to tailor the interaction dynamics in the virtual classroom according to specific needs, preferences, and activity objectives.

The data collected through the system is instantly analysed by the instructor, providing detailed information about participant responses in real time. This information can be shared with students if deemed appropriate or analysed later to assess progress and better understand the group's learning needs.

Therefore, immediate response systems can be highly valuable tools for various purposes, such as promoting student interaction with the content, increasing participation during classes, or reinforcing student engagement with the subject. Additionally, the data collected can be used by instructors to make informed decisions and adjust their teaching strategies as needed.

Research has shown that incorporating these participatory elements, which involve students as active agents in the learning process, significantly enhances educational practice (Deslauriers et al., 2019), resulting in improved academic performance. Thus, we can affirm that Immediate Response Systems (IRS) could play a key role in providing a more enriching and student-centred educational experience, making them a valuable tool for facilitating deep learning in online university environments.

## IV. Advantages of IRS from cognitive psychology

### 4.1. Learning principles

Over the past 50 years, numerous experts in educational psychology have extensively studied how the learning process works and how educators can apply cognitive science principles in the classroom (an excellent synthesis of these advancements is provided in Kischner & Hendrick, 2020). Table 1 summarizes the three basic principles of the learning process and some strategies to facilitate it.

**Table 1.**
*Learning principles.*

| | | Principle of Learning | Teaching Strategy |
|---|---|---|---|
| **A1** | **ATTENTION** | The capacity for conscious attention is limited; we can only attend to a small number of stimuli simultaneously. | Direct students' attention toward the content to be learned. |
| **A2** | **WORKING MEMORY** | Working memory, the centre of conscious thought, has a limited capacity. | Ensure that students focus on small chunks of information. |
| **A3** | **LONG-TERM MEMORY** | Long-term memory is formed because of the thinking process. Thus, students consolidate information into long-term memory when they reflect deeply on its meaning. | Encourage students to reflect individually on the meaning of what they are learning. |

Source: own elaboration based on Fletcher-Wood et al., (2019).

## 4.2. Advantages of IRS based on cognitive learning principles

### 4.2.1. Focusing attention (A1)

In a digital world filled with distractions, attention becomes the most valuable resource to preserve. In virtual educational environments, university students face an additional attentional challenge due to the ease of multitasking, such as attending a class while checking emails, accessing social media, or engaging in unrelated activities. This challenge not only involves managing multiple tasks simultaneously—thereby reducing working memory performance and causing relevant information to compete with irrelevant stimuli (Uncapher et al., 2016)—but the mere presence of digital noise threatens to disperse students' focus. In this context, maintaining students' attention becomes a significant challenge for educators. The use of IRS tools in synchronous virtual classes demands student participation. When students know in advance that their participation will be required at any moment during a session, they tend to pay more attention (Ruiz Martín, 2020). However, the effectiveness of IRS largely depends on how they are integrated into the educational process. If used superficially or merely as a complement, they risk becoming another distraction. On the other hand, when strategically employed to stimulate interaction, foster reflection, and assess comprehension, IRS can enhance attention and enrich the virtual classroom learning experience. Ultimately, the key to maintaining attention lies in how educators manage this tool to balance student participation and focus on the session's core content.

### 4.2.2. Managing working memory (A2)

Working memory capacity is limited, and processing information requires careful use of cognitive resources (Sweller, 1988). Reflecting on and applying new knowledge helps students store it in long-term memory, reducing the constant reliance on working memory. Effective cognitive processing—coherent, relevant, organized, and integrated with prior knowledge—is essential for meaningful learning (Wittrock, 1989).

When we can efficiently retrieve information from long-term memory, we free up working memory to focus on applying that information. Conversely, difficulties in recalling previously learned content can compromise our ability to understand new information and solve problems. In this sense, one of the most interesting applications of IRS is their ability to assess students' prior knowledge. This enables educators to activate relevant concepts in students before introducing new information and evaluate where to begin with the content.

As will be discussed later, anonymity plays a crucial role in providing a more realistic assessment of the class's prior knowledge, not just from those willing to respond orally. Additionally, IRS allows for the analysis of responses from many students within minutes—something impossible through individual questioning and listening.

### 4.2.3. Promoting Meaningful Learning (A3)

Prior knowledge plays a crucial role in our ability to learn new information, as we can only understand new concepts if we can relate them to something we already know. According to David Ausubel's theory of learning (1976), meaningful learning occurs when new concepts or ideas are related to what the student already knows. This can happen through linking new information with prior concepts, organizing information into new meaningful structures, or applying information to different situations.

Meaningful learning, therefore, refers to the process by which new knowledge is incorporated into the individual's existing cognitive structure, making it meaningful and relevant.

Questions are an excellent strategy as they allow students to recall learned content, structure concepts for explanation, and make connections with prior knowledge (Chi et al., 1994). IRS significantly facilitates the design and posing of questions during sessions, whether open-ended, multiple-choice, procedural ordering, matching, or even questionnaires on students' perceptions of their understanding of a specific content.

Properly designed interactive experiences with IRS tools provide students with opportunities to compare, contrast, and categorize information—fundamental actions for meaningful learning (Shimamura, 2018). These tools contribute agility to such practices and ensure anonymity in responses, a critical factor that encourages many students to participate without direct questioning

### 4.3. Teaching Principles

The fundamental principles of instruction that have proven most effective, according to scientific evidence provided by cognitive psychology and educational practices, were described in detail in 2010 by educational psychologist Barak Rosenshine. These ten principles, known as Rosenshine's Principles of Instruction and summarized in Table 2, aim to guide educators on the types of teaching practices that can help achieve better outcomes with their students.

**Table 2.**
*Principles of instruction.*

| THE 10 PRINCIPLES OF ROSENSHEIN'S TEACHING | | |
|---|---|---|
| **E1** | **INITIAL REVIEW** | Begin the class with a brief review of previously taught material to activate prior knowledge in working memory and effectively establish connections with new information. |
| **E2** | **PERIODIC REVIEW** | Plan periodic reviews of the material taught to strengthen information retrieval and ensure continuity in the construction of long-term memory. Provide specific and constructive feedback to improve learning and correct misunderstandings. |
| **E3** | **ASKING** | It's beneficial to ask more questions, involving more students and with greater depth. |
| **E4** | **CHECKING UNDERSTANDING** | Asking questions provides feedback on the effectiveness of our teaching and allows us to check comprehension, ensuring we address and correct concepts that may have been misunderstood. |
| **E5** | **STEP BY STEP** | Break down concepts and processes into small steps to practice each one separately, dedicating time to practice each phase. |
| **E6** | **PRESENTING MODELS** | Clearly present the new concepts or required skills, providing numerous concrete examples and clear explanations. |
| **E7** | **PROVIDING SCAFFOLDING** | Scaffolding is essential for skill development as it provides a system of cognitive support that will gradually be removed. |
| **E8** | **GUIDED PRACTICE** | Provide opportunities for students to actively practice the new material with the guidance and support of the teacher, ensuring they understand the steps and processes involved. Encourage the transfer of learning to new or different situations through activities that require applying the learned concepts in diverse contexts. This guided practice requires close and detailed supervision and feedback |
| **E9** | **SUCCESS RATE** | It is crucial to achieve a high success rate both in answering questions and in the development of practice (around 80%). |
| **E10** | **INDEPENDENT PRACTICE** | Allow students to practice the new material on their own, providing feedback and additional support as needed. |

Source: own elaboration based on Sherrington (2020).

### 4.4. Advantages of SRIs according to the principles of teaching

Below, a series of advantages that SRIs may offer in relation to some of the teaching principles mentioned in Table 2 are outlined.

#### 4.4.1. Initial review (E1)

It is widely recognized that dedicating the first few minutes of a session to actively reviewing with students the content from previous sessions leads to better results in final assessments (Good & Grouws, 1979). SRIs facilitate this initial review practice by allowing the swift retrieval of information from past sessions through review activities. These activities may include multiple-choice questions, relationship tests, image identification, diagram labelling, or reflection on answers to open-ended questions, among others.

#### 4.4.2. Periodic review (E2)

We naturally forget information that is not stored in a prior schema or that is not frequently retrieved. Therefore, practicing information retrieval more frequently and deeply improves the ability to remember it, as retention increases when opportunities for review are increased. Spaced retrieval practice is one of the strategies that offers the greatest benefits for long-term learning, highlighting that review activities from previous lessons lead to better long-term results (Roediger & Karpicke, 2006). Deliberate practice is based on the creation and use of mental models and representations that guide students' possible decisions in different situations. These models, in turn, allow students to observe their own performance to improve it, which is advantageous in relation to metacognition.

SRI systems facilitate periodic review processes of past tasks, allow for the incorporation of standardized tests that prompt students to analyse their performance, reflect on it individually or collectively, review common mistakes, and thus leverage the full potential of retrieval practices.

#### 4.4.3. Asking (E3)

Asking questions should be part of a highly interactive, dynamic, and responsive process (Nuthall, 2007; Wiliam, 2011). The most effective teachers are those who ask more questions, involve more students, explore more deeply, and dedicate more time to explaining, clarifying, and verifying understanding (Rosenshine, 2010). Asking questions during sessions allows, among other things, for periodic reviews, as already mentioned, but they can also be extremely useful for activating prior knowledge in students, thus preparing them for new learning. Additionally, teachers can assess students' understanding of the content in real-time and gather information about the strategies to adopt. It is important to remember that questions also help identify misconceptions, extract them, and try to address them using appropriate models.

To assess students' progress and understand how the group is evolving, it is essential to gather a wide range of responses. This will allow for the planning of the next steps in the instructional process. Since learning may not be immediately evident, active evidence of it should be sought during sessions, which constitutes a practice of "receptive teaching" (Wiliam, 2011). As mentioned, SRIs are designed to easily incorporate various types of questions in real-time to encourage students to practice what they have learned, thereby stimulating reflection and fostering active learning. It is very important to consider the form and quality of these questions, as only relevant questions will lead to relevant answers (Lemov, 2021).

#### 4.4.4. Checking Understanding (E4)

Many authors assert that checking students' understanding is a key process in all teaching. The most effective methods for assessing understanding include asking varied questions, having students explain what they have learned, reviewing all students' answers, and providing feedback and corrections systematically (Sherrington, 2020). These methods are facilitated in virtual environments by SRIs, both during live sessions and afterward, also ensuring students' anonymity when deemed appropriate. Conducting periodic tests or quizzes through SRIs also allows us to check students' understanding, requesting personal identification when necessary for grading purposes. Furthermore, we can check understanding through the SRI using exit tickets at the end of each session. When designing multiple-choice questions in an SRI to assess understanding, it may be useful to include an option such as "I don't know," "I'm not sure," or "I don't remember" as a possible answer, in order to avoid random guessing and assess students' knowledge more objectively. Students should be explicitly encouraged to choose this option if they do not know the answer. Additionally, the option to click an "I'm lost" or similar button anonymously, offered by some SRIs, allows teachers to receive immediate feedback during class and return to content when necessary.

#### 4.4.5. Step-by-step (E5)

Although this principle is not directly related to the main functions of SRIs, spacing out content through rounds of questions offered by these systems can benefit long-term learning, also providing opportunities for feedback and reflection after a delay, as previously mentioned (E2 principle).

#### 4.4.6. Providing models (E6)

The better the models are illustrated, the more likely students are to assimilate the ideas and build an appropriate mental framework (Rosenshine, 2010). Although SRIs were not designed for this purpose, they can help teachers provide models, such as partially solved problems during virtual sessions, as well as graphic representations for labelling, incomplete texts, diagrams for linking with connectors, comparisons, etc.

#### 4.4.7. Providing scaffolds (E7)

SRIs were not designed to provide scaffolds, although they can be used in different types of support activities. For example, a beneficial way to offer support to students through SRIs could be reviewing answers to certain questions provided by students from previous courses, anticipating common comprehension difficulties, and explicitly addressing frequent errors.

#### 4.4.8. Guided practice (E8)

Various studies on guided learning suggest that increased time spent on guided practice leads to higher success rates and greater student engagement with individual work (Kischner et al., 2006). The use of SRIs allows teachers to design guided learning experiences in which content is temporally sequenced, including a practice period for each section, thereby guiding students through their learning process according to their needs.

One of the most important practices in any learning process is feedback, which involves providing students with information on their performance level and offering suggestions on how to improve. Feedback is one of the factors that most effectively contribute to achieving learning objectives (Hattie & Timperley, 2007). SRIs facilitate two types of feedback:

- Instant Feedback: Provided by the system itself based on the student's correct/incorrect responses, which may also include comments on the correct answer or guidance on how to improve performance. This type of immediate feedback can be particularly beneficial for university students, who typically exhibit higher levels of self-regulation. Additionally, receiving feedback from the system can reduce emotional tension for students compared to receiving feedback from the teacher (Wiliam, 2011).
- In-Depth Feedback: Provided by the teacher, not only correcting mistakes but also offering insights into the process, generalizing to other cases, and even providing self-regulation and metacognitive strategies for students. To facilitate the learning process, it is highly effective to provide feedback through repeated low-risk assessments. When these assessments are abundant and regular, anxiety is minimized, and the feedback can be used more productively (Ruiz Martín, 2020), potentially even increasing students' extrinsic motivation through gamification strategies. SRIs enable efficient and agile low-risk assessments, either anonymously or with student identification, and can even be useful for crafting final evaluation tests.

#### 4.4.9. Success Rate (E9)

It is crucial for the teacher to be able to halt instruction when difficulties arise in order to revisit problematic content. Instruction should not continue until a sufficient success rate (around 80% correct answers) is achieved, ensuring mastery of the content (Rosenshine, 2010). SRIs are very useful in this regard, providing checkpoints that are quick and easy for teachers to assess whether it's necessary to review the material again or if they can proceed to the next content section.

#### 4.4.10. Independent practice (E10)

The independent practice facilitated by SRIs at a personalized pace allows students to engage in low-stakes individual routine tests, which can serve as formative assessments and/or spaced practice. This action involves providing tasks on past content to reinforce recall (spaced curriculum) and analyse the learning process, thus fostering the metacognitive aspect of instruction. Additionally, as mentioned earlier, frequent quizzes via SRIs reduce their significance and familiarize students with tests, helping to reduce anxiety in more consequential exams.

### 4.5. Other advantages of SRI

In addition to the previously mentioned possibilities related to learning and teaching principles, SRIs can offer a range of additional advantages that are particularly relevant in online university settings.

#### 4.5.1. Ensuring student anonymity

Despite the limitations in building interpersonal relationships, interacting with anonymous students can have certain benefits. Unlike direct verbal interventions, anonymity can provide a more accurate approach to understanding students' real knowledge. Students often feel embarrassed to publicly share an idea or respond to a question about a session's content,

which can lead them to avoid engaging directly in group discussions. Furthermore, students may feel self-conscious when freely expressing ideas in open-ended questions, as they often perceive these as evaluations of their knowledge. Therefore, using systems that do not require registration, or identification can prevent students from feeling judged while allowing for more authentic individual reflection. This approach can help preserve the feeling of belonging to the class group and foster mutual knowledge from the safety of anonymity. The ease with which these systems allow instructors to switch between different identification options when gathering personalized or anonymous responses can be valuable in analysing the group's behaviour in real-time and deciding whether certain content needs to be revisited based on the results obtained.

#### 4.5.2. Participation

As previously mentioned, asking questions during sessions allows instructors to assess the level of comprehension among their students and gather valuable information for designing effective educational strategies. However, it is common for questions addressed to the entire class to be answered by the same few students, while questions directed at an individual student may lead to unwanted anxiety, hindering deeper learning. SRIs facilitate greater participation from large groups of students, both synchronously and asynchronously, which would be unfeasible through direct questioning. This allows for more realistic assessments of students' general knowledge, gathering relevant information about the learning process, preferences, and impressions, while enabling sufficiently large sample sizes to apply statistical treatments to the collected data.

#### 4.5.3. Motivation

Increasing student participation can lead to greater intrinsic motivation. In a well-designed instructional setting using SRIs, participation can encourage students to engage more fully, seeing themselves as co-creators of the session. This active and responsible role in the development of the session can help improve intrinsic motivation for both students and instructors.

#### 4.5.4. Attention to Diversity

As discussed, the use of SRIs ensures that all student voices are heard and valued, contributing to a more inclusive learning environment. By providing immediate feedback on students' comprehension levels, SRIs allow instructors to tailor instruction to meet individual learning needs. This is especially beneficial for students with different learning speeds or skill levels, as instructors can identify difficulties in real-time and provide additional support as needed.

Furthermore, in their asynchronous options, SRIs enable students to progress at their own pace, making it easier to track their achievements or identify difficulties. Some platforms also offer advanced accessibility options, such as the use of adaptive devices or integration of features within the platform itself. This supports the participation of students with sensory disabilities or special needs in their learning activities.

## V. Final reflections

In traditional teaching models, technology is often used in a one-way direction, primarily to enhance the transmission of content from the teacher to the student. Immediate Response Systems (IRS) enable a two-way interaction, allowing students to engage with the content. Planning moments for this interaction, considering the principles of teaching and learning as well as recent educational research, can significantly enrich online instruction and improve the performance of university students.

It is essential that new proposals are grounded in solid theoretical frameworks. However, in the field of teaching, the empirical experience gained holds irreplaceable value. As discussed throughout this article regarding Immediate Response Systems, while they do not constitute a definitive solution to the pending educational challenges, their intelligent application, supported by evidence from cognitive sciences, can significantly enhance teaching processes aimed at fostering deep learning among university students. Each instructor's individual practice in using these tools, combined with conscious reflection on their implementation possibilities, could enrich progress toward deep learning in this time of educational transformation in higher education.

Rosenshine's principles can serve as an excellent guide for analysing teaching practices, improving them continuously, and focusing attention on the specific areas that may have the greatest room for improvement. As Sherrington (2019) states, Rosenshine never made a distinction between good and bad teachers but between those who are more effective and those who are less effective. This distinction invites us to adopt a growth mindset and consider that improvement in instructional processes is always achievable. When used efficiently, technology can facilitate the journey for educators to improve their practice and meet the unique needs of each student, thus promoting true lifelong learning.

Ultimately, and following the line of authors such as Fullan et al. (2017), it is crucial to change the culture of learning to adapt to a changing world, where distance learning is progressively consolidating. In this process of evolution in educational practices, we believe it is preferable to adopt individual commitments to facilitate new learning processes rather than waiting for this transformation to be imposed bydecree. This involves creating an environment that encourages curiosity, experimentation, and continuous learning for all the stakeholders involved. Adopting an open mindset to change and innovation, where learning is viewed as a dynamic process, supported by scientific evidence and enhanced by technological tools, is necessary to forge the path toward an adaptive learning culture, which will allow us to intelligently face some of the most significant challenges presented by the future of higher education.

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# Chapter 7. Example of a Logical Framework for the development of a productive and sustainable project in the Department of Antioquia - Colombia

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## I. Background

The Department of Antioquia is one of the 32 departments of Colombia, located in the northwest of the country, primarily within the Andes Mountain Range and extending to the Caribbean Sea. In addition to its cultural richness and natural resources, Antioquia is characterized by its urban and rural development, as well as its efforts toward innovation and industrial progress. Furthermore, Antioquia ranks second in the Departmental Competitiveness Index (Consejo Privado de Competitividad, 2022), focusing its initiatives primarily in the Aburrá Valley.

Despite the initially favourable outlook for the department due to its geostrategic location, significant disparities and gaps between subregions and territories are evident. Therefore, it is necessary to implement strategies to extend capacities grounded in Science, Technology, and Innovation (ST&I) to stakeholders across the department, particularly within the rural productive sector (Gobernación de Antioquia, 2014).

Specifically, regarding the eight rural communities considered within the Department of Antioquia and identified as the project's target audience—namely, the communities of La Ceja, La Unión, El Retiro, Apartadó, Santa Bárbara, Salgar, Támesis, and Medellín—there are differing realities and capacities in productive and technical terms. However, a common factor prevails across all these communities: inadequate capacities in entrepreneurship, sustainability, and commercialization.

The project thus aims to foster food security and sovereignty, addressing disparities and promoting the strengthening of the economy, commerce, and internal markets while meeting the nutritional needs of the communities involved in the initiative.

## II. Conceptual Framework of the Project

For a department like Antioquia, it is essential to focus on promoting innovative processes as a strategy for prosperity and development. From an international perspective, and as highlighted by the Inter-American Development Bank (IDB), economic improvement is achievable only through the implementation of strategies that guide and foster competitiveness, development, and business dynamism, with actions centred on innovation-oriented management.

Based on the above and the recommendations of the IDB, the lack of alignment in the capabilities of the Department of Antioquia is evident, leading to a slowdown in business consolidation processes, competitiveness, and innovation. Ultimately, this limits national

socio-economic projection, the participation of producers in associative mechanisms, and the collaboration between academia and the rural productive sector to implement effective actions in favor of food security and sovereignty (Acosta, 2009).

In the dynamics of the Colombian market and economy, the primary sector stands out for its high production of raw materials and the low added value attributed to them. Consequently, the country needs to invest in the structuring and stable construction of a sustainable innovation strategy to enhance productive capacity, strengthen innovation capabilities, and improve competitiveness, productivity, and social development (Consejo Privado de Competitividad, 2022).

This strategy must address the neglect of the commercial and business structure of food production units to directly impact the development of local, departmental, and national economies. By integrating and safeguarding the commercial structure, the strategy should aim to construct and consolidate socio-economic frameworks oriented toward food security and sovereignty.

Regarding rural populations and food producers in Colombia and Antioquia, they have historically been marginalized, with few public initiatives addressing their structural challenges, requirements, and needs. This marginalization reflects a lack of recognition, protection, and guarantees of their rights and the minimum conditions for a dignified life in the country and department.

The Colombian constitutional framework clearly intends to protect the diversity, freedom of labor, associativity, and life projects of these minority populations, particularly rural communities, which are also recognized as a group subject to special constitutional protection. However, adequate public actions to overcome unconstitutional dynamics, such as recognizing, protecting, and guaranteeing the rights of rural and agricultural communities, remain lacking.

Furthermore, there are limited opportunities focused on training, fostering, and strengthening capacities within the framework of ST&I for the rural sector. This has resulted in inequalities in access to credit and financing, technical assistance, markets, and food sovereignty, among other aspects (Deere & León, 2002; Pachón-Ariza et al., 2016). Particular attention is drawn to the gender inequality experienced by women in the productive aspects of rural life.

On the other hand, in 2018, the UN General Assembly approved the Declaration on the Rights of Peasants and Other People Working in Rural Areas, which recognizes Food Sovereignty as a right of these populations. This is defined as "the right of peasant communities to control their food systems through participation in the formulation of agricultural and food policies. Similarly, it is the duty of States to "protect the right to food of peasants through technology and education (La Vía Campesina, 2020).

In this context, the urgent need to strengthen the rural population and acknowledge its status as neglected, overlooked, and rarely invited to participate becomes evident. This neglect results in stagnant productivity, low competitiveness, and limited socio-economic development, challenges that are particularly pronounced in the territories of the Department of Antioquia.

Antioquia recognizes the necessity of building capacities through training, research promotion, and the adoption of new technologies, practices, and business models aimed at creating an ecosystem capable of addressing food security and sovereignty needs in a viable and relevant manner. The region faces challenges such as low adoption of agri-biotechnologies, unsustainable agro-food systems, technical gaps in sustainable production, limited value-added processing of raw materials, and low productivity per cultivated area (Plan de Desarrollo Antioquia, 2020)

**III. Current Magnitude of the Problem and Reference Indicators**

While the Department of Antioquia is ranked as the second most competitive region in Colombia and second in sophistication and innovation, scoring 7.06 out of 10 (Consejo Privado de Competitividad, 2022) it also faces significant challenges in addressing competitiveness gaps among its territories. These challenges relate to technical advancements, tools, capacities, and infrastructure that promote the department's socio-economic development.

The Government of Antioquia, through the Food and Nutritional Security Office (MANA) and the University of Antioquia's School of Nutrition and Dietetics, presented the 2019 Food and Nutritional Profile of Antioquia. This report highlighted several indicators of food insecurity (ISAH) in the department:

- Approximately 7 out of 10 households experienced food insecurity, with the majority being extended households (71.4%).
- Among households with monthly incomes below half a minimum wage, 9 out of 10 (90.8%) faced food insecurity.
- In households where the head of the household had no formal education, food insecurity affected 8 out of 10 households (80%).

In the midst of this widespread food insecurity, the phenomenon of a double burden of malnutrition was evident. Anaemia affected 25.1% of children under five years of age, stunted growth was observed in 10.0%, and a risk of overweight was identified in 17.4% of the evaluated population group.

In addition to the above, it was identified that as the age of schoolchildren and adolescents increases, excess weight predominates over deficiency. Among the group aged 5 to 17 years, stunted growth was observed in only 5.4%, whereas excess weight was prevalent in 24%. Similarly, 25% of youths aged 11 to 18 exhibited unhealthy total cholesterol/HDL cholesterol levels, indicating cardiovascular disease risks.

Regarding the adult population, the situation was even more alarming, with the overweight rate exceeding 58.7% for individuals over 18 years of age (Universidad de Antioquia, 2019).

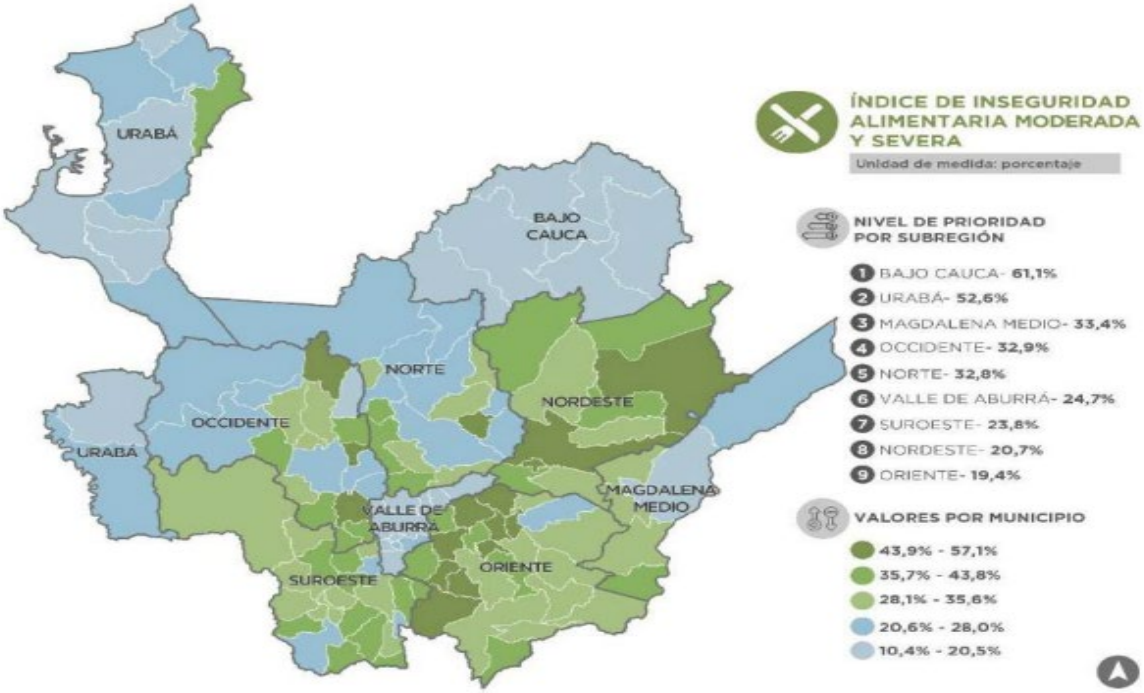
It is therefore evident that strategies addressing food security and sovereignty must be prioritized. Such efforts should begin with actions framed within ST&I, enabling capacity building in territories through training processes and specialized support. These strategies

should foster productive, competitive, and meaningful dynamics for socio-economic development.

Moreover, referring to the Departmental Development Plan of Antioquia, multidimensional poverty, which had shown a positive trend with a prolonged reduction between 2010 and 2017, reversed in 2018, increasing by 2 percentage points to 17.1%. This figure moves away from the national target of 8.4%. This trend is directly related to food security and highlights the need to support the most vulnerable populations to achieve adequate health in nutritional, physical, and mental terms (Plan de Desarrollo Antioquia, 2020).

**Figure 1.**

*Index of Moderate and Severe Food Insecurity in Antioquia*




Source: Departmental Development Plan of Antioquia (2018).
**Reference Indicator:** Peasant organizations and producers trained or educated in competitive and sustainable agricultural technological models, with an emphasis on best practices and agro-industrial development.

**Unit of Measurement:** Number

**Baseline:** 4,443

**Target:** 5,420

**Source:** Departmental Development Plan of Antioquia 2020-2023 "United for Life."

**Responsible Agency:** Secretariat of Agriculture and Rural Development

**Year:** 2020-2023

Analysing the indicator presented above, it is evident that state entities are keenly interested in promoting strategies to support peasant organizations and communities. These efforts aim to build technical, entrepreneurial, social, and commercial capacities to make these groups more competitive, productive, and conducive to departmental and national development.

Thus, based on the information presented in the Departmental Development Plan of Antioquia 2020-2023 **"United for Life,"** the strategic indicator for the territory addresses the territorial demands associated with it.

Below is the problem tree for the presented case study:

**Table 1.**
*Problem Tree.*

| | | | |
|---|---|---|---|
| **Indirect Effects** | 1.1. Limited utilization of agricultural resources. | 2.1. Low participation of rural initiatives and projects in ST&I processes. | 3.1. Low sustainability of rural community projects due to limited commercial participation. |
| | 1.2. Low labour income for rural communities in the Department. | 2.2. Limited access to new markets and funding sources. | 3.2. Food insecurity due to few commercial participation opportunities. |
| | 1.3. Increased unnecessary resource expenditure and hindered productive processes. | 2.3. Stagnation of the productive processes of rural initiatives in terms of growth and competitiveness. | |
| **Direct Effects** | 1. Low utilization of natural resources and land due to limited technical productive capacities. | 2. Limited productivity, competitiveness, and development of projects and initiatives promoting food security in the municipalities of La Ceja, El Retiro, La Unión, Apartadó, Santa Bárbara, Támesis, Salgar, and Medellín. | 3. Difficult access for rural community initiatives and projects to markets with significant impacts. |
| **Central Problem** | Low levels of technological development, innovation, and entrepreneurship contributing to the availability, access, use, and stability of food production, as well as to the sustainable productive strengthening of rural areas in the Department of Antioquia. | | |
| **Direct Causes** | 1.1. Lack of training processes to strengthen technical and productive skills for process improvement. | 2.1. Poor structuring of intervention plans for rural communities to foster business development and innovation. | 3.1. Limited development of competitive intelligence studies. |
| | 1.2. Few tools available for rural communities to guide them in cutting-edge processes and productivity improvements. | 2.2. Deficient implementation of specialized strategies to strengthen rural communities in the territories of the Department of Antioquia. | 3.2. Limited consolidation of productive initiatives into viable and relevant projects with market participation. |
| | 1.3. Few processes involving women, children, and adolescents in productive and sustainable practices. | | |

Source: own elaboration.

## IV. Project Objective

To develop technical, entrepreneurial, social, and commercial capacities within the rural communities of the Department of Antioquia, contributing to the promotion of food security and the development of a productive and sustainable rural sector. In alignment with the Departmental Development Plan of Antioquia, *"United for Life" 2020-2023*, the following indicator is proposed:

**Table 2.**
*General Objective Indicator.*

| Objective Indicator | Description | Verification Source |
|---|---|---|
| Peasant organizations and producers trained or educated in competitive and sustainable agricultural technological models, with an emphasis on best practices and agro-industrial development. | Measured through: Number. Target: 8 (Organizations or rural communities added to the initial baseline). Source type: Report. | Final supervision report. |
| Secondary compliance indicator: Individuals from rural communities benefiting from the processes outlined in the methodological actions. | Measured through: Number. Target: 200 (Individuals from rural communities identified in the project as beneficiaries). Source type: Report. | Final supervision report. |

Source: own elaboration.

The following displays the objective tree:

**Table 3.**
*Objective Tree.*

| | | | |
|---|---|---|---|
| **Indirect Goals** | 1.1. Increase in the utilization of agricultural resources. | 2.1. Increase in the participation of rural initiatives and projects in ST&I processes. | 3.1. High sustainability of rural community projects due to increased commercial participation. |
| | 1.2. Increase in labour income for rural communities in the department. | 2.2. Improved access to new markets and funding sources. | 3.2. Food security due to opportunities for commercial participation. |
| | 1.3. Reduction in unnecessary resource expenditure and hindrance of productive processes. | 2.3. Promotion of productive processes of rural initiatives in terms of growth and competitiveness. | |
| **Direct Goals** | 1. Increase in the utilization of natural resources and land due to the development of technical productive capacities. | 2. Improvement in productivity, competitiveness, and development of projects and initiatives promoting food security in the municipalities of La Ceja, El Retiro, La Unión, Apartadó, Santa Bárbara, Támesis, Salgar, and Medellín. | 3. Improved market access for rural community initiatives and projects with significant impacts. |
| **General Objective** | To develop technical, entrepreneurial, social, and commercial capacities within the rural communities of the Department of Antioquia, contributing to the promotion of food security and the development of a productive and sustainable rural sector. | | |
| **Specific Objectives** | 1. Strengthen technical capacities for productivity and competitiveness that contribute to food security and sovereignty in the rural communities of the Department of Antioquia. | 2. Generate knowledge transfer processes and tools for managing sustainable rural economies through the consolidation of business capacities. | 3. Develop strategies for commercial projection and participation. |
| **Means** | 1.1. Implement training processes to strengthen technical and productive skills for process improvement. | 2.1. Structure intervention plans for rural communities to promote business development and innovation. | 3.1. Develop competitive intelligence studies. |
| | 1.2. Provide tools for rural communities to guide them in innovative processes and productivity improvements. | 2.2. Implement specialized strategies to strengthen rural communities in the territories of the Department of Antioquia. | |
| | 1.3. Implement processes involving women, children, and adolescents in productive and sustainable practices. | | |

Source: own elaboration.

## V. Analysis of Alternatives

Based on the prior analysis of the context, background, and needs of the territories where the project will have an impact, the following solution alternatives are proposed to meet the stated objective:

**Alternative Solution 1:** Capacity building to promote the availability, access, use, and stability of food production, enabling the development of a productive and sustainable rural sector in the Department of Antioquia.

**Alternative Solution 2:** Development of a web-based training portal for the transfer and adoption of technical, productive, social, and commercial knowledge for rural communities in the Department of Antioquia.

The analysis of the above-mentioned alternatives is presented below:

**Table 4.**
*Analysis of Selected Alternatives.*

| Alternative Name | Evaluation Description: Profitability/Cost-Efficiency/Minimum Cost | Brief Justification of the Selected Alternative |
|---|---|---|
| Capacity building to promote the availability, access, use, and stability of food production, enabling the development of a productive and sustainable rural sector in the Department of Antioquia. | Profitability: Yes. | Addresses a comprehensive solution, ranging from the integral strengthening of rural communities in technical-productive terms to the consolidation and emphasis on building leadership and empowerment capacities in women and youth populations within the territories. All efforts are oriented toward social transfer and adoption, economic autonomy, food security and sovereignty, and socio-economic development of the territories. |
| Development of a web-based training portal for the transfer and adoption of technical, productive, social, and commercial knowledge for rural communities in the Department of Antioquia. | Profitability: No. | This alternative does not address the needs of the project or the territorial contexts. While virtuality and digital mediation are current necessities in the ST&I system, without prior community adoption of technologies and easy access to them, the web platform does not provide a comprehensive approach to the identified problem or allow for timely and relevant knowledge adoption. |

Source: own elaboration.

## VI. Technical Analysis of the Selected Alternative

Implementing an integrated model of participation and strengthening rural communities for capacity management and consolidation will stimulate and redirect the productivity and sustainability of economic and food-related actions, aligning the departmental rural ecosystem with food sovereignty and security. This approach requires establishing a series of activities in the territories that, while impactful in the short term, must be projected for long-term sustainability. These activities are structured within the proposed model to comprehensively strengthen rural communities, starting with building technical capacities and involving productive processes such as planting, harvesting, and processing.

The model also includes entrepreneurship, working with women and populations of children, youth, and adolescents to develop skills and vocations, and building economic projection capacities. It aims to encourage market participation and establish value relationships that create opportunities for rural communities, fostering competitiveness and socio-economic development.

Additionally, under the sustainability framework, the selected alternative envisions creating unique characteristics within rural communities through productive processes focused on quality, environmentally friendly practices, and the preservation and enhancement of ancestral knowledge. This approach aims to ensure that the agricultural products resulting from these communities offer a compelling value proposition in the market, whether through direct sales of agricultural products or processed products marketed as food inputs or ingredients.

To select the initiative, an analysis of the project's key aspects was conducted, guided by the following questions. These served as a starting point for constructing and developing a SWOT matrix, which allowed for a comprehensive validation of the previously outlined points. This process ultimately led to selecting a viable, timely, and relevant alternative that addresses contextual needs and requirements while generating opportunities and fostering territorial socio-economic development.

**Table 5.**
*SWOT Matrix of project alternatives.*

| Analysis Variable | Alternative No. 1 - Capacity Building to Promote Availability, Access, Use, and Stability in Food Production, Enabling the Development of a Productive and Sustainable Rural Sector in the Department of Antioquia. | Alternative No. 2 - Development of a Web-Based Training Portal for the Transfer and Adoption of Technical, Productive, Social, and Commercial Knowledge for Rural Communities in the Department of Antioquia. |
|---|---|---|
| **Strengths** | - Validation of the alternative, its purpose, and methodology by the beneficiary communities.<br>- The alternative enables strategies for economic and productive change, revitalizing rural communities in the regions.<br>- Viable and relevant alternative from an economic, financial, and administrative perspective.<br>- The alternative offers a clear, comprehensive, and structured approach with a consistent budget and amplified economic, social, and sustainability impact.<br>- Replicable in other territories.<br>- Well-aligned with national and international strategies and goals. | - Relevant experience of partner actors in developing online educational platforms.<br>- Necessary for the science, technology, and innovation system.<br>- The web portal proposed by the alternative allows customization based on contextual needs. |
| **Weaknesses** | - Extensive administrative procedures for operation.<br>- Limited alignment with regional political dynamics. | - Extensive administrative procedures for operation.<br>- Lack of adoption of digital methodologies and technologies for implementing training actions.<br>- Limited access to necessary technological tools for the target audience.<br>- Does not comprehensively address the identified needs, requirements, and problems. |

| | | |
|---|---|---|
| **Opportunities** | - Dynamics, goals, and territorial plans aligned with the alternative.<br>- National, departmental, and municipal development plans aligned with the alternative.<br>- Regional requirements and needs aligned with the purpose of the alternative.<br>- Stakeholders willing to participate in the alternative. | - Stakeholders willing to participate in the alternative. |
| **Threats** | - Uncertain environment and dynamics amid the economic, social, and ecological crisis caused by the COVID-19 pandemic.<br>- Uncertainty regarding exchange rate dynamics. | - Uncertain environment and dynamics amid the economic, social, and ecological crisis caused by the COVID-19 pandemic.<br>- Uncertainty regarding exchange rate dynamics. |

Source: own elaboration.

## VII. Methodology for Developing the Selected Alternative

From the analysis of the results obtained regarding strategies implemented to promote food security and sovereignty aimed at the sustainable development of the rural sector and territories, the need to integrate knowledge transfer and technology adoption is confirmed. This integration seeks to address environmental concerns through the generation and strengthening of capacities.

To achieve this goal, the proposed methodology includes the development of technical productive capacities, entrepreneurial capacities and an entrepreneurial mindset, social capacities with a gender focus and engagement of children and adolescents in developing their vocations within ST&I (Corporación Ruta N., 2011). Additionally, the methodology incorporates strategies directed toward commercial projection and participation. These strategies encompass the creation and validation of a functional, high-value prototype that meets the needs of communities, the department, and the nation (Colciencias. 2010).

**Table 6.**
*Production chains prioritized by PECTIA for the Department of Antioquia.*

| CADENAS PRIORIZADAS | NACIONAL | | | DEPARTAMENTAL | | |
|---|---|---|---|---|---|---|
| | Área cosechada (ha) | Producción (t) | Rendimiento (t/ha) | Área cosechada (ha) | Producción (t) | Rendimiento (t/ha) |
| Aguacate | 36.461 | 309.852 | 8 | 5.077 | 48.427 | 7,4 |
| Banano | 82.114 | 2.051.143 | 10,7 | 37.100 | 1.275.091 | 13,2 |
| Cacao | 162.827 | 90.020 | 0,6 | 15.434 | 9.023 | 0,6 |
| Café | 801.082 | 850.500 | 1,02 | 109.650 | 120.366 | 1,1 |
| Caucho | 15.167 | 19.516 | 1,2 | 2856 | 5.006 | 1,1 |
| Cítricos | 11.838 | 154.502 | 10,4 | 828 | 11.417 | 11,2 |
| Fríjol | 41.948 | 50.409 | 1,2 | 4.175 | 8.088 | 1,9 |
| Fique | 1.135 | 1.454 | 1,3 | 640 | 838 | 1,5 |
| Hortalizas | 20.505 | 382.504 | 19 | 1677 | 48.137 | 29,9 |
| Mora | 3.593 | 24.263 | 6,7 | 361 | 3.631 | 6,8 |
| Panela | 9.892 | 57.991 | 5,5 | 507 | 1.991 | 4,1 |
| Papa | 8.872 | 149.432 | 12,6 | 914 | 13.433 | 13,7 |
| Pasifloras | 4.535 | 60.887 | 11,6 | 628 | 11.682 | 16,6 |
| Plantas Aromáticas | 1.366 | 17.942 | 14.2 | 230 | 951 | 4 |

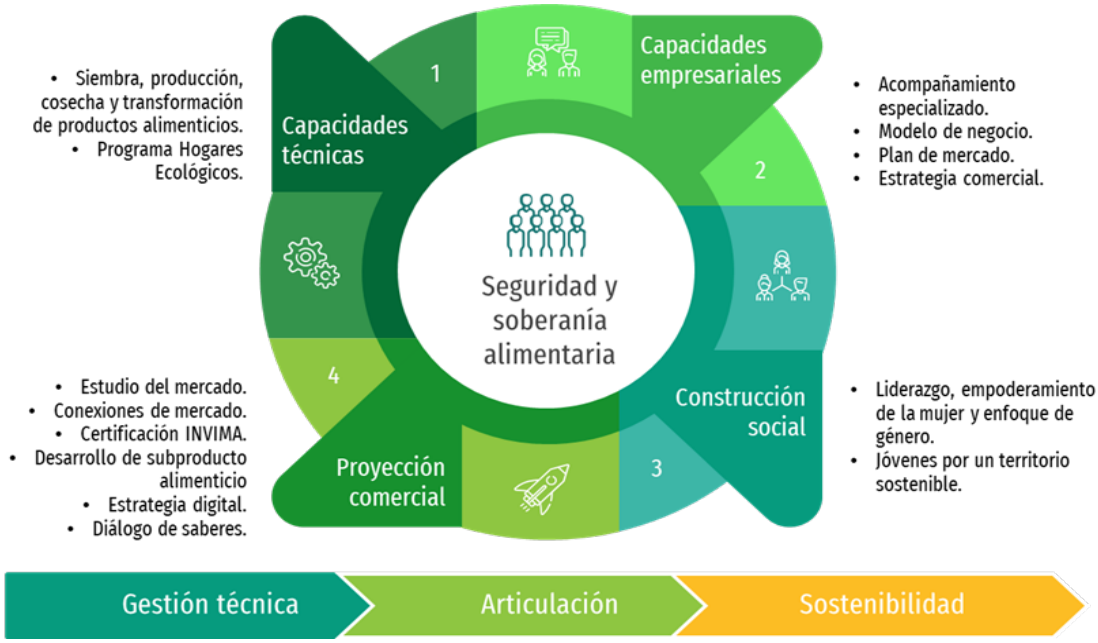
Source: PECTIA ANTIOQUIA 2021.

Thus, the production chains of Citrus Fruits, Vegetables, and Aromatic Plants are selected for this project. These chains will be the primary beneficiaries of the capacity-building and strengthening processes outlined in the project and will serve as inputs for the development of the dietary fibre prototype to be created during the methodological implementation of this proposal. Through this project, food security and sovereignty are promoted and supported by enhancing the capacities of rural communities that produce the food demanded by individuals and families in the department.

To reinforce the above, the methodological framework includes actions such as:

- Development of a validated proof of concept, prototype, or technological product, good, or service applied to the community's needs, as related to the framework of the third specific objective.
- Promotion of ST&I vocations among children and adolescents in the communities concerning food security and sovereignty and the territory's needs.
- Adaptation and strengthening of ancestral or traditional practices and knowledge to improve the productive processes developed by the communities.
- Publication of three scientific articles in national or international scientific journals.
- Contribution to achieving the Sustainable Development Goals (SDGs).

**Figure 2.**
*General Structure of the Project.*




Source: proyecto formulado SGR: Generación de capacidades para el fomento de la disponibilidad, acceso, uso y estabilidad en la producción de alimentos, que permitan el desarrollo de un campo productivo y sostenible en el Departamento de Antioquia.

To achieve the objectives outlined above, the following specific objectives will be pursued:

- **Strengthen technical capacities** for productivity and competitiveness that contribute to food security and sovereignty in the rural communities of the Department of Antioquia.
- **Generate knowledge transfer processes and tools** for managing sustainable rural economies through the consolidation of entrepreneurial capacities.
- **Develop strategies for participation and commercial projection.**

The sequential relationship between the specific objectives and the necessary outcomes to achieve them is presented below. This is achieved through a set of required activities to build technological capacities, fostering availability, access, use, and stability in food production, enabling the development of a productive and sustainable rural sector in the Department of Antioquia.

**Table 7.**
*Project Value Chain.*

| Specific Objective | Product | Measured Through | Quantity / Goal | Activities Associated with the Product |
|---|---|---|---|---|
| **Specific Objective 1:** Strengthen technical capacities for productivity and competitiveness that contribute to food security and sovereignty in the rural communities of the Department of Antioquia. | Research articles (Code according to MGA: 3902002) | Number of articles | Quantity: 3 | - Activity 1.1. Implement the "Eco-Friendly Homes" program to strengthen rural productivity.<br>- Activity 1.2. Train women in leadership through experience exchange.<br>- Activity 1.3. Promote ST&I vocations among children and adolescents in rural communities.<br>- Activity 1.4. Implement a sustainable agroecological classroom.<br>- Activity 1.5. Conduct knowledge-sharing dialogues between researchers and rural communities. |
| **Specific Objective 2:** Generate knowledge transfer processes and tools for managing sustainable rural economies through the consolidation of entrepreneurial capacities. | Support services for knowledge and technology transfer (Code according to MGA: 3902020) | Number of actors | Quantity: 3 | - Activity 2.1. Conduct a business diagnosis.<br>- Activity 2.2. Develop workshops for managing rural enterprises and entrepreneurship.<br>- Activity 2.3. Implement actions to strengthen business capabilities. |
| **Specific Objective 3:** Develop strategies for participation and commercial projection. | Support services for the creation of prototypes of materials, products, or devices derived from experimental | Number of prototypes | Quantity: 1 | - Activity 3.1. Conduct three competitive intelligence and market studies.<br>- Activity 3.2. Design a commercial strategy for products from the three production chains.<br>- Activity 3.3. Carry out commercial activations and validations for products from the three production chains.<br>- Activity 3.4. Conduct sensory testing of products from rural communities.<br>- Activity 3.5. Develop the web platform.<br>- Activity 3.6. Implement a digital strategy.<br>- Activity 3.7. Perform problem |

| | | | | |
|---|---|---|---|---|
| | developme nt (Code according to MGA: 3902029) | | | conceptualization/diagnosis.<br>- Activity 3.8. Design, develop, and validate the product.<br>- Activity 3.9. Conduct commercial validation of the minimum viable product.<br>- Activity 3.10. Provide support for INVIMA registration.<br>- Activity 3.11. Administer the project.<br>- Activity 3.12. Provide supervision support. |

Source: own elaboration.

## IX. Social and Environmental Sustainability of the Project

Recognizing the dynamics and behaviour of the context, it is necessary to reference the current strategies considered from international, national, and territorial perspectives, aimed at addressing the needs and requirements related to food security and sovereignty. This project is therefore configured, from technical, tactical, and strategic standpoints, to align with the following SDGs:

### SDG 1: No Poverty

- **Target 1.1:** Eradication of extreme poverty.
- **Target 1.2:** Reduction of relative poverty in all its dimensions.
- **Target 1.5:** Resilience to environmental, economic, and social disasters.

**Project Rationale:** Through the generation and strengthening of capacities—initially productive, addressing planting, harvesting, and processing, followed by training in entrepreneurship and business development, and culminating in commercial and market projection—an ecosystem is being created. This ecosystem integrates productivity, competitiveness, and participation to enable territorial socio-economic development, job creation, commercial participation, and the promotion of food security and sovereignty. These efforts aim to eradicate poverty, create growth and progress opportunities, and manage environments that open doors rather than close them.

### SDG 2: Zero Hunger

- **Target 2.1:** End discrimination.
- **Target 2.2:** End all forms of malnutrition.
- **Target 2.3:** Double small-scale agricultural productivity and income.
- **Target 2.4:** Promote sustainable and resilient agricultural practices.
- **Target 2.A:** Increase investments in agriculture.

**Project Rationale:** By implementing timely actions that strengthen agricultural practices, their productivity, and competitiveness, the project aims to produce more and better food for communities, improve access to food, ensure proper nutrition, and eliminate hunger and discrimination.

In light of the pandemic's effects on the agri-food sector, this project is particularly timely. It implements measures to ensure and strengthen the foundations of food supply chains and rural productive units, aiming to keep them operational to mitigate the risk of significant disruptions that could severely affect municipalities, the department, and the country, especially poor individuals and vulnerable communities.

In this way, the current project is envisioned as one that aims to meet the immediate and future food needs of vulnerable populations; strengthen the business sector and commercial participation of rural productive units; maintain food trade; keep the departmental and national supply chains operational; and support the capacities of small producers to increase food production. It considers research, entrepreneurship, and innovation as differentiating factors that strengthen productivity, competitiveness, and progress.

**SDG 4: Quality Education**

**Project Rationale:** The importance of this goal lies in the fact that education is the foundation for improving quality of life and achieving sustainable development. By implementing training actions and specialized support for rural productive units, the project aims to break down prejudices and promote equal opportunities. It encourages the adoption of technology, business structuring, and commercial projection, taking into account the dynamics and unique characteristics of each productive unit based on its needs and requirements.

**SDG 5: Gender Equality**

- **Target 5.1:** End discrimination.
- **Target 5.4:** Recognize unpaid care and domestic work.
- **Target 5.5:** Ensure full participation of women and equal opportunities.
- **Target 5.A:** Ensure equal rights to economic resources.
- **Target 5.C:** Adopt policies and laws to promote equality and empowerment.

**Project Rationale:** Actions will be implemented to promote leadership and empower women. This represents a strategy to raise awareness, both individually and collectively, that former female combatants have the capacity to take ownership of their actions, make meaningful decisions for themselves and their territory, and invest in leadership and capacity building to advance their productive units and initiatives.

**SDG 8: Decent Work and Economic Growth**

- **Target 8.2:** Increase productivity through diversification, technology, and innovation.
- **Target 8.4:** Improve efficient and respectful production and consumption.
- **Target 8.5:** Achieve full employment and decent work.

**Project Rationale:** Aiming to improve practices, working conditions, and strengthen an entrepreneurial mindset, the project simultaneously promotes employment, productivity, and decent work. It fosters entrepreneurship, microenterprises, protection of labour rights, and the promotion of a safe environment oriented toward innovation, research, and socio-economic growth, with a focus on sustainability and food security.

**SDG 10: Reduced Inequalities**

- **Target 10.1:** Growth of income for the poorest 40% of the population.
- **Target 10.2:** Promotion of social, economic, and political inclusion.
- **Target 10.3:** Ensure equal opportunities.

**Project Rationale:** Reducing inequality requires a thorough analysis of the relationship between inequality, poverty, and quality of life. Only through this understanding can effective actions be devised to achieve this goal. This project, by identifying the needs and requirements of the context, establishes an ecosystem of comprehensive support, from technical and productive strengthening to commercialization. This approach reduces social exclusion and guarantees opportunities for productive units to participate in appropriate environments and contexts.

**SDG 16: Peace, Justice, and Strong Institutions**

- **Target 16.3:** Promotion of the rule of law and access to justice.
- **Target 16.1:** Reduction of all forms of violence.
- **Target 16.7:** Promotion of citizen participation.

**Project Rationale:** The fundamental purpose of this SDG is to reduce all forms of violence, including those specifically addressed by this project. In this context, the focus is on fostering citizen participation. Through the methodological development of this proposal, opportunities are created not only for rural communities to engage in processes of technical, entrepreneurial, social, and commercial capacity building but also to promote their participation in the market with value-differentiated products. This opens up new opportunities for income, competitiveness, and socio-economic development.

**SDG 17: Partnerships for the Goals**

- **Target 17.6:** Enhance regional and international cooperation, including North-South, South-South, and triangular collaboration in science, technology, and innovation, as well as access to these resources. Increase knowledge sharing under mutually agreed conditions, particularly by improving coordination between existing mechanisms, especially at the United Nations level, and through a global technology facilitation mechanism.

- **Target 17.7:** Promote the development, transfer, dissemination, and diffusion of environmentally sound technologies to developing countries on favourable terms, including concessional and preferential terms, as mutually agreed.

- **Target 17.14:** Enhance policy coherence for sustainable development.

- **Target 17.16:** Strengthen the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and exchange knowledge, expertise, technology, and financial resources to support the achievement of the Sustainable Development Goals in all countries, particularly developing countries.

## X. Conclusions

The collective efforts of various stakeholders—academia, the productive sector, the state, and organized civil society—in designing and structuring a viable and relevant proposal that addresses state needs clearly demonstrate the foundational principle of this SDG. This alliance brings together the technical capacities, experience, and knowledge of these actors to implement actions aimed at competitiveness, productivity, and socio-economic development in the territories, through a methodology designed to focus on food security and sovereignty, particularly for rural communities.

Aligned with the **Strategic Plan for Science, Technology, and Innovation in the Colombian Agricultural Sector (2017–2027),** the proposal advocates for the development and implementation of strategies that bring rural communities closer to markets. This approach fosters socio-economic strengthening through comprehensive competitive intelligence capabilities addressing consumption trends, promotion strategies, and commercialization channels.

It also emphasizes integrating ecosystem actors to mediate and connect supply and demand while enhancing emerging and ancestral technologies to enrich agricultural practices. These efforts contribute to the development and positioning of a portfolio of appealing and widely consumed products and by-products in local communities and the department.

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# Chapter 8. Intercultural competencies in secondary education: The perspective of students from a high school in the city of Barcelona

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## I. Introduction

In an increasingly interconnected, diverse, and unequal world, intercultural dialogue has become essential. Mutual recognition, which encourages openness and attentiveness to others, aims to appreciate the cultural differences of individuals and groups while fostering spaces for exchange and contact that can prevent and address conflicts, strengthen social cohesion, and promote inclusion. In this context, education can play a pivotal role in addressing these challenges.

Although the education system is not the only domain where cultural diversity is expressed, school remains a privileged setting for engaging with it, as it is one of the primary environments where young people encounter diverse interactions outside the family and their immediate surroundings (De Vallescar, 2011).

Several factors highlight the importance and need to address this topic. First, recognizing diversity in contemporary societies and the growing interest across various disciplines in exploring this cultural diversity through multicultural and intercultural perspectives contribute to understanding current issues. Additionally, the ongoing increase in migration and the expanded concept of diversity—which now includes sociocultural, religious, gender, age, ability, and health aspects—pose significant social and institutional challenges (Burgués et al., 2017).

The United Nations' 2030 Agenda (UN, 2015) proposes a common action plan comprising 17 Sustainable Development Goals (SDGs) that aim to tackle the world's most pressing issues, such as eradicating poverty, protecting the environment, and fostering more just and inclusive societies capable of improving people's lives. While international bodies stress the need to address these goals comprehensively, certain SDGs directly intersect with the educational sphere. Below are those that are inextricably linked to this topic:

- **SDG 4**: Ensure inclusive, equitable, and quality education, promoting lifelong learning opportunities for all.
- **SDG 5**: Achieve gender equality and empower all women and girls.
- **SDG 10**: Reduce inequalities among vulnerable populations, with a particular focus on children, migrants and refugees, the elderly, and people with disabilities.
- **SDG 16**: Promote peaceful, just, and inclusive societies.

This study aims to explore young people's perceptions of cultural differences and how they experience this diversity in their daily lives. To this end, the research focuses on a public secondary school located in a neighbourhood in the city of Barcelona with a long-standing tradition of migration and welcoming people from diverse cultures.

Cultural diversity is often linked to migration processes, as it is one of the most frequently discussed factors due to its current relevance. However, it is important to note that migration has always existed, varying according to historical periods and contexts. The reasons for people's mobility are diverse, including social, economic, political, labor, and environmental factors, among others. According to the International Organization for Migration (IOM, 2022), the global number of people changing residence is steadily increasing, from 172 million in 2000 to 281 million in 2022, now representing 3.6% of the world's population.

In recent decades, cultural diversity has emerged as a distinctive feature in Spain that requires specific attention. However, it is crucial to note that Spanish society has historically been deeply multicultural due to the coexistence of groups with diverse cultural practices, religious beliefs, and languages (Aguilar & Buraschi, 2022).

### 1.1. Intercultural Approach in education

In recent decades, the intercultural approach has been a central focus in pedagogical practices and reflections. This concept is associated with educational reform movements and improvements in teaching, often invoking ideas of interaction, mutual enrichment, and cooperation among individuals and groups (Aguado, 2017; 2021). However, the term has caused confusion, as it is frequently used interchangeably with other concepts like multiculturalism, transculturalism, or pluriculturalism.

The concept of intercultural education emerged in the 1960s in Europe and the United States to address the evident ethno-cultural diversity in educational systems. In Anglo-Saxon contexts, "multiculturalism" was more commonly used, whereas "interculturality" predominated in Spain and Latin America[1].

In Spain, this concept has evolved, gaining new nuances in response to debates within the social sciences and the need to adapt to changing educational realities. Initially, the focus was on addressing the needs of minority groups, but over time, broader perspectives based on the principles of inclusive and civic education have been incorporated. This approach aims to foster social justice, promote equity, and reframe the idea of diversity, treating it as an inherent trait of modern societies rather than an exception or deficit. Unlike multiculturalism, which describes differences, intercultural education embraces a dialogic commitment toward inclusive coexistence based on equity.

For some scholars, the intercultural approach goes beyond a model to achieve or a way to label programs, resources, schools, or teachers. It is fundamentally an interpretative framework for understanding educational reality, offering a deeper insight into what is thought, said, and done concerning cultural diversity (Aguado, 2017; Mata et al., 2021; Santos-Rego, 2010).

[1] To delve deeper into the differences between these terms, see Aguado Odina (1991).

Theoretical reflection and pedagogical practice regarding interculturality have been strongly influenced by migration flows, which in Spain have been significant since 2000 (Cernadas, 2021). However, while migration is a prominent factor, the interest it generates cannot be attributed solely to this phenomenon.

The literature suggests that intercultural education has been conceptualized as a dialogic pedagogy that enables students to gain knowledge, understanding, and positive appreciation of diversity and religious pluralism (Santos-Rego, 2017). In line with this, substantial efforts have been made to integrate contributions from various disciplinary fields and theoretical perspectives that address diversity through educational intervention and innovation initiatives (Lalueza, 2012). The intercultural approach in education has also made significant contributions to teacher training and the development of education for citizenship (Mata et al., 2012; Melero et al., 2021). Additionally, critical contributions addressing racism, xenophobia, and hate speech remain highly relevant (Quirós et al., 2021; Osuna et al., 2019).

According to Aguado (2017), the intercultural approach we focus on addresses:

> (...) sociocultural processes aimed at educating free and autonomous individuals, capable of critical thinking and active participation in society. It promotes educational practices directed at each and every member of society as a whole, rather than specifically targeting isolated groups predefined by social categories. It proposes an analytical and practical model that influences all dimensions of educational processes. (...) The ultimate goal is equality and social justice (p.22).

Thus, processes in which certain circumstances arise are valued, emphasizing the relational aspect that some educational experiences can foster. This underscores the importance of addressing the skills, competencies, or aspects that make it achievable in practical terms.

### 1.2. Intercultural competencies

Depending on the language or culture, there are various ways to name and define what are known as intercultural competencies (Deardorff, 2020; Spitzberg & Changnon, 2009). The literature highlights aspects such as the stages in the development of these competencies, the role of language, identity, and the functions of motivation and mindfulness (Bennett, 1986; Ting-Toomey, 2010). According to Deardorff (2020, p.7):

> Intercultural competencies essentially refer to enhancing human abilities beyond differences, whether within a society (differences based on age, gender, religion, socioeconomic status, political affiliation, ethnicity, etc.) or across borders.

In this way, intercultural competencies can be understood as skills, knowledge, and abilities that facilitate behaviours appropriate to a particular context (Leeds-Hurwitz, 2013). These competencies include cognitive (knowing), attitudinal (doing), and affective (being) components. Knowing is linked to understanding other cultures and the willingness to engage with and learn from them, which is necessary for developing intercultural competencies. Learning to do is demonstrated in the ability to interact with people from other cultures, while learning to be involves reflecting on oneself as part of a broader world. As we can see, this is not a univocal concept but a set of diverse skills that comprise ways of acting that promote a healthy intercultural environment (Council of Europe, 2023). In practice, it is evident as the ability to recognize and respect differences, communicate effectively, adapt to diverse cultural situations, and address intercultural conflicts constructively (Vilà et al., 2022).

For scholars like Deardorff (2020), intercultural competencies are based on the recognition of human rights, such as equality, dignity, participation, inclusion, identity, and mutual respect. These competencies are essential for building relationships that normalize difference and for preventing and addressing potential conflicts. In summary, putting these competencies into practice fosters intercultural sensitivity necessary for the formation of fairer societies (De Vallescar, 2011).

The acquisition of these skills involves:

a) Becoming aware: This enables the development of a reflective and creative observational capacity when faced with various cultural situations and exchanges.
b) Informed knowledge of the principles that govern interactions between people from different cultures.

c) Assertive skills and behaviours in intercultural situations.

Cultural diversity should be promoted from childhood, fostering an open attitude in an environment of harmony, respect, and affection, rather than fear or a sense of threat towards the unknown (Arigatou Foundation, 2008).

## II. Method

This chapter presents the research conducted at a secondary educational institution in the city of Barcelona, using a mixed-methods approach (Plano Clark et al., 2022). As a single case study, the aim is to understand the particular and complex characteristics of a specific context in each place and time, gathering diverse data from different sources (Stake, 2013). This case study is instrumental, as it seeks to understand a broader phenomenon: the intercultural competencies of adolescents in a secondary educational institution in Barcelona. This research is part of a larger study and aims to collect additional complementary and explanatory information (Yin, 2014).

### 2.1. Context of the study

The secondary educational institution (IES) where the study was conducted is a publicly owned centre located in the La Prosperitat neighbourhood, in the Nou Barris district, to the north of the city of Barcelona (Catalonia, Spain).

Nou Barris has traditionally been a district that welcomes migrant populations, especially during the second half of the 20th century, when Barcelona experienced rapid urbanization and received many people from other provinces in Spain. Today, Nou Barris continues to be a frequent destination for new migration flows, making it one of the areas in the city with the highest population of foreign-born residents. The new citizens residing in the district mainly come from various Latin American countries, followed by Morocco, Pakistan, China, and Eastern European countries.

The history of the secondary school where the research took place is closely tied to the district's migration tradition. It was founded in 1989 due to the neighbourhood's need for a secondary school for its youth. Its creation and development were made possible by residents' struggles and demands for better facilities, more space, a reduction in the number of students per classroom, and a stable teaching staff.

The school offers secular education and promotes democratic values among students and their families, such as respect for diversity, solidarity, and opposition to any form of discrimination based on origin, ethnicity, religion, or socioeconomic status. The curriculum focuses on educating young citizens who are sensitive to cultural and religious diversity, which motivated the research team to conduct the study in this educational context.

### 2.2. Data collection instruments and techniques

The case study was carried out through the collection and analysis of both quantitative and qualitative information from the students of the educational institution.

#### *2.2.1. Quantitative data collection: Questionnaire*

Quantitative data were collected using a questionnaire that included a Likert scale and sociodemographic questions about the students, as shown in Table 1:

**Table 1.**
*Components of the Questionnaire.*

| Type of Items | Number of Items | % of the Questionnaire |
|---|---|---|
| Demographic Data | 9 | 32,1% |
| Intercultural Competence Scale | 19 | 67,9% |
| Total | 28 | 100% |

Source: own elaboration.

The sample of students who completed the scale consists of 98 secondary school students, aged between 13 and 17, with an average age of 15 years. Of the total, 46.9% identify as female, 52% as male, and 1% did not specify their gender. Regarding cultural background, 21.1% come from Spanish-origin families, while 72.9% are from families from countries outside Europe.

#### *2.2.2. Qualitative data collection: Pedagogical activity*

The educational activity aimed to assess the level of development of intercultural and interreligious competencies among the students of the centres. A total of 45 students from 4th year of Compulsory Secondary Education (ESO), aged between 15 and 17 years, participated in the activity.

The intervention consisted of a discussion based on a short film to identify the intercultural and religious competencies the students display in their interpersonal relationships. After a brief introduction to the activity, small working groups (three per class) were organized. The video was then shown, followed by the distribution of a sheet with a series of prompting questions.

The short film depicted a day in the life of two young women, Sara and Fátima. Through a series of domestic scenes, the film illustrated how both prepared for a job interview. On their way to the meeting, Fátima, unlike Sara, had to face a series of discriminatory situations. The video portrayed the development of the interview and how it ended unfavourably for Fátima, allowing the viewer to imagine how each protagonist felt by the end of the day.

## III. Results

The following section presents the quantitative and qualitative results to describe and better understand the construct studied in the analysed case.

### 3.1. Quantitative results: Intercultural Competence Scale

The analysis of the quantitative data collected through the questionnaire was conducted using SPSS Statistics, version 29. Initially, a series of statistical tests were performed to verify the quality of the data, followed by a descriptive analysis of the collected information.

The Intercultural Competence Scale consists of 19 items and has a Cronbach's Alpha reliability of 0.796, indicating a good level of internal consistency for the instrument. The items include statements for which students must select their level of agreement, choosing from 5 categories ranging from 1 (none) to 5 (a lot).

Table 2 presents the results of the mean and standard deviation for the items on the scale.

**Table 2.**
*Results of the Intercultural Competence Scale.*

| Item | Minimum | Maximum | Mean | Desv. St. |
|---|---|---|---|---|
| **1. To be my friend, the following topics are important:** | | | | |
| 1.1 How much money they have. | 1,00 | 3,00 | 1,1020 | ,39297 |
| 1.2 Their gender. | 1,00 | 5,00 | 1,2551 | ,77740 |
| 1.3 Their religion. | 1,00 | 3,00 | 1,1327 | ,42202 |
| 1.4 Their cultural background. | 1,00 | 5,00 | 1,2041 | ,68803 |
| 1.5 Their political beliefs. | 1,00 | 5,00 | 1,6837 | ,99065 |
| 1.6 Their sexual orientation. | 1,00 | 5,00 | 1,4694 | ,99694 |
| **2. A person's cultural background makes me avoid...** | | | | |
| 2.1 Starting a conversation with them. | 1,00 | 5,00 | 1,3367 | ,78575 |
| 2.2 Including them in my group of friends. | 1,00 | 5,00 | 1,2245 | ,69654 |
| 2.3 Making them my best friend. | 1,00 | 5,00 | 1,1939 | ,71303 |
| 2.4 Having a romantic relationship with them. | 1,00 | 5,00 | 1,6224 | 1,10775 |
| **3. I have insulted or treated other people inappropriately...** | | | | |
| 3.1 For having a different financial status than mine. | 1,00 | 5,00 | 1,1429 | ,51773 |
| 3.2 For having a different gender than mine. | 1,00 | 5,00 | 1,1735 | ,57482 |
| 3.3 For having beliefs different from mine. | 1,00 | 5,00 | 1,2143 | ,64616 |
| 3.4 For being from a different culture than mine. | 1,00 | 4,00 | 1,1224 | ,48195 |
| 3.5 For having a different sexual orientation than mine. | 1,00 | 5,00 | 1,2653 | ,71148 |
| **4. About your friendships:** | | | | |
| 4.1 They are of the same gender as me. | 1,00 | 2,00 | 1,2245 | ,41939 |
| 4.2 They are only from my social class. | 1,00 | 2,00 | 1,0816 | ,27521 |
| 4.3 They are from the same culture as me. | 1,00 | 2,00 | 1,0612 | ,24097 |

Source: own elaboration.

In the initial section of the scale, information was collected about students' preferences when interacting with others and choosing friendships, analysing which aspects they consider important. As shown in Table 1, the means for all items are below 2, indicating that the various characteristics mentioned are not considered relevant by the surveyed youth. However, the most relevant aspect compared to the others is political ideas (m=1.68), though still at a relatively low level.

Regarding the cultural background of individuals, it does not seem to significantly influence the establishment of friendships, although it is slightly more relevant (m=1.62) when considering a romantic relationship.

Concerning inappropriate behaviour or insults towards others, students mostly reported not engaging in such actions based on culture, gender, sexual orientation, or other characteristics, with means below 1.30.

In terms of the diversity of their friendships, students showed no preference for friends from the same culture, gender, or class group within the school, with means below 1.25.

When comparing the percentage of agreement or disagreement based on the gender with which students identify, no significant differences were observed between female and male students. However, there were some discrepancies regarding the sexual orientation of their friends: while 95.65% of female-identifying students considered sexual orientation not at all or very little important in forming friendships, this percentage dropped to 78.43% among male-identifying students.

Comparisons between students from Spanish-origin families and those from foreign-origin families revealed some discrepancies in the percentage of agreement or disagreement, as described below:

In response to the question about the gender of their current friends, 88.46% of students from local-origin families reported having friends of their own gender and other genders, whereas students with origins in other countries showed a lower percentage, with 74.28% having friends of a different gender than their own.

90% of students from Spanish-origin families reported not engaging in negative behaviour towards others based on gender or sexual diversity, a percentage that rises to 95% among students from foreign-origin families.

Regarding inappropriate behaviour or insults towards individuals from different cultures, 92.30% of local-origin students stated they had not engaged in such actions, compared to 97.14% among students from families with cultural roots in other parts of the world.

Concerning negative attitudes towards individuals with different beliefs, 92.30% of students from Spanish-origin families and 96% of students from other countries said they had not insulted or shown negative behaviour due to differences in beliefs.

At the end of the scale, students were presented with a multiple-choice question asking them to select a response to the hypothetical situation of a family member or friend marrying someone from a different culture. Notably, most students overall considered it “normal.” When comparing by family origin, some differences were observed: 80.7% of students from Spanish-

origin families viewed the situation as normal, while this percentage increased to 90% among students from families originating from other countries.

### 3.2. Qualitative results: Pedagogical activity with youth

The analysis of the educational activity was conducted using AtlasTi, based on the following analytical categories:

a) Awareness and observational skills.
b) Informed knowledge about differences among people from diverse cultures.
c) Skills and behaviours.

Regarding the differences experienced by each protagonist in the short film, students quickly identified instances of discrimination, recognizing the elements underlying differentiated and asymmetric treatment. The youth were thus able to acknowledge the hierarchy of differences present in some everyday situations they perceive as familiar. In their responses, they established a direct and stereotypical connection between the veil, religion, and a specific country of origin, assigning it a particular identity and national belonging.

> *"Sarah is treated like a normal person, whereas Fatima is not treated the same." "They are treated differently in the same situations because Sarah is Spanish, and Fatima is Moroccan". (4A)*

They attribute the discriminatory and differential treatment to an inherently racist society where education plays a significant role, either as a space where such discrimination is expressed or to mitigate it.

> *"Because of the racism ingrained in society and the way we are sometimes educated." (...) "We believe it happens because people are poorly educated from a young age; you are not born RACIST." (...) "It happens due to a lack of education and respect". (4A–4B)*

Regarding the effects these situations provoke, they mention feelings of sadness, frustration, pain, or loneliness for those who experience them, and indifference or detachment for those who are not exposed to such stereotypes and discriminatory behaviours.

> *"Sarah is indifferent because she doesn't experience racism, whereas Fatima is excluded." (...) "Well, we'd feel both sad and angry at the same time. It would seem very unfair to us." (...) "We'd feel very disappointed because no one deserves to go through situations like this because of their religion". (4C–4B)*

In all groups, participants reported having experienced or witnessed situations of discrimination or racism like those depicted in the video. However, they showed difficulty verbalizing and identifying potential responses or solutions that were not automatic or predictable. For instance, when asked to select a moment from the video that illustrated the discussion, most chose the scene where a young boy insults the girl wearing a headscarf or the scene where no one sits next to one of the protagonists on the bus.

> *"Parents should educate their children better on this topic... To resolve it, we should teach young children that we need to respect and accept all religions and cultures". (4B)*

Having presented the results obtained from the questionnaire and the pedagogical activity, the discussion and conclusions of this study are outlined below.

## IV. Discussion and conclusions

By analysing the results of the questionnaire answered by the students, it can be concluded that the responses are "expected" or "politically correct," reflecting their perception of what is expected from them. They know what to say in front of the adult and institutional gaze, and in this sense, the school is a good example of this, being an ideal place to work, consciously, on the development of this skill. Most of the students surveyed demonstrate a respectful and non-discriminatory attitude toward cultural diversity in their responses. However, other studies on the subject reveal that school bullying motivated by cultural and religious differences remains a very palpable reality and a pressing problem, contradicting the answers given by the students (Ministerio de Educación y Formación Profesional de España, 2023; Karaman, 2023; Vilà et al., 2020; Paraušić, 2017). Despite this, school is a fundamental space for socialization in the lives of young people, likely more significant than others during adolescence. Therefore, the school is a privileged space where students could interact with different people and where they learn, practice, and rehearse future adult roles that they will need to play in diverse environments.

A determining and learned factor is discrimination. Although there is more awareness of the issue, it continues to operate strongly and manifests in different ways, making it difficult to ensure equal treatment in terms of social justice between individuals and groups. Intolerance of differences is structurally reproduced in various contexts, particularly in relation to religion or cultural traits, often linked to migration. In this regard, the media and politicians often appeal to fear and insecurity toward what is different, constructing scenarios and hate discourse that affect people's relational abilities (Hellgren & Zapata-Barrero, 2022). In this way, ignorance and fear are closely linked, solidifying stereotypes and prejudices that are difficult to dismantle.

Regarding the differences found between students from Spanish cultural family backgrounds and those from non-European countries, it is observed that the second group shows more open attitudes toward coexistence with different cultures and beliefs. This aligns with the findings of several studies concluding that people from backgrounds different from the white Western norm feel more comfortable in contexts with a high diversity of nationalities, cultures, and religions (Zapata-Barrero & Hellgren, 2023). This is likely due to their ability to empathize with those who have also experienced discrimination. In this sense, the homogenizing trend in schools does not help develop the intercultural and religious competencies necessary to interact and build new bonds with other people.

In the pedagogical activity conducted, the responses follow the same line, although they lack the nuances needed to critically address some stereotypes. When students are asked how they would feel in similar situations, some empathy is observed, but they show difficulty in providing responses that would solve or confront these situations. Regarding attitudes (what they do), according to the students, they show openness to living with people from different cultures and beliefs, and in fact, they predominantly do so in their daily lives.

Regarding the competencies linked to knowledge (knowing), it is observed that the young people have a certain mastery of them; however, this knowledge is more rational than sensitive. This is likely because interculturality is a pressing issue that concerns governments

and institutions, particularly educational ones, which have recently had to address issues of coexistence and discrimination. In response to this, the solutions often involve the provision of resources, programs, or pre-established pedagogical content, which do not always align with training aimed at developing sensitivity and empathy.

To develop the sensitivity of young people, it is necessary to provide rich pedagogical experiences that welcome and critically examine their own attitudes and privileges. Only in this way can we advance in a truly transformative intercultural education that perceives diversity not only as a resource or a problem, but as a potential for change when cultures come into contact in the same space (Maza, 2020). For this reason, it is essential to consider that these spaces are not only formal, such as schools, but also informal ones like leisure activities, sports, music, neighbourhoods, or the consumption of certain goods, where multiple interactions can occur. Public spaces, such as parks, promote interaction, likely with much more naturalness than in a formal space.

In Europe, the Council of Europe's Intercultural Cities Programme (ICC) has played a fundamental role in introducing interculturality into the European political context and, consequently, on a global scale. Locally, in the context of the case study presented, it is worth highlighting the actions undertaken by the government of Catalonia, a territory committed to promoting and developing intercultural and interreligious competencies in its children and youth, thus contributing to the construction of more just, peaceful, and inclusive societies.

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# Chapter 9. The construction of local memory: the municipality and educational institutions as preservers of collective history

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## I. Service-Learning as pedagogical innovation

Pedagogical innovation has recently become a trending topic, particularly the deconstruction of traditional "lecture-style" teaching in favor of a more practical approach. This is where the Service-Learning (SL) model connects (Bernet, 2009). This model is not at odds with technological innovation in the classroom; rather, it can leverage technology to establish better methodologies. The core of the SL model lies in fostering solidarity within a community through two main vectors: first, by upholding academic excellence, and second, by enabling students to provide a service to their community while engaging in experiential learning. However, the question arises: if SL fundamentally relies on education, how can it contribute to improving less advantaged populations? (Aramburuzabala, 2015).

Various SL projects can be carried out, supported by schools and in collaboration with municipal councils, to highlight different elements of value (Odria, 2007). For instance, municipal and parish archives (when available and containing useful information), archaeological sites, and monuments can be utilized. By emphasizing these resources, students will learn the content of their curricula while providing a service. This service could materialize in multimedia repositories of oral history, archaeological site exploitation (creating explanatory panels), cultural and environmental routes (cleaning trails, signage, preserving biodiversity), and encouraging publications and conferences on local history. This learn-by-serving approach will generate significant public and private benefits, attracting tourism, boosting the economy, fostering a robust artisan network, and substantially improving the lives of rural communities facing decline and depopulation. The educational proposal is to develop a service-learning project focused on Spain’s democratic transition, narrowing it down to how the transition was experienced in rural areas, particularly in Andalusia (Mangas & Martinez-Odria, 2012).

The fundamental premise is that, when faced with a social need identified in a specific environment, students, guided by their teacher, undertake an action to address it (Arratia, 2008). This process helps students learn by applying skills, knowledge, and, above all, attitudes. The benefits span several dimensions:

- **The Educational Centres**. It provides an opportunity to implement values-based and civic education, which every institution should emphasize. It can also directly and indirectly enhance the subject of "Education for Citizenship." Additionally, it strengthens the school-community relationship.

- **For Families**. It offers a way to experience more engaging and motivational educational activities that demand greater involvement from their children. Likewise, it provides a meaningful and solidarity-driven way to spend leisure time together as a family, transmitting core values.
- **For the Community**. It improves the living conditions of its members and strengthens their sense of belonging. It fosters trust among the population, reinforces volunteerism, and bolsters civil society.
- **For Students**. It enhances their learning and academic performance, as both boys and girls are more motivated when they see a social purpose in what they study. It helps them develop responsibility as active citizens.

The success of service-learning lies in various premises that must be correctly valued and positioned to ensure its effectiveness. First, a solid foundation is essential, which involves fostering the values of solidarity, particularly in the context of education (Campo, 2008). Many public schools and institutions are increasingly promoting these values through various solidarity-driven activities. Consequently, there is a strong foundation for service-learning in Spain, although there is always room for improvement.

Additionally, it is crucial to invest in educational and pedagogical innovation, even though innovation can sometimes pose adaptation challenges. For instance, while service-learning is highly beneficial, it can create difficulties for educators who struggle to adapt or for students who may misuse the methodology by failing to meet their responsibilities.

Implementing new pedagogical methods demands responsibility, and we are not always prepared for this. As a result, introducing such methodologies requires significant time and effort. Moreover, managing them in the classroom can be challenging. For example, in a hypothetical scenario involving the use of tablets, it is important to ensure students do not access inappropriate programs or become distracted by games. When properly explained and implemented, service-learning can help address such situations for several reasons. Firstly, it promotes pedagogical innovation and introduces effective methods to manage these challenges (Furco, 2011). Secondly, its mutual benefit is fundamental, providing value both to those who give and those who receive (Martínez, 2007, 2008).

Thus, service-learning can be seen as a response to the current crises, not only economic but also moral. Upholding values such as volunteerism, solidarity, and selflessness are increasingly challenging, as these values are often relegated to the background. It is essential to understand that service-learning has gained traction because it works, and the results are evident. It improves academic performance while fostering values like solidarity, respect, and mutual cooperation.

Moreover, service-learning facilitates cooperation that transcends boundaries, encouraging collaboration between institutions (Tapia, 2006, 2008, 2010). Significant alliances are being formed to create new projects, collaborate, and provide mutual support. In a sense, it is a genuine effort, as teachers must thoroughly understand the needs of their community and motivate students to participate in the projects. At the same time, a minimum level of coordination is required.

Although it is not easy, it is far from impossible. It simply requires a degree of interest, patience, and a clear understanding of the pedagogical potential of this educational methodology, along with the outcomes demonstrated in various studies.

## II. The importance of local archives in Service-Learning: connecting with the local environment

One of the most significant shifts in historiography in recent times has been the rise of local history, as opposed to the national or transnational history emphasized by researchers in the last century (Casanova, 1999). The current prominence of local history in historiography is undeniable, as evidenced by the wealth of scientific research it generates. One only needs to attend a congress or symposium on any historical period to observe the valuable contributions arising from local perspectives. While these works often originate from various, and sometimes obscure, locations across Spain, their significance is increasingly recognized by attendees of such events (Fernández, 2007).

The scientific community has sought to understand the reasons behind the rise of local history, yet no singular explanation has emerged; instead, it is influenced by multiple factors. First, political factors, particularly after the Spanish Constitution of 1978, established the autonomous model that was progressively implemented. Autonomous regions and their governments have actively promoted studies of their respective territories, which have also been integrated into the curricular designs of both primary and higher education (Prats, 1996). Thus, political and geographical influences have played a significant role in this development.

However, not all causes are endogenous; there have also been exogenous influences, such as the rise of Anglo-Saxon social history, the Annales School with its focus on daily life and mentalities, and Italian microhistory (Pons, 2007). During the Franco regime, the first Institutes of Local Studies were created, organized under the Spanish Confederation of Local Study Centres and supported by the Spanish National Research Council (CSIC). The local sphere has transformed and reacted to external agents, with citizens participating in shaping content by contributing human capital, which, along with economic resources, defines the local element. Additionally, this local element continuously responds to external influences, producing new forms of collective action (Rodríguez, 2006).

In essence, microhistory holds great potential because it does not focus on major national or state-level issues but instead centres its attention on the everyday. Within this everyday perspective lies something crucial: microhistory is, in part, an emotional history. This emotional connection stems from a love for a town, a land, or even a specific group, which defines its unique characteristics. The importance of microhistory lies in making the hidden visible—those aspects deemed unnecessary to investigate but are fundamental to understand. This is particularly true because historical phenomena result from the aggregation of small, everyday actions, and within these small actions, we find answers to larger issues.

Microhistory is essential because it constructs global history by bringing to light situations that might otherwise remain hidden. Furthermore, it is this form of history that forges the cultural and collective identity of a community through the recovery of memory. One could even argue that microhistory helps create more reflective citizens who are committed to addressing local issues. Thus, microhistory plays a fundamental role as a renovator of history. Traditional approaches to history may be limited if we fail to understand the essential processes that

stabilized, changed, or revolutionized societies in a specific time and place. The connection between Service-Learning and the local environment can be established through three fundamental axes: legislative, press, and archival sources.

By definition, an archive is an organized collection of documents produced by an individual, society, or institution in the course of their functions or activities. A municipal archive, however, is an administrative archive aimed at preserving documents received or produced by the institution itself. Its purpose is to inform local authorities, internal officials, other organizations, or researchers in general. Certainly, depending on the time periods associated with the documents, challenges may arise. Nevertheless, I believe these challenges can be overcome in all communities.

When undertaking Service-Learning (SL) projects, it will be necessary to consult two types of archives. The administrative archive stores documents that are still in process, meaning that its organization is part of the administrative unit's responsibilities. Each unit manages its office archive by organizing documents into files and series, as mandated by the central archive. These files represent the core of the administrative archive. They consist of an orderly collection of documents and actions that provide the foundation for administrative resolutions. The files include various types of documents, all authenticated and numbered. Files can be divided into two categories: those subject to administrative procedures and those that are non-regulated. The former involves actions and procedures outlined by law, containing documents related to each phase of the administrative process. The latter pertains to matters not governed by formal procedures and serves statistical or informational purposes.

Among the documentation available for SL projects, the minutes of municipal council meetings stand out. These minutes serve as evidence of agreements, debates, and motions recorded during council sessions. All activities requiring council approval are documented in these minutes. The municipal council meeting is a gathering held at the town hall where council members, presided over by the mayor, debate and approve decisions of municipal interest. This process was formally regulated by Law 7/1985 of April 2, which governs the foundations of local administration, specifically in Article 46, which outlines the conduct of council meetings.

Additionally, there is the Standing Government Committee, a delegated body responsible for managing and resolving routine matters, such as permits, business licenses, and construction authorizations. While valuable, this documentation often lacks broader context and focuses primarily on administrative details.

One particularly interesting document for research is the Secretary's Annual Report. Municipal secretaries were required to produce an annual summary of the municipality's economic, social, political, and patrimonial status at the end of each fiscal year. These reports are excellent indicators of a municipality's evolution across various dimensions over time, particularly during the political transition years. The limitation of these reports is that some municipalities do not have complete, uninterrupted records, with missing reports for certain years. However, the standardized structure of these reports facilitates comparative studies, making them highly useful for researchers.

Another valuable resource is the election files. While electoral results are often published, election files provide a detailed breakdown of results by neighbourhood, allowing researchers to examine party candidate lists and any incidents during election day. This offers a comprehensive interpretive framework of significant utility.

Additionally, municipal festival programs constitute an underappreciated yet highly informative source. These programs often included writings by council members, interviews with mayors, and reflections of the community's social climate, providing insight into public opinion and local dynamics.

Supplementary documents include Mayor's Resolutions and Mayoral Correspondence, which may provide context on certain issues but are often redundant with council minutes or limited to communication with civil governors, police, or local institutions such as schools. Furthermore, some municipalities publish Informative Bulletins, which can serve as valuable sources for specific investigations.

An ever-expanding universe of digital archives is emerging as public institutions progressively digitize their most important documents. Among these is the Hemerographic Archive of Prof. Juan J. Linz: The Spanish Transition in the Press (1973–1987). This archive comprises 76,000 clippings from Spanish newspapers, personally selected by Professor Linz, a Sterling Professor at Yale University and honorary member of the Scientific Council of CEACS, alongside his colleague Rocío de Terán. It is an invaluable resource for understanding declarations, opinions, and events from the Spanish Transition period in a broad sense. With its powerful search engine, users can efficiently find relevant clippings by simply entering a keyword.

Another notable resource is the Archive of the Spanish Transition Foundation. This foundation, established in 2007 by former deputies, ministers, and government officials—mostly linked to the UCD—aims to promote and disseminate knowledge about the Spanish Transition. The archive contains valuable materials and links to other websites with essential documentation, as well as audiovisual resources. Similarly, the Archive of the Fundación Estudios Sindicales–Historical Archive of CC.OO. focuses on labour studies and has made significant strides in digitizing its collections, particularly those related to non-parliamentary leftist parties during the Transition period.

As mentioned earlier, hemerographic sources are of vital importance and easy to access, especially for contemporary history studies. The press from the Spanish Transition period has been extensively analysed, as it provides a rich tool for understanding social, economic, and political dynamics. Online resources such as the Virtual Library of Historical Press Portal offer access to newspapers from relevant periods. Even more intriguing is the Clandestine Press Portal, which features publications from political parties and unions operating at a national level during the Transition.

Additionally, the Andalusian Newspaper Archive provides digital access to regional publications. Of particular interest are La Hoja del Lunes, local newspapers, and even the monthly informative bulletins issued by municipalities.

Legislative sources are also crucial, albeit more challenging to work with in a school setting. At a general level, analysing the Organic Law of the State (1966) and the Law for Political Reform (1976) is essential to understanding the fracture between the end of Francoism and the beginning of the democratic transition. For local research, a comparative study of the Local Regime Bases Law of 1945 and subsequent laws is indispensable. Under Francoist municipal corporations, governance was heavily constrained by organic state laws and the Fuero de los Españoles, which established basic representational frameworks.

Finally, the value and importance of oral sources should not be overlooked. Two particularly insightful examples are:

- Individuals who held political positions during the era—many of whom were instrumental in fostering neighbourhood associations, which became key elements in articulating democracy during the late Francoist period and the Transition.

- Returned emigrants, individuals who experienced the Spanish Transition firsthand while also living in other democratic systems. Their testimonies are invaluable, as they often acted as the vanguard of social thought in Spain. These emigrants, who left the country for economic reasons, encountered what can be termed "schools of democracy" in their host nations, learning European democratic practices. This exposure allowed them to deeply understand and compare the principles of true democracy, making their insights particularly enriching for Service-Learning projects.

## III. Educational Institutions as Promoters of Local Development

The topic of the Spanish Transition remains highly relevant today. We are living in historical moments that demand research and, above all, re-examinations of this period. This has been the case since the Transition itself up to the present. However, some interpretations of these relatively recent events are still open to debate. For instance, the political process known as the Transition has often been framed within rigid interpretive paradigms. These suggest that the transition from dictatorship to democracy was carried out not only in the best possible way given the circumstances but also as a resounding success.

This framing positioned the Spanish Transition as a model to be exported to other countries. The protagonists included former regime politicians who embraced understanding and change by founding parties like the UCD and AP; left-wing politicians from the PSOE and PCE; and, above all, the monarchy represented by King Juan Carlos I, who championed unity and the interests of the Spanish people. As a result, the process was fundamentally top-down, with democracy reaching Spain through efforts originating in the nation's capital and driven by political consensus, understanding, and, above all, the pacification of the country.

However, these events are far more nuanced. For instance, certain historical processes, such as democratization from below, have been overlooked. Initially, historiography neglected the importance of popular pressure, democratization in rural areas, and the small but powerful movements that paved the way for democracy in Spain. Consequently, textbooks, manuals, and academic analyses have often made implicit references to political parties and the monarchy as the sole architects of democracy. As a result, the role of the people and popular pressure has been relegated to isolated mentions of student protests in major state capitals.

In truth, it was a combination of multiple elements that ultimately forged what we now call the democratic transition.

Rural areas are thought to have been crucial not only for consolidating democracy but also for its very emergence in Spain. Historically, rural Spain has been perceived as a sphere rooted in the past, with a conservative mindset, traditional values, and little connection to political processes. However, this perception is gradually being challenged as the capacity of rural communities to assert their role in shaping thought, advocating for rights, and engaging in struggles becomes more apparent. This is particularly significant given the hardships faced by rural areas in Spain.

Firstly, the autarkic economy implemented during the early Franco regime created inequality, poverty, and limited opportunities for economic advancement. This, in turn, fostered not only class consciousness but also a unique awareness that led to resistance within rural communities. These resistances were primarily motivated by the pursuit of justice and the preservation of traditional livelihoods. For instance, industrialization under the dictatorship often led to land expropriation for industrial zones, while rural inhabitants were encouraged to migrate to cities under the promise of progress. This push for urbanization and modernization forced many to abandon their towns and traditional ways of life, driven by an acute crisis that compelled them to settle in industrial hubs like Madrid, Barcelona, or Bilbao.

The geography and layout of cities underwent significant transformations during this period, with the emergence of "working-class neighbourhoods" reshaping urban landscapes. These historical developments gave rise to new ideas and movements that supported democratization from below while also defending rural life, which was increasingly marginalized by the agents of change and modernization introduced by the Francoist government in the 1960s. Rural communities mobilized directly, and their demands were embraced by leftist parties, particularly the Communist Party, which not only supported these causes but also created an extensive clandestine network to undermine the Francoist regime from within.

Municipal governments played a crucial role as the initial channels for these demands, making their analysis vital to understanding this period. Furthermore, there was openness within right-wing parties during the Transition, notably with the creation of Alianza Popular and UCD. Another significant factor was the aggiornamento, or renewal, emanating from the Second Vatican Council, which influenced the mindset of priests, nuns, and laypeople of that time, further fuelling the winds of change.

The following outlines the materials we will use to implement service-learning focused on the Spanish Transition. Our primary resource will be hemerographic sources, as they are highly accessible for students through newspaper archives.

Hemerographic sources are essential for contemporary studies, as the Spanish press during the Transition offers invaluable insights into social, economic, and political dynamics (Lazo & Aldea, 2012). For this activity, we will investigate the Municipal Newspaper Archive to trace news articles, editorials, and letters to the editor that provide an accurate depiction of social behaviour in Granada Province. Our primary focus will be on various newspapers, but we will also include local magazines and information from associations. Additionally, we will use

online resources, such as the Pablo Iglesias Foundation, which allows access to issues of *El Socialista* from the Transition period.

Following this approach, we will also gather materials from the newspapers of the CNT union, accessible through the Anselmo Lorenzo Foundation for Libertarian Studies, which houses issues of the anarchist union's newspaper from 1976 to the present.

Furthermore, local archives will be an integral part of the project. These archives are generally easy to consult, allowing students to engage directly with the documentation. This material can be photographed and collectively described. Students will also record audio or video interviews with witnesses of the Transition, conducting interviews with family members or visiting associations and day centres where individuals who are isolated or in need of companionship can share their stories. These interviews will contribute to the creation of an oral history archive that can later be consulted. The ultimate goal is to develop a website compiling testimonies, documents, interpretations, bibliographies, and other materials to serve as a resource for students and researchers.

Regarding the pedagogical content of the project, the education of the whole person requires educators to understand each student individually and address the development of their intelligence, willpower, and emotional well-being. Teachers are not merely transmitters of knowledge; their role encompasses motivating, modelling, and guiding students' work. Whether intentionally or not, a teacher influences their students through their actions in the classroom, and only when this influence is deliberate and aligned with educational goals can it truly be formative (Furco, 2011).

The intellectual, emotional, and moral development of students forms an interconnected whole that unfolds through daily work and is closely tied to their experiences and lives (Tejada, 2013). An effective educator strives to instil in students a dynamic and practical culture rather than a purely theoretical or "bookish" one. It is not enough for students to "hear" or "see;" they must engage actively in the learning process to internalize it. Only work executed with precision and excellence fosters genuine intellectual growth. *How* a student learns is as important, if not more so, than *what* they learn. Thus, educators must prioritize learning processes alongside outcomes, emphasizing the value of well-done work.

Students, guided by solid values, cannot limit themselves to personal development alone. A fundamental objective is to awaken social awareness and foster concern for others through concrete actions.

Education entails "sowing the seeds of the future," mobilizing efforts to build a better society. This principle serves as the cornerstone of the Service-Learning Project, which aims to promote education and cooperation, tailoring them to the characteristics and possibilities of each student (Puig, 2008, 2011). This approach emphasizes a deep understanding of each student, fostering personalized learning that enhances their holistic development.

The project primarily seeks to enable students to advance toward autonomy, becoming active participants in their own learning. This involves teaching them how to learn by leveraging the specific content of various subjects to develop strategies that allow them to assist their communities and those around them (Luna, 2010). In this way, learning becomes an active tool for social transformation.

It is essential to continue developing students' intelligence by teaching them to think and reason critically. This process not only enhances their cognitive abilities but also enables them to apply their knowledge to real-world problem-solving. In this context, the acquisition and internalization of virtues become pivotal, especially those necessary for moral growth and service to others. Educating students in the value of well-executed work fosters excellence and prepares them to contribute positively to society.

Finally, the project places a strong emphasis on helping students interpret their experiences and emotions correctly, integrating them harmoniously into their personalities. This approach promotes the education of emotional intelligence and solidarity, which are essential values for building empathetic and engaged citizens. The Service-Learning Project thus seeks to develop not only well-prepared students but also individuals who are more conscious of and responsible for their environment.

The core activity of the project involves creating an oral history archive with students, framed within the context of service-learning. This activity allows people to share their life stories and experiences with others. The archive will serve as a historical resource, aligning with the project's goals: to teach students to cooperate with one another and with others, to realize the practical applications of their curricular subjects, to manage time and engage in collaborative work, to raise awareness of the issue of elderly isolation, and to learn about the Transition in an innovative and transformative way—not solely through books—while contributing to society.

The activity consists of creating an oral history archive, as previously mentioned, with the intention of publishing it digitally. Historians recognize that elderly individuals hold a wealth of stories in their memories that can be incredibly valuable for students. Moreover, many older adults are eager to share their histories and often face loneliness. The idea is to divide the class into groups, with each group assigned several elderly individuals to interview. Each group would engage with these individuals on three main topics: 20th-century history, arts and popular traditions, and life memories. These informal interviews, lasting several hours, would also provide companionship. The information gathered would then be processed and organized into a web-based archive, making it accessible for future research.

This activity promotes experiential learning by teaching students different learning dynamics. First, they gain insight into a component of the curriculum, such as 20th-century history. Additionally, they develop self-regulated learning skills, becoming active participants and protagonists in experience-based learning. Lastly, the project instils values of respect for and responsibility toward the elderly, while fostering collaborative work. Engaging in this activity together not only strengthens bonds of deep friendship among students but also encourages reflection on various contemporary social issues.

The ultimate goal is to transform this activity into an innovative educational tool that combines historical research, social interaction, and technological integration, contributing meaningfully to both students' personal growth and the broader community.

The activity is designed to teach students how to learn by engaging them in various learning dynamics. First, they will explore a component of the curriculum, such as 20th-century history. Additionally, they will develop self-regulated learning skills, becoming active participants and protagonists in experiential learning. Finally, the activity aims to instil values of respect and

care for the elderly. Collaborative work on this type of project fosters deep bonds of friendship and reflection on pressing social issues.

The tools for this activity will include the history textbook, mandatory reading materials, and technological tools such as apps. Learning strategies will span multiple dimensions. First, interviews will be recorded, and notes will be prepared. Students will be encouraged to expand their vocabulary, particularly in historiography. The activity also aims to improve reading comprehension, requiring students to write argumentative and expository texts. Reading skills will be emphasized, including reading aloud and understanding historical texts to enhance communication. These activities will help students develop oral and written discourse, particularly in a historical context.

The Oral History Archive will serve as the primary research project, supplemented by quarterly projects. The first term will focus on consulting local archives, the second on newspaper archives, and the third on libraries. These projects aim to spark investigative curiosity and familiarize students with contemporary social, scientific, and cultural issues. Students will learn to create planning timelines, gather information from diverse sources, and organize it effectively. This process will also integrate information and communication technologies, fostering rigorous argumentation and critical thinking.

This project is built around three main pillars: the municipal government, the local library, and cultural centres or neighbourhood associations. These institutions are integral to any local community, making them ideal partners for the project. Connecting local research with institutions such as municipal governments, associations, and libraries is essential for a community's holistic development. These research initiatives, focused on specific topics within a defined geographic area, directly impact citizens' quality of life and inform local decision-making.

Municipal governments play a critical role as facilitators and promoters of local research. They have access to relevant community data, such as demographic statistics, property records, and public infrastructure information. Collaborating with local researchers, municipalities can provide access to these resources, enriching the research and making it more relevant to local needs. Additionally, the findings from such research can be utilized by municipal governments to make informed decisions about public policies, urban planning, resource allocation, and community development programs.

Local associations also play an essential role in connecting with local research efforts. These associations, which may represent specific community interests such as neighbourhood groups, non-profit organizations, cultural or environmental groups, among others, can collaborate with local researchers by contributing their expertise and specialized knowledge on particular issues affecting the community. This collaboration can guide research toward priority areas and ensure that its results are relevant and beneficial to the broader community. For instance, one of the associations that has significantly contributed to the local understanding of the Spanish Transition is that of returned emigrants. These associations shed light on the Transition from an international perspective, as emigrants could compare fully functioning democracies with the movements driving the Transition in Spain. They actively participated in the creation of networks that fostered democracy across multiple aspects and directions.

In terms of oral sources, these testimonies are considered relatively unbiased. This is because interviews with councillors or mayors, while providing a broad perspective on the experiences within municipalities, may also present a skewed narrative, potentially leading to a biased account. Thus, individuals who experienced the Spanish Transition firsthand and were also familiar with other democracies or forms of governance inevitably include returned emigrants. Their testimonies are particularly compelling, as they represented the vanguard of social thought in Spain. These emigrants, who primarily left the country for economic reasons, experienced what are known as "schools of democracy" in their host countries—European practices and approaches to governance. These experiences provided them with a profound understanding of democracy and democratization while allowing them to compare what constitutes a true democracy, as many have highlighted.

The central issue in this discussion is the role emigrants played in Europe and how the host countries treated them. Political socialization was key, as emigrants gained insight not only into Spain's political situation but also into the political realities of the countries where they settled. At first glance, there is little difference between emigrants who went to Belgium, Switzerland, Germany, or France in this regard.

Furthermore, it is important to distinguish between several clearly differentiated profiles. First, a deep division exists between first-generation emigrants and second-generation emigrants, not only chronologically but also due to profound shifts in mindset between the two groups. The first generation was profoundly shaped by the Spanish Civil War and its aftermath, marked by fear—not only of expressing emotions but also of voicing political thoughts and convictions.

In contrast, the second generation, born and raised in European countries such as France, Belgium, or Germany, grappled with reconciling family traditions with new political, social, and economic perceptions. For them, the Civil War and dictatorship were distant and archaic events. Growing up in fully democratic societies, they only became aware of the differences when visiting Spain, particularly after the dictatorship formally ended. This shaped a distinct perspective on Spain and its politics compared to that of their parents.

Returning to the first generation, their migration was primarily a result of economic crises. None of the individuals interviewed left Spain for political reasons or dissatisfaction with the regime. They migrated for economic improvement and to provide better opportunities for their families. Therefore, comparing the two generations' participation in oral history projects can reveal nuanced differences in how each group viewed and was influenced by these paradigms.

On another note, local libraries are centres of information and resources that play a pivotal role in promoting and disseminating local research. In addition to providing access to a wide range of information sources, libraries can collaborate with local researchers by offering bibliographic search services, access to specialized databases, and advice on information management. Libraries can also serve as venues for presenting research results through conferences, talks, or exhibitions, fostering idea exchange and public debate. Indeed, these spaces can be instrumental in generating and disseminating the results of educational institution-led research. This creates a network linking local libraries with schools, associations, and other entities, thereby fostering shared knowledge and mutual support.

The service-learning methodology provides an excellent opportunity to bridge local research and local institutions in a participatory and collaborative manner. Service-learning combines teaching and learning with community service, enabling students to acquire knowledge and skills while addressing societal needs. This alliance can take many forms.

One approach involves identifying local needs. Local research efforts can begin by identifying specific community needs. Students and researchers can collaborate with local institutions, such as municipalities, associations, or libraries, to pinpoint areas requiring research and service. For instance, oral interviews might reveal municipal shortcomings, community requests, or proposals for improving living conditions.

Following this, joint project designs can be developed. Once local needs are identified, research and service projects can be designed to address them comprehensively. For example, if a community needs to improve its recycling policies, students could investigate best practices in similar communities and collaborate with the local government to implement a pilot recycling program. Alternatively, projects could explore historical recycling practices from the 1970s and 1980s, such as bottle return systems.

Another collaborative effort could involve integrating oral history projects into municipal resources. For example, indexing oral history archives on the municipality's website or collaborating with municipal employees on projects like identifying electoral lists, conducting interviews, or documenting political party activities. Much of this documentation, such as that of the defunct Union of the Democratic Centre (UCD), was transferred to municipal archives or remains in private homes.

Regarding project evaluation, once completed, it is crucial to assess its impact and gather feedback to inform future research and actions. Local institutions can provide data and evaluations to measure the project's success and identify areas for improvement. To ensure continuity and sustainability, long-term mechanisms for collaboration between students, researchers, and local institutions should be established. This could include formal alliances or integrating research results into institutional policies and programs.

Finally, municipalities also play an active role in promoting collective memory by preserving historic sites, celebrating significant anniversaries, and commemorating notable local historical events. Through exhibitions, conferences, and educational activities, municipalities engage the community in valuing and preserving their historical heritage, thereby strengthening their sense of identity and belonging. This highlights the critical importance of creating resources that enable students to understand both the individual and collective history of their local area.

## IV. Conclusions

Historical research is a multifaceted endeavour that not only involves academics and experts but also heavily relies on collaboration between diverse institutions and social actors. In this context, municipalities and educational institutions play key roles in preserving historical heritage and promoting historical knowledge within local communities. However, this is not always the case. The prevailing individualism often prevents the formation of alliances that could enhance scientific knowledge while fostering enriched learning activities, situations, or didactic programs in educational centres.

At the same time, we face a series of challenges that hinder the development of such initiatives. It is essential to recognize that understanding the past is crucial for building individual and collective identities, as well as for making informed decisions in the present. However, historical research faces obstacles such as limited access to primary sources, fragmented knowledge, and a disconnection between academia and society at large. In light of these challenges, promoting collaboration and resource-sharing among various institutions, including municipalities and educational centres, becomes critical.

Municipal governments play a fundamental role in preserving and disseminating historical heritage at the local level. Through the management of municipal archives, organization of cultural events, and promotion of historical tourism, municipalities actively contribute to the appreciation and conservation of the past. However, to maximize the impact of their efforts, municipalities could benefit from establishing strategic alliances with local educational institutions.

Educational centres are vital spaces for shaping future generations of researchers and citizens. Beyond teaching historical knowledge in classrooms, schools can actively participate in historical research through collaborative projects, extracurricular activities, and volunteer programs based on methodologies such as service-learning. By involving students and teachers in historical research, educational centres not only promote active learning but also contribute to the advancement of historical knowledge within the community. Furthermore, these collaborations can yield a range of benefits for both the institutions involved and the broader community.

First, such partnerships can expand access to primary sources and historical resources, enabling students and scholars to undertake more comprehensive and enriching research. Additionally, they can foster the exchange of knowledge and experiences across different generations and sectors of society, thereby strengthening the social and cultural fabric of the community.

Building on these ideas, successful case studies from different geographic and cultural contexts can serve as examples. For instance, projects where high school students collaborate with a municipality's local history department to investigate and document the history of a historic neighbourhood in their community. These initiatives could include interviews with senior residents, analysis of historical documents, and visits to historical sites, enabling students to make meaningful contributions to the understanding and appreciation of local heritage.

In conclusion, collaboration between municipalities and educational institutions is essential for fostering historical research and promoting the appreciation of cultural heritage within local communities. By establishing strong partnerships and developing collaborative projects, these institutions can maximize the impact of their efforts and enrich learning and civic engagement in society. Municipalities and educational centres are encouraged to explore opportunities for collaboration, develop teamwork strategies, and fully leverage available resources to advance historical knowledge and collective memory in their communities.

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# Chapter 10. Discrimination within the university? Case study of female professors at a Colombian public university

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## I. Introduction

Although education was denied to women for centuries, when they demonstrated their abilities and gained access to higher education, pursuing all kinds of professional careers, the university no longer remained a foreign world. They sought entry as university professors, transgressing the unwritten mandate to aspire only to teach in primary and, perhaps, high school.

The feminization of the primary teaching profession is a global historical fact, with the assumption that the characteristics of women give them the “natural aptitude” for such work (Stanislav Stanislav, 2022). Yannoulas (2007) suggests that this process was also a result of men leaving their jobs because of wars, or many teachers leaving their classrooms for better job opportunities during the industrial revolution (González, 2009). Thus, the occupational niche of primary education allowed women to work in exchange for a salary, extending their natural capabilities associated with motherhood in a safe environment where children and other women surrounded them. Therefore, women’s performance did not represent a concern or challenge for men (Ospina, 2014).

However, according to Bidegain (2005), first Letters women teachers became the head of women’s movements demanding their education and political rights. Many of them became the first women writers or journalists in Latin America. They were also founders of leagues, unions, and syndicates. Thus, teachers played a key role in the history of feminism, and the doors to teaching in universities opened for them.

Women’s access to higher education was gained after an ideological and legal struggle dating back to the mid-1600s, which generated cultural ruptures and changes. In 1377, the University of Bologna decreed the express prohibition of accepting women because they were considered “the first reason for sin, the weapon of the devil, the cause of man’s expulsion from paradise”; however, almost 300 years later, some female aristocrats earned their degrees in law and even served as professors at the same establishment (Palermo, 2006).

For a particular case, Giuliana Antonella Giacobbe (2018) narrates that on June 25, 1678, the brilliant Elena Lucrezia Cornaro Piscopia became the first woman in the world to obtain a doctorate in philosophy at the University of Padua (Italy). The pioneering university women generally had their families’ support, and they addressed women’s issues in their undergraduate work.

In countries such as England, France, and Germany, some notable ladies, with the support of the nobility, especially queens, founded private schools for wealthy ladies. In such institutions,

women were required to be teachers, tutors, and counselors, thus paving the way for female university professors (Harvey & Jones, 2022).

In Latin America, female university pioneers gained access to study medicine mainly toward the end of the 1800s—initially in Argentina, Brazil, Mexico, Chile, Cuba, and later in Costa Rica. However, while each country has its particularities, the social mobility of the middle strata was favored in all cases (Palermo, 2006).

In Colombia, women entered universities because of their own interest, rather than as a result of the government's or society's initiative; they were allowed to study to defend themselves at work in exchange for a salary and to be better mothers and wives (Hernández, 2004), this was a process that was "not only slow but predominantly elitist" (Piñeres, 2006, p. 22). Women broke new ground and fought for their educational ideals.

In 1935, a university received a woman in the classrooms of the Faculty of Medicine for the first time. She was Miss Gerda Westendorp Restrepo, who did not finish her career because she married Alfonso Núñez Arango but graduated with a Bachelor in Philology and Languages on April 15, 1955, at the National Women's Pedagogical University in Bogotá. She began teaching German, her paternal language, at the National University in 1956.

Thus, women fought to enter the university; transgressed pre-existing mandates, and became students, professors, outstanding researchers, and managers. However, considering the androcentric structure of higher education of higher education; invisible biases, glass ceilings, discriminatory behaviours, symbolic violence, and others still prevail toward women, for whom universities are not yet fully adequate.

Discrimination against university women professors refers to any action or practice that prevents or limits equal opportunities and treatment for women working in higher education (Meléndez-Ferrer, 2022; Shafina, 2020). This may include lower salaries, lack of promotion, bias in hiring, unequal workloads, lack of recognition, lack of visibility, and harassment.

This article reports discriminatory acts faced by female university professors in the Colombian university where this case study was conducted.

## II. Literature review

Drudi (2008) claimed that gender discrimination in academia is unfair and has significant consequences for the quality of and diversity in higher education. The underrepresentation of women in leadership positions and certain academic areas can limit research opportunities for women, and the gender pay gap can undermine women's engagement and quality in teaching and research.

Paniagua et al., (2020) mention how gender discrimination in higher education is a complex and multifaceted problem that requires an integrated and sustained approach. Academic institutions must be committed to promoting gender equality in all areas, from hiring and promotion to assessment and institutional culture.

Harvey and Jones (2022) assert that despite advances in gender equality in higher education, significant barriers for women regarding promotion, salary, and recognition persist. Gender

discrimination remains a severe problem in academia, and concrete steps need to be taken to address it.

Buquet (2016) exposes how, from the 1950s onward, universities began to receive women on a massive scale, but parity in the student population was only achieved at the end of the 20th century; however, by the second decade of the 21st century, equal participation among academics is still not achieved. These conditions of disadvantage respond to a system of social organization called gender order, in which women as a group are subordinated to men and which constructs arbitrary differences resulting in the performance of differentiated and hierarchical social roles that are reproduced in all spheres of being and human activity. Such differentiation is both a product and a producer of gender distinctions.

The antecedents of this change are related in common aspects: the arrival of women to university teaching was not easy, yet it was transcendental; it did not arise because of altruistic reasons but resulted from significant needs at the national level. Difficulties arose mainly because of ecclesiastical positions and the prevailing machismo within university cloisters.

Gender segregation tendencies are evidenced at the vertical and horizontal levels, characterized by the unequal distribution of women and men in disciplines and areas of knowledge, especially in engineering and natural and exact sciences, at the levels of academic appointments and in decision-making positions, indicating that female university professors have less access to power and recognition. Several universities have initiated processes to incorporate the gender perspective and promote changes favoring equality in university communities, but divergences remain.

By way of conclusion to the state of the art, it is observed that female university professors are a privileged group because not everyone can achieve a professional position in higher education; however, their growth is restricted because of the male elites who have dominated university spaces for centuries. Therefore, women academics face challenges such as external factors, like the patriarchal society, and internal factors, like a lack of self-confidence. A gap in the data on female university professors' perceptions and experiences in the classroom has been identified, which will also be addressed in this article.

## III. Methodology

The research is framed within the qualitative paradigm of historical-hermeneutic character because it aims to interpret, clarify, and understand the discrimination faced by female teachers in a public university during a historical period (1965–2015). The temporal time frame begins in 1965, when the first female professor entered a university, and ends in 2015, when the university obtained a great distinction in regard to aspects of teaching. This work corresponds to a case study aimed at investigating the phenomenon of the presence of female professors at the university.

### 3.1. Stages of the methodology

For the development of the investigation, a modification of the protocol of the Montes-de-Oca-O'Reilly (2019) proposal was used through the phases presented in Figure 1.

**Figure 1.**
*Stages of the investigation.*


Source: own elaboration.

**Phase 1.** Identifying the female professors at the university from 1965 to 2015. The sources of information selected were the offices of archives, human resources, and faculties.

**Phase 2.** Classifying the teachers. The category of "generation", which refers to a group of people who share a series of similar characteristics and experiences, was used to classify the teachers (Ortega y Gasset, 1923; 2010).

3.2. Concepts of generation and prosopography in research

"Generation" in research, first mentioned in 1923 by Ortega y Gasset in the essay "The Idea of Generations", refers to a group of people who share similar characteristics and experiences, such as age or place of birth.

From this perspective, the use of generations as a research category is appropriate for this work because common experiences can be considered regardless of the age of the university professors. Additionally, as this is a historical study, the influence of events related to the presence of female teachers from 1965 to 2015 will be analysed.

**Table 1.**
*Unit of work per generation.*

| | Range of years per generation | Total number of female teachers |
|---|---|---|
| **I Generation Tc** | 1965–1980 | 4 |
| **I Generation Hc** | | 4 |
| **II Generation Tc** | 1981–1996 | 20 |
| **II Generation Hc** | | 49 |
| **III Generation Tc** | 1997–2015 | 41 |
| **III Generation Hc** | | 274 |

Source: own elaboration.

**Phase 3.** Population selection. A non-probabilistic purposive sampling was conducted to select teachers who met the inclusion and exclusion criteria presented in Table 2.

**Table 2.**
*Inclusion and exclusion criteria.*

| Inclusion criteria | Exclusion criteria |
|---|---|
| Is or has been a teacher at the university | Has a medical condition that prevents effective communication |
| Has location information | |
| Manifests desire to participate in the research | |
| Willingness to communicate via personal appointment, email, phone call, or video call | |

Source: own elaboration.

The lower limit for the interviews was 10% of the total number of female teachers; for the first generation of female university professors, it was only possible to locate one teacher because the others had either died or were ill. The life histories of those interviewees who allowed it were applied as given in Table 3.

**Table 3.**
*Unit of work per generation.*

| | Total number of female teachers | Effective interviews | Life history |
|---|---|---|---|
| **I Generation Tc** | 4 | 4 | 4 |
| **I Generation Hc** | 4 | 1 | 1 |
| **II Generation Tc** | 20 | 6 | 3 |
| **II Generation Hc** | 49 | 5 | 2 |
| **III Generation Tc** | 41 | 11 | 8 |
| **III Generation Hc** | 274 | 34 | 16 |
| **TOTAL** | | 61 | 34 |

Source: own elaboration.

**Phase 4.** Design and application of instruments. The extended unstructured interviews, oriented toward teaching, research, and management, included questions on teachers' motivation for entering the university and the evolution of their career and perceived opposition.

In the life history, supported by prosopography, priority was given to questions on family constitution and lifestyle in childhood, adolescence, and adulthood; type of upbringing (i.e., who participated, what or who influenced their upbringing; life project; meaning of being a woman; professional projection; and affective and contemporary life

**Phase 5**. The analysis of the data used the category of "generations", focusing on three roles: teaching, research, and management positions. From each technique applied, interpretations were made in addition to the triangulation or cross-referencing of information, from which the categories described in the results emerged. The ATLAS.ti software was used for analysis.

## IV. Results and discussion

The research results were divided into three categories: “women should be silent”, “women must be submissive”, and “difference in female corporeality”.

### 4.1. Women should be silent

A recurring element found in the interviews and life histories is that some colleagues prefer female teachers to remain silent: “Many male teachers try to silence us women because we are direct. There are women teachers who have been trained, are disciplined and dedication, and are much more responsible and committed.” (E50)

In some Middle Eastern societies, women wear veils that completely cover their faces and mouths, known as *niqab* and *burqa.* In Colombia, specifically in this case study, women do not physically cover their mouths, but many men would like them to do so because they would rather them to be quiet and submissive. For Tapia (2018), the desire to silence women who express themselves is not because of the content of their words “but the simple fact that she is saying it.” (p. 116) Participants E53 and E60 exposed the following:

> “(...) he is a scary misogynist, (...) but nobody said anything there; he could say the most outrageous things; he could make the biggest proposals; he could not be opposed; they were very silent and limiting (...) there was no meritocracy.” (E53)

> “In the department, there were only two of us professors, and the discrimination [was] psychological in terms that one would propose an idea, [then] everybody would say that it didn’t work. Twenty minutes later, a man would expound the same thing that [one of us] had said and [to the others] it would seem like a wonderful idea.” (E60)

> Meanwhile, many men do not accept that women are at the same level as they are but rather consider their knowledge to be inferior: “In my faculty [], where we are the only two full-time female professors, our ideas are undervalued by most of our male colleagues.” (E10) “(...) some male professors showed discomfort when ideas of renewal were generated in some processes that had to do with the program.” (E11) “(...) they listen to me... [but do not] pay attention to me so to speak, I do not know if it is because most of them are men and I am the only woman there.” (E22) “Male teachers prefer to recognize the work of other male teachers, not that of female teachers.” (E50).

### 4.2. Women must be submissive

Men do not always agree with the judgments that women make about the work they presented, because on the scale of knowledge, the masculine is superimposed on the feminine. Consequently, the masculinized world of the university normalizes behaviours associated with undervaluing women’s knowledge or judgment compared to that of a man even if she is qualified and has demonstrated sufficient competence:

> “I do perceive a lot of *machismo* [toward] women even if they are very qualified (...) I have felt discriminated against and it has shocked me a lot (...) everyone has the same conditions, capabilities, rights, and duties, so I have been quite shocked by the fact that women are not treated the same as men.” (E14)

> "In the beginning, I had no problems with anyone, but as the semesters went by, I encountered some issues with coworkers; especially with male professors who saw me as a rival, relationships were not the best." (E56)

E57 recognizes subtle but evident patriarchal relations in such vital activities as the creation of programs and curricular designs:

> "With time I have seen, for example, that there were meetings between male teachers to discuss the new curricular program; in other words, even in teachers' assemblies, they mentioned that in their homes, for instance, the idea of creating the new program had arisen (...)." (E57)

> The above cases represent how a woman who excels in the same activities as a man goes from being a team member to becoming a rival. This transgression is usually considered "unbearable" among peers because they have grown up with a mentality of not conceiving women as peers, but as inferiors. The following participant's statement emphasizes that all those, especially women, who confront the male authority of other teachers—that is, a sense of superiority not because of being bosses or hierarchical superiors but of being men; and for that reason, they believe themselves to be lords—are labeled as crazy. In this regard, there are many historical references, for example, Hubertine Auclert was arrested for "Thinking that [she] was equal to men." (Fournier, 2005, p. 7) This event is synchronized with E59 "If we are reactive, it is because we are half crazy." (E59)

> "How competitive the university environment can be and the fear of confronting (...) that image [that] professors build of women (...) [in] their role as men; they expect women always to be submissive (...) So what do we do? Are we afraid of creating that image (...) [or] simply (...) keep the party in peace? This should not be the role, right? Instead, without being contentious, one should assume a critical position, regardless of gender. Here we are all as good as the other." (E59)

Emphasis is placed on the "subtle naturalized behaviours" against women, which lead to the decline in the social and academic status of women in universities, further increasing the already considerable gap in equity with their male peers, while equality is even further away. According to Zabalgoitia (2022), biases in the female academic careers are presented by the camaraderie among men, inducing male suspicion toward women.

> Delving into the relationships of camaraderie, the female teachers refer to the existence of a "macho thread among [male] teachers" (H11) that protects all those who are part of it and blocks and attacks those who are outside it. The participants' considerations are as follows: "If [men] go up [to hierarchical positions], they take their friends who are also men; they would not take account of women. Men feel more supported among other men." (E8) "Regarding the workload, there are male professors with much more time at the university who refuse to carry out some tasks and simply do not perform them." (E11) "(...) to be honest, in the university... there is a big thread, and that thread is masculine, and it has been difficult not to break it, not to permeate that part." (E45)

> "(...) there is a preference for men, for example, for administrative positions. There is a kind of culture where when a man does something, for example, it is highly valued and applauded. I feel that it is more difficult for women to achieve recognition; for women, it is much more costly. It is more difficult, really, but it is also quite subtle, isn't it?" (E3)

### 4.2. Difference in female corporeality

> "(...) the reception was enjoyable. I really saw from the beginning that it had been a good decision to come to the university (...) despite all the physical limitations of not having offices (...) We had no problems with our classmates. Everyone received me very well even though the teacher who had been there before, physically different from me, was a wonderful teacher (...) Fortunately, I have not had any problems with students." (E59)

In participant E59's account of how she was positively received at the university, it was striking that she compared herself physically with the teacher she replaced. Lagarde (1996) affirms that "the body is the most precious object of power." (p. 56) Therefore, androcentric society seeks to dominate female bodies by imposing what is considered beautiful and, consequently, the desirable features in a body so that, silently but imperiously, body standards are established, and whoever wants to be considered beautiful must makes sacrifices according to the canons of beauty. Women who do not wish to or cannot adapt to these standards are at a physical disadvantage, an element that can affect their self-esteem or self-confidence.

Some evidence shows that a young and pretty female teacher is susceptible to being complimented or harassed by students, who consider this behaviour appropriate for men, apparently forgetting the invisible barrier of respect that separates teachers from students.

> "When I first started, it was ugly with the students, it was horrible, I was very young, and I was (...) bullied, because they were not used to seeing women, let alone very young women… [it was not] rude bullying, no, it was more like instances of calling me "mamacita" (...) I did have some attributes (smiles) (...) that made me feel terrible, I was about to... no more, you know what I mean? [until] one day they made me feel so angry that I got furious, and at that moment, I took out a sheet of paper and told them we should do a quiz, and that was like the holy remedy." (E18)

Most female teachers began their professional lives when they were very young, a fact that generated fear and internal resistance within them. At the beginning of their careers, there were wary of presenting themselves to students. Nevertheless, no teacher reported feeling more fearful when addressing men. Furthermore, this situation did not prevent them from deploying their knowledge, strategies, and authority. The female teachers concluded that these adverse events were transformed into respect and support from male and female students.

> "Perhaps at that time, because of youth, I felt resistance from within rather than from the students. I mean, when I evaluate that first stage... I suddenly felt young, not because of the responsibility, but it was overcome, one can say, in that short period of the first year of university entrance." (E27)

The university is immersed in a patriarchal culture, so myths and stereotypes associated with women are present and circulate in it; additionally, in the university areas, no spaces or structures have been generated for specific feminine aspects such as maternity, a natural process that requires special protection but that can be considered a disadvantage in the hiring process because of the cost and time implications (Casas Baamonde, 2023). The following situation refers to this subject:

> "At times, I have felt (...) a lack of understanding (...) [in] one of my pregnancy processes (...) I had some health difficulties. Regarding the children's reaction, they would be more interested in finishing the academic semester, and so on; they would request the teacher's replacement." (E55)

Concerning the testimony immediately above, and from a legal perspective, when high-risk pregnancies occur in teachers, they must be separated from their academic activities temporarily. In this case, the university has an obligation to manage a person quickly and agilely on temporary leave, although Professor E55 speaks of a replacement, the correct term is "temporary leave". However, the university should urge students to remain calm, assuring them that their semester load will not be affected as an effective solution is provided. A high-risk pregnancy is not only the mother's responsibility; but, it does not imply any sanction (Ramírez Bustamante, Tribín, and Carmiña, 2016).

> "(...) they called me to ask me if I could take that chair [at the university], but we can't pay you because you are on maternity leave (...) and I said, no problem, I can do it *ad honorem* (...) So I was going to work with the "pochecas así" [she gestures to indicate that her breasts were huge due to the amount of milk]." (H30)

Maternity leave is an irrevocable right for women, however, the situation of participant H30 was as follows. She had another job that legally covered all her pregnancy needs, but she also had a great desire to work at the university, to which she had applied on previous occasions without achieving the expected result. The participant is invited as a lecturer, and when she communicates that she is on leave, the university responds that because of her condition she cannot be hired. However, her interest is very strong and as she is required *ipso facto*, she proposes to work *ad honorem* until the end of her maternity period, and so it happened that she was hired at the end of this cycle. The procedure described has no legal repercussions, contrary to the following case:

> "(...) when I had my daughter, I saw a huge problem—the right to breastfeed. A worker in any company is supposed to have the right to one hour of breastfeeding until the child is six months old, I went to check with human resources and they said that this did not apply to the university because (...) one did not have a fixed schedule so one could breastfeed at any time, but there is no garden here, so one cannot breastfeed when one feels like it or even when the child needs it." (E10)

The right to breastfeed is protected and guaranteed by the International labour Organization and the Code of Childhood and Adolescence in Colombia, among other legal instruments. It is a sensitive and important issue because newborns and infants enjoy the protection of the so-called "best interest of the child."[2] Employers who affect this right will be subject to sanctions. In the testimony of participant E10 there is misinformation; she is told that she can take her breastfeeding hour, but she was possibly recommended not to do it within her class schedule, but at another time of her academic assignment.

[2] The protection of infants takes precedence over other rights.

In addition to the legal aspect, the physical and emotional aspects must also be considered because the hormonal processes of pregnancy, lactation, and menstrual cycles can affect female behaviour. This reality has been translated as weakness and illness on the part of women because they are associated with states of insanity, depression, sensitivity, hysteria, constant anger, etc.

> "(...) specific aspects of women's condition should be considered, which, whether they want to or not, affect work and time dedication—for example, maternity and breastfeeding. It is also an emotionally and physically altering period for most women." (E6)

> Related with the previous story, the menstrual period is one of the realities that has confined women to the interior of their homes. (Guzmán, 2022). However, Professor E60 emphasizes female biological characteristics as favorable conditions: "(...) she [the woman] purifies herself through gestation; she not only cleans her body, but she also cleans her head. These are things we do not understand... [and] the menstrual period [for example]." For centuries, menstruation has legitimized a behaviour of rejection, discrimination, and isolation toward women. Nowadays, however, in the social and human sciences, there is a strong tendency to recognize such feminine elements as a basis for achieving equality in relations between men and women. According to Ramírez (2016), in the female body, there is a "condensation and simplification of the power of nature that is capable of creating but also of destroying, modifying, and transforming, having in turn its own cyclical nature from its vital cycles and mainly from hormonal development." (p. 137)

Notwithstanding the above, women experience premenstrual syndrome, which manifests itself differently in each one; common factors are recorded including pain of varying intensity, mood swings, and swelling and affliction in the digestive system (Malpartida Ampudia, 2017). Such symptomatology extends to the days in which menstrual flow occurs.

> "(...) if I am going to mention it here! The days when we are in our menstrual period are sometimes not even understood. It is taken as something very normal even while many get sick and have terrible cramps; they are expected to continue responding to their jobs in such a situation." (E22)

Similarly, in the sense mentioned about the hormonal affectation and changes in moods, participant H13 expresses her life history:

> "So, the mental health part of it, if they did something here, a management, some assessments, some tests.... I don't know, I think they would find that most of the teachers and especially women have this (hormonal disorder). Besides the fact that, in women, the hormonal aspect is significant. In this period of the life cycle, some women are pre-menopausal while others are menopausal. All this results in emotional changes, so if we wanted to manage this from the health promotion part, for example, we should use some strategies to make each woman aware of the stage she is in."

Menopause, which is a natural stage for women, has also a historical limitation (Delia Pilnik, 2022) as it marks the end of the female reproductive period. Another stereotype associated with femininity is weakness; over the years, women have been forcibly put in the category of the weaker sex, and this myth persists in the imagination of the university community. Since Aristotelian times, women have been understood as imperfect males or as soft versions of men (Castrillo, Gillate, & Apaolaza-Llorente, 2023); moreover, male standards have always been used to measure the feminine. This false understanding of reality has been rooted in the

mentality of many people for centuries. Thus, feminine vindication has been a complex process, despite the progress that has been achieved.

> "They said, I'm not going to do anything to you because I'm a man and you're a woman, so things like that... and then there's the fact that I talk tough, so sometimes... that can also cause intimidation (smiles)." (E10)

> "The university still maintains the culture that the fact of being a woman implies that we cannot achieve goals or that we need someone's protection or that we need to go to meetings accompanied by men because we need to be protected. I don't know why this context persists." (E44)

Some men do not see this attitude as machismo; rather, they feel right acting this way:

> "I was [supporting] another person who was not the candidate for the deanship (...), so [the chosen Dean] sent me to wash dishes in the kitchen." (E53)

The following fragment reflects the belief that when a woman carries out "masculine" actions, she deserves to be criticized, discriminated against, and excluded; the participant refers to having ridden a motorcycle when this vehicle was considered a male symbol.

> "At the time of entry, there was a lot of machismo. There were only two female professors (...) We were frowned upon (...) I started riding a motorcycle (...) There is a lie in society where women are assigned the simplest subjects, but now this is changing. In civil engineering, there are almost no women. [There was] more support among men." (E46)

Participant E46 mentions the myth associated with activities, mainly technical or power activities. One of the first types of engineering highlighted worldwide was civil engineering, which was popularized by the construction needs of growing cities in its beginning and because of the non-existence of specialized machines (XVIII and XIX centuries). Civil engineering was associated with physical force work, which is why women were not considered; besides the historical context, there were not sufficient facilities to study civil engineering. Thus, a myth was created regarding the difficulty of engineering for women; although engineering was diversifying, the same teachers, mothers, and fathers, among others, were responsible for discouraging female students or applicants, informing them that their brains were not prepared for the tremendous intellectual load required by engineering (Chiva Miralles et al., 2020).

> "In the master's program (...), it was up to us women to carry out the operational tasks (...) and the men to carry out the experiments and analyse the results. I guess the message was to show the difference in capabilities in the group, which was overcome when I dared to carry out my own experiments (...) From then on, I felt I had gained a space that was recognized (...)." (E59)

## V. Conclusions

Although the university doors were closed to women, they managed to transgress pre-existing mandates and become students and professors. However, considering the androcentric structure of higher education, there still prevail invisible biases, glass ceilings, discriminatory behaviours, symbolic violence, and other issues toward women in universities, for whom universities are not yet fully adequate. Thus, although universities have been patriarchal

structures and often shielded against women, they were not infallible to the hard work of women (Baro, 2021).

In terms of professional roles, university access for women has been androcentric. Historically, the Council of Trent discussed whether women had souls, placing them on the same level as animals, who are considered sentient beings in Colombia from 2016 onwards. Thus, the arrival of women in territories dominated by male action is the result of an arduous battle fought by educators and some visionary men and does not in any way correspond to altruistic feelings. Universities were slow to open their doors to women, which is why they are celebrating almost a century of involvement and engagement in higher education; meanwhile, men have enjoyed this privilege for more than six centuries.

Women have been considered inferior beings, who have had to work twice as hard as their male counterparts to gain access to their natural rights. Currently, society accepts female representation in all fields of action, although it does so with hypocrisy because in the imagination of some men and women, the latter should be dedicated to certain activities, such as confinement at home, motherhood, caring for others through education or health, and everything that requires an ornamental presence.

The interviews in this case study show the masculine and feminine gender scripts in society and, in this case, in education, the male role is assumed to be a synonym of impetus and power. Women are associated with aesthetic tasks without noticeable participation. Another significant finding in this thesis is the constant male camaraderie, which leads men to act as a union of strength and weight.

Participants also noted that male and female teachers are equal in terms of training, skills, and level of performance; however, the differences appear in terms of access to opportunity. The absence of female roles in the fields described above impacts the imagination of young men and women. Likewise, the entire university community must become aware about how women are treated, including the symbolic violence exercised against them, their needs such as maternity leave, and above all an egalitarian and inclusive language, in which phrases such as “they are only good for...” are not allowed. Meritocracy should prevail in higher education institutions.

## VI. References

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**Educational Innovation: Tools and Practices for Effective Learning** stands as a testament to the transformative power of innovative educational strategies. Directed and coordinated by a distinguished team of experts, this book offers a comprehensive exploration of methodologies and practices designed to enhance learning outcomes across diverse educational contexts.

The book is structured into several key chapters, each addressing a critical aspect of modern education. It begins with practical insights into using digital badges in Moodle, illustrating their potential to foster motivation and creativity in online learning environments. Subsequent chapters delve into the implementation of systematic reviews in early childhood and primary education, highlighting innovation projects that integrate technology, interdisciplinary approaches, and constructivist principles to meet the demands of 21st-century learners.

A significant portion of the book focuses on higher education practices, including strategies to maintain academic integrity in the face of artificial intelligence and promoting deep learning through Immediate Response Systems (IRS). These explorations emphasize the role of technology in creating active, reflective, and student-centered learning environments.

The book also provides insights into intercultural competencies in secondary education, offering perspectives from high school students in Barcelona, and the development of sustainable and productive projects in global contexts such as Antioquia, Colombia. Through these case studies, the book underscores the universal applicability of innovative methodologies, transcending geographical and cultural boundaries.

At its heart, the book advocates for a balance between technological integration and pedagogical depth. It explores the ethical dimensions of education in a rapidly evolving digital landscape while proposing strategies that emphasize collaboration, creativity, and inclusivity. This work challenges educators to rethink traditional teaching models, embrace technological advancements, and commit to lifelong learning.

As a resource, this book equips educators, policymakers, and researchers with tools and practices that inspire transformation in classrooms worldwide. It is a call to action for reimagining education as a dynamic, equitable, and forward-looking endeavour, capable of meeting the challenges of our interconnected and constantly changing world.