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La *Revista Cátedra,* which belongs to the Faculty of Philosophy, Letters and Education Sciences of Universidad Central del Ecuador has been a means of communication since 1992; the academic voice of the professors was expressed through the bulletins, whose relevant objective was to improve the educational quality based on their experience, wisdom and knowledge as professors forming other educators. On May 2018, Revista Cátedra reemerges as a space that creates and disseminates articles oriented to the improvement of the educational process and its linkage with society.

OBJECTIVE
To disseminate multidisciplinary scientific unpublished articles, elaborated under the parameters of the research methodology, written with academic rigor and based on the teaching practice.

TOPICS
The topics covered are the theoretical bases of the Education Sciences in its different specialties and levels of the educational system. Priority will be given to papers describing pedagogical experiences, didactics used, innovation processes, and their relationship with new educational technologies.

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Cátedra Journal, of the Universidad Central del Ecuador, Faculty of Philosophy, Letters and Educational Sciences, publishes scientific articles on various areas of knowledge related to Educational Sciences, based on the methodology of educational research and community service.

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To be promoters in the publication of high quality scientific articles that, guided by research and from different areas of knowledge, become the most prestigious reference in the understanding and improvement of the educational process.

FOCUS AND SCOPE: Revista Cátedra has as its theoretical basis the Educational Sciences in its different specialties and levels of the educational system. Priority will

be given to papers describing pedagogical experiences, didactics used, innovation processes, and their relationship with new educational technologies.

It disseminates scientific-academic articles constructed under the parameters of research methodology. It is open to national and international writers interested in contributing significantly to the solution of current educational problems.

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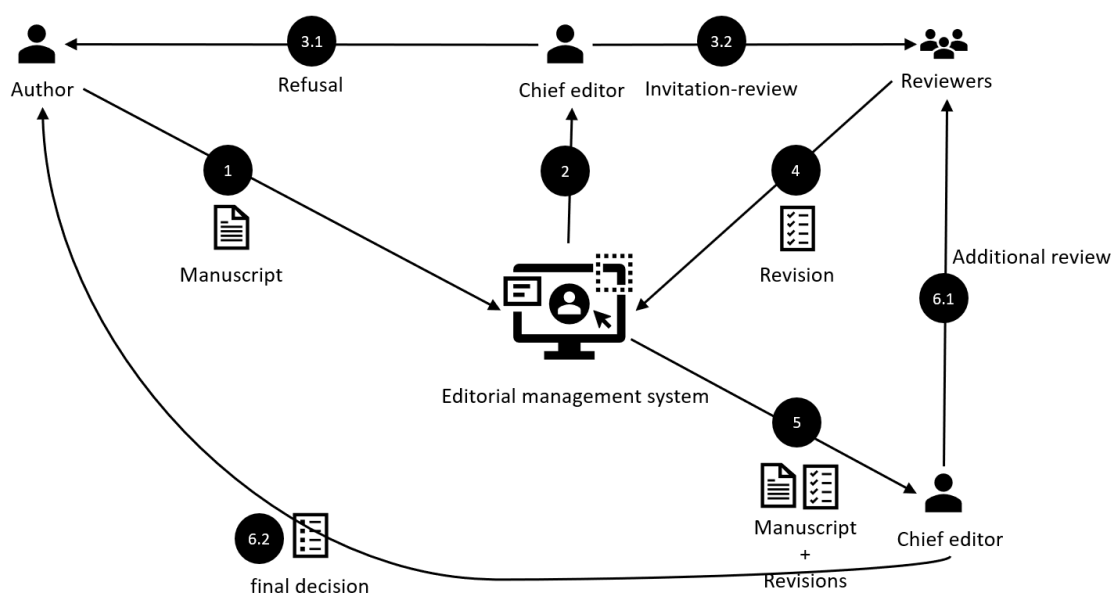
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Education

It is a pleasure for the *Revista Cátedra* to present volume six, number two in the electronic version. The thematic developed has its theoretical bases in the Educational Sciences in its different specialties and educational levels; this is how some relevant aspects are exposed, such as Informatics, gender and education.

The contents presented in this new issue are characterized by being elaborated under the parameters of research methodology. In addition, they are built with academic rigor and based on teaching practice.

The issue consists of eight approved articles:

The first article entitled Digital Narratives as innovative didactic strategies for Initial Education teachers authored by Stephanie García-Mera and Marcela Silva-Jiménez. This study is based on the need to incorporate digital narratives as learning strategies in early childhood education, taking into account that teachers are currently faced with new challenges due to the current situation caused by a post-pandemic. The manuscript highlights the creation of a Storytelling Web page (Viviendo el ayer) consisting of material created for use by teachers. This page is an easy-to-use, eye-catching tool that aims to generate emotions that provide rewarding experiences for children.

The second article entitled Artificial intelligence for analyzing academic performance in higher education institutions. A systematic literature review, authored by Patricia Jimbo-Santana, Laura Cristina Lanzarini, Monica Jimbo-Santana and Mario Morales-Morales. The manuscript reviews research that has been developed using artificial intelligence techniques to analyze academic performance in higher education institutions. The scientific databases Web of Science, Scopus, and IEEE Xplore have been considered. Among the results obtained, it can be indicated that the most used techniques for the prediction of academic performance are: neural networks and decision trees. The authors conclude by indicating that the application of artificial intelligence can improve the efficiency and accuracy of assessment, and provide valuable information for decision making and improving the quality of education.

The third article entitled Teaching competence in future Computer Science teachers in Ecuador, authored by Juan Rojas-Viteri and Alex Álvarez-Zurita. The manuscript diagnoses and analyzes the level of mastery in the 5 areas of digital competence in the students of the Pedagogy of Experimental Sciences of Informatics of the Central

University of Ecuador. The instrument that was applied was created by the teachers: Débora Martín Rodríguez, María Saénz, Raúl Santiago and Edurne Chocarro, professors from two renowned universities in Spain. To measure the reliability of the questionnaire, Cronbach's alpha coefficient was used for dimensions of digital competence in teaching, obtaining a score of over 0.90. The methodology used was empirical-analytical and descriptive, using non-probabilistic sampling at the convenience of the researchers; the respondents were 161 students from different levels and subjects. Among the main conclusions found were that the least developed areas of teaching digital competence are problem solving and safety.

The fourth article entitled E-book: a gamified didactic resource for learning Natural Sciences, was authored by Rossana Benavides-Velasco. The manuscript responds to the need to improve teaching and learning processes through the use of Information and Communication Technologies (ICT). The methodology is quasi-experimental and consists of two groups: 135 students in the experimental group (EG) and 115 in the control group (CG). A pretest and posttest were used with a questionnaire validated through expert judgment, Cronbach's alpha was 0.80, which proves the reliability of the questionnaire. The results were relevant as they significantly improved the students' interest and motivation to learn, directly influencing their academic performance, which was demonstrated in the averages obtained: the GE reached an increase of up to 4 points as opposed to the GC, which decreased one point when performing the activities in a traditional manner.

The fifth article entitled Intimate partner violence among college students, by Johanna Bustamante-Torres, Pablo Burbano-Larrea and Ana Isabel Cano-Cifuentes, was written by Johanna Bustamante-Torres, Pablo Burbano-Larrea and Ana Isabel Cano-Cifuentes. The objective of the manuscript was to determine the prevalence of violence in intimate partner relationships in students of the Psychopedagogy and Educational Psychology careers of the Universidad Central del Ecuador. This study was developed under a quantitative, descriptive, documentary and field approach. The results identified the naturalization of violence in the study population, most of whom reported having experienced violence in their relationships. The authors point out that violence is attributed to the cultural factor, and that its main etiology comes from psychological and sexual aggressionl.

The sixth article Feminism in Equatorial Guinean literature: an approach to the socio-educational study of the novel Ekomo by María Nsue Angüe, authored by Pedro Bayeme Bituga-Nchama, Marcelo Beká Nsue-Nsá, María Soledad Ayíngono-Edú and Anita Hichaicoto-Topapori. The manuscript studies the feminist perspective of this novel to learn about its socio-educational content and to promote

socio-cultural changes that allow for a more equitable and inclusive society. A qualitative, descriptive approach was used in the methodology. The results reflect the inconsistencies of male discourses, as well as the injustices and asymmetries of gender relations in Equatoguinean society. The authors conclude by indicating that it is necessary to disseminate the novel Ekomo from the academic sphere, since its content is pedagogical.

The seventh article, entitled Student access to the National University of Equatorial Guinea: prior guidance needs, was written by María Lourdes Nso-Mangue, Beatriz Malik-Liévano and Juan Llanes-Ordóñez. The manuscript diagnoses the orientation needs of university students in Equatorial Guinea, prior to their access to university. The methodology used was a quantitative, non-experimental, exploratory-descriptive approach through a survey. The results indicate that there is little information regarding the choice of career, as well as the career enrolled, and therefore, there is a diversity of academic problems and dissatisfaction with current studies. The authors conclude that it is necessary to present projects of academic-professional orientation in the choice of a university career to meet the needs and difficulties faced by Equatoguinean students throughout their university education. The eighth article, entitled Functionality of research competencies in the application of the Integrating Knowledge Project with undergraduate students, was written by Kléver Cárdenas-Velasco. The manuscript analyzes the incorporation of the Knowledge Integration Project (PIS) as an innovative learning strategy that changes the role of teachers and students. The author points out that in the application of this project, teachers will have to assume the formation of research competencies in their students, and students will have to develop collaborative learning. The results of this study indicate a better interaction between teachers and students, a change of methodology in the teaching and learning process, with new challenges and commitments.

Revista Cátedra thanks all the authors and reviewers of the articles that have made possible the publication of this issue. It extends an invitation to the national and international academic community to submit their research papers related to Educational Sciences in their different specialties and educational levels.

Directors/Chief Editors

Digital Narratives as Innovative didactic strategies for Initial Education teachers

Narrativas innovadoras para las docentes de educación inicial digitales como estrategias didácticas

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Abstract

The current situation demands that children from very early ages assume impressive educational challenges, technology has become essential in the teaching-learning process. This research work is based on the need to incorporate digital narratives as learning strategies in early childhood education, taking into account that teachers today have been beset by new challenges, as a result of the current situation caused by a post-pandemic. The present work synthesizes the process of creating a proposal framed within the new digital logics of teaching. In the following, we will present 1) a theoretical synthesis that covers the most relevant aspects that support the proposal within the framework of digital narratives and Storytelling, 2) the methodology used, which adopts a mixed paradigm of qualitative-

quantitative character shown in the data collection in a delimited sample with the teachers of the Learning Network Nº1, as well as an interview with the Director of the Education District 04D01 San Pedro de Huaca-Tulcán; 4) the results obtained determine that teachers do not apply digital narratives in the teaching-learning process. Thus, to conclude, the creation of a Storytelling Web page (Viviendo el ayer) is highlighted, which consists of tools for the creation of digital narratives and access to the material created for use by teachers. In addition, this page is considered an easy, eye-catching instrument, and through it we intend to generate emotions that provide rewarding experiences to children.
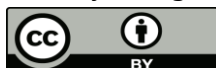
Keywords
Meaningful learning, innovative strategies, legends, digital storytelling

Resumen

La situación actual demanda que los niños desde edades muy tempranas asuman retos educativos impresionantes, la tecnología se ha vuelto imprescindible dentro del proceso de enseñanza-aprendizaje. El presente trabajo de investigación parte de la necesidad de incorporar las narrativas digitales como estrategias de aprendizaje en los niños de educación inicial tomando en cuenta que el docente en la actualidad se ha visto acechado por nuevos retos, producto de la situación actual que se vive a causa de una postpandemia. El presente trabajo sintetiza el proceso de creación de una propuesta enmarcada dentro de las nuevas lógicas digitales de enseñanza. En lo sucesivo se presentarán 1) una síntesis teórica que abarca los aspectos más relevantes que sustentan la propuesta dentro del marco de las narrativas digitales y el *Storytelling*, 2) la metodología empleada, que acoge un paradigma mixto de carácter cualicuantitativo que se muestra en la recolección de datos en una muestra delimitada con las docentes de la Red de Aprendizaje Nº1, así como una entrevista al Director del Distrito de Educación 04D01 San Pedro de Huaca-Tulcán; 4) los resultados obtenidos determinan que los docentes no aplican las narrativas digitales en el proceso de enseñanza-aprendizaje. De tal forma, para concluir, se destaca la creación de una página *Web Storytelling* (Viviendo el ayer) que consta de herramientas para la creación de narrativas digitales y el acceso al material creado para la utilización por los docentes. Además, esta página se considera un instrumento fácil, llamativo, y por medio de este se pretende generar emociones que briden experiencias gratificantes a los niños.

Palabras clave
Aprendizaje significativo, estrategias innovadoras, leyendas, narrativas digitales.

1. Introduction

The present research work is framed within the research line "educational innovation" and subline "learning" in the thesis work of (García-Mera, 2021). The changes that have occurred in the educational system at national and international level due to covid 19 have been taken into account. At present we live a post-pandemic scenario, so the proposed topic aims to complement the teaching and learning process in early education through the use of innovative technological tools such as digital narratives to obtain interest in an active and striking way in students.

The relevance of the research carried out is oriented to the role that teachers acquire in early ages as entities that intervene and influence directly in the development of children,

for this reason, it is essential to take into account the application of new strategies to capture and maintain their interest in the face of the sustained construction of deeper learning processes. Hence the importance of processes that stimulate sensory development at the personal, family and social levels. For educational theorists such as Hermann-Acosta, 2015, this is achieved through the integration of textual, sound and visual languages with a marked interval character. It is in this same line in which the new Information and Communication Technologies (ICT) move within the framework of initial education; as Hermann indicates, radio, cinema and television (to which it is worth adding devices such as smartphones) constitute not only means of cultural representation, but also make possible mechanisms to educate audiences (Hermann Acosta, 2015).

Therefore, the objectives pursued in the research presented here are oriented to contribute to the development of innovative strategies in teaching processes, through the implementation of tools oriented to digital narratives in early education levels.

This document is structured as follows: the development contains the theoretical foundation; the methodology describes each step carried out in the research; the results and discussion present an analysis of the measurements found both from the point of view of the teacher and the consultation; the proposal determines the use of the web tool Storytellying as a solution strategy to the given problem. Finally, conclusions are presented that summarize the findings, as well as possible future lines of research.

2. Development
2.1 Theoretical framework

What are digital narratives?

Gallego-Torres points out that the first referential orientations for the study of digital narratives are related to audiovisual and multimedia narratives; the link made with education goes along the line of the role that these changes in narrative structures transform, also the ways in which education builds learning-teaching strategies (Gallego-Torres, 2017). This process, according to Hermann-Acosta argues can be understood as the integrated aggregate of both visual and sound languages, so that these can give possibilities of interaction with the user. Within this dynamic, the role played by technological media for the transmission of information goes far beyond, to the point of being able to mold consciences, and to "educate them" (Hermann-Acosta, 2015). Avilés-Dinarte, for his part, adds that, within this framework, the potentialities of storytelling are amplified even more, giving way to students of the skills and knowledge they have to be able to tell stories (Avilés-Dinarte, 2011).

The story then becomes a vehicle that encourages and stimulates the creative process and substantially improves the learning processes, as it allows a closer link between the apprehension of knowledge and the everyday life in which the subject develops; he adds that this is not restricted only to language and communication, or literature, in fact, it concerns the individual's own ability to tell stories (Cela- Ranilla et al., 2017). In recent years, education has undergone a marked shift from a traditional trend that places special emphasis on the development of competencies both at a formal logical-mathematical level and at a cognitive level; towards the promotion of the holistic development of different types of intelligence and particular emphasis on those in which the individual shows greater affinity. The inclusion of digital narratives is oriented precisely towards the latter trend.

According to Pujol 1999, this process is part of a restructuring of the methodological planning methods of formal and institutional instruction. There is, he continues, a close relationship between the transition to the increasingly widespread use of digital narratives in educational processes and the construction of metacognition by the subjects who are part of such processes, leaving behind evaluation methods based on rote learning or reactive components, but now there is a greater emphasis on problem solving, project development and innovation (Pujol, 1999).

However, it is necessary to take into account the learning process itself that involves the inclusion of digital narratives in a context of transition as described above; any educational process that involves the use or assistance of interactive tools based on the web, or multimedia applications is entirely useful as long as the teacher is able to use it properly and take advantage of all its possibilities; otherwise, it could cause the opposite effect. This also applies to the case of students, although, as Pujol details, these tools are increasingly oriented towards their use being intuitive and allowing the development of the student's capacities in creative and cognitive terms. Montaña-Cristancho also adds that education, using the tools at its disposal, must be able to train students with the ability to analyze, search and solve problems; therefore, the teacher must be able to stimulate, even in the initial phase, the analysis and reflective capacity of students (Montaña-Cristancho, 2016)

This is precisely one of the main differences of methodologically structured education for current times in relation to traditional education, based on behaviorism and with harmful patterns for students: tendency towards the inferiorization of the student, glorification of discipline and obedience, tendency towards constant correction and the restrictive capacity of the teacher.

Martínez-Migueléz (2006) adds to these "behaviors that are detrimental the very evident tendency to label children as motorically handicapped, starting from the ideological and paradigmatic anachronisms of the teacher himself" (p. 25). As indicated by Pujol 1999 and emphasized by Leví-Orta 2015) at the time, and Hermann-Acosta 2015), the new ICTs are a fundamental part of the transition that education is undergoing since the transition to the 21st century; the naturalization of the use of the Internet in everyday social life can become an invaluable ally for education if the aspects that involve the use of interactive tools oriented to the construction of digital narratives are taken into consideration. The emergence of new demands for the formation of competent human beings with the criteria of cognitive and psychosocial development of contemporary society, as well as with the ability to adapt that accelerated change in an interconnected world requires, are fundamental axes for education aimed at stimulating holistic skills from its initial stages, starting from tools such as digital narratives.

2.1.1 Types of Digital Narrative
According to Montaña-Cristancho (2016) there are 4 types of digital narratives to consider within the field of Internet and ICT communication:

> Multimedia: Merging different types of content. Hypertext: Use links to redirect to new information. Hypermedia: The user interacts with the audiovisual content but also contributes to its construction. Transmedia: Using several tools with a single narrative and in a synchronous way (p. 58).

What tools can be used to make use of digital narratives in education? Cassany 2012 recognizes the potential that new ICTs have to exponentially develop educational processes, but also draws attention to the growing need for teachers to also take a leading

role in the learning processes and mastery of these tools so that they can be of better use and benefit from them; the fundamental contribution of digital narratives in this process still depends largely on teachers, as mediators, being able to adapt to the necessary changes (Cassany, 2012).

Some of the most interesting proposals for the development of learning processes aided by digital narratives are meaningful learning, experiential learning and certain existing contributions in non-formal education.

This process, as may be evident, is not mechanical, nor does it obey a passive assimilation of knowledge with the help of narrative constructions; rather, it is composed of three unavoidable aspects (Rosales-López, 2009) previous knowledge, experience and new knowledge. In addition, Ausubelian meaningful learning suggests that the use of conceptual schemes and cognitive anchors should also be taken into consideration in order to move from the abstraction that knowledge in itself implies to the concrete level of everyday life.

2.1.2 Innovative Teaching Strategies

In order to understand the development of children's learning processes, it is not enough to try to understand the subject itself (in this case, the child entering early education); it is also important to take into account all the biopsycho-socio-cultural variables that are part of the development of the child's life; the characterization of the individual's social life is closely linked to the ability of subjects to attend to the changes that arise within their social environment, as well as to the understanding of their own biological changes and how these impact on their surroundings.

In this context, pedagogical practice seeks meaningful learning to ensure that the knowledge acquired in educational spaces can be used in the circumstances of the child's daily life.

2.1.3 Problem-based learning

Problem-based learning (PBL) is understood to be an extremely powerful didactic strategy for developing a learning process centered on the investigation and reflexivity that students can have according to the requirements of the subject; instead of being a restrictive tutor, the teacher becomes a guide for the student, who must focus his or her abilities on proposing possible solutions to the problem posed by the teacher. The student must resort to the concepts he has been learning to articulate a plausible solution to the problem, giving way to diverse and non-static scenarios that allow him to develop a better reflexivity on the concepts learned based on his own reasoning and creative capacity.

2.1.4 E-learning

It is the teaching through digital instruments and other consumer electronic devices such as computers, smartphones, tablets, among others. These are part of the educational paradigm known as virtual teaching/learning or E-learning, in it are condensed much of the education strategies oriented to non-face-to-face contexts and methods of capturing interest that go beyond traditional strategies (Cool, 2016).

2.1.5 ICT in early education

As previously stated, the dependence of education at different levels on Information and Communication Technologies is undeniable, and using it properly, it can result in an invaluable aid for the development of learning strategies oriented to the holistic development of students' capabilities. (Hermann-Acosta, 2015).

2.1.6 Meaningful Learning

The epistemological basis of experience-based education is based on the contributions of authors such as John Dewey and Kurt Lewin, who conceived that the educational act had to be related not only to the understanding of how the teaching-learning processes take place, but also to establish how the educational sphere should be articulated with the psychological and social spheres and in this route how theory is articulated to experience and vice versa.

Meaningful learning, or as it is also known, learning based on reception, consists of stimulating the student to restructure certain sets of information in such a way that it can be integrated into his cognition; the objective with this process is that the student himself has the capacity to reorganize or change these sets of data in such a way that he finds the existing or non-existent relationships between them. Kolb would be one of the first to articulate meaningful learning to digital narratives, taking as a fundamental point the absences of learning based on the exclusive stimulus to cognition (Kolb and Kolb, 2005).

3. Methods and Materials

The research presented here takes its empirical basis from the results obtained in the Learning Network N-1 of Tulcán with early education teachers and with the interest in the application of digital narratives. For this, it was necessary to opt for a mixed approach, that is, with both qualitative aspects based on reflections based on interviews and theoretical analysis; and quantitative aspects, obtained through the processing of interview data.

In this sense, the research was descriptive and field-based, as it proceeded to collect theoretical and field information to analyze the current situation and justify the need for the implementation of digital narratives in early childhood education. The techniques used were a survey of early education teachers and a qualitative interview with an expert in education.

According to Hernández-Sampieri et al. (2010) when "the target population is less than fifty (50) individuals, the sample is constituted by the population as a whole" (p. 112); in that sense, given that the target population is constituted by the first group of teachers N°1 of the Learning Network of the education district 04D01 of San Pedro de Huaca, Tulcán, the entire group was chosen as the sample for the collection of information. The type of sampling used is homogeneous non-probabilistic.

To determine the level of reliability of the data collection instrument, the reliability coefficient known as Cronbach's α was used, where $\alpha = 0.72$. This shows that the instrument is reliable.

4. Results and discusión

In response to the research question: in what way do digital narratives contribute as the main cause of ignorance as an innovative teaching strategy for early education teachers? Different answers are presented: the study sample is of 24 teachers of the Learning Network N°1 of early education in the city of Tulcán of which 91.6% of them consider that it is necessary to include digital narratives, because they contribute in a creative way in the development of learning environments while 8.3% consider that it is not necessary. About this, it is determined that, as in this city, in other parts of the country and the world, it is important to readapt the different processes in the educational field returning to a "new normality" that leaves the post-pandemic. This can be corroborated by the impressions of

Óscar Villarreal, Director of Education of District 04D01 San Pedro de Huaca-Tulcán, considered the main district authority on education in the study area, and his criteria regarding the way in which education is being carried out in the current context, and the strategies that can be used to face the new challenges are very much in line with what was seen previously with the teachers surveyed.

In relation to the item that says what is the importance of digital narratives in education and how can the teaching-learning processes be understood and improved? It leads to reflect on the incorporation of narrative including creative processes, employing audiovisual media as strategies that improve the teaching-learning process (Hermann-Acosta and Pérez -Garcías, 2019).

Figure 1 shows that 91.6% of teachers consider that it is important to implement digital narratives in resources and 8.3% consider that it is not. That is, despite the lack of knowledge of these tools, it is relevant to apply them in virtual education. On the other hand, 96.1% of the teachers consider that it is important for the teacher to implement the best didactic strategies with their students, while 3.9% do not. This shows that almost all respondents agree on the constant innovation of educational processes.
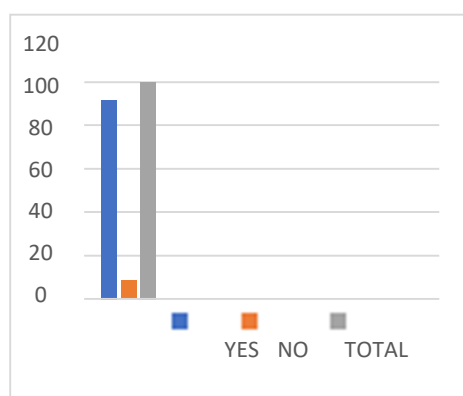
Figure 1. Do you think it is important to implement digital narratives in resources? Source: (Survey to Early Childhood Education teachers, 2020))

In relation to the item that says in what way can innovative didactic strategies be applied in a digital context during the teaching-learning process, it agrees with Coll (2016) who states that "teaching by means of digital tools, among others, are part of virtual teaching or E-lerning; in it a large part of non-face-to-face education strategies are condensed with methods of interest beyond traditional strategies" (p. 37).

Consequently, 29.1% are familiar with digital narratives, while 70% are not. Likewise, 25% know the components of the subgenre of digital narratives, while 75% do not. This demonstrates the need to formulate strategies to develop pedagogy focused on virtual education with innovative didactics and oriented to digital narratives, 70.8% of early education teachers strongly agree while 24.1% agree on the need to update strategies for early education. The constant search for innovation in education is necessary for most of them and would allow generating initiatives for this updating.

On the other hand, in the interview, the need for a comprehensive reformulation of the educational processes, taking as a starting point the new normality in order to adopt pertinent strategies in educational development and benefit their skills, was detailed.
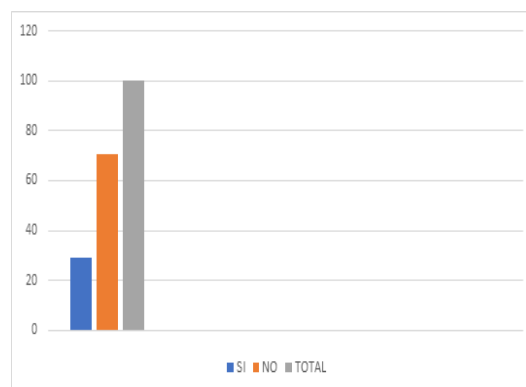
Figure 2. Do you know what digital narratives consist of? Source: (Survey to early childhood education teachers, 2020)

Of the 91.6% of teachers consider it necessary to include digital narratives to facilitate learning in the context of the pandemic, while 8.3% consider that it is not necessary. In a context where education has moved from a face-to-face majority to virtuality, the implementation of digital narratives is essential.
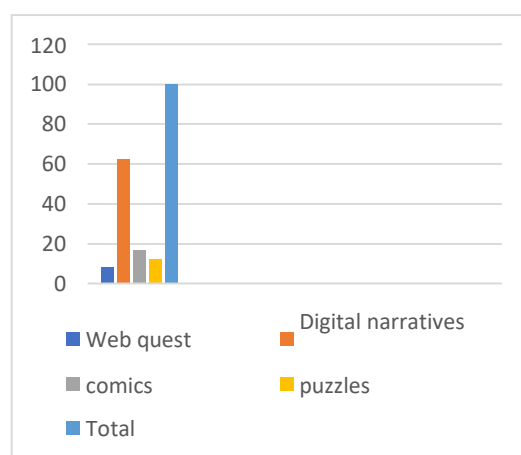
Figure 3. Which of the following didactic strategies do you think should be applied in early childhood education? Source: Survey of early education teachers, 2020.

Finally, in response to the last question, is it necessary to implement a web page oriented to the development of digital narratives as an innovative strategy that can be used by early childhood education teachers? The creation of a page that provides useful multimedia tools, simple, intuitive and of great audiovisual impact of the narration of legends from the province of Carchi with necessary adaptations to capture the interest of early childhood education students generating a significant learning process is proposed.

In the results obtained, 87.5% of the surveyed population, consider that they would use digital narratives to create a legend, 8.3% a puzzle and 4.1% a drawing. At the same time, 75% of the teachers surveyed consider that the legend enhances children's beliefs, cultural identity and oral tradition. 16.6 % only cultural identity, 4.1 % beliefs and 4.1 % oral tradition. This demonstrates the interest in rescuing cultural and identity values in order to strengthen these aspects from the initial levels. It is also evident from the results obtained that there is a marked predisposition to recognize digital narratives as an extremely valid and necessary instrument for the development of innovative strategies for early childhood education. In addition to the fact that, despite there is an evident intention

to apply them to their particular teaching processes, it is also clearly shown the scarce specific training within such strategies so that they can effectively develop the teaching-learning process.

In addition, one of the interviewees considers that virtual teaching should be improved and the web page initiative would be an appropriate resource that would allow maintaining interactive contact between teachers and students in order to achieve meaningful experiences in children; the same can be said of cultural identity, which is reflected, in the best of cases, only in texts that often remain dead letters without any meaning for children. Therefore, digital narratives become an elementary resource for education, so it is important that early childhood education teachers know them and implement them in the classes with the children.

5. Proposed solution

The web tool Storytellying: living yesterday is part of the implementation of an innovative didactic strategy that includes both teachers and students of early education of the Learning Network N°1 of the Education District 04D01 San Pedro de Huaca-Tulcán. The tool was developed to allow guided, intuitive and easy-to-use access. The key element proposed for the development of a more adequate teaching and learning process consists in the implementation of multimedia web tools combined with Storytelling; in other words, the use of digital narratives is promoted as an innovative didactic strategy.

Since the results obtained suggest that there is a significant gap in terms of knowledge and implementation of digital narratives within the teaching and learning processes, it was imperative to make a proposal aimed at developing projects oriented to the illustrative and results-oriented inclusion of digital narratives in academic processes; with which it was considered not only relevant, but also necessary the strategic intervention with the teachers of the Learning Network No. 1. The website provides useful, easy to use, intuitive and high-impact multimedia tools that teachers can use to create or use the already structured narratives; the user has these two options and in either of them will be able to ensure an effective response from students.

The web page is currently available for use, which means that it is now possible to access its environment and use the different tools that have been made available for this purpose. It should be noted that in the initial phase of implementation of the strategy, it has been oriented, above all, to teachers who are members of the Learning Network N°1 of the Education District 04D01 San Pedro de Huaca-Tulcán[1].

In addition, teachers participated in induction meetings on the platform, in which informative talks were given on its objectives, operation, dynamics and available tools. The platform contains hyperlinks to support videos and resources for payment at the time of applying the narratives with the students, as well as opening a space for doubts and concerns about the platform.

The results obtained in the initial application phase of the project are that the web page is an authentically useful tool for the teachers of the Learning Network N°1 of the Education District 04D01 San Pedro de Huaca-Tulcán. Through the web page, it is expected to

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[1] Link to the website https://mers21tef.wixsite.com/storytellingva This is free to view and use all the material found on it.

consolidate the implementation of innovative didactic strategies in the teaching and learning processes for early education students. It is hoped that academic processes will be strengthened in a context in which dependence on digital tools has increased considerably; that the conservation of the community's identity values will be promoted through the transmission of local legends. In addition, it allows to bring students closer to their own creative and academic development process.

6. Conclusions

The study showed that teachers were unaware of innovative didactic strategies, which are fundamental for the teaching-learning process of early childhood education students, strengthening the skills that are desirable at this level. It is imperative the need to create innovative educational strategies that make use of existing tools to improve teaching and learning processes. In the particular case under study, it is concluded that digital narratives are a solid resource from which to initiate such processes. Digital narratives in early education generate expectations and interest in children, so it is considered an ideal resource for teachers.

It is evident that through the application of the instrument, all early education teachers agree that it is important to apply innovative didactic strategies in the teaching-learning process with children. Although there is a low level of knowledge on the subject, in general it can be seen that there is approval by teachers for the adoption of digital tools for the development of strategies oriented to digital narratives, which consolidates the relevance of the project presented. The website "Storytelling living from yesterday" created with organized and relevant information about digital narratives will facilitate the use and application of this tool within the teaching-learning process for early childhood education teachers; it marks the essential beginning in order to achieve the objective.

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Artificial intelligence for analyzing academic performance in higher education institutions. A systematic literature review

Inteligencia artificial para analizar el rendimiento académico en instituciones de educación superior. Una revisión sistemática de la literatura

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Abstract

Artificial intelligence is constantly evolving and is being applied in several areas, including education. The analysis of the academic performance of students in higher education institutions is a critical issue for decision making and improving the quality of education. The objective of this article is to perform a systematic review of the literature, considering the research that has been developed using artificial intelligence techniques to analyze academic performance in higher education institutions. The scientific databases Web of Science, Scopus, and IEEE Xplore were considered. Keywords related to artificial intelligence and academic performance were considered. Articles published from January 2017 to December 2022 were taken into account, 1427 manuscripts were obtained, from which 74 were selected and analyzed, according to the predefined inclusion and exclusion criteria. Among the results obtained, it can be indicated that the most used techniques for the prediction of academic performance are: neural networks and decision trees. In conclusion, it can be indicated that the application of artificial intelligence can improve the efficiency and accuracy of the evaluation, and provide valuable information for decision making and improvement of the quality of education. In addition, the implications and limitations of these studies are discussed and areas for future research are proposed.

Keywords

higher education, artificial intelligence, academic performance, systematic review.

Resumen

La inteligencia artificial se encuentra en constante evolución y se está aplicando en varias áreas, dentro de esta se encuentra la educación. El análisis del rendimiento académico de los estudiantes en instituciones de educación superior es un tema crítico para la toma de decisiones y el mejoramiento de la calidad de la educación. El objetivo de este artículo es realizar una revisión sistemática de la literatura, considerando las investigaciones que se han desarrollado utilizando técnicas de inteligencia artificial para analizar el rendimiento académico en instituciones de educación superior. Se han considerado las bases de datos científicas Web of Science, Scopus, e IEEE Xplore. Se consideró palabras clave relacionadas con la inteligencia artificial y el rendimiento académico. Se tomó en cuenta artículos publicados desde enero 2017 hasta diciembre 2022, se obtuvieron 1427 manuscritos, de los cuales se seleccionaron y analizaron 74, según los criterios de inclusión y exclusión predefinidos. Entre los resultados obtenidos se puede indicar que las técnicas más utilizadas para la predicción del rendimiento académico son: las redes neuronales y los árboles de decisión. En conclusión, se puede indicar que la aplicación de la inteligencia artificial puede mejorar la eficiencia y precisión de la evaluación, y proporcionar información valiosa para la toma de decisiones y la mejora de la calidad de la educación. Adicionalmente, se discuten las implicaciones y limitaciones de estos estudios y se proponen áreas para futuras investigaciones.

Palabras clave

Educación superior, inteligencia artificial, rendimiento académico, revisión sistemática.

1. Introduction

Today we are immersed in a society that is increasingly subject to large-scale technological processes:

> The area of education (which is sensitive to changes in society as it advances along with it) is also going through such a trend of adaptation to the novel communities of technological interaction; a process that is oriented to new trends and profiles in relation to the new proposals in the sector (Ocaña, 2019, p. 537).

Artificial intelligence represents a synonym of innovation and technology, since it mimics the processes of human intelligence with the use of algorithms and helps to find patterns of behavior that are not visible to the naked eye. In the field of education it has been of great help in various fields, including the prediction of academic performance, thanks to the fact that artificial intelligence is responsible for processing large amounts of data, which allows us to better understand the profiles of students and thus their needs. Based on these requirements, plans, projects and academic activities can be established to help improve the quality of education, understand the profile of students and their needs in terms of the level of progress or beginnings of desertion, which is important because in this way the institutions can make decisions that provide support in the learning processes, and at the same time maintain a constant monitoring of the level of quality of education.

If we refer to educational theories, we can mention the instructional design theory that uses data collected through digital technology and artificial intelligence to inform the design of effective learning environments. It has been observed that artificial intelligence is able to analyze data on students' academic performance and provide valuable information to improve the design of materials, activities and assessments. Another relevant theory is that of adaptive learning, which proposes adapting instruction and educational resources according to the individual needs of each student. Using machine learning algorithms, artificial intelligence can analyze data on academic performance and adjust content delivery, activity sequencing, and teaching strategies to optimize learning for each student.

Artificial intelligence-based applications for education have been growing rapidly around the world, and have impacted higher education institutions. Several of these applications are being implemented to improve university services, help teachers provide quality education, make decisions regarding university attrition, and support student learning (Salas-Pilco and Yang, 2022).

> Higher education institutions have detailed information on each student, however, they lack models that allow them to describe the student objectively, and based on this analysis make decisions that allow them to avoid problems such as student dropout (Baldino et al., 2016, p. 589).

On the other hand, over time it has been possible to evidence a steady growth of artificial intelligence applications in educational processes, being one of the emerging fields educational technology, because although it has existed for approximately 30 years, it is still unclear whether it can significantly impact teaching and learning in higher education (Zawacki-Richter et al., 2019, p. 2).

Some of the problems that may arise in higher education institutions by not using artificial intelligence in the assessment of academic performance may include: lack of efficiency in assessment, difficulty in identifying patterns and trends, lack of early intervention in

student performance, limitations in institutional decision making, among others. It should not be overlooked that the education system is shifting from focusing on product to process, expanding beyond the domain of knowledge to include self-regulation, collaboration, and motivation (Roll and Wylie, 2016).

In research using artificial intelligence to predict academic performance, several variables are used to build prediction models, such as the student's academic history, age, gender, socioeconomic status, among others. These variables are processed by machine learning algorithms that seek to identify patterns and relationships between them, and thus predict the student's future academic performance.

Currently, not employing artificial intelligence techniques in academic performance could imply a lack of efficiency in information management, create biases and subjectivities, as well as lack of personalization and adaptation to the specific needs of students.

The objective of the present work is to perform a systematic literature review that considers research conducted from January 2017 to December 2022, on artificial intelligence techniques (data mining, deep learning, big data), to analyze academic performance in university institutions, considered as the result obtained by a student in one or several standardized tests, such as exams, homework, projects, among others, which measure the level of knowledge and skills acquired in a certain period of time. Academic performance can also be measured in terms of class attendance, participation in extracurricular activities, fulfillment of homework and school responsibilities, performance in teamwork, and other indicators that reflect the student's academic performance.

This paper is organized as follows: section 2 describes the materials and methods used, section 3 indicates the analysis performed and the results obtained, section 4 deals with the Discussion, and finally section 5 indicates the conclusions and future work.

2. Materials and Methods

It is important to first consider the objectives of this research:

- To analyze the evolution of artificial intelligence techniques applied to academic performance in higher education.
- To identify the countries in which these investigations have been developed.
- To evaluate the sample size used in research on the analysis of academic performance in higher education institutions.
- To identify and describe the artificial intelligence techniques used for the analysis of academic performance in higher education institutions.

2.1 Methods

The research used is a systematic review of the literature, which aims to synthesize and critically analyze the available evidence on a specific topic. This involves carrying out a set of activities framed in three phases, i) approach, ii) conduct, and, iii) presentation, following the scheme proposed by (Kitchenham, 2014) and that gives formal support to this research (Figure 1). To this end, a systematic and exhaustive search is carried out in databases and other relevant sources, predefined inclusion and exclusion criteria are applied and the selected studies are analyzed.
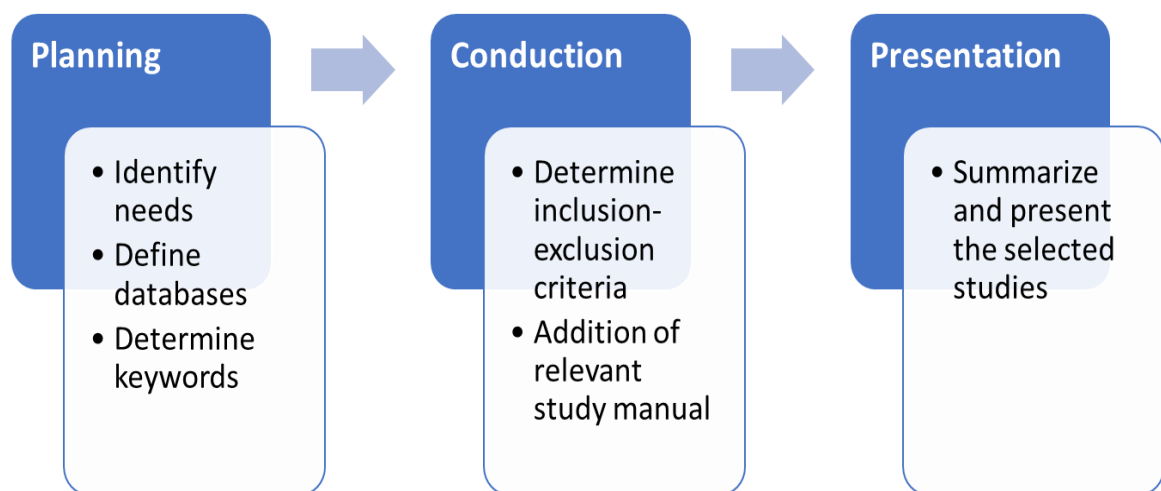
Figure 1. Systematic review activities

The techniques and strategies for the study included searching the scientific databases Web of Science, Scopus and IEEE Xplore, with keywords related to artificial intelligence and academic performance. Articles published from January 2017 to December 2022 were selected and predefined inclusion and exclusion criteria were applied to select the 74 articles analyzed. In addition, a critical and analytical approach was used to synthesize the results and discuss the implications and limitations of the studies found.

According to Brereton (2007) "conducting a systematic review involves several discrete activities, which can be grouped into three main phases: planning, conducting the review, and reporting the review" (p. 2), which is considered to determine the current status of artificial intelligence, in relation to academic performance in higher education.

In the execution of the protocol, the need for the review was identified, the questions that will guide the research were determined, the terms, strategies and search strings (English and Spanish) were identified, the inclusion criteria were established to proceed with the data extraction. Finally, the review protocol was executed and developed.

2.2   Necessity of the revision

In conducting the respective review, several systematic review articles were found on the use of artificial intelligence in higher education, focused on various fields, thus we can indicate:

Chiu (2023) performs a systematic review between 2012 - 2021 "emphasizing four domains: learning, teaching, evaluation and administration" (p. 1). In another study of conducted a systematic review between 2012 - 2020 where they focused on online learning, the same that has been implemented gradually in higher education in recent years, in addition to bringing challenges and new challenges, also allows institutions to improve instruction and learning (Ouyang et al., 2022, p. 23).

They also conducted a literature review, analyzing articles from 1980 to 2019, here they mention the technological advancement that brings the Industrial Revolution 4.0, this allows higher education institutions to be forced to face the digital transformation and consider within it artificial intelligence (Castro-Benavides et al., 2020, p.1). In another work of perform a theoretical framework, analyzing the digital transformation in higher education institutions (Almaraz Menéndez et al., 2017).

Other research focuses on the changes that have been generated in higher education institutions, this due to artificial intelligence, in addition to the new challenges that come hand in hand with it, thus concluding that artificial intelligence is a challenge of great importance for higher education institutions, but nevertheless in the case of Latin America this reality is still unattainable (Ocaña Fernández., et al., 2019, p. 8). Another research focuses on the opportunities, risks and possibilities faced by education, and the advantages obtained by using artificial intelligence (Barrios Tao et al., 2021, p. 1). Another study talks about the evolution that has been evidenced in technology, and how artificial intelligence has been applied in different fields in higher education institutions (Ouyang and Jiao, 2021).

Of these investigations, none of them provide significant information in the area of academic performance in higher education institutions. It is important to consider that technology is advancing day by day, so it is necessary to conduct a literature review that incorporates the latest research.

2.3   Research Questions

The research questions guiding the systematic review are:

- How have artificial intelligence techniques applied to academic performance in higher education evolved?
- In which countries has this research been developed?
- What is the sample size that has been used in the investigations?
- What artificial intelligence techniques have been used for the analysis of academic performance in higher education institutions?

2.4   Search terms

Based on a preliminary literature survey, the search terms contained in the title, keywords and abstract of the articles were identified through different combinations of main and secondary terms, as shown in Table 1, and AND and OR logical operators were used.

The English search string used was:

("artificial intelligence" OR AI) AND ("academic performance" OR "college performance") AND ("higher education" OR university OR college).

Main terms in Spanish	Alternative terms in Spanish	Main terms in English	Alternative terms in English
Artificial Intelligence	IA	Artificial Intelligence	AI
Academic Performance	University performance	Academic Performance	College Performance
Higher education	University	Higher Education	University College

Table 1. Search Terms

2.5 Search strategies

The selected databases included Web of Science, Scopus, and IEEE Xplore, which were selected for their relevance to this line of research.

2.6 Inclusion criteria

The articles were selected according to the following criteria:

Inclusion criteria	Exclusion criteria
- Scientific articles should be related to the application of artificial intelligence to predict and/or describe the academic performance of students in higher education institutions. - Scientific articles should relate to the application of artificial intelligence to predict and/or describe the academic performance of students in higher education institutions. - Scientific studies or articles are relevant to answer the research questions. - Scientific articles should cover the entire university field, i.e., without distinction of country., university. Careers or professions. - Studies or scientific articles are relevant to answer the research questions. - Studies should be within the research range from January 2017 to December 2022. - Studies must be in English and Spanish language. - Articles that include search strings in the title, keywords, or abstract. - Articles published in journals or conferences - Scientific articles available in full text	- Studies that applied artificial intelligence to predict or forecast academic performance in education in schools, colleges and kindergartens. - Scientific articles focusing on artificial intelligence tools for the teaching-learning process, engineering, physical education, programming, among others. - Studies conducted before 2017.

Table 2. Inclusion criterio

2.7   Data extraction

Several search strings were structured, combining main and alternative terms, considering articles within the period January 2017 to December 2022. From this search, 1427 articles were obtained; articles that did not meet one or more of the inclusion criteria were discarded. Figure 2 shows the selection process according to (Xu W. and Ouyang, 2022, p. 6), the detail is shown in Table 2.

From the review, careful consideration was given to the introduction, the technique used, as well as the conclusions, which were closely related to the research questions.
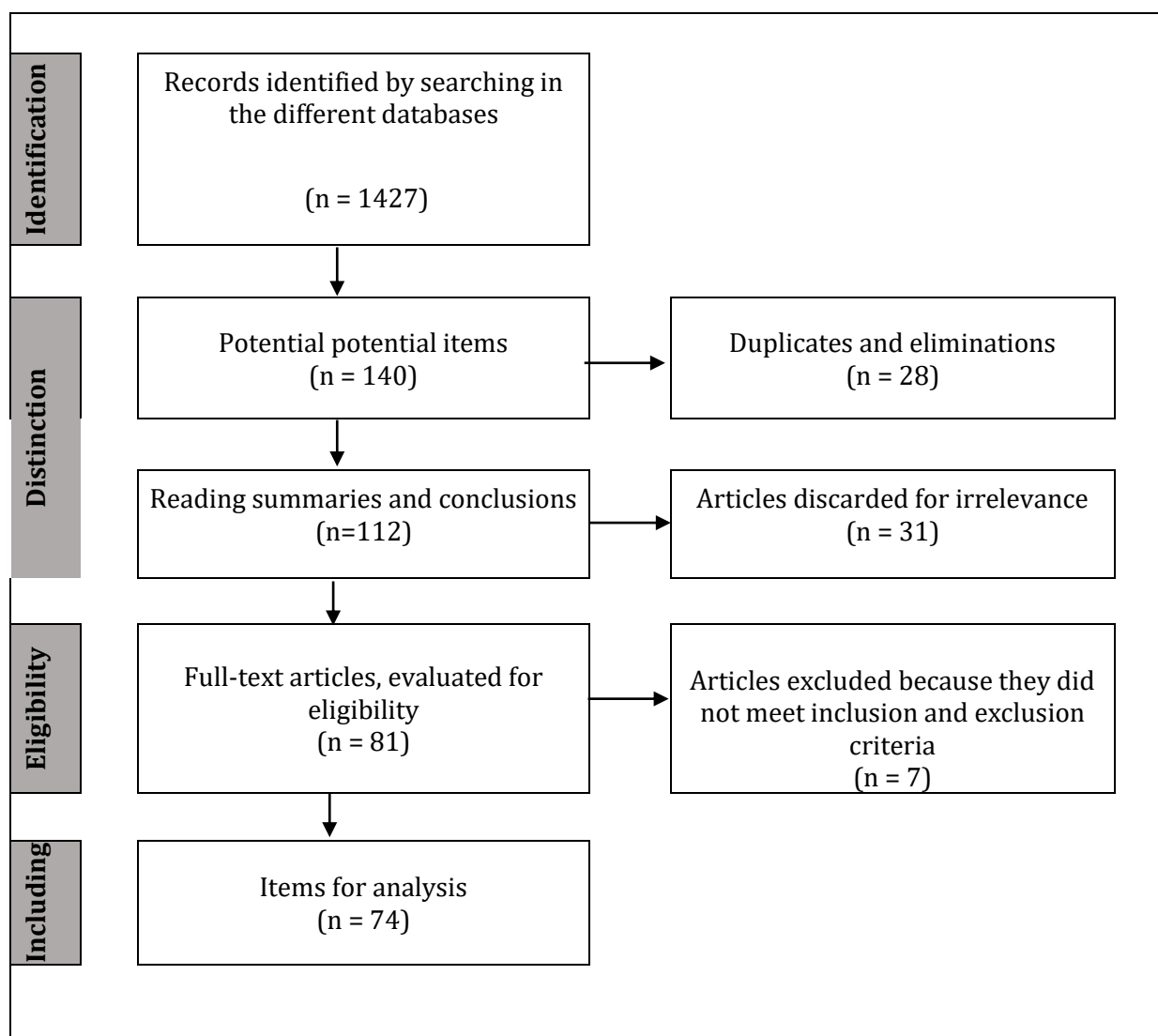
Figure 2. Selection process

Source	Found articles	Items included
Web of Science https://access.clarivate.com	511	40
Scopus https://www.scopus.com/	433	31
IEEE Xplore https://ieeexplore.ieee.org/	483	19
TOTAL	1427	74

Table 3. Articles found by the search string, selected by keywords, and included in the study.

Of the 140 articles selected, 74 were included in the review, representing 52.86%. A matrix was prepared with the selected articles, which is directly related to the research questions. The fields considered for the elaboration of the matrix are: author, year, title, methodology used, variables analyzed, population or sample, precision, results obtained, database, country. A summary of the articles analyzed is shown in Table 3.

Title Article	Author	Year of publication	Author's country	Database	Method
Predicting students' academic performance using artificial intelligence techniques	Al-Wabil, A.	2019	Saudi Arabia	Scopus	Neural Networks and Decision Trees
"Predicting academic performance of students using machine learning algorithms"	Garg, S.	2020	India	Scopus	Logistic regression, Decision trees, Neural networks, Neural networks
Application of artificial intelligence in predicting and analyzing students' academic performance	Sun, X. and Zhai, L.	2022	China	Web of Science	
An intelligent education system based on machine learning for predicting academic performance	Ma, S., et al.	2022	China	Web of Science	Decision tree and support vector regression (SVR)

Title Article	Author	Year of publication	Author's country	Database	Method
Intelligent Tutoring System to Improve Students' Performance in Basic Programming	Munguía-Saucedo et al.	2020	México	IEEE Xplore	Deep Learning
Predicting Academic Performance of Engineering Students Using Machine Learning Algorithms	Yudana et al.	2018	Indonesia	IEEE Xplore	Decision Trees, Naïve Bayes, SVM
Predicting Student Academic Performance Using Random Forest and Support Vector Regression Techniques	Singh et al.	2017	India	IEEE Xplore	Random Forest, SVM
Impact of a Tutoring System Based on Artificial Intelligence to Improve Academic Performance in Linear Algebra	Ortega-Guerrero, M.A. et al.	2020	México	IEEE Xplore	Redes neuronales
Artificial Intelligence-based Analysis of Academic Performance and Its Correlation with Course Content	Amin, F. et al.	2021	India	IEEE Xplore	Neural Networks
Application of machine learning techniques to predict academic performance of college students	C. Santos	2020	Brasil	Scopus	Neural Networks and Decision Trees
A Hybrid Model of Machine Learning for Predicting Students' Academic Performance	Mhamdi, S. et al.	2019	Túnez	IEEE Xplore	Neural networks, Decision trees
Intelligent Tutoring System based on Deep Learning for Improving Students' Academic Performance	Li, X. et al.	2018	China	IEEE Xplore	Neural networks
Predicting student dropout in online courses using deep learning	Yang, J.	2020	China	Web of Science	Neural Networks
Predictive Models of Students' Performance Using Educational Data Mining Techniques	López-Cobo et al.	2018	España	IEEE Xplore	Random Forest, SVM, Naïve Bayes

Title Article	Author	Year of publication	Author's country	Database	Method
A machine learning-based method for predicting academic performance of college students	Yang et al.	2022	China	Web of Science	Neural network
An intelligent prediction model for college students' academic performance based on Bayesian network	Xiao et al.	2022	China	Web of Science	Decision tree
A student performance prediction method based on machine learning algorithms	Cui et al.	2022	China	Web of Science	Neural network
A Deep Learning-Based Method for Predicting College Students' Academic Performance	Jiang, J. et al.	2021	China	IEEE Xplore	Neural networks
Predicting Student Performance in Online Courses Using Decision Trees and Random Forests	Khuri et al.	2018	EEUU	IEEE Xplore	Decision Trees, Random Forests
A decision tree-based method for predicting academic performance of undergraduate students	Wang et al.	2022	China	Web of Science	Decision tree
An artificial neural network approach to predicting academic performance of high school students	Li et al.	2022	China	Web of Science	Neural network
"A new method to identify key factors affecting student academic performance"	Shi et al.	2019	China	Web of Science	Neural Networks
"The impact of academic performance and learning attitudes on employment of Chinese university graduates: An artificial neural network analysis"	Zhang et al.	2020	China	Web of Science	Neural Networks

Table 4. Summary of analyzed articles

3. Analysis and Results

Based on the 74 articles considered for the review, the following research questions are resolved:

- How have artificial intelligence techniques applied to academic performance in higher education evolved?

In the research that refers to artificial intelligence applied to academic performance in higher education institutions, there is a trend of increasing studies in this field over time, especially in recent years. A significant increase of studies is also observed in 2022, indicating that it is a topic of growing interest in research. Of the 74 articles selected the years with the most publications are: 2021 with 22.97 %, and 2022 with 24.32 %. This detail can be seen in Figure 3.
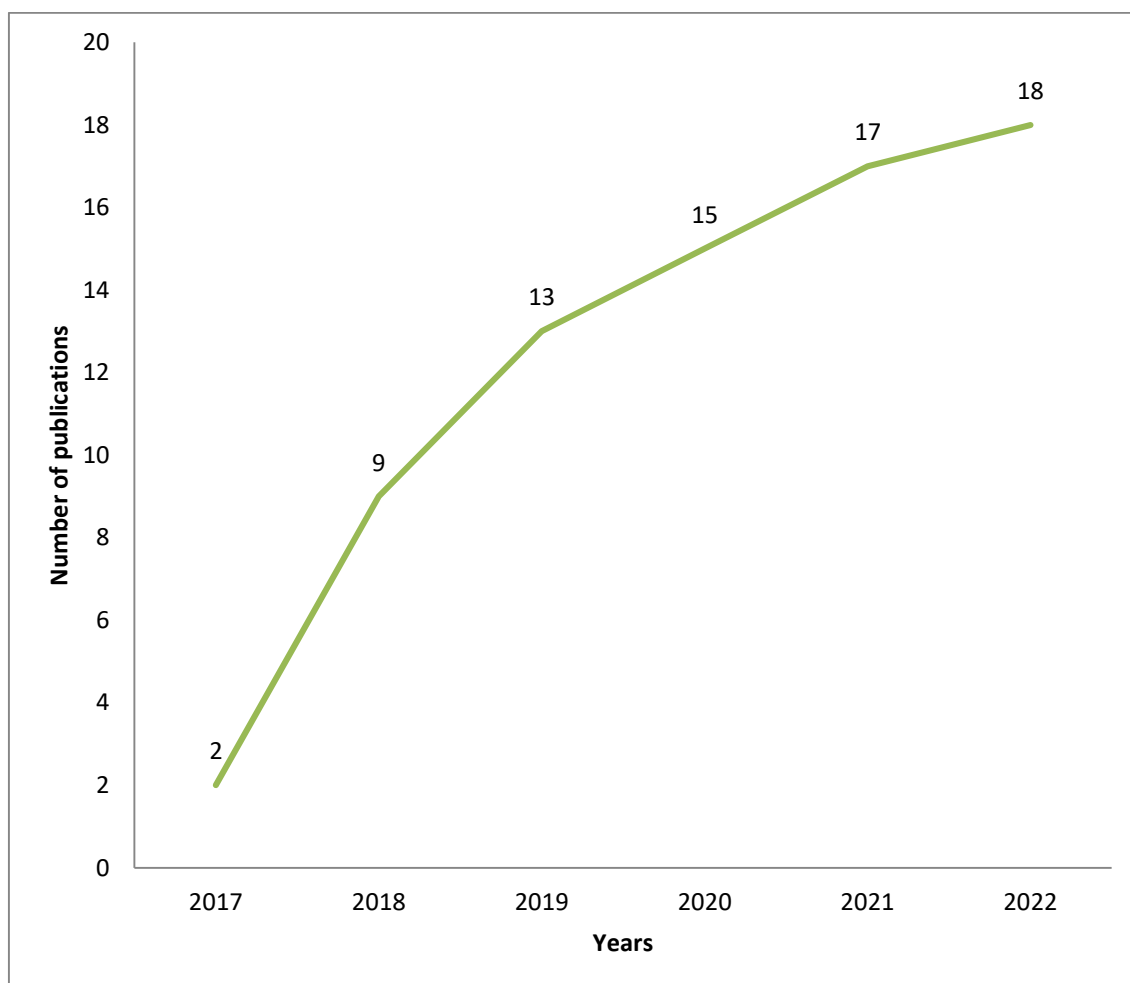
Figure 3. Articles by year of publication

- In which countries has this research been carried out?

The analysis by country shows the following results: China (n=36), India (n=6), Spain (n=4), Saudi Arabia (n=3); the rest of the countries included in the review contributed one or two articles (n=25), as shown in Figure 4.
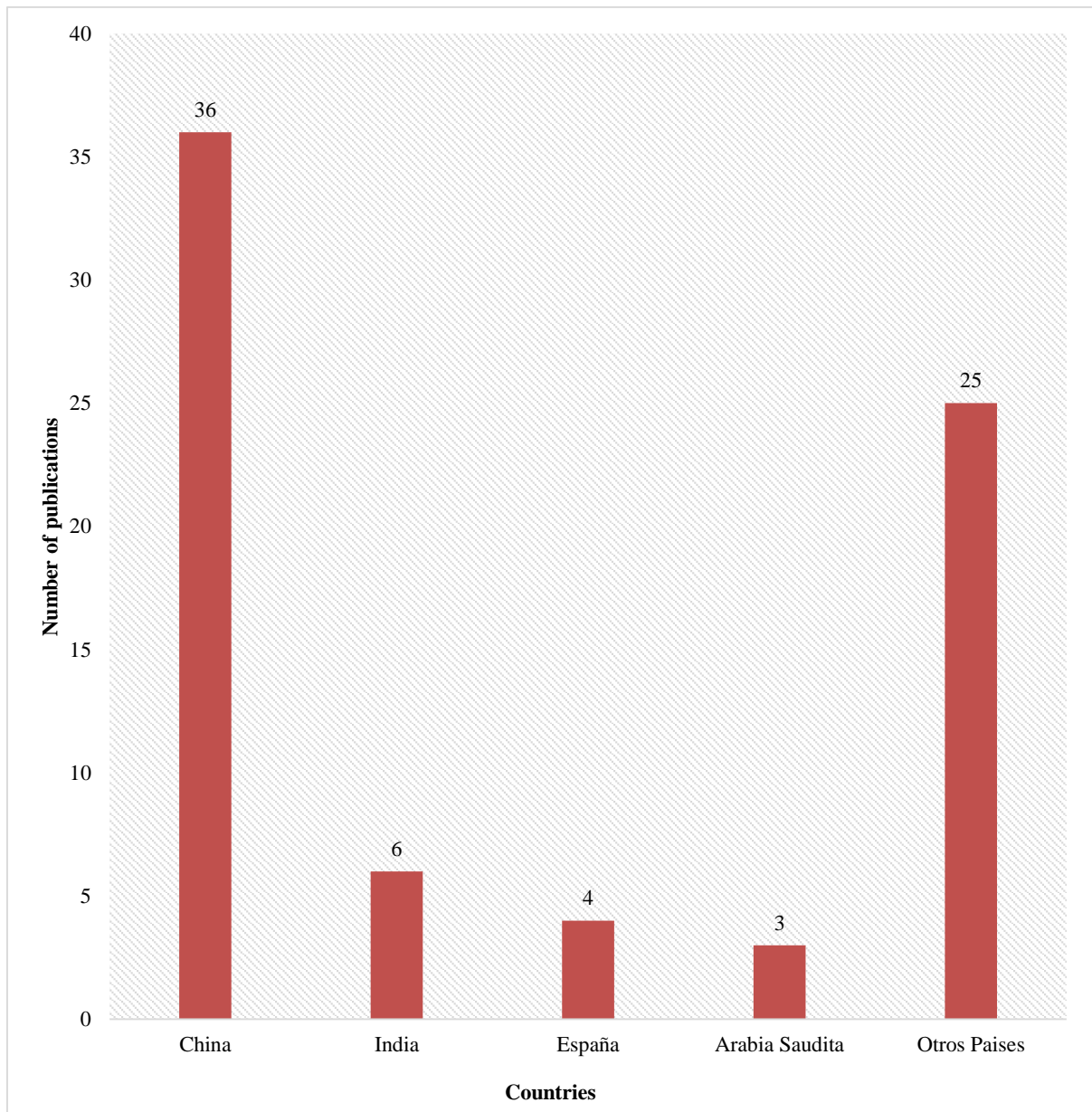
Figure 4. Articles by country

- What is the sample size used in the research?

To consider the sample size, the number of subjects included in the sample was analyzed, this referred to students, teachers, higher education institutions. It was determined that several authors generally use up to 90 students. Other research tends to use up to 500 students as a sample to evaluate their behavior, others use up to 5000 students to extract broader information. Due to the dispersion of the data, the articles were grouped by intervals. The details can be found in Table 4.

Range of users considered in the sample	No. of articles that considered it
90-500	7
501 – 1000	4
1001-5000	4
Greater than 5000	2
Not specified	57
Total	74

Table 5. Items by user intervals according to the sample.

- What artificial intelligence techniques have been used for academic performance analysis in higher education institutions?

The following methodologies were considered: neural networks (n=33), decision trees (n=6), Bayesian networks (n=8), support vector machines (n=5). There is a large percentage of studies that combine several methods to obtain greater precision, such as: neural networks and decision trees (n=12), decision trees and logistic regression (n=3); others (n=7), such as Random Forest with support vector machines and Bayesian networks, genetic algorithms, as shown in Table 5.

Technique	No. of items
Neural Networks	33
Decision tres	6
Bayesian networks	8
Support Vector Machines	5

Technique	No. of items
Neural networks and decision trees	12
Decision trees and logistic regression	3
Other data mining techniques	7
TOTAL	74

Table 5. Artificial intelligence techniques used in academic performance.

3.1   Neural Networks

Different studies have carried out the production of academic performance under the use of neural networks. Among the most relevant is a comparative study of several techniques with university students obtained an accuracy of 94.00 %, using demographic and grade variables (Al-Radaideh et al., 2021). On the other hand, the model used a hybrid approach, combining demographic, academic and environmental factors obtaining an accuracy of 85.20 % (Tien et al., 2018).

(Meng et al., 2020) used input (academic performance, personal characteristics, demographic information), output (final exams) variables of 415 students, obtaining an accuracy of 83.10 %.

Similarly (Wang et al. 2022), used a deep learning model to predict the academic performance of college students, with an accuracy of 89.40 %, the variables analyzed are: age, gender, nationality, career, type of admission, high school scores and college entrance exam scores.

(Cui et al., 2022) achieved an accuracy of 86.70 %, variables analyzed: gender, high school grades, college entrance exam scores, and participation in extracurricular activities. (Liang et al., 2022) obtained a high accuracy with a value of 92.40 %, variables under analysis: academic performance, online learning behavior, personal information. (Liu et al., 2022) conducted a study on college students, obtained an accuracy of 90.30 % considering the following variables: academic performance, learning motivation, study habits, time management.

(Wang et al., 2022) combined neural networks with support vector machines, achieving an accuracy of 89.40 % the variables under study were: academic performance, psychological factors, academic motivation, time management. Another study by the same author where he used Long Short-Term Memory (LSTM) neural networks to predict student grades based on variables such as student demographic information, high school grades and class attendance. The model achieved an accuracy of 86.23% in predicting student performance.

3.2 Decision trees

There are several researches that use decision trees, among these we can mention (Guo et al., 2022) who developed a model based on decision trees to predict the academic performance of college students with an accuracy of 8920 %. The variables analyzed were demographic data, socioeconomic level and academic background. (Zhang et al., 2022)

proposed an improved decision tree algorithm to predict the academic performance of college students with a good accuracy of 92.50 %. The variables analyzed were academic performance, daily attendance rate and number of courses completed.

(Wang et al., 2022) developed a decision tree-based method to predict academic performance in undergraduate students with an accuracy of 87.50 %. The variables analyzed were previous academic performance, course attendance rate and socioeconomic status.

(Xiao et al.,2022) proposed an intelligent prediction model for undergraduate academic performance combining decision trees and Bayesian networks with an accuracy of 86.30 %. The variables analyzed were academic background, learning attitude and learning style.

3.3 Neural networks and Decision tres

Several studies combine these techniques, of which we can cite that have higher accuracy we have (Zhang et al., 2019) analyzed the academic performance of Chinese business school students using machine learning algorithms, achieving an accuracy of 90.5 % and highlighting the importance of pre-college factors.

(Khademi et al., 2019) used decision trees and artificial neural network models to predict academic failure, achieving 92.20 % accuracy and identifying attendance and prior GPA (grade point average) as important predictors.

(Alghamdi, 2020) combined these techniques, achieving an accuracy of 86.6 % and highlighting the importance of course-related variables. (Santos, 2020) applied machine learning techniques to predict academic performance, achieving an accuracy of 90.5 % and identifying previous GPA and school type as important predictors.

(Zhang et al., 2020) also combined these techniques to predict students' academic performance, obtaining an accuracy of 8610 % using academic development variables as well as demographics.

3.4 Support vector machines

(Zhang et al., 2022) aimed to explore the relationship between college students' academic performance and mental health using big data analysis. They collected data from 1800 students in a Chinese university. The variables analyzed included academic performance, mental health, gender, career, and family income. The results showed that there was a significant positive correlation between academic performance and mental health. They also found that main and family income had a significant impact on academic performance, while gender did not. They achieved an accuracy of 88.16%.

4. Discussion

The systematic review is carried out with the purpose of having knowledge of the latest developments according to the line of research, in our case the research that has been developed using artificial intelligence techniques to improve academic performance in higher education institutions. These researches have grown considerably in the last three years, the year where most of these researches have been developed is 2022; this indicates how the interest in this line of research has been increasing..

Of the countries with the greatest number of investigations, we can mention China (n=36), followed by India (n=6) and Spain (n=3), the rest of the countries are just starting in this line of investigation.

If we refer to the size of the sample, we can indicate that analyses are carried out with small and large data samples, there is no regulation or standardization in this regard, among these we have that the largest number of investigations are carried out with an interval of 90 - 500 (n=7). Most of the studies do not specify the number of students (n=57).

Regarding the most used artificial intelligence techniques, which give an accuracy higher than 80%, we have artificial neural networks (n=31), followed by decision trees (n=6), it is also important to mention that there are some hybrid methods that also present a high accuracy such as the combination of neural networks and decision trees (n=11).

5.   Conclusions and Future Work

Artificial intelligence has undergone significant advances in recent decades, and has been increasingly used to analyze and improve the academic performance of students in higher education institutions, evolving from simple approaches such as machine learning algorithms to more advanced techniques such as neural networks and deep learning algorithms.
Neural network models have been found to be more accurate than decision tree models, and hybrid methods combining several techniques give excellent results. Research has been carried out in a wide range of countries, both those with a long tradition in the use of educational technologies and those that are adopting these technologies more recently. Countries with an outstanding track record in educational research, such as China, have been leaders in the application of artificial intelligence to academic performance in higher education. Other countries, such as India and Spain, have also shown significant interest in this area and have conducted relevant research in the use of artificial intelligence in the academic context.

It has also been found that the most commonly analyzed variables are GPA, previous student performance and participation in extracurricular activities. In addition, the authors have also used different databases and sample populations to conduct their studies.

Being clear about this set of techniques, especially the predictive ones, will allow higher education institutions to develop strategies and policies that allow for student follow-up and monitoring.

In future research, several techniques, such as clustering and autoencoders, can be combined to reduce the dimensionality of the input space and predict students' academic performance. In addition, it would be interesting to explore how these techniques can be adapted to different student populations, such as students of different ages or academic levels. The effectiveness of these techniques in different countries or geographic regions could also be investigated.

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Teaching competence in future Computer Science teachers in Ecuador

La competencia digital docente en los futuros profesores de informática del Ecuador Digital

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Abstract

The knowledge society and economy of the 21st century demand that students develop the necessary skills and abilities to face the requirements of adult life. Thus, future teachers of computer science secondary education in Ecuador, due to their technical-pedagogical training, face the challenge of developing the digital teaching competence to help their students to face the technological challenges that the current world demands. The present study aimed to diagnose and analyze the level of mastery in the 5 areas of digital competence in the students of the Pedagogy of Experimental Sciences of Computer Science at the Central University of Ecuador, through the application of a questionnaire created by professors Débora Martín Rodríguez, María Saénz, Raúl Santiago and Edurne Chocarro, professors of two renowned universities in Spain. In addition, the instrument was validated by local experts. To measure the reliability of the questionnaire, Cronbach's alpha coefficient was used for each dimension of digital competence in teaching, obtaining a score of over 0.90. The methodology used was empirical-analytical and descriptive, using a non-probabilistic sampling, at the convenience of the researchers, of 161 students of different

levels and subjects. Among the main conclusions found were that the least developed areas of teaching digital competence are problem solving and safety.

Keywords

digital competence, teacher, covid 19, students, educational informatics, covid 19, educational informatics.

Resumen

La sociedad y economía del conocimiento del siglo XXI exigen que los estudiantes desarrollen habilidades y destrezas necesarias para hacer frente a los requerimientos de la vida adulta. Es así como los futuros docentes de educación media de informática del Ecuador, por su formación técnico-pedagógica se enfrentan al reto de desarrollar la competencia digital docente para ayudar a sus alumnos a enfrentar los desafíos tecnológicos que el mundo actual demanda. En el presente estudio se pretendió diagnosticar y analizar el nivel de dominio en las 5 áreas de competencia digital en el estudiantado de la Carrera de Pedagogía de las Ciencias Experimentales de la Informática de la Universidad Central del Ecuador, a través de la aplicación de un cuestionario creado por los docentes Débora Martín Rodríguez, María Saénz, Raúl Santiago y Edurne Chocarro, profesores de dos reconocidas universidades de España. Además, el instrumento fue validado por expertos locales. Para medir la fiabilidad del cuestionario se usó el coeficiente alfa de Cronbach por dimensiones de la competencia digital docente, obteniéndose sobre los 0.90. La metodología utilizada fue empírico-analítica y de tipo descriptivo, se usó un muestreo no probabilístico, a conveniencia de los investigadores de 161 alumnos de distintos niveles y asignaturas. Entre las principales conclusiones encontradas se tiene que las áreas de competencia digital docente menos desarrolladas son solución de problemas y seguridad.

Palabras clave

Competencia digital, docente, covid 19, estudiantes, informática educativa.

1. Introduction

Higher education institutions are currently facing a generation of students born in the 2000s, who have lived surrounded by digital technology. They are accustomed to the use of mobile devices that allow them to satisfy their needs for communication, fun, information, entertainment and education. This phenomenon has allowed them to develop technological skills related to social activities, which are so natural for this age group that they are carried out on a daily basis and serve as a means of interaction between groups of like-minded people or even with strangers. A good example of this is social networks and the great impact they have had on our lives. This reality leads us to reflect on the use that each generation gives to digital tools, which became even more acute with the arrival of the pandemic of covid 19. "Teachers and students at the University cannot escape from the reality in which we live, absolutely conditioned by technologies and also bearing in mind that digital competence is one of the key competencies of the citizen of the XXI century". (Prendes et al., 2018, p.9). This reality is repeated in higher education institutions around the world. In this regard, some studies have been conducted that evidence what these researchers state when referring to people who use technology for social and communicative activities, with a high frequency of use, but do not present a development of competencies for the management of more complex resources, so they are not able to take full advantage of these tools, nor apply them to their own work. The interest of the researchers was to know how prepared the students of the mentioned career were to face the pandemic with virtual classes. The main obstacle encountered was the application and

collection of data on the subjects of the study. The research presented temporal limitations, since it was intended to study the students in times of pandemic and the results may vary in different conditions. The documentary contribution of this article was the product of a dimension studied and presented in the doctoral thesis of Professor Juan Carlos Rojas in 2020. The present work is created based on the methodology, introduction, methods, results and discussion (IMRyD).

1.1. Digital competencies in Ecuadorian higher education

Digital competence turns out to be a great ally for professionals of all specialties, allowing them to create, manage and interpret large amounts of information and thus use it to solve problems specific to their career or in everyday life. To define what digital competence is, the framework suggested by INTEF (2017) is quoted verbatim, which, in its version 2.0, expressed.

> Digital competence is one of the 8 key competences that any young person should have developed by the end of compulsory education in order to be able to enter adult life successfully and to be able to develop lifelong learning throughout life according to the European Parliament's indications on key competences for lifelong learning (Recommendation 2006/962/EC of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning, Official Journal L 394 of 30.12.2006). Digital competence not only provides the ability to take advantage of the wealth of new possibilities associated with digital technologies and the challenges they pose, it is increasingly necessary to be able to participate meaningfully in the new knowledge society and economy of the 21st century." (p. 5). (see figure 1). It is clear, then, the importance of developing teachers' digital competence. In the following pages we will use the acronym -CDD-, to refer to this.

Comparison of changes in the areas of the Common Framework for Digital Competence in Education

Version 2013

Information

Troubleshooting

Communication

Security

Content creation

Version 2017

Information and information literacy

Troubleshooting

Communication and collaboration

Security

Creation of digital content
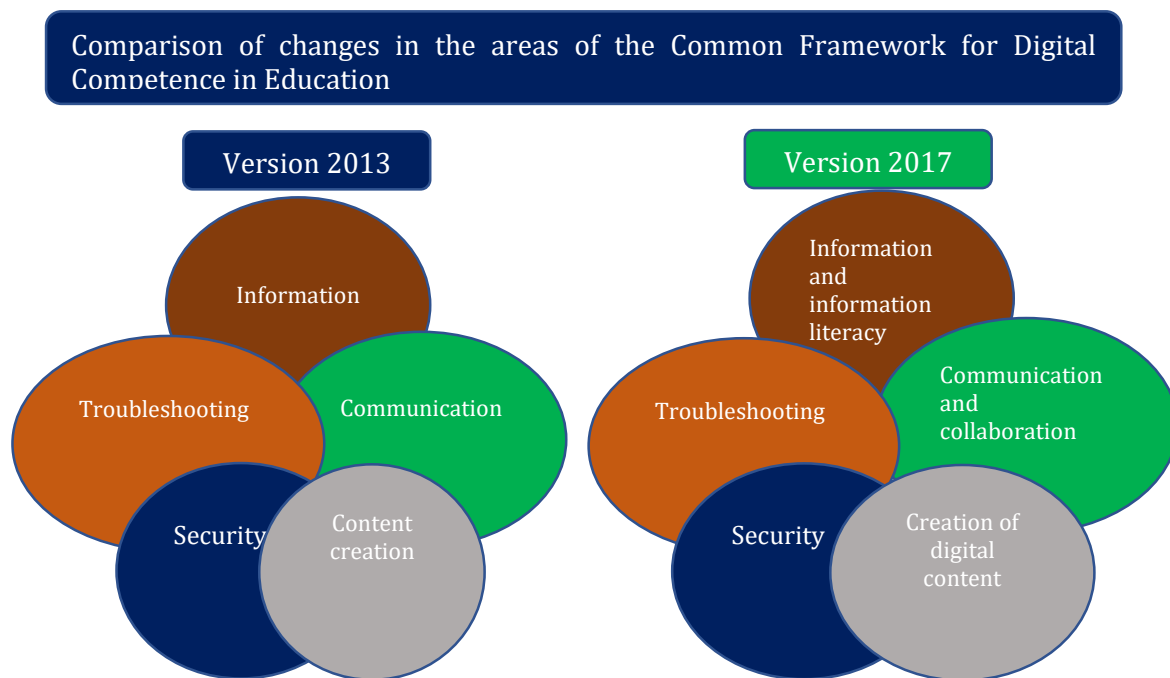
Figure 1. Comparison of changes in the areas of the common framework of teaching digital competence. Source: (Intef, 2016)

The figure shows the changes that have occurred over time in the areas of teaching digital competence (TDC) in the common European framework.

1.2. Digital competence in teaching as a fundamental element of professional development.

The evolution of the term digital competence has had great relevance in recent decades and has been linked since its inception to the need to make people technologically literate, given the digital revolution we are living (Roig-Vila and Moreno-Isac, 2020, p. 4). From the appearance of computers, then the Internet and its introduction in schools and homes, it was necessary to understand how they work, and to try to make the most of them.

It was thus required to enter a digital literacy process that went from being focused on the interpretation and critical expression of the different audiovisual and artistic manifestations to aspects related to access to technology and the management and evaluation of information "technological and information literacy" (Mon and Cervera, 2013, p. 31). Suddenly, "it was no longer only mandatory to know how to read and write" (Roig-Vila and Urrea-Solano, 2020, p. 8), but also to have developed skills and abilities to manage the information generated through electronic and computer media, to adapt to an increasingly changing reality; it is essential "that we enter into a process of digital literacy that allows mastering a broad spectrum of skills, knowledge, awareness and attitudes" (Bawden, 2002, p. 56).

Digital literacy (see Figure 2) is the consequence "of the intersection of three dimensions: technical dimension, cognitive dimension and socioemotional dimension of digital literacy" (Ng, 2012, p. 1066) which, in turn, are made up of a set of specific skills that allow an efficient application of this knowledge in the solution of professional and real life problems:

> The technical dimension. refers to possessing a set of skills and abilities that allow using ICT for teaching and learning, as well as in daily activities, i.e., computer management, operating system, office suites, specialized software, utilities such as file compressors, antivirus, internet search, social networks, email, among others.
> The cognitive dimension. refers to "the ability to think critically in the search, processing and evaluation of digital information (...) being able to evaluate and select appropriate software to perform a task" (Ng, 2012, p. 1068). "This dimension of digital literacy requires the individual, among other issues, to know the ethical, social and moral derivations related to the reproduction of digital content (copyright and plagiarism)" (Gutiérrez, Cabero, & Estrada, 2016, p. 3).
> The socioemotional dimension. focuses on,"being able to use the Internet in a responsible way to communicate, socialize and learn" (Ng, 2012, p. 1068).

And finally, at the intersection of the three dimensions we observe what would be digital literacy, which is the result of the skills provided by the dimensions. To demonstrate that the person possesses these skills Ng, (2012) mentions:

> Perform basic tasks with computer equipment and access resources in their daily use.

> Search, identify and evaluate information in an appropriate manner for the purposes of research and content learning.
> Develop competence in the use of technological tools to develop tasks, solve problems, etc.

Behave appropriately in virtual communities (p. 1069).
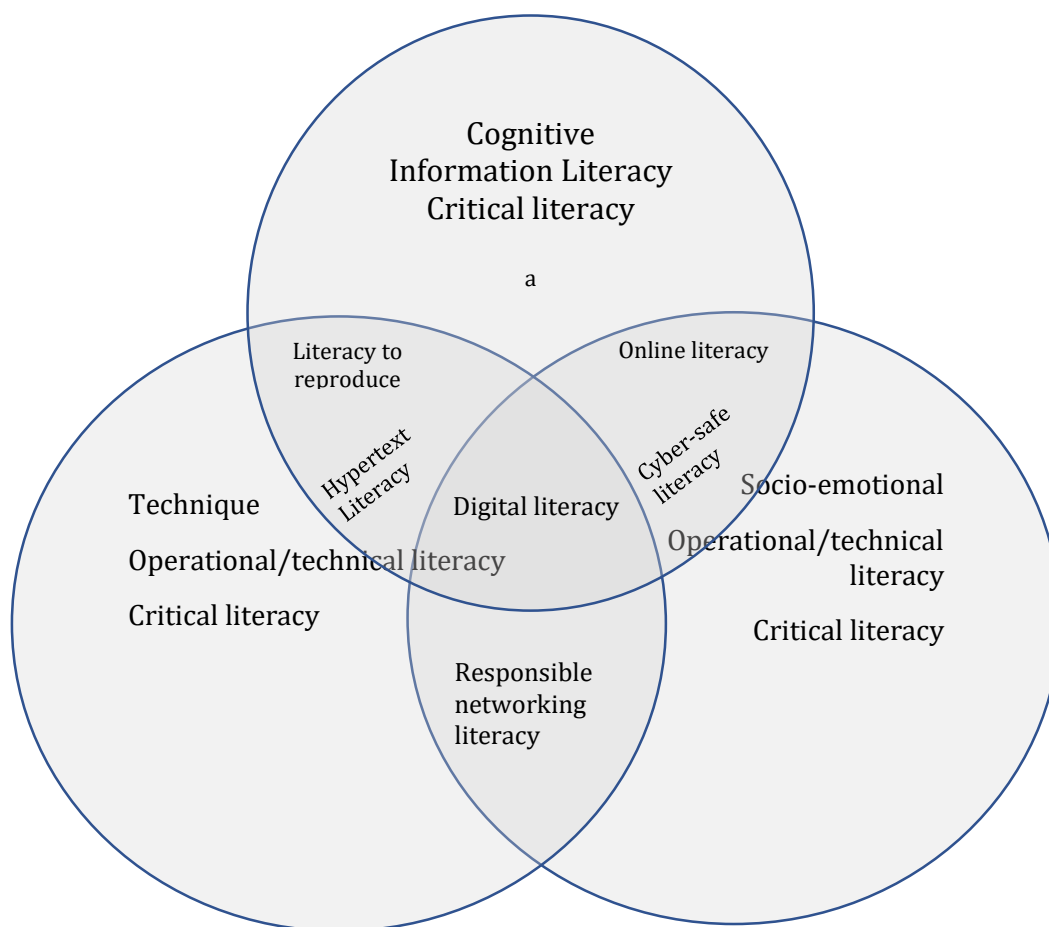
Figure 2. Digital literacy. Source: (Ng, 2012, p. 1067).

It is understood that teaching digital competence is shown to be indispensable and exceeds in extension and depth the mere digital literacy since it "encompasses other aspects such as technological, informational, audiovisual and communicative" (Ferrari, 2012, p. 11).

Undoubtedly, and despite the various positions that different authors express about competencies and digital literacy for this study, it is interpreted that one depends on the other, i.e., digital literacy in a technological culture such as the current one tends to the learning of information technology and education resources (ICT). It is also fundamental in the development of competencies, abilities and cognitive skills related to obtaining, understanding and producing information and its correct application in the different fields that make up the life of human beings. In this sense, the definition of the European Union Parliament (2006) about digital competence is citedl:

> The safe and critical use of information society technologies (IST) for work, leisure and communication. It is underpinned by basic ICT skills: the use of computers to obtain, evaluate, store, produce, present and

exchange information and to communicate and participate in collaborative networks via the Internet (p. 8)..

In addition, the CDD encompasses higher cognitive skills needed to process and manage information efficiently and thus be able to use these competencies with our students, guiding them in a learning process based on their needs, favoring a digital culture based on the right to choose and select the information we consume and generate with social responsibility. In this sense, Cabero et al. (2009) presents a series of comments regarding digital literacy:

> To speak of digital literacy requires speaking of a literacy that goes far beyond the mere technological and instrumental mastery of ICTs. It implies not only the ability to receive messages, but also their construction. It implies the ability to evaluate and select, according to our educational project and needs, the amount of information that is reaching us through new technologies. Using the media and technologies in their daily lives not only as resources for leisure and consumption, but also as environments for expression and communication with other people. It implies understanding literacy as an attitude of use for communication (p. 12).

It is clear that the process of making a conglomerate of people digitally literate necessarily involves the development of competencies that allow them to face the day-to-day use of ICTs. Classrooms may be a good place to start this process, but the need is so great that governments must prepare national plans to train all the loping different competencies in several aspects:

> Know when there is a need for information.
> Identify the information need.
> Work with a variety of information sources and codes.
> Know how to master information overload.
> Evaluate information and discriminate the quality of the information source.
> Organize information (p. 14).

Below are a series of teaching competencies to be developed according to the Common European Framework 2017 (see figure 3).

Common Framewrok 2017	Competencies
Information and Information Literacy	Identify, locate, retrieve, store, organize and analyze relevant information, evaluating its purpose and relevance.
Communication and Collaboration	Communicate in digital environments. share resources. connect and collaborate with others through digital tools. interact and participate in communities and mies: intercultural awareness.
Digital Content Creation	Create and edit new contents (texts, images, videos, etc.). (texts, images, videos...). integrate and rework previous knowledge and contents. create new productions. multimedia contents and computer programming. Know how to apply intellectual property rights and licenses of use in the classroom.
Security	Protecting data digital identity. security use. safe and sustainable use.
Troubleshooting	Identify digital needs and resources. to choose the appropriate digital tool. according to the purpose or need. solve conceptual problems, technical problems and update their own and their students' competence.

Figure 3. Digital competence of teachers. Source: (Intef, 2016)

The European Commission 2018 conducted a study where the level of digital skills of the inhabitants that make up the European countries was noted (see Figure 4.)
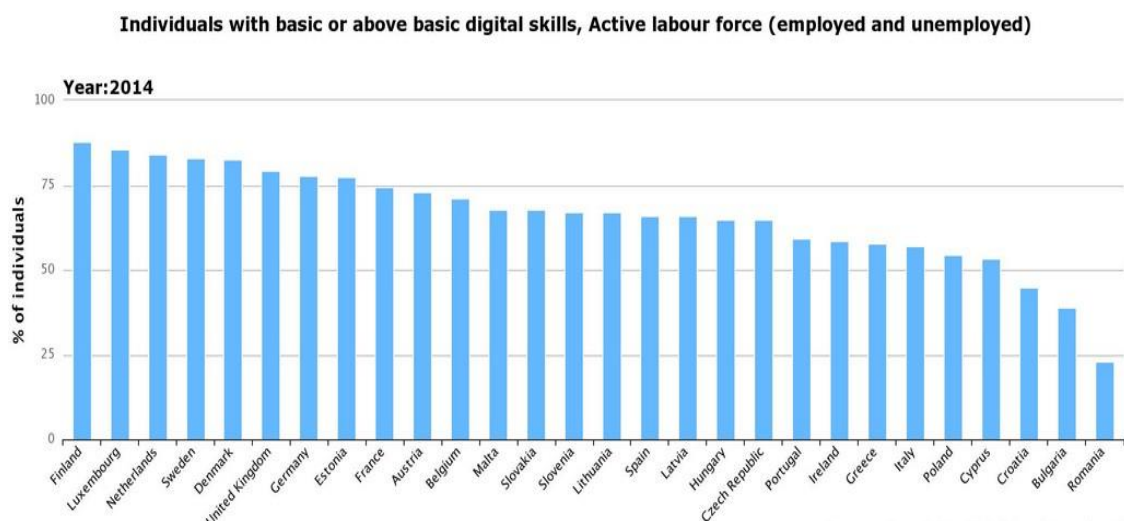
Figure 4. People with basic or higher digital skills, active workforce (employed and unemployed). Source: (European Commission, Digital Agenda Scoreboard, 2018.)

In the case of Ecuador, there is isolated research published in the form of scientific articles or graduate or postgraduate theses, which are insufficient given the importance of the subject matter. The Organic Law of Intercultural Education of Ecuador (LOEI), in its article 6, literal j, refers to the obligations of the state and states: "guarantee digital literacy and the use of information and communication technologies in the educational process, and promote the link between education and productive and social activities". Likewise, the Ministry of Telecommunications and Information Society (MINTEL), the governing body for the development of information and communication technologies in Ecuador, prepared the National Telecommunications and Information Technology Plan of Ecuador 2016-2021.

Among its objectives is to promote studies, reports or research to improve ICT management. This is why they have been involved with training the population, creating 854 infocenters -community computer centers-, nationwide distributed in 728 parishes, benefiting more than 6.2 million people with an investment of approximately 70 million dollars and have registered until August 2017 more than 12 million visits, being more than 500 thousand citizens trained in the use of ICT and digital illiteracy with 11.5% in ages between 15 and 49 years old.

2. Literature review

In 2019, a study was conducted on Digital competence of teachers and its impact on the teaching-learning process of mathematics, the methodology used was a non-experimental and descriptive quantitative approach, working with a sample of 150 students and teachers in the area of mathematics at the middle level in Ecuador. The results show that most of the respondents show non-positive opinions about the impact of digital competence in the teaching-learning process of mathematics given the lack of knowledge and application.

In 2020, a study on Digital competence of teachers to reduce the digital divide: Comparative study of Spain and Costa Rica was presented. This study was carried out with a quantitative, descriptive and correlational methodology where 5 investigations were analyzed in a sample of 126 teachers from both countries. The results show that despite the political, social and educational differences in each country, the perception of teachers is not so different. The main conclusion is that teachers in both countries feel confident in their digital skills, are motivated, understand that the education system does not respond to current needs and see the need for a specific curricular inclusion of the subject.

The study entitled Digital competence of teachers: a systematic review was reviewed. The objective of the research was to review theories and foundations of digital competencies in teachers from years between 2017 and 2021. The methodology used consisted of a systematic review of 441 articles. Forty scientific texts framed literature selection criteria were collected. The results showed that digital competencies are the skills that empower the individual to use digital media in different environments.

In the year 2022, a study was conducted on Digital Competence of Teachers: The Case of Canton Pichincha, Manabí, Ecuador. The methodology was based on a quantitative approach with a non-experimental design, it was descriptive-correlational. We worked with 45 university graduates who work as teachers at the professional technical level. The level of CDD of the teachers participating in the study was characterized by a general medium-low tendency, where there was a homogeneous classification in all the dimensions of the levels of knowledge and use of the teachers.

In the year 2022, a study called Digital Competence was presented. Here, a systematic exploration of research related to the digital competencies of university professors in Ibero-America is carried out. The methodology used was a documentary review of international academic databases. Among the main results, the need to include ICT in the teaching methodology to improve their teaching practice was evidenced.

3. Méthods and materials

3.1. Research Objectives

The following are the objectives that guided this investigation:

- To determine the level of mastery in the 5 areas of competence in the students of the Pedagogy of Experimental Sciences of Informatics.
- To analyze the levels of mastery according to the level of studies and gender.

3.2. Focus and scope

En la presente investigación se usó el enfoque cuantitativo, tal como lo señala Rodríguez-Peñuelas (2010):

> It focuses on the facts or causes of the social phenomenon, with little interest in the subjective states of the individual. This method uses questionnaires, inventories and demographic analyses that produce numbers, which can be statistically analyzed to verify, approve or reject the relationships between operationally defined variables, and the presentation of results of quantitative studies is regularly supported by statistical tables, graphs and numerical analysis (p. 32).

This study also relied on an empirical-analytical and descriptive methodology, calculating through frequencies of use, arithmetic mean and standard deviation, what is the level of mastery of the students investigated. For the second part of the study, the Chi-Square test was applied, which is a statistical procedure used to establish significant stocks of expected results.

3.3. Participants

For the realization of this study, 3 subjects corresponding to the Pedagogy of Experimental Sciences of Informatics of the Universidad Central del Ecuador were used. These were: Educational Legislation in the first semester with 63 students, Operating Systems in the fourth semester with 52 students and Projects III, in the eighth semester with 46 students. This was done in this way given the difficulties in collecting information from the participants due to the aforementioned health emergency. In addition, we worked with a non-probabilistic sampling at the convenience of the researchers with a total of 161 students, 99 males and 62 females.

3.4. Procedures

In order to establish the levels of mastery of the CDD in the selected students, work was carried out during the November 2021 - April 2022 semester in virtual classrooms created on the Moodle platform. These virtual learning environments were developed with the instructional design - Analysis, Design, Development, Implementation and Evaluation - (ADDIE). It should be noted that activities and resources that favored work in the following areas were included: information, content selection/creation, communication, safety and problem solving. At the end of the academic period, a questionnaire was applied to measure levels of mastery.

3.5. Instrument

In order to collect the necessary information for the research, a questionnaire created by professors Débora Martín Rodríguez, María Saénz, Raúl Santiago and Edurne Chocarro, professors at two renowned universities in Spain, was used to carry out a study called design of an instrument for diagnostic evaluation of the digital competence of teachers: Flipped Classroom training. This instrument measured the knowledge and use of the CDD through a scale of 4 possibilities and a total of 53 items. The Google forms tool was used for its application, and it sought to measure the dimensions established by the Common Frame of Reference for Digital Competence in Teaching project (2016):

> Information. Identify, locate, retrieve, store, organize and analyze digital information, evaluating its purpose and relevance.
> Communication. Communicate in digital environments, share resources through online tools, connect and collaborate with others through digital tools, interact and participate in communities and networks, intercultural awareness.
> Content creation. Create and edit new content (texts, images, videos...), integrate and rework previous knowledge and content, make artistic productions, multimedia content and computer programming, know how to apply intellectual property rights and licenses of use.
> Security. Personal protection, data protection, digital identity protection, security use, safe and sustainable use.
> Problem solving. Identify needs and digital resources, make decisions when choosing the appropriate digital tool, according to the purpose or need, solve conceptual problems through digital media, solve technical problems, creative use of technology, update own competence and that of others (p. 11).

The instrument was validated by 3 teachers who are experts in educational technology. Cronbach's alpha coefficient was also used to measure the reliability by dimensions of the instrument (see Table 1).

Indicator	Educational Legislation	Operating Systems	Projects III
Information	0.970	0.943	0.933
Content Selection/Creation	0.977	0.965	0.924
Communication	0.958	0.949	0.948
Security	0.970	0.965	0.945
Troubleshooting	0.986	0.983	0.926

Table 1. Cronbach's Alpha

4. Results

The results of the diagnosis of the level of mastery in the 5 areas of competence in the group investigated are presented below. If the subjects are analyzed by academic courses, it can be seen that in Educational Legislation -first semester-, the information indicator presents the values closest to 4 points on the scale for the category's knowledge with a $\mu = 2.58$ and use with a $\mu = 2.59$. This result is typical of a group of digital natives, as are the students

investigated, since their life practically revolves around the use of technology. On the other hand, the result obtained in the problem-solving indicator is worrisome because it is presented with the lowest score of all, showing the knowledge category with μ = 2.35 and use with μ= 2.37.

With respect to the subject Operating Systems -fourth semester-, the information component once again obtained the highest values with μ=2.93 and μ=2.92 in the categories knowledge and utilization, respectively. This result is worrying, since despite the fact that the students investigated have already advanced a few semesters, the values obtained are not significantly higher. Also, problem solving is the lowest indicator, obtaining a μ=2.65 and μ=2.62 in the category's knowledge and utilization, respectively. The information obtained allows us to make a scan of the group investigated and to work on this important aspect for the professional development of the students.

In the subject Projects III -eighth semester- we find that the information component, once again, is the highest value, achieving a μ=3.21 in the knowledge category and a μ=3.14 in the utilization category. It is understood that the students have improved their information search and analysis skills, although it is disturbing that the other components remain at a much lower increase than expected, despite the academic knowledge that the students are acquiring over the semesters. Problem solving is once again the component with the lowest value in the knowledge category with a μ=2.86 and in the utilization category is the communication indicator with a μ=2.76. (See Table 2).

Indicator	Educational Legislation				Operating Systems				Projects III			
	Knowledge		Usage		Knowledge		Usage		Knowledge		Usage	
	μ	Σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
Information	2.58	0.066	2.59	0.050	2.93	0.063	2.92	0.020	3.21	0.086	3.14	0.076
Content Selection/ Creation	2.51	0.055	2.48	0.049	2.76	0.060	2.1	0.051	2.96	0.112	2.87	0.115
Communication	2.48	0.068	2.42	0.049	2.66	0.094	2.65	0.075	2.90	0.125	2,.6	0.126
Security	2.45	0.008	2.45	0.036	2.67	0.040	2.65	0.031	2.86	0.085	2.79	0.068
Troubleshooting	2.35	0.052	2.37	0.065	2.65	0.039	2.62	0.031	2.86	0.113	2.78	0.087

Table 2. Arithmetic Mean/Standard Deviation of the level of proficiency in the 5 areas of competence

In response to the need to verify whether the level of studies and gender contribute to the development of digital competence in teaching, the following hypotheses are proposed: the gender variable is related to the development of the CDD, since it is considered that since there are more men in the career and with the sample worked on, they will be at an advantage. To test this hypothesis, the non-parametric chi-square test was used to establish whether there are significant differences between the study variables.

Having too many tables from the analysis in the SPSS software, a contingency table was made to summarize all the necessary data. In this context, the aim is to test the null hypothesis:

- H0: Female students do not develop CDD more than male students.
- H1: Female students develop CDD equally with male students.

As shown in Table 3, the null hypothesis is rejected, and the researcher's hypothesis is accepted, since in light of the results obtained in none of the areas of competence is there evidence that the value is less than 0.05. Therefore, it is considered in this study and under the given conditions that there is no evidence to affirm that the gender variable is related to the development of CDD (See Table 3).).

Indicator	Sex		Chi-square knowledge		Knowledge likelihood ratio		Knowledge of linear by linear association		Use of chi-square		Use of likelihood ratio		Use of linear by linear association	
	women	men	Df	Asymptotic significance	Df	Asymptotic significance	Df	Asymptotic significance	Df	Asymptotic significance	Df	Asymptotic significance	Df	Significación asintótica
Information	62	99	3	0.010	3	0,040	1	0.020	3	0.001	3	0.049	1	0.02
Selection of content creation	62	99	3	0.040	3	0.043	1	0.001	3	0.049	3	0.039	1	0.037
Communication	62	99	3	0.031	3	0.033	1	0.001	3	0.041	3	0.038		0.032
Security	62	99	3	0.022	3	0.022	1	0.003	3	0.021	3	0.023		0.046
Troubleshooting	62	99	3	0.023	3	0.021	1	0.020	3	0.029	3	0.029	1	0.042

Table 3. Chi-square summary by gender

Thus, we also wanted to investigate whether the academic level of students related to the development of the CDD. For this purpose, the hypothesis was proposed: the variable semester studied is related to the development of the CDD. It is understood that as students pass semesters and advance in their careers, they develop the CDD.

To test this hypothesis, once again the chi-square statistical test was used. Then, supported by this tool we contrasted the null hypothesis:

- H0: Students in higher semesters do not develop CDD more than students in lower semesters.
- H1: Students in higher semesters develop CDD more than students in lower semesters.

In light of the results obtained, we proceed to reject the null hypothesis in the areas of CDD: information, content selection and creation, and problem solving, where the p-value is less than 0.05, accepting the researcher's hypothesis; and the null hypothesis is accepted in the areas of CDD: communication and safety, where the p-value is greater than 0.05, rejecting the researcher's hypothesis (See Table 4).).

INDICATOR	Semester in progress			Chi-square knowledge		Knowledge likelihood ratio		Knowledge of linear by linear association		Use of chi-square		Use of likelihood ratio		Use of linear by linear association	
	1RO	4TO	8VO	DF	Significación asintótica	DF	Significación asintótica	DF	Significación asintótica	DF	Significación asintótica	DF	Significación asintótica	DF	Significación asintótica
Information	63	52	46	6	0.030	6	0.025	1	0.011	6	0.022	6	0.018	1	0.003
Selection of content creation	63	52	46	6	0.021	6	0.011	1	0.025	6	0.047	6	0.041	1	0.069
Communication	63	52	46	6	0.073	6	0.067	1	0.029	6	0.123	6	0.114	1	0.076
Security	63	52	46	6	0.114	6	0.066	1	0.09	6	0.086	6	0.064	1	0.149
Troubleshooting	63	52	46	6	0.003	6	0.002	1	0.011	6	0.072	6	0.064	1	0.045

Table 4. Chi-square summary by semester

5. Discussion

The results derived from the univariate analysis -first part of the study- showed that the students investigated have developed some areas of CDD more than others. It is clear that, being a young group, they are accustomed to using digital devices for practically everything. The CDD areas (information and communication) are the most achieved by those investigated, agreeing with studies by other academics such as (Valdivieso and Gonzáles 2016, p. 71).

Thus, a reality is also evident in the classrooms and refers to the area of CDD (problem solving) presents the lowest values followed by the area of CDD (security), that is, the management of personal information or not, in digital media. The results derived from the multivariate analysis confirm the former, indicating that the two least developed CDD areas are problem solving and security. In addition, it is verified that, in this case, and in the conditions in which we found ourselves when the research was conducted, the gender variable is not related to the development of CDD. These results are consistent with studies such as that of (Domingo et al.,2019, p. 76).

It is important to note that education careers have an important role with society by training future teachers. Therefore, it is vital to keep curricula updated both in the development of pedagogical and digital competencies, since the next generations of students come loaded with the use of digital technology, enhanced by Artificial Intelligence. "Teachers possess a medium level of ICT competencies, higher in technological than in pedagogical ones" (Suárez-Rodríguez et al., 2013, p. 51)

6. Conclusions

The results found in this study belong to a moment in the history of humanity very hard and sad where the pandemic of covid 19 caused by the SARS-CoV-2 virus, tested all the systems that make up societies. This was how public higher education faced the importance of maintaining a powerful and updated technological infrastructure, as was the case of the Central University of Ecuador, which acquired in 2017 a Data Center, same that allowed to face this health contingency, allowing virtual classes to be developed through the Moodle platform and MS- Teams.

On the other hand, this research allowed to bring to light results regarding the development of the CDD in the student body, the data are worrying for the researchers, since it is understood that in the subjects they work not only using digital tools but active learning methodologies that enhance the cognitive development of the student body through

individual and group strategies such as problem-based learning or project-based learning, as well as collaborative learning.

Active methodologies have been designed to work in conjunction with ICT, thus we have Flipped Learning, which integrates several strategies to develop meaningful learning in students from any electronic device, anywhere and at any time.

This study made it possible to approach the reality of the students of the Pedagogy of Experimental Sciences of Informatics where it is assumed -from the teaching staff- that, being a technical career, the students master computer tools, and although in the areas of informational and communicational competence the results confirm this, there is still much work to be done in the areas of CDD (problem solving and security). From this reality, research needs arise, as is the case of teaching methodologies and the emergence of artificial intelligence, which will completely change education.

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E-book: a gamified didactic resource for learning Natural Sciences

E-book: Un recurso didáctico gamificado para el aprendizaje de las Ciencias Naturales

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Abstract

This research responds to the need to improve teaching and learning processes through the use of Information and Communication Technologies (ICT), as a reality of the low use of technological tools by teachers in the classrooms, with this background, the application of the e-book as a gamified didactic resource in the ninth years of the Instituto Nacional Mejía was proposed. The methodology is quasi-experimental, consisting of two groups: 135 students in the experimental group (GE) and 115 in the control group (GC). A pretest and posttest were used with a questionnaire validated through expert judgment; Cronbach's alpha was 0.80, which proves the reliability of the questionnaire. The data of the activities developed were processed through the T test, allowing to reject the null hypothesis by having a p (value) less than 0.05 in the arithmetic means of the pretest and posttest, graphic organizers and workshops, the final decision was to reject the null hypothesis and accept the alternative hypothesis, which mentions the gamified didactic resource e-book that allows improving the teaching and learning processes, and achieving a higher academic performance in Natural Sciences in the experimental groups. The results were relevant as they significantly improved the interest and motivation of the students to learn, directly influencing their academic performance, which was demonstrated in the averages obtained: the GE reached an increase of up to 4 points as opposed to the GC, which decreased one point when performing the activities in a traditional way.

Keywords

E-book, teaching and learning, teaching resource, academic performance, ICT, teaching and learning.

Resumen

La presente investigación responde a la necesidad de mejorar los procesos de enseñanza y aprendizaje a partir del uso de las Tecnologías de Información y Comunicación (TIC), como realidad del bajo uso de herramientas tecnológicas por parte de los docentes en las aulas, con este antecedente se planteó la aplicación del *e-book* como recurso didáctico gamificado en los novenos años del Instituto Nacional Mejía. La metodología es de tipo cuasiexperimental conformado por dos grupos: 135 estudiantes del grupo experimental (GE) y 115 del grupo control (GC). Se utilizó un pretest y postest con un cuestionario validado a través de juicio de expertos, el Alfa de Cronbach fue de 0.80 que comprueba la confiabilidad del cuestionario. Los datos de las actividades desarrolladas se procesaron mediante la prueba de T, permitiendo rechazar la hipótesis nula al tener un *p* (valor) menor a 0.05 en las medias aritméticas del pretest y postest, organizadores gráficos y talleres, la decisión final fue rechazar la hipótesis nula y aceptar la hipótesis alternativa, la cual menciona el recurso didáctico gamificado *e-book* que permite mejorar los procesos de enseñanza y aprendizaje, y lograr un mayor rendimiento académico en Ciencias Naturales en los grupos experimentales. Los resultados fueron relevantes al mejorar significativamente el interés y motivación de los estudiantes por aprender, influyendo directamente en su rendimiento académico lo que se demostró en los promedios obtenidos: el GE alcanzó un incremento de hasta 4 puntos a diferencia del GC que disminuyó un punto al realizar las actividades de manera tradicional.

Palabras clave

E-book, enseñanza y aprendizaje, recurso didáctico, rendimiento académico, TIC.

1. Introduction

The current digital era is a true technological revolution that has made people's lives easier and changed their habits, creating a new digital culture that arises from the creation of ICTs that have transformed the world and the way in which people interact in it. ICT offers a world of opportunities that should be taken advantage of, especially in the educational field, since technological resources have produced a significant change in the teaching and learning processes; making education break down barriers, allowing the presentation of information in a very different way by replacing old traditional resources (books, blackboard and notebooks).

E-book is a didactic resource with great benefits that allows to be used in any type of computer, tablet or cell phones; it has different gamified digital tools becoming something innovative and modern, managing to awaken the motivation, interest and active participation of the students generating a significant learning. E-book seeks to create different gamified educational didactic materials that use elements such as: components, mechanics and dynamics, which will facilitate the creation of: games oriented to learning results, generation of rules and rewards. In this regard, Ortiz-Colón et al. (2018) state that.:

> Gamification processes in education are highly beneficial for students, such as: motivation, immersion to enable the anticipation and planning

> of situations; engagement and socialization through interactivity and interaction; as well as the variety of elements involved, which makes the educational activity more motivating and stimulating for students (p.44).

Gamification is an emerging methodology that consists of using games or game mechanics in playful contexts; developing in the classroom the motivation of students, which must be actively integrated into the teaching-learning process. The application of the e-book with gamified tools optimizes learning, improves academic performance, and teachers feel committed to continue preparing themselves in the use of these technological tools that dynamize learning environments.

In this research, which is the result of a thesis, the research questions are: what is the degree of use of didactic resources with gamification tools in the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía? how to configure a pedagogical didactic structure based on gamification in the meaningful learning of contents related to Natural Sciences? how is the e-teaching structure used in the teaching and learning process of Natural Sciences? How is the e-book with gamification tools used as a didactic resource in the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía in Quito? And what is the level of mastery of the contents of Natural Sciences before and after the use of the e-book with digital tools based on gamification? The main objective of the research is to determine the impact of the application of an e-book as a gamified didactic resource for the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía , and as specific objectives we have proposed to analyze the degree of use of didactic resources with gamification tools in the teaching and learning process of Natural Sciences; to configure a didactic pedagogical structure for the application of the e-book as a gamified didactic resource; to apply an e-book based on gamification tools; and to determine the impact of the e-book as a gamified didactic resource in the teaching-learning process of Natural Sciences. It is thus understood the importance of promoting the use of other didactic resources based on ICT, since it constitutes an opportunity for students to experience new ways of learning, leaving aside the use of traditional media.

According to the criteria required for the realization of a research work, the following sections are developed: section 2 presents the theoretical contextualization, which consists of the review of the bibliographical sources that address the issue under study. Section 3 establishes the hypotheses raised about the application of the e-book. Section 4 determines the objectives. Section 5 details the methodology used to develop the research. Section 6 shows the results, analysis and discussion. In section 7, conclusions are drawn according to the results obtained.

2. Theoretical contextualization

2.1 Communication and information technologies

Information and communication technologies (ICT) are all those tools and programs that process, manage, transmit and share information with the help of technical supports. Computers, the Internet and telecommunications are the most common information and communication technologies, although their growth and development continue to produce new models. For this reason, "ICTs are a set of advanced techniques, developments and devices that integrate data storage, processing and transmission functionalities" (Rodriguez, 2009, para. 1).

On the other hand, Moya (2009) states that:

> Most governments and educators recognize that the use of ICT in education improves its quality. However, it is a matter of using ICT in the classroom and using them from a pedagogical perspective, not as a complement to traditional teaching but as an innovative way that, by integrating technology into the curriculum, improves teaching-learning processes and students' school processes (p. 2).

It is important to understand that learning in education should be a motivating and interactive process in which technology plays a very important role in the acquisition of knowledge, skills and significant abilities. Advances in technologies are greatly influencing the educational field by developing quality learning and improving the performance of both students and teachers in the teaching and learning process. Guerrero (2016) argues that:

> ICT in education is teaching and learning with technological tools and applications offered by Information and Communication Technologies. The use and emergence of new technologies today is no longer a novelty, it is part of our daily life, noting that young people are the most inclined to use technological tools (p.18).

There is no doubt that when the intercessor of the teaching and learning process uses only textbooks to transmit knowledge to students, the impacts generated are low and not very useful. It is important to recognize that in the digital era we live in today, the current society is audiovisual and interactive, especially in young people. Today the new generations are considered digital natives who have been surrounded from an early age by new technologies and devices, their inclination for both is based on learning new things, which is striking and fun at the same time.

2.2 ICT as a teaching resource

ICTs are transforming and becoming an educational tool, improving the quality of education, creating didactic structures and integrating meaningful learning based on enabling technologies. Peña and Calmaestra (2007) state that:

> ICTs are presented as an innovative resource in the classroom, but for this tool to be truly useful in the educational environment and not used as an end in itself, it is necessary to comply with a series of premises that are applicable to any teaching-learning process (p. 9).

To make a good use of technology, and that this is really useful in the educational field should emphasize important keys to the development of the teaching-learning process, the student must form a significant development of thinking. The teaching-learning process must reach a significant learning to reach the objective; the students must be in a high level of motivation achieving that they easily grasp the new knowledge.

2.3 Learning and gamification

In order to develop learning to occur, certain environmental and psychological conditions are required. The environmental conditions refer to the environment in which information is received or learning activities are performed, in this sense, playful environments have characteristics that allow attention and concentration despite external or distracting elements.

In this regard, Posada (2014) argues that playful environments are "an opportunity for the student, the protagonist of the teaching-learning process, to take ownership of what he/she wants to learn and how, to make the playful activity the creative, constructive, open way to interact with knowledge" (p. 28). The psychological conditions have to do with the skills used in the face of challenges and problem solving, motivation and inclination towards playful and recreational aspects. In this sense, gamification offers learning optimal conditions for its development; the success of learning lies in the motivation and interest produced in the student within the learning experience itself. Therefore, it is not the content of the class topics that is significant, but the learning experience itself.

In this sense, a motivated student will be a student with a positive disposition to learning. In this order of ideas, this same disposition can be observed in the attitude of some children towards video games, which in most cases is opposite to the attitude they have towards learning in schools.

Moreira and González (2015) state that:

> Gamification allows removing boredom from the class and generates greater interest in the student, thus representing a significant strategy in the achievement of learning objectives". Based on the above, it is asserted that gamification is a necessary tool in the classroom because through motivation and interest students improve the teaching and learning processes (p. 15-38).

Every process has its advantages and disadvantages, and gamification is no exception, in Table 1 both can be clearly identified, it is therefore necessary to know how to implement gamification in the classroom because if the activities lose their formative character they become unproductive.

Caparrós (2017) state that:

> Gamification enhances the socializing capacity since the game stimulates the social competence of the participants and their ability to relate to each other as teams can be formed. At the same time, it avoids frustration through a progressive increase in difficulty, personalizes the teaching-learning process and provides practical information to the teacher, which allows him to rethink the organization of the subject according to the results obtained in the application of the game in the classroom..

On the contrary, Giménez (2016) mentions that:

> He warns of certain disadvantages of gamification, such as the promotion of competitiveness, which can sometimes be misunderstood by students, the deviation of students towards the superficial objectives of the proposal or even the increase in expenditure on the acquisition and renewal of materials and tools, software and even teacher training.

ADVANTAGES	DISADVANTAGES
▪ Motivation, which stimulates interest in learning activities or tasks that are not very attractive to them. ▪ Concentration, the game contributes to a longer lasting concentration. ▪ Improves cognitive skills, the mechanics of gamification affects the improvement of memory, logical reasoning and deductive inferences. ▪ Time use, by improving motivation and concentration, the student makes better use of time. ▪ Improves self-esteem, the dynamics of gamification allows the student to overcome levels or problems without significant frustration..	▪ The possibility of creating a temporary motivation. Motivation based exclusively on obtaining rewards is diminished once it ceases to be something novel. ▪ To obtain the rewards, all players must assume the same objectives, which makes it difficult to accommodate different interests and learning styles. ▪ The balance between fun and learning is very difficult to achieve, and if the activity loses its learning character, it will be unproductive. ▪ Gamification is very good for developing a whole series of skills, but others such as oral expression are very difficult to develop.

Table 1. Advantages and disadvantages of gamification

2.4 E-book in education

It is a digital tool which is designed with different gamification techniques, it is considered a didactic resource of great benefit because it uses different educational gamification applications and can be read on any type of computer or cell phone.

It is an opportunity for students to experience new ways of learning, leaving aside the use of traditional media such as blackboards, texts with extensive readings and the use of notebooks that only allow them to copy what the teacher dictates or what is already in a text.

The creation and application of the e-book will allow the classes to be striking and innovative; it will make it possible to positively influence the behavior of students in relation to learning, through the activities developed based on gamification, the student can experiment, discover, be fascinated and want to continue playing to overcome the challenges and difficulties present in the topics of Natural Sciences, whose information constitutes the content of the game. In this regard, Hernández (2016) argues that:

> Several aspects were considered in the structuring of the e-book. First, the learning channels of the students, the following inclusion of sounds, music and videos, so that the students are stimulated visually, aurally and kinesthetically, for which interactive activities based on gamification were designed (p. 33).

In structuring the e-book, several aspects were considered. Firstly, the learning channels of the students in the sample, and then the inclusion of sounds, music and videos, so that the students were visually, aurally and kinesthetically stimulated, for which interactive activities were designed.

Their application with gamified tools optimizes learning, improving academic performance and teachers feel committed to continue preparing themselves in the use of these technological tools that dynamize learning environments.

2.5   E-book features

E-book, being a versatile technological tool, has several features that allow it to arouse the interest of both the teacher and the student. A learning environment that relies on resource-based teaching methods should be deeply motivating in the sense that it offers students and teachers a variety of opportunities, benefits and changing roles, problem-solving, decision-making and assessment skills. The following are the main features of the e-book (See figure 2)
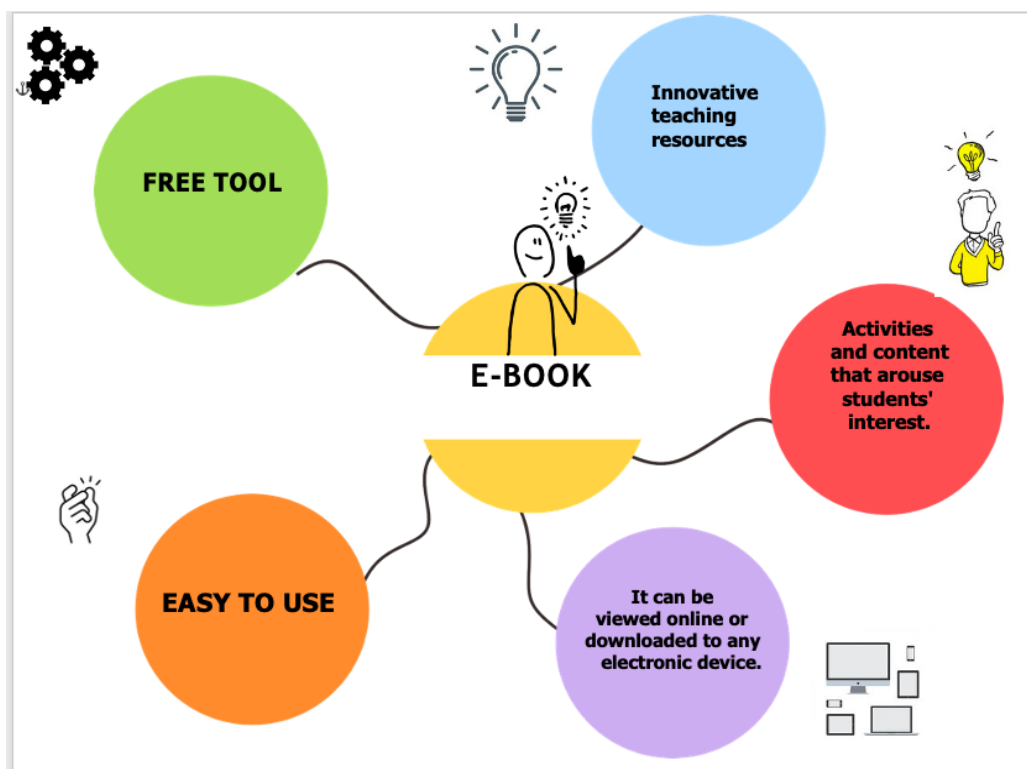
Figure 2. e-book features

3.   Methodology

The present research is of an experimental-exploratory type, the modality applied in the research was carried out through a mixed approach: starting from a qualitative basis, having an interpretative approach with the study subjects, and as a second point, with a quantitative approach through data tabulation. Once completed, the survey technique was used with its instrument, the questionnaire structured on a four-point Likert scale.

To collect the information, a structured questionnaire was used as the research technique. This questionnaire was composed of questions related to the topic of study to find out if students in the ninth year of basic general education use ICT and gamified tools to improve

their academic performance. Thus, with the information collected, possible conclusions were drawn based on the results obtained.

The structured questionnaire was composed of 15 questions on a Likert scale. This questionnaire allowed the researcher to obtain the required information based on the objectives set for this research. This survey was applied to ninth grade students with the objective of determining the students' reality regarding the use of ICT and gamified tools according to their educational level and the didactic sequence of the class.

The researcher worked with the entire population of 250 students and 6 teachers of the Natural Sciences Area of higher basic general education. For this research work, it was hypothesized that the gamified didactic resource E-book improves the teaching and learning process of Natural Sciences of ninth grade students.

In the e-book, test activities, graphic organizers and quizzes were developed using gamified tools: wordwall, canva and liveworksheets respectively. This emerging methodology consists of using games or game mechanics in playful contexts, providing motivation for students in education, which is why it should be actively integrated into the teaching and learning process.

4. Analysis and results

To test the hypotheses, the two-sample test statistic was applied; therefore, the most appropriate statistic for this sample (pre-post test averages) was the T-test for related samples, having a p (0.04) less than 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted. (See figure 3).

HYPOTHESIS TESTING

$H_0: \mu_d \leq 0$

$H_i: \mu_d > 0$

$S_d = \sqrt{\dfrac{(d_i - \bar{d})^2}{n-1}}$

Test statistic

$t = \dfrac{\bar{d}}{S_d/\sqrt{n}}$

$\bar{d} =$ 1,9643

$n=$ 7

$\sqrt{\frac{|d|}{|x|}} =$ 2,487568

$t =$ 2,089193629

Critical value:

$gl = (n-1) =$ 6

$\alpha =$ 0,05   5%

$t_{(1-\alpha),(n-1)} =$ 1,943180

p-valor = 0,040844665

Acceptance rejection H_0

Acceptance acceptance H_0

1.94

Decision: **The null hypothesis is rejected**
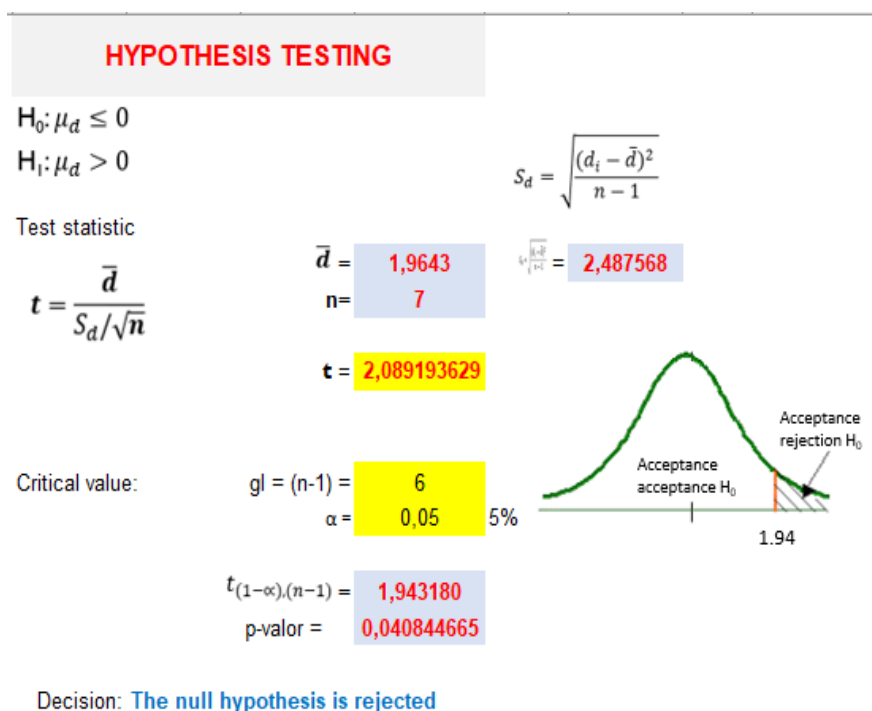
Figure 2. Pre and post test hypothesis testing

Null hypothesis	Activity	Test	Sig	Decision
	Test		0.04	
The gamified e-book didactic resource does not allow improving teaching and learning processes and achieving higher academic performance in Natural Sciences in experimental groups..	Organizer graphic	Related-samples t-test	0.03	Reject the null hypothesis
	Workshop		0.04	

Table 2. Summary of hypothesis testing

Having a p (value) less than 0.05 in the arithmetic means of the pre and post test in the graphic organizer and workshops developed by the students for this research, the final decision is to reject the null hypothesis (H0) and accept the alternative hypothesis (H1); which mentions that the gamified didactic resource e-book allows improving the teaching and learning processes and achieving a higher academic performance in Natural Sciences in the experimental groups.

The results presented below were taken from the instrument, which consists of 15 questions on a Likert scale, in turn, the most representative questions within the research were selected.
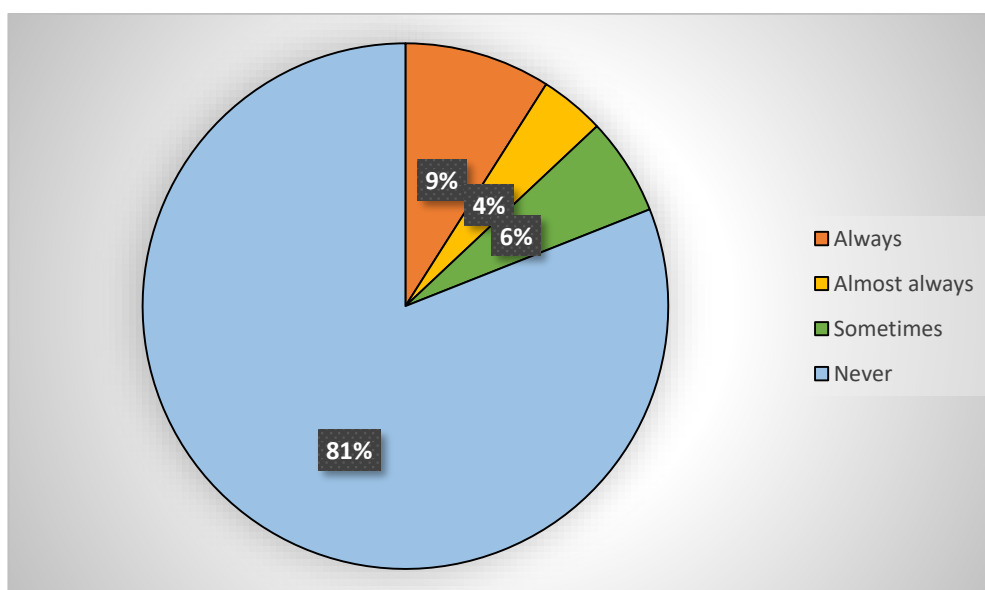
Figure 3. In all the Natural Sciences classes taught, the teacher uses technological teaching resources such as: interactive books, educational platforms, educational videos, interactive games, etc.?

Regarding the opinion of technological didactic resources, 81% mentioned that the teacher never uses this type of resources, while 9% affirmed that almost always, 6% sometimes, and concluding 4% always. The majority of students affirm that their teacher never uses

technological didactic resources such as interactive books, educational platforms, educational videos, interactive games. One of the major problems facing education today is boredom. Today's students no longer learn in the same way; faced with this situation, educators seek to innovate their classes and create fun and interactive environments.
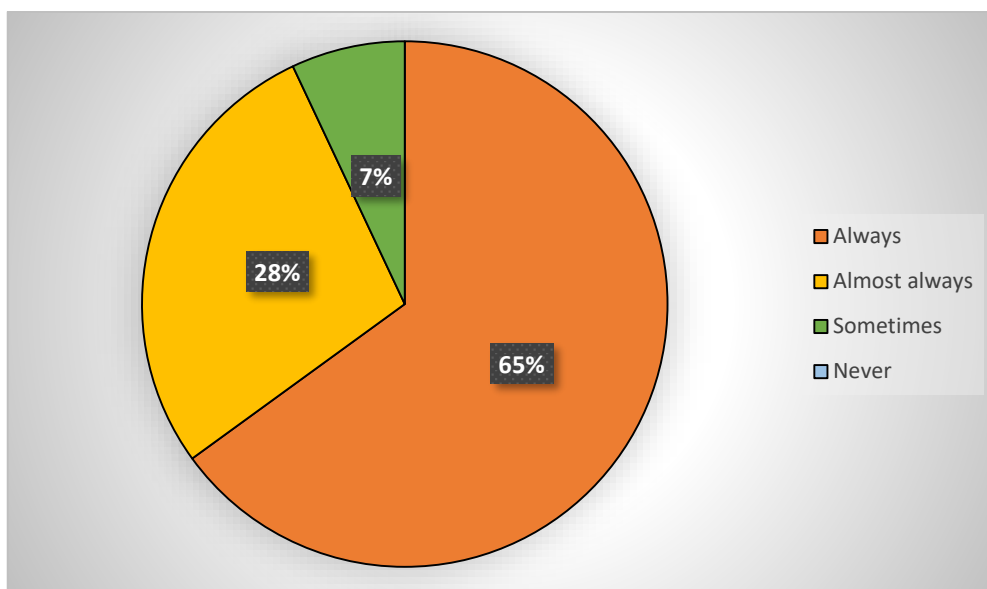
Figure 4. Do you consider that the use of gamification (a technique that uses game elements) is an innovative aspect in the learning of Natural Sciences??

Regarding the opinion of the use of gamification, 65% of students affirm that it is always an innovative aspect, 28% affirm that it is almost always and finally 17% mention that it is sometimes. Most of the students affirm that the use of gamification is an innovative aspect, for this reason it should be implemented in the educational environment, because it uses game elements that allow to involve students, motivate them to action and promote learning and problem solving.
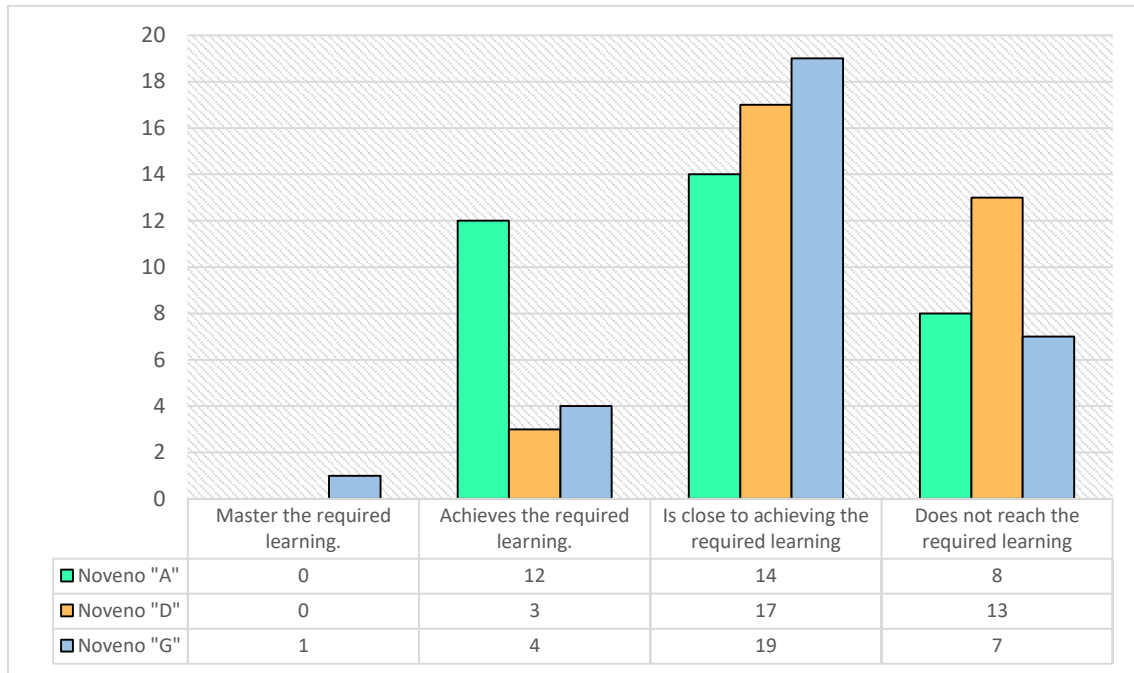
Figure 5. Post-test result without applying the e-book

The respective analysis of Figure 8 informs that 1 student masters the required learning, 19 students reach it, with a total of 50 students representing the majority are in the range of are close to reach the required learning and a total of 28 do not reach it, with these data and when comparing with Figure 9 it is concluded that by not applying the e-book students remain in the ranges close to and do not reach the required learning, which shows that the teaching and learning processes do not improve by using a traditional methodology and the use of conventional resources.
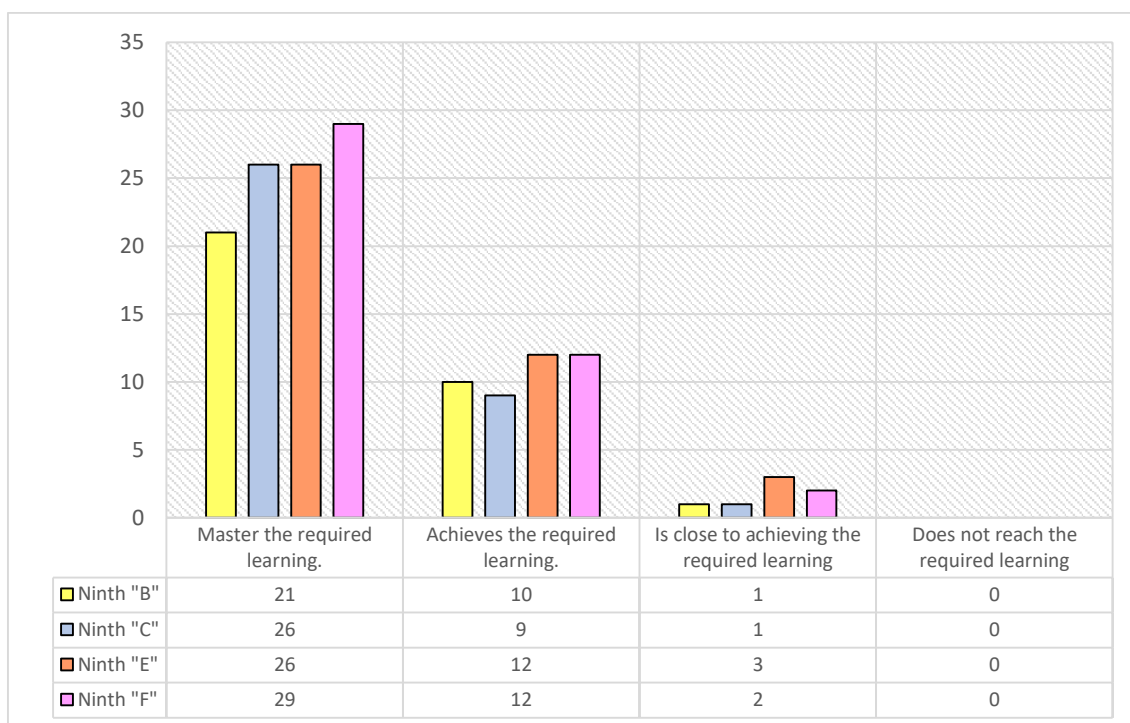
Figure 6. Post-test result with application of the e-book

In the results obtained in Figure 9 it can be identified that a total of 102 students master the required learning, while 43 students reach it, 7 students are in the range of are close to reach it and 0 students do not reach the required learning, with this premise and in comparison with Figure 8 it is affirmed that the application of the e-book as a gamified didactic resource reinforced the subject of cell, considerably improving the teaching and learning processes and therefore the academic performance.
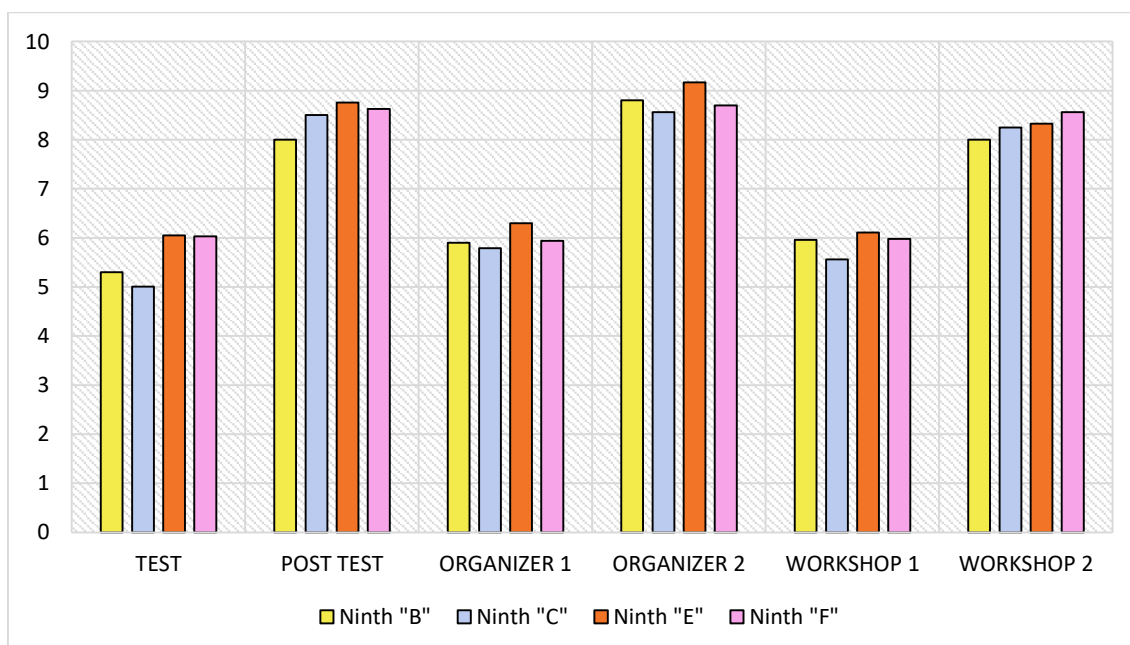
Figure 7. Results of overall averages in experimental groups Ninth B, C, E, and F
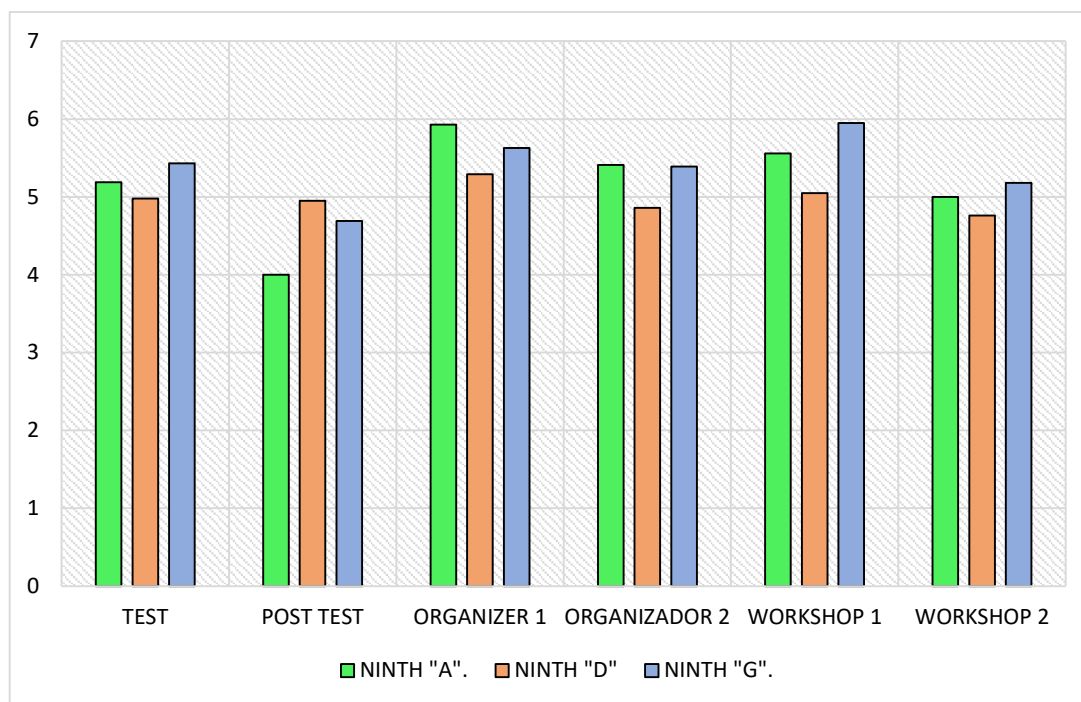
Figure 8. Results of the overall averages in non-experimental groups Ninth A, D and G

In the educational field it is necessary to implement the use of technology in the classes to make it motivating, dynamic and interactive. Based on the results obtained from the averages of the activities performed in the parallel sevens with and without the application of the e-book it can be visualized that in the case of Figure 10 used virtual tools introduced in the e-book such as: Wordwall, Canva and Liveworksheets generated an increase in their grades and facilitated the teaching and learning process of the different topics reviewed in class, generating significant learning in each of the students and resulting in better academic performance in the three activities performed compared to the non-experimental groups observed in Figure 11 in which it is represented that their academic performance did not improve and in many cases decreased.

The use of ICT in the teaching and learning process provides different benefits for students, awakening their motivation, interest and active participation in classes, and with this, their grades improve, as in the case of this research, the increase in grades is visible, thus making learning meaningful. In relation to the General Objective "to determine the influence of the e-book as a gamified didactic resource for the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía, period 2021-2022", 93% of students consider that the use of gamified didactic resources are an innovative aspect. This shows that applying this teaching methodology allows involving students and offering them a different way of learning, while 100% of teachers express that it stimulates interest, motivates and improves the understanding of the subject of Natural Sciences. Therefore, it is worth mentioning that the influence of the E-book as a gamified didactic resource is very positive and relevant since it is a tool that allows motivating, interacting and awakening student participation, among other aspects. It is a tool with numerous advantages for both the teacher and the student. On the other hand, there is very little knowledge about didactic resources with gamification tools and in the educational institution it is not widely used by

teachers, due to different factors such as lack of updating and training, which prevents the quality or educational level to be improved over time.

The interactive e-book applied to an experiential pedagogy and the use of emerging technologies in education, manages to stimulate in the student and the teacher their power of analysis in the process of research and awareness, giving a critical look to the student. Therefore, it can be inferred that the use of the E-book optimizes learning, improves academic performance and the teacher feels committed to continue preparing in the use of these technological tools that energize learning environments (Medina, 2017, pp. 34-40).

The specific objective 1 "To analyze the degree of use of didactic resources with gamification tools in the teaching and learning process of Natural Sciences" shows that 81% of students think that the teacher never uses technological resources to teach the subject of Natural Sciences, while teachers point out that 66% sometimes use technological resources to teach the subject. It can be seen that teachers use few of these tools or didactic resources, which make the student awaken greater interest in the subject, investigate, interact, generate unknowns and above all achieve a more motivating and enriching class.

The use of diverse didactic resources in the classroom allows a greater approximation to the positive standard, linking empirical reflection and scientific models. The latter are the ones that the student must internalize and adapt, in the end being part of their prudent knowledge to enrich their knowledge, the use of these attracts the student's attention and is of great importance for the development of the teaching-learning process for the same reason a teacher should always use these resources to achieve meaningful and innovative learning (Chango and Sailema, 2017, pp. 30-52).

The specific objective 2 "Configure a didactic pedagogical structure for the application of the e-book with gamification tools in the teaching and learning process of Natural Sciences" Based on the results obtained, 84% of students affirm that gamification as a technological didactic resource will improve their learning in Natural Sciences after obtaining a different, positive and full teaching experience while teachers point out in 87% that implementing this resource in their classes is a different experience, allowing to improve the teaching and learning processes in the subject of Natural Sciences.

Gamification tools provide teachers with many opportunities to ensure that students carry out self-regulated learning in an enjoyable and active way and, above all, to achieve significance in what they have learned (Zambrano-Álava et al, 2017, pp. 349-369).

The specific objective 3 "To apply an e-book based on gamification tools for the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía de Quito in the school year 2021-2022" is stated according to students in 90% consider that the application of didactic resources through educational ICT facilitate the acquisition of knowledge through the identification, observation and analysis of the facts that happen in nature and reinforce the contents of Natural Sciences while teachers indicate in 83% that ICT are important in the educational field in addition to allowing them to improve their personal satisfaction, strengthen the contents of Natural Sciences, The teachers (83%) say that ICTs are important in the educational field, besides allowing them to improve their personal satisfaction, their work performance and their relationship with the students, due to the wide range of possibilities they offer.

It is clear that just capitalizing on new technology is not enough; new educational models must use new tools, technologies and services to engage students at a deeper level and ensure academic quality (Falco, 2017, pp. 59-76).

The specific objective 4 "to determine the impact of the e-book with gamification tools in the teaching and learning process of Natural Sciences in the ninth years of the Instituto Nacional Mejía de Quito in the school year 2021-2022". It is affirmed that 83% of the students consider that the use of gamification as a technological didactic resource improves their learning in Natural Sciences after obtaining a different experience, positive and full of teaching, while 87% of the teachers are predisposed to implement this resource in their classes because it is a different experience, allowing to improve the teaching and learning processes in the subject of Natural Sciences.

It is necessary to present multimedia materials that promote reading comprehension in an interactive, fun, creative way, in an environment of enjoyment, starting from their previous knowledge, supporting them in case of difficulties without pointing out in a negative way, expressing positive reinforcements, since it depends on this that there is a potentially adapted reading society and taking advantage of new technologies (Hernández, 2016, pp. 57-63).

5. Conclusions

The impact of the application of the e-book in the ninth grade students of the Instituto Nacional Mejía was satisfactory; by implementing a new gamified didactic resource in the classroom, a great interest and curiosity to use it was awakened in the students. On the other hand, the activities developed motivated the students to learn about the different topics reviewed in Natural Sciences classes, allowing them to improve the teaching and learning processes and their academic performance, which could be seen in the averages obtained in both the experimental and control groups.

The e-book tool is a didactic resource that, due to its versatility and ease of use, has become ideal for developing the teaching and learning process of Natural Sciences in the ninth years of general basic education. In addition, it contributes from its application to activate and innovate knowledge, taking students and teachers out of the monotony by learning new technological tools and developing the gamified activities found in it, such as maze games, word searches, interactive quizzes, quiz games, quizzes, vokis, among others, in order to improve the teaching and learning processes, and thus the academic performance of students which was reflected in their grades.

Hernández (2016) state that:

> The e-book is intended for visual perception, but there are elements that complement the content, such as audio, video, animations, etc. Its objective is to provide the possibility of improving the teaching and learning processes, that is, it is necessary to present and use attractive and captivating materials, focused on the fact that today's society is inclined to digital, electronic and audiovisual, adequate content, according to the tastes, interests and needs of the student (p. 19).

The impact of the application of the e-book was positive and relevant, this was proven through the T-test of related samples when having a p (value) less than 0.05, the final decision is to reject the null hypothesis (H0) and accept the alternative hypothesis (H1), which mentions that the gamified didactic resource e-book allows improving the teaching

and learning processes and achieving a higher academic performance in Natural Sciences. In the experimental groups it was observed that the students mastered the required learning, while the non-experimental groups that were subjected to traditional pedagogical procedures kept their grades low, demonstrating that it is necessary to incorporate meaningful and lasting learning strategies.

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Intimate partner violence among college students

Violencia en las relaciones de pareja en estudiantes universitarios

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Abstract

Violence is one of the most common manifestations of subordination, domination and control of subjects over others, and in its different expressions it has been present in social interaction throughout history. Intimate partner violence is one of the classifications of this fact and the object of this study. Gender violence is characterized by the presence of this coercion in the sphere of couple relationships, being, unfortunately, the woman in a higher percentage the recurrent victim of these unequal relationships. An important cause of this fact is the subjective difference established between the sexes. It does not seem to respect age, social class or level of education, being present in various contexts and environments in which people develop. Therefore, the objective of the research was to determine the prevalence of violence in intimate partner relationships in students of the careers of

Psychopedagogy and Educational Psychology of the Universidad Central del Ecuador. This study was developed under a quantitative, descriptive, documentary and field approach. The results identified the naturalization of violence in the study population, most of whom reported having experienced violence in their relationships. The main etiology was attributed to the cultural factor, and it was found that psychological and sexual violence had the highest prevalence.

Keywords

university students, intimate partner, violence, gender-based violence, intimate partner violence.

Resumen

La violencia es una de las manifestaciones más comunes de subordinación, dominio y control de los sujetos sobre los otros, y en sus distintas expresiones se ha presentado en la interacción social a lo largo de la historia. La violencia de pareja es una de las clasificaciones de este hecho y objeto de este estudio. La violencia de género se caracteriza por la presencia de esta coerción en el ámbito de las relaciones de la pareja, siendo, lamentablemente, la mujer en un mayor porcentaje la víctima recurrente de estas relaciones de desigualdad. Una importante causal de este hecho es de la diferencia subjetiva establecida entre los sexos. Parece no respetar edad, clase social o nivel de formación, estando presente en diversos contextos y ambientes en que las personas se desenvuelven. Por tanto, el objetivo de la investigación fue el determinar la prevalencia de la violencia en las relaciones de pareja en estudiantes de las carreras de Psicopedagogía y Psicología Educativa de la Universidad Central del Ecuador. Este estudio se desarrolló bajo el enfoque cuantitativo, de nivel descriptivo, de tipo documental y de campo. Los resultados identificaron la naturalización de la violencia en la población de estudio, que en su mayoría señalan haber experimentado este hecho en sus relaciones. Se le atribuyen al factor cultural su principal etiología y se halló que la violencia psicológica y sexual presentan la mayor prevalencia.

Palabras claves

Estudiantes universitarios, pareja, violencias, violencia de género, violencia de pareja.

1. Introduction

Violence naturalized in our society generates effects, particularly in the early stages of the maturing process of human beings. Aviña refers that the impact of the practices of the different manifestations of physical, sexual and psychological violence, among others, during the development of the personality of children and adolescents is later expressed in the processes of socialization, giving rise to a distorted way of acting, communicating, transmitting feelings and thoughts towards other people (Aviña, 2021, pp. 38-39). As a consequence, these actors inserted in the family and educational centers are influenced by a violent culture that in the future will allow the reproduction of these behaviors in socio-affective relationships in different contexts. From this framework, the concern that led to the present study was what is the prevalence of violence in intimate partner relationships in students of two careers at the Central University of Ecuador? Cormos et al. point out that violence has been legitimized and even justified by the system, thus, at the macro level, economic, political and social factors influence the ideology, behaviors and attitudes of people and these have repercussions at the micro level where the victimizer reproduces and establishes power relationships through violent practices in their relationships; and the

ontogenetic level that reflects the individual typologies of the victimizer (Cormos et al., 2023, p. 154-155). From this perspective, the general objective of the research was to determine the prevalence of violence in intimate partner relationships in students of two careers at the Universidad Central del Ecuador. Therefore, it is important to analyze violence as a justified practice in all contexts and as a result of adaptation mechanisms to threatening environments that would ensure the maintenance of power over other people. Molina, et al. mention that aggressiveness can have the purpose of survival of the species in obtaining resources, but not violence that has the conscious intention of harming the other (Molina, et al., p. 47-48).

The structure of this work consists of 6 parts: the first part presents the relevance and importance of research on intimate partner violence in the university context, as well as the objective of this study; the second part points out in more detail relevant statistical data on gender violence in the Ecuadorian context, and also clarifies some related concepts: the third shows the research approach, methodology and instrument through which primary information was collected; part 4 allows to demonstrate the findings and determine the prevalence of violence in the study population; part 5 identifies the coincidences and contradictions with the results of other similar research; finally, the last part establishes the most important conclusions of the research.

2. Theoretical framework

Violence would be the natural response of human beings and animals to situations of danger, vulnerability and risk; manifesting itself as a survival resource in defense. It is intended to guarantee organic integrity, life, food or in the struggle for reproduction, gene transmission and perpetuation of the species. While violence is defined as:

> The intentional use of physical force or power, threatened or actual, against oneself, another person, or a group or community, that causes or has a high likelihood of causing injury, death, psychological harm, developmental delay or deprivation (World Health Organization - WHO, 2002, p. 5).

In other words, violence not only causes physical or psychological harm that must be covered with professional support. It can also lead to the death of the victim and thus to a vicious circle that leads to the naturalization of violent behavior.

As in the case of children who grow up in violent homes or communities, they tend to establish and internalize these behaviors. And they manifest themselves as a way of resolving disputes and tend to repeat such abusive actions against their spouses and children in the future. In the same logic, violence is conceived as a way of violating people's rights and freedoms, so much so that "violence is a human behavior, based on a scheme of unequal powers, whose intention is to subdue and control a person or groups of people to achieve the proposed objectives" (Rodney et al., 2020, p. 2). Therefore, violence, being a social phenomenon, is also anachronistic. Since man organized society, he made it in his own image and likeness, with consistent manifestations of isolation, segregation and exclusion of those who did not have the expected characteristics, with violence as a response to such diversity.

The unfortunate thing is that both men and women have replicated it over and over again, transmitting stereotypes from generation to generation. These stereotypes are the difference in clothing, roles, functions, jobs, among others. Without considering the fact that

both men and women have strong capacities as well as weaknesses, which would ratify Galton's theory of individual differences. In recent years, Ecuadorian society has been hit with a wave of reports of gender violence, including violent deaths known today as femicide. Despite being typified in the Comprehensive Organic Criminal Code, the Attorney General's Office in the Criminological and Crime Statistics Bulletin, states that between August 2014 and May 2019 in Ecuador 935 cases of femicides were recorded, being 2017, the most violent year with a record of 103 cases nationwide. Likewise, the National Institute of Statistics and Census, mentions that approximately 65 out of every 100 women suffered some type of violence (INEC,2011). It is important to consider that the data come from the official census of 2010, only in 2022 the last population census was carried out and the official results are not yet available; therefore, according to these data, violence in the country is alarming and with the same sociocultural pattern; that is, intimate partner violence occurs in most cases from men to women, this being one of the most infamous forms of violence. On the other hand, violence by women against men within the couple is a reality despite still being considered a social taboo, due to the differences that have been established between the stronger sex and the weaker sex, the latter socially attributed to women by the patriarchal system (Alfaro et al., 2022).

Gender violence within a couple's affective relationship is an evident problem and because of this, thousands of women and men worldwide have taken to the streets to demand and request government authorities to implement laws that favor equal opportunities and rights for all people without any type of exception. In this sense, it is imperative to consider the work of the educational system as a fundamental entity within the development process of a conglomerate. Education should be the means through which the transmission, production and innovation of a culture of peace is promoted, making it possible to undertake and maintain adequate interpersonal relationships.

But what causes these discrepancies between men and women? Perhaps it is the fact that anatomical differences are more important than similarities in cognitive processes. Such is the case that sex, as such, classifies mammals, including humans, based on their physical characteristics, which is not subject to debate or further analysis. The problem is established by the implications that different societies have historically given to this biological fact, describing the sexes with a series of characteristics that should be inherent to them. Consequently, it is pointed out that the "term gender is coined to establish the set of conceptions evidenced in socially established and culturally expected behaviors for men and women, thus differentiating it from sex". (Rubín, 1986, pp.103-104.) In such a way that it emphasizes the roles and functions that are assigned and socially accepted in each of the genders.

This term produces a questioning of what is supposedly characteristic of each sex, understanding that "gender not only questions the existence of a feminine and masculine essence, but the social organization of relations between sexes and the naturalization of the inequalities that are established between them" (Quintana and Rosero, 2014, p. 20). In this sense, a systematic analysis of the roles that both men and women have played in different periods of human existence is initiated, as well as the possible causes and consequences of this separation. The logical assumption of gender classification has been accompanied by that of hierarchization, a fact that in most of the world has resulted in inequality as a constant in the dynamics of the relationship between men and women. This serious phenomenon, without a doubt, evidences a predominance of the male gender in religious, political, cultural, sports, economic, family, and other spheres.

These stereotypes have been established as a paradigm that has implicitly permeated the consciousness of human beings, making their effects on society invisible, to the extent that they are the victims or victims of this hegemonic system of imposition. On the other hand, it is stated that "it is women themselves who are responsible for reproducing the patriarchal order to the extent that they transmit to their sons and daughters the model they have incorporated" (Chodorow, 1978, p.7). The fact that human beings have developed in a society constituted on the basis of these conceptions has not allowed us to intuitively perceive how these mechanisms have deepened discrimination and violence. In this context, the patriarchal system is naturalized, and even justified, by society, as pointed out by:

> The vast majority have adhered to the dominant culture and, until well into the 20th century, have not shown a critical perspective with respect to the beliefs and stereotypes about men and women constructed by the patriarchal system that has been imposed on our civilization for centuries (Errázuriz, 2012, p.11).

With this prelude, a worldwide problem is analyzed: gender violence, which refers to all types of mistreatments that occur between a man and a woman. In which the authority and dominance of one of the subjects against the other is evident. In general, based on the statistical frequency, this phenomenon is expressed by the imposition of the man taking the role of aggressor over the woman taking the role of victim.

Therefore, gender violence is present in different spheres such as: in the family, from father to daughter or mother to son, in the couple. In schools, from teachers and authorities to students; in the workplace, from bosses to subordinates, among others. Predominantly in the couple, where women have been socially and historically subjected to the authority of men through intimidation, threats and aggression. They cause physical, psychological or sexual harm, within an evident relationship of inequality and domination. In this sense, Blázquez and Moreno, (2008) state that "intimate partner violence is one of the most frequent manifestations of violence in family contexts" (p. 480). This phenomenon in Ecuador evidences alarming figures presented by the National Institute of Statistics and Census, which show that 6 out of 10 women have experienced some type of violence with a distribution of 47.1 % of single women, 85.4 % divorced, 78 % separated, 62.5 % married and 61.5 % unmarried (INEC, 2011). There is evidence of higher rates of violence among women who live with or have separated from their partners.

Another present phenomenon shows that there are high rates of violence in dating relationships, which causes adolescents and adult women to have romantic relationships before marriage, where women are victims of an unconscious system that has perpetuated violence as a way of life and whoever tries to leave this status quo must overcome difficult paths to become a subject of rights. In the same logic, there are factors that influence or participate in the situation of intimate partner violence, making some women more vulnerable, such as: cultural, age, economic, educational level, health conditions and supportive environments. For example, according to the National Institute of Statistics and Census, in Ecuador, 52.4% of women who have reported being victims of gender-based violence have a university degree, 52.8% have a postgraduate degree, 67% have no education and 70% are literate (INEC, 2011). This shows that having a higher level of education does not guarantee a life free of violence.

In other words, violence is prevalent among women with lower educational or academic levels, but it is present in more than 1 out of every 2 women at the undergraduate and graduate levels. This is evidence that gender violence is entrenched in society and that the cultural imaginary built over decades is still present in the dynamics of relationships, normalizing behaviors that have undermined the integrity of women. In the case of men who have suffered gender violence, the same society has been determined to hide it, and there are black figures in the judicial and social system. For a man, because of his historical legacy of manhood, he is more susceptible to being mocked or taunted if he tries to ask for help or denounce his victim.

Thus, a study by the National Institute of Statistics and Census at the national level obtained data on the most common types of violence in couples: 87.3% physical, 76.3% psychological and 53.6% sexual (INEC, 2011). An important factor that influences the triggering of all these types of violence in couples is affective dependence. This is characterized by the establishment of relationships with evident imbalance in which the subject, in this case the woman, is conditioned to tolerate all types of violence and is not emotionally capable of abandoning the relationship. Despite the manifestations of suffering, she tends to minimize the negative aspects of the aggressor and magnify the positive ones, reaching a situation of idealization of the partner.

Thus, the victim tends to use different cognitive fallacies to justify the aggressor's acts of aggression, even blaming herself for them. Thus, "rationalization is a very human reaction, which does not necessarily indicate a serious problem. But it begins to be when, on a regular basis, one finds oneself excusing unacceptable behavior by one's partner" (Forward, 1993, p. 21). That is, she empowers herself in her role as a victim, because she feels safe within that hell. While she continues to cede control of her life to the person who takes the role of victimizer. Therefore, it is urgent to create safe environments, of trust in the other and above all of self-love, where every human being, men and women, can complement each other in the joint construction of a more equitable and respectful society.

3. Methods and Materials

The research was conducted under a quantitative, descriptive, documentary and field approach. It was carried out in the careers of Educational Psychology and Psychopedagogy of the Faculty of Philosophy, Letters and Educational Sciences of the Universidad Central del Ecuador, whose general objective was to determine the prevalence of violence in intimate partner relationships in students of two careers of the Universidad Central del Ecuador. The first specific objective was to determine the socio-cultural influence of violence in couple relationships of university students; the second objective was to establish the frequency of psychological, physical, economic and sexual violence in couple relationships; the third objective was to analyze the level of violence in a couple relationship; and the fourth objective was to determine the relationship between the different types of violence. A total population of 263 students participated in the study on a voluntary basis and with guaranteed anonymity, of whom (94) are enrolled in the Educational Psychology and Counseling program and (169) are enrolled in the Psychopedagogy program, corresponding to (71) men and (192) women, of legal age, who declared to be in a dating relationship (224 persons), married (22 persons) and in a common-law relationship (17 persons), all of whom signed the informed consent form. The questionnaire was applied in the classrooms of the 2 careers, and authorization was requested from the career management of the 2019-2020 period.

In order to investigate the existence of violence in intimate partner relationships and determine the level of violence, the Maltrato en el Noviazgo (CMN) questionnaire by Osorio et al. 2008, which is composed of a demographic data sheet and 66 Likert-type items; 53 of them evaluate the presence and level of partner abuse, with responses ranging from 1=Never to 5=Always; 13 items reveal the possible influence of sociocultural factors, of which 8 items (type of response from 1=Completely disagree to 5 Completely agree) and 5 items (type of response from 1=No, 2=Yes and 3=Maybe). The questionnaire has an internal constancy of 0.89. The test is composed of five subscales called: E1. Psychological violence, with 28 items ($\{\alpha\}$= 0.88); E2. Physical violence, with 7 items ($\{\alpha\}$=0.69); E3. Economic violence, with 7 items ($\{\alpha\}$= 0.72); E4. Sexual violence, with 10 items ($\{\alpha\}$= 0.72); E5. Sociocultural influence, with 13 items ($\{\alpha\}$=0.68). At the end of the instrument, two types of measures were obtained: one for each of the subscales indicating the type of violence and another general one indicating the level of violence.

The questionnaire was applied, the data were emptied into a spreadsheet using Excel, and errors, possible duplications in data and identification of missing data were verified and purged, the adequately structured database was imported into SPSS where descriptive analyses were performed, The database, properly structured, was imported into SPSS where descriptive analyses were performed, presented in tables in the results, allowing the determination of the frequencies in the different types of mistreatment, as well as their respective levels, and the correlational analysis by determining the Pearson coefficient, using a significance level of 0 in this research. 01.

4. Results

The following results were obtained with respect to socio-cultural influence:

Scale	Fs	Fs%
Disagree	34	12.9
Neither agree nor disagree	222	84.4
Agree	7	2.7
Total	263	100.0

Table 1: Socio-Cultural Influence of Violence Findings

It is shown that 84% of the participants of the study answered neither agree nor disagree with respect to the statements: if you love you must forgive violence, violence is part of marriage, if you love your partner you must accept negative attitudes. These results are highly worrying, since they show that within the cultural imaginary of university students there persist ideas that allow normalizing and even justifying violence. Although the approval of these assertions is not statistically significant with 2.7%, neither is the rejection of these positions categorically expressed, since only 12.9% state that they do not disagree.

The results obtained for the sociocultural construct of violence as part of family dynamics are presented below.

Scale	Fs	$Fs\%$
No	166	63.1
Yes	87	33.1
Maybe	10	3.8
Total	263	100.0

Table 2: Findings on the socio-cultural construct of violence as part of the family dynamic

The results show that a significant 63.1% of the people surveyed mentioned that they did not come from violent families, while the remaining 36.9% mentioned having been influenced by this type of environment, where they have witnessed and experienced frequent aggressions in their homes.

The descriptive results of the different types of violence are presented below.

Scale	Economic violence		Physical violence		Psychological violence		Sexual violence	
	Fs	Fs%	Fs	Fs%	Fs	Fs%	Fs	Fs%
Some of the time	240	91.3	222	84.4	200	76.0	212	80.6
Several times	21	8.0	40	15.2	58	22.1	48	18.3
Many times	2	.8	1	.4	5	1.9	3	1.1
Total	**263**	**100.0**	**263**	**100.0**	**263**	**100.0**	**263**	**100.0**

Table 3: Frequency of violence according to its typology

The findings on economic violence show that 91.3% of the participants in the study indicated that they had ever suffered some type of control, manipulation or threat to regulate their behavior on the part of their partners, basing these behaviors on economic aspects. This is not the most predominant type of violence in this age group and this may be due to the fact that they are not married or in a situation of dependence on their partners.

The evidence of physical violence showed that 84.4% of the students affirm that they have sometimes been pushed, hit, slapped or intimidated while observing their partner hitting or throwing objects; and although it is not significant, 15.6% indicate that several or many times they have been victims of this type of behavior, which is worrisome considering that they are just in a dating relationship and that violence increases with the passage of time.

Regarding psychological violence, 76% of the students indicated that they have sometimes been victims of behaviors related to threats, blackmail, prohibitions, interrogations, insults, mockery or indifference. It is striking that 24% indicate that they have suffered this type of actions several or many times, which is unacceptable and establishes this type of violence as the most frequent in the group participating in the research.

And with respect to sexual violence, 80% of the students indicate that they have been forced to have sex or have suffered some type of abuse in this sense. It is also striking that 19.4 % indicated that they have felt affliction on the part of their partner. This makes this type of violence the second most frequent above economic and physical violence.

On the other hand, the results are presented based on the positions taken by the distribution of the answers on the types of violence, thus presenting the levels found in the researched population.

Position	Economic violence		Physical violence		Psychological violence		Sexual violence	
Position	fs	fs%	Fs	fs%	fs	fs%	fs	fs%
Very Low	0	0.00	0	0.00	28	10.65	0	0.00
Low	155	58.94	96	36.50	65	24.71	88	33.46
Moderate	0	0.00	65	24.71	81	30.80	82	31.18
High	90	34.22	78	29.66	67	25.48	72	27.38
Very High	18	6.84	24	9.13	22	8.37	21	7.98
Total	**263**	**100**	**263**	**100**	**263**	**100**	**263**	**100**

Table 4: Levels of violence according to its typology

Regarding economic violence, 58.94% of the responses are accumulated in a low position, which indicates that economic violence is not the main type of violence in the group studied. Once again, the characteristics of the sample with which the present study was developed, students at the university level, share to a large extent the fact that they still live under the economic dependence of their families, so that many of the respondents still do not live together and do not share their expenses with their partners. Likewise, 41.06% of the responses are accumulated in the high and very high positions; being that these behaviors are characterized by limitations and prohibitions that are made to the freedom of the couple in aspects such as shopping, studies and spending money. These percentages are worrisome and call upon the authorities, the University Welfare Department and teaching staff to address this problem in a technical and specialized manner.

On the other hand, the results of physical violence show that the accumulated relative frequency between moderate, high and very high reaches 63.50 % of the answers, which is an alarming figure that shows the presence of shouting, pushing, throwing objects, intimidation by hitting walls or doors and direct aggression accusing injuries. Likewise, psychological violence shows that the relative frequency accumulated between the moderate and very high positions reaches 64.64%. The results are alarming, since this type of violence damages people's self-esteem and is usually a preliminary step to physical violence.

This includes behaviors such as teasing, social and family prohibitions, blackmail, social exposure to embarrassing situations, imposition of will, comparison with another person. Also, limitation of activities related to personal interests, threats against the safety of oneself and family members, persuasion to commit crimes, interrogations on personal and intimate topics, intimidation.

Finally, sexual violence with 66.54% of the results show that it is the most prevalent among the types of violence studied. It presents behaviors such as: criticism of sexual performance and behaviors, threats of abandonment, forcing to maintain relations, imposition of

shameful or degrading sexual activities, manipulation of sexual organs.   Regarding the correlation between the types of violence, the results show that:

			Economic violence	Physical violence	Psychological violence	Sexual violence
Spearman's rho	**Economic violence**	Correlation Coefficient	1.000	.576[**]	.452[**]	.392[**]
		Sig. (2-tailed)	.	.000	.000	.000
	Physical violence	Correlation Coefficient	.576[**]	1.000	.511[**]	.373[**]
		Sig. (2-tailed)	.000	.	.000	.000
	Psychological violence	Correlation Coefficient	.452[**]	.511[**]	1.000	.414[**]
		Sig. (2-tailed)	.000	.000	.	.000
	Sexual violence	Correlation Coefficient	.392[**]	.373[**]	.414[**]	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	263	263	263	263

Table 5: Correlation between types of violence

Although the results in both level and frequency show that economic and physical violence are not the most prevalent in this population, they are not absent. Furthermore, considering that they are in the dating period without cohabitation, these findings become alarming, since a moderate statistically significant linear relationship was found between the factor economic violence and physical violence (r_s=0.576, $p < 0.01$). The correlational analysis yielded a statistically significant moderate linear relationship between economic violence and psychological violence (r_s=0.452, $p< 0.01$). These results allow us to interpret that economic violence is a subscale of psychological violence, since threats and blackmail are habitual behaviors.

Also, a statistically significant low linear association was found between economic violence and sexual violence (r_s=0.392, $p < 0.01$), which may be due to the fact that in the case of women who feel some type of economic dependence are more vulnerable to tolerate sexual requests and physical aggression from their partners. In the same framework, a statistically significant moderate linear relationship was found between the factor physical violence and psychological violence, evidencing a moderate positive association (r_s=0.511, $p < 0.01$).

Both the classic literature and the findings of global studies show that physical violence is always accompanied by shouting, insults, threats and intimidation; therefore, aggression not only affects the physical integrity of the victim, but also his or her affective-emotional

integrity. Undoubtedly, the violation of the freedom, rights and autonomy of the victims of sexual violence affects in a very important way the set of dimensions that make up the personality of the assaulted person, which is evidenced by the finding of a statistically significant moderate linear relationship between psychological violence and sexual violence (r_s=0.414, $p < 0.01$).

5. Discussion

The romantic idealization of love as a cause of social factors influences the development, actions and thoughts of people in a natural way. It is interesting to note that, of the 4 types of violence, 155 people reported having suffered a low level of economic violence, while psychological, physical and sexual violence are the factors that are located between moderate to very high levels of violence, finding a clear sociocultural influence, since the vast majority of those investigated affirm, among other indicators, that alcohol releases the abuser from responsibility and that after marriage there is no more violence.

The population studied indicated that specifically in the psychological area, their partners, after a violent fight, tend to be attentive and affectionate, in addition to giving gifts and details, typical behavior of people who do not control their anger, as explained by Walker 1984, in the cycle of violence. It is common that once the couple enters this dynamic, the degree and consequences of the violence suffered increase. According to the study by Hidalgo and Valdés 2014, psychological violence prevailed, followed by physical and sexual violence; in the same way they stated that sexual violence is not expressed in a remote manner, but always includes a high dose of physical and psychological violence; closely related to the population investigated.

In the sexual area, according to studies conducted in the university population by Osorio and Ruiz 2011, they found considerable levels of sexual violence, which is consistent with the study conducted in Puerto Rico by Toro and Rodriguez 2003. In relation to the results of the present research, it is evident that the population of university students (from the careers of Psychopedagogy and Educational Psychology and Guidance) present considerable rates of sexual violence, being that those investigated refer that their partners touch parts of their bodies without their consent and ask them to perform sexual acts that they do not like and with which they do not agree.

As for physical violence, it is manifested through hitting, pushing, shaking, kicking, suffocation or burns. The study population manifests that they have been occasionally hit by their partner, presenting bruises / scars, screams when they argue, have been threatened with weapons or sharp objects, or have been shaken. In the same line, Sanhueza 2016 explained that the relationship between the main social factors and types of violence yielded that the lack of family communication is related to violence: physical, psychological, and economic. In the case of the present research, there is a moderate relationship between physical violence, with economic violence and psychological violence, and although low with sexual violence.

In terms of economic violence, the respondents mentioned that their partners forbid them to study or work, tell them what to buy, ask for money or valuables. According to Sanders and Shnabel (2004, cited by Vélez and Meireles, 2017) "it is important to understand that not having one's own income compromises economic and human rights, as well as the autonomy to decide the course of one's own life" (p.4).

That is, the roles assigned at the social level have established that men provide economic sustenance to women, generating the idea that, whoever brings money home is the authority that decides what has to be done and even eat or dress, which brings with it for women a low self-esteem and lack of autonomy for the achievement of their goals. In the 1993 United Nations Declaration on the Elimination of Violence against Women, it was pointed out for the first time that one of the consequences of violence against women is the fact that they have little access to legal, political, social, and economic spheres. According to the above "living in a country that discriminates against women in access to land and other assets is a strong risk factor related to domestic abuse" (Heise and Kotsadam, 2015, cited by Vélez and Meireles, 2017, p.3).

One of the attributed variables that is frequently handled in the literature as protective of social prejudice and stereotypes is the academic level of individuals. In the present research, the level of studies is high, since one hundred percent of the population attends the third level; however, a large majority of the population mentioned being in complete agreement with phrases such as The person who abuses when taken is not responsible for his actions or thinking that, with marriage, his partner will change, which is related to the study conducted by Osorio with homosexual couples, who points out that violence is naturalized and not identified, and the most serious thing is that the abused people think that they are responsible for the situation (Osorio,2011).

All this coincides with the explanations of González and Echeburúa, who state that among the risk factors in the dynamics of violence in young couples are the violence experienced in the school context and traditional attitudes regarding gender roles (González and Echeburúa, 2008). Another factor that cannot go unnoticed is the existence of social influence, adolescents, and young people in constant search of approval from their peers, which motivates them to engage in behaviors that are considered to be accepted.

6. Conclusions

At the end of the investigation, the following conclusions were reached:

- Violence is socially generalized, in various dimensions of human activity; the economy, education, the family and in couple relationships it has become naturalized. 61.22% of the participants' responses allow us to attribute this phenomenon to sociocultural influence. It is stated that behaviors observed since childhood are adopted as normal. In the 21st century, in a largely urban society and with a population with access to higher education, it has been observed that the type of interrelationship between parents, alcohol consumption, socioeconomic class and the set of beliefs rooted in the culture influence the behaviors that characterize the interrelationship present in couples.
- In addition, it was determined that there is undoubtedly violence in this group, unfortunately present in its different modalities, the most prevalent with 24% psychological violence, in second place 19.4% sexual violence, 15.6% physical violence and 8.8% economic violence. The fact that most of the couples do not live together is evidence that there is still no economic dependence, so this type of violence is the least present in this population, but it is striking that in a dating situation psychological and sexual violence is so high. Threats, blackmail, manipulation and prohibitions are the most frequent behaviors.
- Among the participants who indicated that they had suffered situations of violence by their partners in relation to the level of violence in intimate partner relationships

is a current problem among university students, it is found that 64.89% of the responses of the participants correspond to levels between moderate, high and very high, in three of the four types of violence: physical violence, psychological violence and sexual violence; although no differences are found between the three types of violence, in terms of sexual violence the highest rate is observed with 66.54%. In relation to economic violence, a rate of 41.06% was found, which is still a cause for concern.

- On the other hand, economic violence presents a moderate significant correlation with physical violence, which may be due to the fact that if there is some type of economic dependence, people are more vulnerable to tolerate physical aggressions. Likewise, there is a moderate significant correlation between psychological violence and physical violence, because verbal aggressions such as insults, shouting, threats and others are linked to physical violence.

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Feminism in Equatorial Guinean literature: an approach to the socio-educational study of the novel Ekomo by María Nsue Angüe

El feminismo en la literatura ecuatoguineana: una aproximación al estudio socioeducativo de la novela Ekomo de María Nsue Angüe

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Abstract

The purpose of this article is to study feminist thought in Equatoguinean literature, based on an approach to the socio-educational study of the novel Ekomo by María Nsue Angüe, the first novel written by a woman in the history of Equatoguinean literature. The research problem focuses on the lack of academic dissemination of the study of feminist thought in the novel Ekomo within the literature of Equatoguinean literature in particular and in the literature of the Hispanic world in general. However, it is important to study the feminist perspective of this novel to know its socio-educational content in order to promote socio-cultural changes that allow a more equitable and inclusive society. The method used for this analysis is descriptive, based on qualitative methodology that has allowed us to analyze the data obtained from the questionnaire conducted, and whose main results show that the novel Ekomo is feminist, because it reflects the inconsistencies of male discourses, as well as the injustices and asymmetries of gender relations in Equatoguinean society.

Existing research on this novel does not focus on pointing it out as a feminist work because of its socio-educational component for the Equatoguinean society. Therefore, the solution we propose to the problem is to study this novel as feminist because it helps to claim from literature the abandonment of aberrant cultural practices. Therefore, it is essential that a work of this nature be more widely disseminated from the academic field so that its pedagogical content is known.

Keywords
Education, emancipation, feminism, literature, woman, novel.

Resumen

El propósito de este artículo es estudiar el pensamiento feminista en la literatura ecuatoguineana, a partir de una aproximación al estudio socioeducativo de la novela *Ekomo* de María Nsue Angüe, la primera novela escrita por una mujer en la historia de la literatura ecuatoguineana. El problema de investigación se centra en la poca difusión académica que tiene el estudio del pensamiento feminista de la novela *Ekomo* dentro de la literatura ecuatoguineana en particular y en general de la de la literatura del mundo hispánico. Sin embargo, es importante estudiar la perspectiva feminista de esta novela para conocer su contenido socioeducativo para impulsar cambios socioculturales que permitan una sociedad más equitativa e inclusiva. El método utilizado para este análisis es el descriptivo, fundamentado en la metodología cualitativa que ha permitido analizar los datos obtenidos con el cuestionario realizado, y cuyos principales resultados ponen de manifiesto que la novela *Ekomo* es feminista, porque refleja las incoherencias de los discursos masculinos, así como las injusticias y asimetrías de las relaciones de género en la sociedad ecuatoguineana.

Las investigaciones existentes sobre esta novela no se centran en señalarla como una obra feminista por su componente socioeducativo para la sociedad ecuatoguineana. Por eso, la solución que proponemos al problema está en estudiar esta novela como feminista porque ayuda a reivindicar desde la literatura el abandono de prácticas culturales aberrantes. Por tanto, es fundamental que una obra de esta naturaleza tenga más difusión desde el ámbito académico para que se conozca su contenido pedagógico.

Palabras clave

Educación, emancipación, feminismo, literatura, mujer, novela.

1. Introduction

Following the importance of literature as an object of study of gender relations, this article focuses on the analysis of the emergence of feminist thought in Equatoguinean literature. For this purpose, the work Ekomo, written by Maria Nsue Angüe, a socio-educational novel that can be considered pioneering because it presents the struggle of women to break out of the patriarchal yoke in which they find themselves, has been chosen. To understand the role played by feminism in Equatoguinean literature, it is convenient to start from what this literature really is in which, since its beginnings, it has been led mostly by men. However, the incursion of the novel Ekomo in Equatoguinean literature has led to the emergence of a generation of women writers committed to activism and the demand for the dignified treatment of women.

Literature has been the mirror through which the Equatoguinean woman has denounced her situation within the culture, therefore, the abandonment of cultural practices that vilify women, as is the case of polygamy, levirate, gender violence, lack of consideration, dowry, etc., is a clamor that can be seen in almost all Equatoguinean women writers to detoxify themselves from the patriarchal education they have received and thus promote other values based on equality.

The problem posed in this research lies in the scarce academic dissemination of the study of feminism within Equatoguinean literature, where the socio-educational approach of the feminist novel Ekomo has been overvalued. Although some researches have been done on this novel, they devote little interest in the study of this novel from the feminist perspective because firstly, it shows the difficulties of women in the Equatoguinean society, and secondly, it proposes solutions for the emancipation of women, hence its socio-educational character.

Given this approach, this article defends the thesis that feminist thought appears for the first time in Equatoguinean literature in 1985 with the publication of the novel Ekomo by Maria Nsue Angüe. This work marked a before and after in Equatoguinean literature. A before because there are no female referents who have decided, at least from the novel, to reflect and plant a resistance and denunciation on the situation of the Equatoguinean woman within their culture. And it marks an after because it laid the foundations for many women like Trifonia Melibea Obono, Guillermina Mekuy, Anita Hichaicoto Topapori, among others, to continue writing feminist literature, thanks to its socio-educational content that allows to promote substantial changes to improve the situation of women.

In this article we want to answer the following questions: Is there an influence of feminism in Equatoguinean literature? Is Ekomo a feminist novel? What is the feminist impact of the novel Ekomo in Equatoguinean literature? Is there a socio-educational content in Ekomo?

To answer these questions, we will proceed to a review of the theoretical framework established for Equatoguinean literature. The main text guiding our analysis is the novel Ekomo, since it constitutes the epicenter from which the emergence of feminism in Equatoguinean literature is studied. Beforehand, it should be made clear that one of the difficulties involved in this type of research has to do with the lack of a theoretical and epistemological foundation on this subject, which is a real obstacle for any researcher. To this must be added the fact that gender studies are gradually emerging in Equatoguinean

society, all with the aim of breaking the cultural barriers that prevent the empowerment of women, for which literature has been the first means of expression used by many of these women who want to see a free, educated, independent and empowered woman.

As will be seen in the section where detailed information on the methodology employed is given, this is not a quantitative study and therefore we do not provide empirical data on this issue. We are dealing with a qualitative methodological design based on the descriptive method to analyze and better understand our study phenomenon based on the existing literature on the subject. In this sense, it should be specified that this is a research with a descriptive scope of qualitative type very frequent in Social Science research because "it seeks to conduct studies of a phenomenological or constructivist narrative type, which seek to describe the subjective representations that emerge in a human group about a certain phenomenon" (Ramos-Galarza, 2020, p. 3). Therefore, the theme of the emergence of feminist thought in Equatoguinean literature is circumscribed within this type of descriptive research.

Regarding the structure of this article, it is divided into the following parts: the first part presents a brief introduction of the research problem; the second part presents a review of the literature on the object of study; the third part is a defense of the main thesis of the article; the fourth and fifth parts present the methodology used and an analysis of the results. Subsequently, the conclusions are presented, showing the results, limitations and future lines of research. Finally, the bibliography used in this article appears.

2. Literature review

In order to understand the reasons why feminist thought finds a niche in Equatoguinean society, it would be appropriate to present a succinct description on the situation of women in this context. In this sense, it can be noted that in Equatoguinean society, "gender relations are still perceived from the point of view of male domination" (Pérez-Armiño, 2018, p.30). This domination established by the patriarchal system is what makes many women begin to question it, to highlight that it is not a natural fact but a social construction naturalized by men to oppress or subordinate women.

When it comes to laying the foundations of the patriarchal system, as it has been defined within the feminist movement, it is held that:

> Patriarchy is a political system that institutionalizes the sexist superiority of men over women, thus constituting a structure that operates as a mechanism of domination exercised over them, based on a biologicist foundation. This ideology, on the one hand, is constructed taking the biological differences between men and women as inherent and natural. On the other hand, it maintains and exacerbates these differences by postulating a dichotomous structure of reality and thought (Vacca and Coppolecchia, 2012, p. 60).

This institutionalized political system, which exalts above all the superiority of men, is brutally exercised in many places. In the Equatoguinean context, it manifests itself, for example, in polygamy, dowry, levirate marriage, gender violence, etc. In this regard, Bituga-Nchama (2020a) asserts that "the Equatoguinean woman is a product of her culture, which means that the way she is, feels, speaks or acts has been learned through a system of socialization established for her sex" (p. 148). All this allows many women, as in the case of Maria Nsue Angüe, to decide to question the culture and show how incoherent it is as far as women are concerned.

In this order of ideas, it should be pointed out that in all cultures there are a series of traits that construct a distorted image of women. Among these are:

> 1) an ideology and its expression in language that explicitly devalues women by giving them, their roles, their work, their products and their social environment, less prestige and/or power than that given to men; 2) negative meanings attributed to women and their activities through symbolic facts or myths [...]; 3) structures that exclude women from participation in, or contact with, the spaces of the highest powers, or where the spaces of greatest power are believed to be, both economically, politically and culturally.]; 3) structures that exclude women from participation in, or contact with, the spaces of the highest powers, or where the spaces of greatest power are believed to be both economically and politically and culturally; 4) dichotomous, hierarchical and sexualized thinking, which divides everything into things or facts of nature or culture, and which, by placing men and the masculine under the second category, and women and the feminine under the first, establishes men as the parameter or paradigm of what is human, while justifying the subordination of women in terms of their supposedly natural roles (Facio and Fries, 1999, pp. 21-22).

The argument presented by these two researchers makes the situation of the Equatoguinean woman a necessary demand for equality. The Equatoguinean woman is an activist, not conformist for the place that culture expects her to occupy. All this makes literature, through its different literary genres, the workhorse of many Equatoguinean women who devote themselves to the world of letters to express their emotions and concerns about their future and that of their offspring. All the dissertation presented ut supra, allows feminist thought to emerge within Equatoguinean literature. However, in order to understand the impact of feminism as a political and social theory in Equatoguinean literature, it is useful, in this regard, to offer a summary description of the nature of what is meant by Equatoguinean literature.

Generally speaking, Equatoguinean literature is a literature written in Spanish, by Equatoguinean writers. In other words, it can be said that:

> The literature of Equatorial Guinea develops a theme very much in line with the surrounding daily reality (...) The objective of Guinean writers is therefore summarized in giving an account of the reality lived by themselves and their compatriots throughout the history of their country. It is a literature that is at once genre, historical and social. Indeed, most Equatorial Guinean writers make use of the rich culture of their country to develop their artistic work; for them, it is a matter of vindicating their traditions in the face of the recently arrived Western culture introduced into the country with the Spanish colonization (Otabel Mewolo, 2003, p. 121).

As a result of the above, we are dealing with a literature produced in Africa, but in Spanish. Equatoguinean writers produce literature based on their culture and history, developing themes of social impact. According to Mbaré Ngom (2003), this type of literature written in Spanish is born out of the:

> Encounter of two cultural traditions, the first, black-African and ungrammatical, has its roots in the Bantu tradition and is nourished by orality in its different modalities, and has more flexible and pragmatic expressive and aesthetic norms. As for the second, European, imported and imposed, it is based on writing and its rigid norms. African literature of Castilian expression, therefore, is based on these premises, among others, while at the same time it participates in both cultural traditions in its perception and representation of reality. Likewise, the African cultural project born in these circumstances is marked by a certain cultural hybridity (p. 3).

For Ndongo-Bidyogo (1984), one of the greatest exponents of Equatoguinean literature, the literary creation of Equatorial Guinea has gone through three periods: "From the Spanish colonization to the present, three periods have marked the evolution of the literature of Equatorial Guinea: the colonial period, the period of "the years of silence" and the period after the first dictatorship, that is, that of Francisco Macias Nguema" (pp. 28-29).

However, the subject of the situation of women had not had a special dedication since the publication in 1953 of the first Equatoguinean novel written by Leoncio Evita Enoy, with the title Cuando los combes luchaban (When the combes fought). For this very reason, it is somewhat complex to speak of a literature with an approach anchored in feminist thought. The first Equatoguinean novels were written by men, which may have had an influence on the fact that the theme of the situation of women in Equatorial Guinea is not so recurrent. Therefore, if the novel Cuando los combes luchaban is the first novel written by a man, Ekomo is the first novel written by a woman.

Within the analysis of Equatoguinean literature, there are not many female referents. An example of this is that the Anthology of Equatoguinean Literature, a work published in 1984 by Donato Ndongo Bidyogo, is full of Equatoguinean writers, where the only woman is Raquel Ilombé. All this is a sign that, for a long time, women were excluded from the field of literature, which would explain the late incursion of Maria Nsue Angüe in the world of literature. In order not to be contradictory in our argument, it should be noted that "women were absent in Guineo-Ecuadorian literature until 1978, when Raquel Ilombé's collection of poems Ceiba was published, making her the first Guineo-Ecuadorian woman to publish a literary work" (Bituga Nchama et al., 2022, pp. 137-138). Although Raquel Ilombé is the first woman to dedicate herself to literature in Equatorial Guinea, she did not focus on women's issues nor did she dedicate herself to the novel but rather to poetry. An example of this is in the publication of her collection of poems Ceiba in 1978..

To address the emergence of feminism in Equatoguinean literature, it must be recognized that there is no theoretical framework on feminist literature in Equatorial Guinea, probably due to the scarcity of studies on the impact of women in Equatoguinean literature or on gender relations in this society. In addition to this, also the diffusion of feminist thought in this society is still incipient, hence the gender perspective is not yet incorporated as normative in the gender relations that occur in this political community. For this reason, feminist literature is still in an initial phase, but it already has a road already traveled, it only remains to continue to maintain it in order not to go backwards. In fact, there are researchers who consider that:

> The feminist ideology currently rooted in Equatoguinean society is forging a new consciousness where women have begun to question this education they receive from their mothers or society itself to become

> submissive, being only wives and mothers, exercising only the maternal function and attending to their husbands (Bituga-Nchama, 2020a, p. 157).

Based on the above approach, it is undeniable that there is a feminist literature in Equatoguinean society that highlights the struggle of women for equality, paying tribute to one of the goals of feminism, which is to:

> A political theory and practice articulated by women who, after analyzing the reality in which they live, become aware of the discriminations they suffer for the sole reason of being women and decide to organize to put an end to them, to change society. (...) Feminism is articulated as a political philosophy and, at the same time, as a social movement (Varela, 2018, p. 14).

Feminist thought is a political and social solution to the problems of discrimination suffered by women all over the world for the mere fact of being women. Therefore, in Equatoguinean literature, these demands for equality are embodied in Equatoguinean women writers, although what prevails most is the struggle against the patriarchal culture that suffocates them and with which they have to deal. Therefore, the Equatoguinean feminist literature that begins with the novel Ekomo by María Nsue Angüe should be understood as a literature whose fundamental objective is the constant struggle for equality, freedom, dignity, etc. The emergence of feminist thought in Equatoguinean literature has made it possible to:

> Rethink the literary phenomenon from a different perspective, since the text is seen as a space of representation of socio-affective relations between the sexes in which gender roles and ideals of gender identity are also reproduced through the assignment or labeling of gender (Vivero-Marín, 2009, p. 69).

Until now, Equatoguinean literature has been presented from the male point of view, however, from the perspectives of Maria Nsue Angüe, through Trifonia Melibea and Guillermina Mekuy, Equatoguinean literature has given women a voice, because the narrative no longer presents the standards of male characters fighting for their freedom and that of their people, but now it is about seeing how female characters have to confront the scourge of the patriarchal system that imposes stereotypes or gender roles that leave women in a status quo.

In the early stages of Equatoguinean literature, there is no feminist thought, meaning that there are women who put or reflect the plight of the Equatoguinean woman, who, out of respect and compliance with cultural norms, has to do what they stipulate, whether she wants to or not. The emancipation of women is therefore an absent clamor in literature that was born precisely with Leoncio Evita, author of the novel Cuando los combes luchaban..

Within Equatoguinean literature, there is a group of women who have dedicated themselves to literature, each one within her literary genre. In addition to the writers already mentioned ut supra, it is worth remembering: Cristina Dyombe Dyangani and Trinidad Morgades Besari. Of all these women, the one who laid the foundations of the feminist novel in Equatoguinean literature is undoubtedly Maria Nsue Angüe, without detracting from the merit of the others. Grosso modo, the origins of feminist thought in Equatoguinean literature appear with the publication of the novel Ekomo, before that, we only find literature that highlights the longing of men to return to pre-colonial Africa, or that

vindicates the independence of African peoples, always highlighting the role of men. Although as we have indicated ut supra, before Ekomo there were no other novels written by women that focused on the role of women, but we do find women writers such as the aforementioned Raquel Ilombé who dedicated herself to poetry and not to the novel, nor did she focus on women's issues.

Feminism is a movement that criticizes society and, therefore, seeks above all equality between women and men. Literature is a space that has allowed women to express their emotions and experiences, but also to be very critical of the patriarchal system that oppresses them, as is clearly evident in the novels written by Equatoguinean women, which, although at first glance do not seem feminist, have a strong feminist component. This is to say that the feminist movement has allowed the politicization of many social issues that were already naturalized.

The reasons why it is possible to argue that feminism exists in Equatoguinean literature since the publication of the novel Ekomo are more than obvious. Probably the most visible is that all these writers focus on the role of women in their society and culture, on inequality, gender violence, forced marriage, sexual exploitation of women, among other things. All these issues are part of the feminist movement and although some of them do not declare themselves feminists, they are actually feminists, at least according to the way in which they present the situation in which many of them live. Therefore, we agree with Montero (2006) in maintaining that:

> Feminism is also critical thinking. Its objectives of transformation require action in the field of ideas in order to subvert deep-rooted cultural codes, norms and values, as well as the symbolic system of interpretation and representation that makes sexist behaviors and attitudes, which privilege the masculine and patriarchal power relations, appear normal. In this context, feminism disarticulates the discourses and practices that try to legitimize sexual domination from science, religion, philosophy or politics (p. 171).

The influence of feminist thought in Equatoguinean literature is practically evident in all Equatoguinean writers, both those who consider themselves feminists and those who do not declare themselves as such. However, this impact is most visible in the novel Ekomo, which constitutes our object of study because it marks the path to be followed later by other women writers.

3. Ekomo: a feminist novel. Thesis defense

In Equatoguinean literature, it is atypical to find a novel with the characteristics of Ekomo. As has been made clear above, Equatoguinean literature in general, is represented mainly by men, women who dedicate themselves to literature are very few. However, it must be recognized that it is a number that is growing exponentially. Therefore, it should be noted that the number of women writers is growing exponentially:

> Focusing on literature written by Guineo-Ecuadorian women, the names of Raquel Ilonbé, Trinidad Morgades Besari and the promising young Guillermina Mekuy are of interest. But the greatest triumph of women's voice so far is the publication of Ekomo, a novel written by María Nsue Angüe (Álvarez-Méndez, 2010, p. 174).

As has been pointed out, Ekomo is the first novel written by a woman, but that does not mean that it can only be considered a feminist novel. Ekomo is, first of all, a women's novel that belongs to what is pejoratively called women's literature, as if literature had sex/gender. For methodological reasons, it is necessary to offer a clear distinction between the terms: women's literature, women's literature and feminist literature. According to Vicente Serrano (1991):

There are those who, when they speak of "women's literature", refer to texts written only by women, and by "women's literature", they allude to texts written both by women who write as such, and those written by men who exhibit in their writing characteristics of "women's literature" (p. 72).

Feminist literature refers to literature in which both women and men use this means of expression to highlight the difficulties faced by women simply because they are women. In feminist literature, the topics are usually related to labor inequality, sexual violence, abortion, glass ceilings, etc. Therefore, one of the objectives of the feminist novel is to reflect male dominance over women. In this regard, Nsue Angüe (1985), details it as follows:

One day Ekomo wanted to kill me. I don't hold a grudge. The poor guy was desperate. [...], and taking the plate he had put under the bed so that the liquid would fall into it, he approached me with the purpose of pouring it on my face. By chance I happened to be lying on my side with my arms folded over my cheek, and the liquid touched my face but little, while the rest fell on my arms (p. 170).

In this sense, there is an open repertoire of themes that are circumscribed around women, whose objective in most cases is to demand cultural, social and economic changes that do not denigrate women. Reference should also be made to the fact that:

Feminist studies of women's writing start from the assumption that all writing and, by extension, all cultural production is marked by gender, but they also start from the conviction that, in the case of women's production, it is a "bitextual" dialogue between the male tradition and the female tradition, since women's literature takes place within the context of dominant male discourses rather than outside of them. For this reason, all women's writing has a double voice (Fe, 1996, p. 170).

In this regard, the argument that we present here is forceful, since we consider that the novel Ekomo is, firstly, a feminine novel because it is written by a woman, and, secondly, it is feminist because it demands changes for women within a culture that it considers oppressive. The information that we can give a priori is that it is a novel set in the:

Guinea from the colonial era, in the late 1950s or early 1960s, denounces the alienation and the feeling of inferiority instilled by the men of the tribe. They define women as people without much sense, with no conscience of fidelity, who have to marry to be protected, who have to surrender with fear to rituals of sexual encounters with their elders, etc. Moreover, when they marry, they belong to the husband's tribe and therefore must abandon their homes and customs, even their hobbies, as in the case of the protagonist who danced under the name of Paloma de Fuego (Dove of Fire). They are made to feel as unimportant elements, without voice and presence, in that environment in which men are the

> ones who have decision-making power over all aspects of everyday life, including marriage, motherhood, polygamy or the situation of widows. (Álvarez-Méndez, 2010, p. 175).

The last aspects of this quotation are the ones that call our attention, because seen from a feminist perspective or from the point of view of gender relations in Equatoguinean society, this novel is a pioneer for being the first to highlight the situation of women within their culture. Due to the little diffusion that Equatoguinean literature continues to have within the literature of the Hispanic world in spite of the great efforts that are being made, the novel Ekomo has not been very little studied. There are a few studies that have disseminated or made it visible. However, the exploration of the feminist content is very little studied, which can be understood if one takes into account that gender or feminist studies are very little developed in Equatoguinean society, the tonic is the patriarchal structure that sometimes obscures things and naturalizes certain customs, especially those that have to do with women.

At this point, it would probably be appropriate to ask two questions that seem inescapable for the understanding of this article: Is there a socio-educational component in the novel Ekomo to be considered important for Equatoguinean society and literature? What is there of feminism in the novel Ekomo?

To answer this question posed, it is appropriate to evoke the thought of Dos Santos (2011), because we consider it crucial for a better understanding of this feminist thought that is observed in the novel Ekomo. According to the aforementioned author:

> Feminism is reflected in literature from a reflection on the role of women in society and also through the uneasiness experienced by the woman who writes, that is, on the difficulties of finding her own voice in a world, that of literature, reserved for the male sex, in which women are the object but never the subject of their own enunciation [...] feminist literature is an example of a committed discourse, understood as a type of literature that expresses the problems of a society from a fictional story, which may or may not be plausible (p. p.). feminist literature is an example of committed discourse, understood as a type of literature that expresses the problems of a society on the basis of a fictional story, which may or may not be plausible (p. 5).

The above approach fits and revitalizes the objectives of a feminist novel such as Ekomo, because it presents a series of obstacles that the protagonist Nnanga goes through, a woman who is torn between culture and modernity, and who must fight to break many myths that condemn her for being a woman.

Indeed, Ekomo is published at a time when it seemed unthinkable that a woman could write a novel in Equatorial Guinea, since there were already some male referents, well positioned and consolidated within the Equatoguinean literature in terms of literary production, such is the case of Leoncio Evita, author of Cuando los combes luchaban (1953), and Una lanza por el boabí (1962), by Daniel Jones Mathama. However, due to the situation in which Equatoguinean women lived, the conditions were ripe for the appearance of a novel that emphasized women's issues.

Before going into the study of this novel from a feminist point of view, it is useful to offer first a short biography of Maria Nsue Angüe, the author of Ekomo. According to some research, Nsue Angüe was born in:

> The province of Rio Muni, in what was then Spanish Guinea, in the year 1945, he spent the first years of his life in a small village with his family of the Fang ethnic group, of which he would always keep vivid memories and a broad cosmogony that he later captured in his stories and novels. When he was only eight years old, he traveled with his parents to Madrid. It was 1953, and at that time, Guinea was still Spanish territory, as attested by the national ID cards of some of its inhabitants. Here he did his first studies and began his literary career, but he soon returned to his native place, where he worked as a journalist at the Ministry of Information, Press and Radio of Equatorial Guinea (Alcojor, 2020).

We are dealing with a woman who had to face many vicissitudes for being a woman, both in her homeland and abroad. María Nsue Angüe passed away on January 18, 2017, but it is as if she were still alive, for she inspired a whole generation of women and even empowered many women writers. The novel Ekomo was published in 1985, thanks to the support and authorization of the National University of Distance Education (UNED). There are studies which also conclude that, due to the themes addressed in Ekomo, it is a feminist novel, the first in Equatoguinean literature. Among these studies on Ekomo are those carried out by Minsongui Dieudonné (1997), in which he emphasizes that:

> Maria Nsue Angüe, with her revolutionary pen, highlights in her feminist writing the problems of the traditionalist "fang" woman of Equatorial Guinea (...) After all that has been said, we can say that Maria Nsue Angüe is a feminist writer; she defends tradition, but also fights for the emancipation of women. This position is evident when Nnanga Abaha "breaks the taboo" by touching the corpse of her deceased husband, and especially when the Pastor asks her to get up from the ground, thus putting an end to the very hard trials of widowhood (p. 218).

Likewise, another recently published study on this issue points out that:

> The play Ekomo is a narrative not only about generational conflicts, Afro-feminist and identity rebellion against patriarchal and Catholic oppression, but also about cultural hybridity in which almost all the protagonists are torn between fang tradition and modernity (Keffa, 2023, p. 45)

Although it must be admitted that the novel is presented in a context very different from the current one, it must be recognized that the situation of the Fang woman has not changed much. In the novel Ekomo, Nnanga, a woman of the Fang ethnic group, one of the majority ethnic groups in Equatorial Guinea, is presented as having to marry without her clear consent. In this novel, Maria Nsue Angüe speaks of abduction, which, although no longer practiced today, was one of the forms that led to Fang marriage. For the Fang, abom or abduction was a very common practice where the man abducted the bride and took her with him to his tribe.

For some researchers, among them Hidalgo Lopez (1993), in Ekomo, "Maria Nsue (...) emphasizes the marginal situation of women within African family structures, and its consequences of anguish that often leads to existential loneliness" (pp. 42-44). In the same vein, it can be added that in Ekomo, the odyssey of the protagonist throughout the book reflects the suffering of the woman of this era, who must blindly respect her tradition, but we also see the struggle of women for her freedom, to always choose what she wants for herself. In short, the protagonist suffers for having rebelled against tradition and the ideals of the time. It has even been said of the protagonist of this novel that:

> Nnanga, with her reddish hair, is an exceptional woman, brave, strong, independent and upright, who, however, defines herself in relation to the figure of her husband, Ekomo, with whom she goes on pilgrimage in search of a cure. But, although it is the latter who gives the title to the work, the female point of view from which it is narrated is a reflection of the double subversion carried out in the novel, since it vindicates the African and, in turn, the female perspective (Álvarez-Méndez, 2010, p. 175).

Therefore, it is about a woman who fights against the patriarchal ideals of the era in which the novel is set, it serves as a testimony that evidences the harsh conditions in which all women found themselves during this time. For the first time, someone dared to capture all this struggle for emancipation in a novel, as a kind of criticism and pedagogy that exhorts consciousness towards change. The theme of this novel is a cry for the freedom of the fang woman, in the face of the bonds imposed by patriarchy. "This Fang patriarchal system is barbaric, as the woman is only seen as an object to achieve her goal" (Keffa, 2023, pp.54-55). Ekomo is a novel divided into ten chapters, but in all of them, from a feminist point of view, it reflects a constant struggle of Nnanga to change or go against the canons that the fang patriarchal system has imposed on women. Bearing in mind that:

> The fang patriarchal system is not a product of today, but rather a very long-lived system, with several centuries of existence in which the fundamental theme has always been the oppression of women. It must be recognized that women themselves also contribute to keeping this system alive. We say they contribute because, having been indoctrinated by the patriarchal system, they themselves have transmitted or reproduced the learned patterns of behavior (Bituga-Nchama, 2021, p. 220).

Maria Nsue Angüe captures in this novel the main problems that constitute a challenge for the Fang woman, marriage, polygamy, dowry, the situation of widows, the Acus or levirate, etc. All these problems are themes with which the protagonist of this novel is linked, in addition, the male leadership or androcentrism of the Fang ethnic group is perfectly reflected. Although the novel Ekomo analyzes the situation of women during a specific time, all this can be extrapolated because during the Spanish colonization, through the period of independence to the present day, the situation of women has only gradually changed, cultural obstacles to the empowerment of Fang women in Equatoguinean society still continue or persist.

The protagonist often has to evade her current reality and remember other times when she had not become a woman and was free. Therefore, in addition to being a cry for freedom, it is also a pedagogy for all women so that they do not renounce their own being because of

certain circumstances, as happens to Nnanga in this novel. Nsue Angüe reflects in the novel Ekomo, a kind of feminist militancy in the struggle for the emancipation of women, in the face of an androcentric culture. For this reason, it is a novel capable of putting the reader in the protagonist's shoes, feeling her pain, her fears, her desire to be heard and consoled.

Bearing in mind that the purpose of this article is not to make a text commentary on this novel, but to analyze the influence of feminist thought and the socio-educational content of this novel, it should be pointed out that it deals with several aspects that vilify and denigrate women. Where it is clearly seen the intentions of men in qualifying and defining when a woman is worthy, when she is useful, when she deserves to be married, etc. In the first chapter of the book, it is clearly observed how men decide the punishment to be imposed on an adulteress. Thus it is stated:

> In the abaha, the men discuss. They all talk about Nchama, the naughty, flirtatious woman who committed adultery yesterday in the forest. The men talk, the women are silent... this sentence remains! -shouts the old man. For the adulteress, fifty sticks in the ass. And -he continues saying while clearing his throat- for the adulterer, two goats, thirty thousand bipkuele and one hundred and fifty sticks. Because a woman is like a child. She has no conscience of fidelity. And her guilt, therefore, is lesser (Nsue Angüe, 1985, pp. 17-18).

In the above quote, the macho thinking ingrained in the Fang ethnic group is evident when determining everything. The woman is compared to a child who has no conscience in general. This way of thinking has served to justify the subordination and dependence of women. It is an indoctrination that Nsue Angüe criticizes in this novel. Likewise, she shows how men take control of the word and women become mere listeners, even when it comes to issues that only affect them.

The ailments suffered by women in this novel are also picked up by the author when she has to speak or describe the situation of widows. First of all, it should be noted that thanks to the voice raised by women like Maria Nsue Angüe, the ill-treatment that the woman went through when her husband died in the Fang culture, has changed considerably in recent years, although it must be recognized that it is still going on, but most certainly that rite called Acus, to which the woman is subjected, faces the sunset.

The Acus is a ceremonial rite that occurs in different African cultures of which there are few written references. In the Fang language, we find two related words, Acus and Ncus. The first is a ceremonial funeral rite to which the Fang woman is culturally subjected after the death of her husband. It is an obligatory cultural precept for all those who belong to the Fang ethnic group, however, each family decides to perform it or not. As for the second word Ncus, it is the name given to the woman once the Acus has been performed. In this regard, Nsang Ovono (2018) explains the following.:

> In the event that the woman is widowed, it is common for the brother of the deceased to take her as his wife. This is known as levirate marriage. This keeps her in the bosom of the family since, let us not forget, she has been part of the family since the perfection of the marriage with her deceased husband; in this way the loss of the family wealth is avoided (p. 47).

The traditional practice of this rite has several justifications, but seen from the point of view of human dignity, it is extremely degrading. The Acus ceremony begins as follows:

> In the kitchen, the widows or widower were stripped of all hair and cornered in a corner of the kitchen, sitting naked on the floor, where three consecutive days will be isolated from all kinds of life activities, including talking, symbol of accompanying the husband in death. This was the beginning of the Acus ceremony (Nsue Mibuy, 2005, p. 204).

At this moment the woman has her eyes closed and her head bent downward; in this position the widow feels death in flesh and blood. It is also necessary to clarify that nowadays the widow is no longer naked as in ancient times, but rather is dressed in black or purple as a symbol of mourning, and as noted above, the widow can be placed in the kitchen (when the ceremony takes place in a rural setting) or next to the coffin of the deceased with a cloth covering her face (in urban settings). In Ekomo, the harsh conditions that Nnanga goes through when her husband dies are described, but these conditions are not decided by her, but imposed out of respect for the culture. In this novel, this situation is described in these terms:

> In the abaha they discuss whether or not I should get up from the floor as Nana has suggested or, on the contrary, stay up to eight days as the torturers, my mistresses, have said. I think about it, about the people, the men and the abaha. A woman's life is always exposed to the decisions of the abaha from the moment she is born until she dies (Nsue Angüe, 1985, p. 188).

The situation of the widow is a recurring theme throughout this novel. What this is meant to achieve is to make women aware so that they can rebel against cultural practices that debase or vilify them. The resistance to comply with cultural traditions that may be considered harmful as the calamity that widows go through in the Fang culture is something that Nsue Angüe captures very well in her novel:

> When the village punishes the widow for having touched her husband's corpse to bury him, it is the Fang shepherd who defends her despite his respect for the customs of his ethnic group. At that moment, a new debate arises between Christian and African cosmogony, as Nnanga must choose between defying the tradition of African taboos or disobeying God (Álvarez Méndez, 2010, p. 144).)

In the face of this type of events that occur in the life of this protagonist, it can be affirmed that in this novel there is, without a doubt, a plan of resistance and vindication for the change of cultural patterns that denigrate women. Another fragment of the novel that details the drastic consequences that a woman suffers when she has committed adultery is as follows:

> — The sentence remains! - shouts the old man. For the adulteress, fifty sticks in the ass. And - he continues saying while clearing his throat - for the adulterer, two goats, thirty thousand bipkwele and one hundred and fifty sticks. Because the woman is like a child. She has no conscience of happiness. And her guilt, therefore, is less. [...], because she is like the leaves of the trees: she loves according to the direction in which the wind comes to her (Nsue Angüe, 1985, p. 18).

The conception of women as inferior beings who can be punished like children is clear. Culture cannot be a means to justify certain atrocities, as is the case of female genital mutilation, which, although not practiced in Equatoguinean society, but in other parts of Africa, is a form of physical violence exercised on women's bodies in the name of cultures and traditions. Regardless of the multiple reasons adduced to justify the rite of Acus, it has all the signs of gender violence, because of the multiple psychological and physical injuries that the beatings leave on the body and soul of the victim. However, it is normalized, because the culture allows it, but it is still violence against women, because it is observed that when a man becomes a widower, his head is not shaved and he is not subjected to multiple beatings, which is evidence of the discriminatory treatment that the Fang woman suffers within their culture for being a woman.

In a context where patriarchal ideology is extremely determinant as it is in Equatoguinean society, gender violence is just one more problem faced by women. When African women writers such as Chimamanda Ngozi Adichie, Trinidad Morgades, Buchi Emecheta, María Nsue Angüe, Trifonia Melibea Obono, Anita Hichaicoto Topapori, Fatou Diome, Ken Bugul, Wangari Maathai, Sembène Ousmane, Mariama Bâ, etc., reflect the problems of African women, it is because they want to promote social and political changes of inclusion for African women.

The scenario of Equatoguinean literature changes drastically with the appearance of the novel under study, because it introduces a theme never before presented in the history of Equatoguinean literature, therefore, it has been argued that they are the beginnings of feminist literature in Equatorial Guinea. Therefore, it can be admitted that Nsue Angüe is in fact a feminist woman, as reflected in this novel that can perfectly be considered the first work of Equatoguinean literature that places an unparalleled emphasis on the situation of the Fang woman. For this reason, she deserves great respect for her courage and dedication in the struggle for the emancipation of women. When one reads the novel Ekomo, one can glimpse several themes, such as colonialism, the freedom of African peoples, ethnicity, etc. According to some researchers:

> Nsue tries to reflect on the cultural reality of his society and, to do so, he focuses on the relationship between life and death, relying on cosmogony as a means of interpreting the world. His proposal raises the conflict between Christianity and traditional African myth. The protagonist, Nnanga, who had assumed the Western Protestant religion accepted by her husband, seems to return to traditional beliefs when he dies. But she finally violates a taboo by deciding to bury him, as she touches his corpse. Latent in all these episodes is the dialectic between tradition and the progress of modernity (Álvarez Méndez, 2010, p. 141).

However, if we analyze this novel from a gender perspective, we clearly see that it is a novel that highlights the pain or suffering of women in Equatoguinean society in general, although the emphasis is on the Fang ethnic group. The woman that Nsue Angüe presents in Ekomo, is a real fighter, who after the death of her husband Ekomo, continues with her life, and although she must also respect her culture, she decides to be the protagonist of her own destiny. With the novel Ekomo, Equatoguinean literature takes on another meaning, not only because it does not focus on attacking colonialism, although it describes some of its impacts on African peoples, but also because unlike all the writers who had preceded him, Nsue Angüe bets on a narrative focused on women. It is an unusual work that emerges, as

mentioned above, at a time when Equatoguinean literature has only male writers as referents.

Nsue Angüe's incursion into Equatoguinean literature introduces women as a subject to be studied because of the difficulties they face in their culture. This is revealed in Nnanga, an unusual woman who challenges the same culture at a time when the Fang tradition was even more patriarchal. This is precisely why the novel Ekomo is plausible in every way. Nsue Angüe's message in this work is for the woman to stop being a mere spectator of her life and become the protagonist of her life, to be able to choose her life over anything else. In fact, when the shepherd goes to look for Nnanga in her village after the death of her husband, he does not raise her up, but gives her the choice of continuing the yoke of tradition or saving her life and rising up.

> In sum, Nnanga from her position as a woman, African and Equatoguinean, opens the door in her narrative to fundamental questions from within and outside her community. She reveals the impossibility of claiming a voice for Africa without including women in it, as well as the search for a community that retains its union with the past and adapts to the structures of a modern and democratic state to foster a balanced development and hinder new forms of oppression (Beatriz Celaya, 2011, p. 55).

In this sense, it should be pointed out that it is a novel that vindicates the emancipation of Equatoguinean women in the face of the veteropatriarchal culture that oppresses them, relegating them to the private sphere. There are clear intentions to address an issue that concerns the author and that she considers important. The peculiarity of this work lies in its novel theme, never recorded in Equatoguinean literature. In addition, it is a great fundamental contribution in Afro-Hispanic literature.

4. Methodology

In accordance with the problem statement of this article, the research methodology is descriptive. That is, we are dealing with a descriptive methodological design. In this type of research, the researcher focuses on the study of a specific topic that affects a particular group, with the intention of analyzing its nature in order to better understand it. In other words, in research with the descriptive method, the researcher does not want to reach great generalizations, but describes or explains a certain phenomenon such as the pedagogical dimension of the feminist principles of the novel Ekomo in Equatoguinean literature in order to better understand it; or in its case, to generate new knowledge that will help future research to investigate aspects that were not taken into account in other research with a similar approach.

Despite the statistical data we provide in this research, it is not a quantitative methodology, but a qualitative one. These are partial data that we cannot avoid due to the objectives of this research and the absence of official data that would better clarify the understanding of our object of study. The population on which this research has been conducted is essentially from the city of Bata and the representative sample will consist of 402 citizens of both sexes, aged 18 to 30 years. The selected sample is representative because the city of Bata is the most populated city in Equatorial Guinea and is very cosmopolitan. In addition, the selected age groups constitute the school and working population of Equatorial Guinea. In this sense, the results of this sample can be generalized to the entire population. In any case, detailed

information on the characteristics of the sample used can be found in the subsection dedicated to the case study of polygamy in the city of Bata.

5. Analysis and discussion of the results

The Statistical Package for Social Sciences (SPSS) was used to generate the data obtained from the field research. For data collection, the survey technique was used, while the instrument consisted of a questionnaire made up of five closed questions of simple selection to determine whether the pedagogical content of the novel Ekomo serves to sensitize citizens on the issue of women's emancipation and respect for their rights, such as the right to education and other civil and political liberties. We consider this instrument to be valid and reliable because of the data it provides on content. The questions of the questionnaire and the results of these are as follows:

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	205	51.0	51.0	100.0
	No	197	49.0	49.0	49.0
	Total	402	100.0	100.0	

Table 1. Have you read the novel Ekomo from Equatoguinean literature?

Interpretation: With a total of 402 respondents, 51.0% have read the novel Ekomo, while the other respondents, 49.0% have not read this novel.

Analysis: The relevant result of this question is that most of the citizens surveyed according to the characteristics of the selected sample have read the novel Ekomo. First, because it is a novel that has been made known to the population about its existence, and because some professors of Equatoguinean literature often recommend it as a fundamental reading to pass the subject. As a result, the novel has been so widely disseminated that when it is talked about, most people have some notion of it. Above all, the writer is recognized, because it is often repeated in class that she is the first Equatoguinean woman to write a novel. Despite the considerable number of citizens who have not had access to the reading of this novel, it is mainly due to the scarcity of copies of the book, because it should be noted that, at the Bata level, only the Spanish Cultural Center of Bata has these books.

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	235	58.0	58.0	100.0
	No	167	42.0	42.0	58.0
	Total	402	100.0	100.0	

Table 2. Can the content of the novel Ekomo be considered as educational for the Equatoguinean society?

Interpretation: For 58.0%, the novel Ekomo has an educational dimension for the Equatoguinean society, while 42.0% think the opposite.

Analysis: In this question, it is correct to note that the majority of respondents consider that the content of this novel is educational for the Equatoguinean society. In the first place, it is fundamentally due to the idea that has been developed throughout this article, and that is that the novel Ekomo addresses a theme linked to the recognition of women's rights, that is, it seeks a socio-cultural change in terms of gender relations. Taking into account the patriarchal structure of this society where women have been gradually conquering their rights, the novel Ekomo exalts the courage of women and recognizes the enormous challenges that the future holds for them. Therefore, teaching the importance of this novel is crucial if we want to change the androcentric mentality of Equatoguinean society.

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	233	79.9	79.9	79.9
	No	169	20.1	20.1	100.0
	Total	402	100.0	100.0	

Table 3. Do you think that the novel Ekomo has inspired other women to dedicate themselves to literature and write about the same subject matter?

Interpretation: Out of a total of 402 respondents, 79.9% recognized that the novel in question has inspired other Equatoguinean women writers to write on the same subject. On the other hand, 20.1% said that they did not consider this novel relevant enough to motivate other writers.

Analysis: Taking into account the data shown in the table above, a large majority of respondents consider that the novel Ekomo is the one that inspired subsequent women writers to dedicate themselves to literature, many of them mentioned in this research and who write about themes that circumscribe women, providing a different vision of society and culture with respect to women in Equatoguinean literature. The novel Ekomo marks a before and after in Equatoguinean literature, still very little studied in Equatorial Guinea and in the range of what is called Hispano-Afriacan or Hispanic literature. At present there is a plethora of Equatoguinean women writers who focus on different genres, although it must be recognized that the genre par excellence is the novel. Very few works in African literature have been able to detail the asymmetrical situation of African women in relation to men.

		Frequency	Percentage	Porcentaje válido	Porcentaje acumulado
Valid	Yes	387	96.0	96.0	96.0
	No	15	4.0	4.0	100.0
	Total	402	100.0	100.0	

Table 4. Do you think Ekomo can be categorized as a feminist novel within Equatoguinean literature?

Interpretation: According to the respondents, 96.0% consider this novel as feminist, followed by 4.0% who do not find reasons for this work to be considered feminist.

Analysis: The result is imposed in this question, because apart from the fact that it is inexorably linked to one of the objectives of this article, it confirms the same thesis that is defended because the majority of respondents consider this novel as feminist within the Equatoguinean literature. This question is linked to the previous one, as it has been the inspiration for several women writers to offer a theme that focuses their interest in making visible the problems that affect women, something that had never been presented by their peers, as they offered themes where the protagonism was given to men.

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	392	98.0	98.0	98.0
	No	10	10.0	10.0	100.0
	Total	402	100.0	100.0	

Table 5. Is it important to promote the reading of the novel Ekomo in the Secondary and Baccalaureate education of the Equatoguinean educational system?

Interpretation: Of the 402 respondents, 98.0% said that the reading of this novel should be encouraged in secondary and high school education in the Equatoguinean educational system. At the antipodes of this thought, 10.0% consider that it is not necessary to read this work.

Analysis: The results of this question corroborate some of our arguments presented in this thesis. In a novel within the Equatoguinean literature whose reading should be necessary for those who attend Secondary and Baccalaureate. The pedagogical foundation of this novel, as well as the nature of the author herself, allows it to be made known to students so that they learn from it and are able to draw their conclusions on the various issues addressed in this novel, some of them analyzed throughout this article.

6. Conclusions

Equatoguinean literature is represented by women authors who are still invisible due to the limited diffusion of their works. In fact, until recently, the novel Ekomo did not arouse the interest of researchers. Precisely, the pedagogical dimension of this novel has allowed the appearance of several researches focused on the study of this unusual work within the

Equatoguinean or Afro-Hispanic literature, thus becoming the first novel by an African author in Spanish. From the feminist perspective in which the socio-educational component of this work is analyzed, there is a great interest on the part of the author in presenting a woman, in this case, Nnanga who is the protagonist, strong, intelligent and beautiful, who tries to break the patriarchal yoke in which women find themselves within their culture. It is a novel that can be categorized as feminist because it describes the inequalities and injustice committed against women. Inequalities that are observed in aspects such as the power of speech. When men speak, women keep silent. For this reason, the thesis of the pedagogical component of this novel has been defended within the Equatoguinean literature because it exhorts to change the parameters of inequality rooted in the society in which the work is developed.

The socio-educational character of this work promotes the change of cultural paradigms within the Equatoguinean society. This novel is intended not only to highlight the different socio-cultural problems faced by African Fang women in Equatoguinean society, but also to promote the implementation of egalitarian policies such as access to education for girls, the elimination of arranged marriages and any kind of harmful cultural practices against women. Although the novel Ekomo is practically set at the end of the colonial period, when Equatorial Guinea is about to become independent from Spain, it must be said that the situation of women at that time has not changed much, however, we must recognize that thanks to women like Maria Nsue Angüe, many things have changed. Today we can see that women feel more self-confident and are committed to their own and their children's education.

Throughout this article, we wanted to make it clear that it is not a text commentary of this novel, but rather to highlight the feminist thinking and socio-educational content that exists in this work, thus demonstrating that it is the precedent of the struggle for the rights of Equatoguinean women. Within Equatoguinean literature, which is mostly represented by men, we can find a novel that focuses on presenting the odyssey that women go through within the Fang culture, and advocates for them to be given their rightful place.

Before the publication of this novel, it was unheard of to think that a woman could dedicate herself to literature and even more so to write a book, in this case, a novel. In fact, it is not surprising that the subject matter of this novel highlights the problems that vilify women in the Fang patriarchal system, such as dowry, widowhood, polygamy, and so on. All these problems still persist, but thanks to the courage of Nsue Angüe, she managed to make them visible in order to put an end to these obstacles. Nsue Angüe's imprint on Equatoguinean feminist literature has helped other generations, such as that of Trifonia Melibea Obono, to continue vindicating women's rights in Equatoguinean society. That is to say, the thematic initiated by her has influenced other generations to continue with the same fight, always oriented to obtain the rights and freedoms for women in basic things like the right to education.

In general terms, the above allows us to say that more lines of research should be developed on this novel, but, above all, to reflect on the role that women like Nsue Angüe have left in the history of Equatoguinean literature. Her legacy is an impulse for other women who want to follow the same theme initiated by this great writer. In this order of ideas, in this novel it is convenient to recognize that history is a little fair in the recognition of all those Equatoguinean women writers who are forgotten and who do not appear in the different textbooks used in the Equatoguinean educational system. Therefore, we believe that a good

line of research could also be to really investigate what is the diffusion of the literary production of Equatoguinean women writers within the educational system of this country, to see if the student body really knows or has read at least one novel written by an Equatoguinean woman. Ekomo cements the feminist novel in Equatorial Guinea through literature to detoxify the education fostered by the patriarchal system that constitutes a brake on the development of women's skills.

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Student access to the National University of Equatorial Guinea: prior guidance needs

El acceso del estudiantado a la Universidad Nacional de Guinea Ecuatorial: necesidades previas de orientación

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Abstract

The absence of guidance in the Equatoguinean educational system dates back to the Spanish colony. Today, guidance is recognized as a right of all students. The objective of the research of this article is to diagnose the guidance needs of university students in Equatorial Guinea, prior to their access to the university, and thus, to present the results to the educational authorities in case they believe it is convenient to design proposals for the implementation of guidance services in this student population. A quantitative, non-experimental, exploratory-descriptive approach was used through a survey. The study sample is composed of 404 students of the National University of Equatorial Guinea. The instrument for the collection of information is a questionnaire of university orientation needs of the students elaborated for this purpose. The descriptive results show that there is little information regarding the choice of career, as well as a variety of academic problems and dissatisfaction with current studies. This would mean that this group of students presented needs of academic-professional orientation in the choice of their university career, and academic and personal needs during their studies at the university. The results of this research reveal a concern for attending to the needs and difficulties faced by Equatoguinean students throughout their university education.

Keywords

Diagnosis of needs, Equatorial Guinea, guidance, reasons for choice, university students.

Resumen

La ausencia de la orientación en el sistema educativo ecuatoguineano data desde la colonia española. En el día de hoy, la orientación se reconoce como un derecho de todo alumnado. El objetivo de la investigación de este artículo es diagnosticar las necesidades de orientación en estudiantes universitarios de Guinea Ecuatorial, previas a su acceso a la universidad, y así, presentar sus resultados a las autoridades educativas por si creen conveniente diseñar propuestas de implantación de servicios de orientación en esta población estudiantil. Se utilizó un enfoque cuantitativo no experimental, exploratorio-descriptivo, a través de una encuesta. La muestra del estudio está compuesta por 404 estudiantes de la Universidad Nacional de Guinea Ecuatorial. El instrumento de la recogida de información es un cuestionario de necesidades de orientación universitaria del alumnado elaborado para este fin. En los resultados descriptivos se constata que existe poca información respecto a la elección de la carrera, asimismo, de la carrera matriculada, se presenta diversidad de problemas académicos, y de insatisfacciones con los estudios actuales. Lo anterior significaría que este grupo de estudiantes presentaba necesidades de orientación académico-profesional en la elección de su carrera universitaria, y necesidades académicas y personales durante sus estudios en la universidad. Los resultados de esta investigación revelan una preocupación por atender las necesidades y dificultades que enfrentan estudiantes ecuatoguineanos a lo largo de su formación universitaria.

Palabras clave

Diagnóstico de necesidades, estudiantes universitarios, guinea ecuatorial, motivos de elección, orientación educativa.

1. Introduction

The work presented analyzes the reality of 404 students of the National University of Equatorial Guinea enrolled in the 2013-2014 academic year in one of the university courses taught by the institution. The problem of study lies in the analysis of the transition to the first year of university and their integration into the institution. It puts the focus on the decision-making process and on the accompaniment for the choice of studies. There is a lack of guidance and support from the previous educational stages, as well as in the first moments in the institution of higher education. The relevance of the topic lies in the need to establish guidance services in the educational system to accompany students from the concept of lifelong education, under the protection of the country's educational laws, which today have not yet crystallized either in the educational institutional culture or in the guidance practice.

Guidance should be present, both in classroom practice, from the teacher's own role (academic tutoring) and in the institution's policy with tutorial action plans by degrees and/or centers and university guidance services (career tutoring). The laws of the country itself and of the institution under analysis so stipulate in their guidelines, in line with international policy. Guidance should facilitate the process of transition and adaptation of the student at the University, offer students information, guidance and resources for learning, advise students in the configuration of their curricular itinerary - paying attention to each specific reality - as well as facilitate access to the world of work or the continuation of studies, in an increasingly complex and changing society where decision making will be vital in the management of personal and professional careers (Pantoja-Vallejo, et al., 2020; Romero-Rodríguez and Figuera-Gazo, 2016). For this, it will also be key to think about the figures that should appear in this intervention model: tutors or mentors, faculty, students, expert agents, as well as the work dimensions to be incorporated as a priority according to the current needs of the university community (Fernández-García et al., 2019; Llanes et al., 2017; Martín et al., 2020; Pantoja-Vallejo et al., 2021).

The article is divided into five sections. The first section deals with the state of the art on the problem under study, analyzing the concept of orientation and the three dimensions that make it up: academic, professional and personal. It analyzes other similar research to contextualize the object of study in the country and university chosen. Subsequently, the methodology (quantitative), sample and information collection strategy (questionnaire) are explained, as well as the data collection procedure and its subsequent treatment. The third point describes the results according to the specific objectives of the study. The discussion triangulates the theoretical framework of the article and the results found in the research, giving an account of the orientation needs for the group under study. Finally, the conclusions, limitations and prospective of the study are shown, which show the need to continue working in this line of intervention.

1.1 Guidance in the Equatoguinean education system

The absence of guidance in the Equatoguinean educational system dates back to the Spanish colonial era. The research of this article aims to diagnose the guidance needs of university students in Equatorial Guinea that highlight the need to implement guidance services for this student population.

Nowadays, guidance has become a necessary activity at all educational levels, not only because it is considered a basic indicator of quality, but also because it provides students with help at different stages of their comprehensive training process (Álvarez and Bisquerra, 2012). Dutercq et al. (2018) indicate that "lifelong educational and vocational

information and guidance (IOPS) are today more present than ever at the center of educational policies in industrialized countries". He already explained that IOPS would be positioned as the "backbone" of any educational system. Not to consider it would be to evolve as a castaway without a compass (Bomda, 2021). Álvarez-Pérez and López-Águilar (2017) indicate that guiding students continuously to achieve control of their formative process and plan their professional project has become a major challenge of current education. Gil-Beltrán (2002) "justifies the importance of university guidance in international meetings on the subject and in the very principles of the creation of FEDORA (Forum Européen de l'Orientation Académique) which works exclusively in the university field" (p. 3).

The issues addressed by the authors cited above present the idea that no person should be left out of receiving the information and guidance necessary to survive in this era of worldwide globalization. In 2007, the first working session on Academic and Vocational Guidance in the Higher Education System: Bachelor, Master and Doctorate (LMD) was held in Yaudé. Experts from Belgium and France participated in this work. In March 2008, on the occasion of the International Day of La Francophonie, L'Agence Universitaire de la Francophonie organized in Yaoundé a round table on the following theme: Higher Education Orientation in the LMD system. In recent years, countries such as Congo, Niger, Nigeria, Democratic Republic of Congo, Senegal, Cameroon, Gabon, among others, have insisted on the importance of introducing educational reforms at the baccalaureate level to include guidance as a key element of the training system (a step prior to the subsequent transition to the LMD system), and to make it an integral part of the education system.

The Government of Equatorial Guinea, among the agreements adopted at the First National Conference on Education (General Education Law of Equatorial Guinea, 2007 and 2019) would state that Educational Guidance should be one of the priorities to be implemented in the country throughout the education system, based on the concept of lifelong education. In reference to the above, Law No. 5/2007 contemplated articles referring to the academic and professional orientation of Equatoguinean students (arts. 14; 44,3; and 148). Article 113 of the Statutes of the National University of Equatorial Guinea (UNGE) (1995) also contemplates the right of university students to receive the benefits granted by the Vocational Guidance and Student Welfare Service. However, despite the relevance of guidance in the international context, and the existence of legislation at the national level, guidance continues to have little interest in educational policies in our country, which translates into its absence in the educational system. Meanwhile, there are constant social, educational and labor changes at the national and international level that imply the need to include guidance counselors to help Equatoguinean students to face possible difficulties throughout the educational system, which in some way contribute to work on integration, permanence and progress in the educational system (Sánchez-Escobedo et al., 2005).

It is therefore suggested that diagnosis and guidance should go hand in hand. That is to say, any guidance intervention design, whether preventive or specific, must start from the diagnosed needs of the population whose problems are to be improved.

1.2 Diagnostic of Educational Guidance Needs (DNOA)

Educational guidance is defined by Rodríguez-Espinar (1993) as "the sum total of planned experiences offered to students aimed at achieving their maximum development" (p. 15). The personal, scholastic and professional aspects merge interactively in a holistic conception of their personality. In the university context Vieira and Vidal (2006) define educational guidance as "the process of helping university students in academic,

professional and personal aspects in the context of higher education institutions" (p. 19). These two definitions reveal important aspects for understanding educational guidance as a process of help directed to the student in a holistic manner, that is, attending to all facets of his or her development. They emphasize the academic, personal and professional aspects of the student.

There are different approaches to the concept of need. Moreno-Cámara et al. (2015) understand it as "a subjective assessment that reveals a gap between a desired state of the person and the actual state, from which the action of "impulse" can be derived to correct this situation" (p. 34). As for the term diagnosis, it has different meanings. Granados and Mudarra (2010) consider it as "an activity in search of knowledge of a situation in order to establish whether or not they present certain deficiencies that demand guiding interventions" (p. 27). Based on the previous meaning, the diagnosis of university students' needs is the information obtained from an analysis or evaluation about their formative process at the university (difficulties, aptitudes, needs, among others). According to Alfonso and Serra (2016) it is necessary to "start from an individual and group diagnosis of the students that make up each of the groups of students accessing higher education in their academic year." (p. 37) In this way, their potentialities that can be exploited in their professional training will be detected, and the problems or insufficiencies to act on them.

1.3 Research on counseling needs analysis among university students

There are studies that have highlighted some of the orientation needs in university students.

García-Ripa et al. (2018) analyzed the motives of study choice in university students. They found differentiated groups of students, making their classification aimed at the design of guidance actions according to their motivations and needs in a given context. Santana and García (2009) analyzed the difficulties in the process of making academic-professional decisions in high school students. The results evidenced a feeling of uncertainty in the students with respect to the suitability of their academic-vocational decisions. Salmerón et al. (2014) evaluated the university orientation needs of Moroccan students seeking access to Spanish universities. In the results, only 18.6% of the respondents admit to have clearly chosen their university career, almost 30% have doubts about their future profession. Villafañe et al. (2011) analyze the academic, personal, social and vocational needs of international students. The findings revealed needs mostly in the academic and vocational areas. They recommend working with these needs, as they can affect their academic performance and even their emotional health. Sánchez-Herrera et al. (2005) analyze the need for guidance in the university context of Extremadura. In the results, these students mainly demand orientation in professional issues. Santana et al. (1997-1998) (Cited in Salmerón et al., 2014), analyze the conditions of the transition from secondary to higher education, and the adaptation to university of new students. It was detected that a significant percentage had received little or no information about the studies and subjects they were going to take (86%), or had little knowledge about the training itineraries of the degree (91%) and were unaware of the professional opportunities of the studies they were taking (57%).

The results obtained from these studies explain the demand for guidance interventions by university students in the professional, academic and personal spheres, and make this type of action increasingly necessary (Amor, 2012). It is found in the international university context that the needs presented by students are met through the guidance services present in higher education centers (Alfonso and Serra, 2019; Moreno-Yaguanay, 2019).

In our national context, studying for the first time the university guidance needs of the student body was difficult to delimit. However, taking into account the state of the art of this topic in the international context, we dare to approach our research. The diagnosis of needs considers three moments of university student life along the lines of García-Félix et al. (2014): a) Before entering university, the student's needs are considered as follows.

2. Methodology

This study used a method based on a quantitative approach focused on observable aspects susceptible to quantification (Río-Sadornil, 2005), which makes possible the statistical treatment of the data of the study variables (Camarero et al., 2010). It is exploratory in scope, the problem of the study is addressed for the first time in our country (Hernández et al., 2010), and descriptive, since the level of knowledge sought with the research does not attempt to offer broad answers to the question of the problem, but to analyze it and base it on a base of empirical data that allow the formulation of new work proposals that have an impact on the specific aspects detected in the description of the results obtained (Morales, 2013).

The objective of the research in this article is to diagnose the guidance needs of university students in Equatorial Guinea, in order to present the results to the educational authorities in case they believe it is convenient to design proposals for the implementation of university guidance services in this student population.

This general objective is worked in practice from operative objectives.

1º. Describe the profile of the sample participating in the study.
2º. To know the previous knowledge of the students before choosing a university career.
3º. To analyze the motives for choosing a university course.
4º. To find out the students' perceptions about their current university studies.

2.1 Research design, population and participant sample

The study was carried out using a non-experimental, ex-post-facto design through a survey. In fact, the independent variables that are supposed to cause the students' orientation needs are not manipulated, because their effects have already occurred in their day. The characteristics of the study variables cannot be observed directly, but through questions to the student body, which we believe can provide us with this information at specific moments of university life (García-Llamas et al., 2001). The population under study is composed of 5,795 UNGE students from the 2013-2014 academic year. Information provided by the Directorate of Academic Affairs. From this population, we selected 600 students as the invited observation sample in our research (Callejo et al., 2010; Corbetta, 2010). Their selection was by multistage probability sampling (García-Llamas et al., 2001).

The final participating sample was 404 students (67.7% of the selected sample) (sampling error of 4.7% in relation to the population under study). The sample extension was checked with specific formulas. One of the finite population formulas found in Camarero et al. (2010). Being the population of (5,795), with an expected error (5%), confidence level (95%), so the Z is (1.96) rounded to 2, (p= 0.5) and (q= 1- p=0.5), an extension of n =382 was obtained. With these same data we checked in the Fhiser, Arkin and Colton Table found on the web: with a population of 5,000 the n was equal to 370, and in a population of 6,000, n= 375,

being 5,795 between 5,000 and 6000. Our uncertainty about student participation caused the sample to be increased by 600 students. In the end, the actual number of participants exceeded the n calculated in the formulas. In view of this situation, we accepted the information provided by the 404 subjects.

The distribution of this sample was based on the following criteria: sex, age, career and course.

Sex: Males 273 (67.6%) and 131 (32.4%) females.

Five-year age group: 21 to 25 years (239, 59.2%), 26 to 30 years (80, 19.8%), 16 to 20 years (57, 16.6%), and over 30 years (18, 4.5%). Total 404 (100%).

Career: Engineering (116, 28.7%), Political Science (73, 18.1%), CC. Economics (56, 13.9%), Law (54, 13.4%), Teaching (44, 20.9%), Environmental Sciences (30, 7.4%), Business Administration and Management (16, 4.0%), Education (15, 3.7%).

First year: First (111, 27.5%), Second (168, 41.6%), Third (125, 30.9%). Five-year age group: 21 to 25 years (239, 59.2%), 26 to 30 years (80, 19.8%), 16 to 20 years (57, 16.6%), and over 30 years (18, 4.5%). Total 404 (100%).

Career: Engineering (116, 28.7%), Political Science (73, 18.1%), CC. Economics (56, 13.9%), Law (54, 13.4%), Teaching (44, 20.9%), Environmental Sciences (30, 7.4%), Business Administration and Management (16, 4.0%), Education (15, 3.7%).

Year: First year (111, 27.5%), Second year (168, 41.6%), Third year (125, 30.9%).

2.2 Instrument development

The instrument used to collect information in our research was an ad hoc questionnaire. According to Torrado (2004), the questionnaire is the most common technique in needs assessment and, according to Ruíz (2009), questionnaires are very useful instruments for data collection in the field of education. Our instrument is composed of 45 closed questions of different formats in which the following were analyzed: students' prior knowledge for choosing a university course (information received from the course enrolled), the reasons for choosing the course, and students' perceptions of their current studies, focusing on orientation needs (see Table 1).

Dimensions	Number Question	Information
Personal data, work and academic situation	1-6	Collects data on gender, age, employment status, economic status, career and course. Nominal and discrete measurement
Previous knowledge of university career choices	7-15	Collects university information on: high school choice, own university careers, academic abilities, prior to career choices. Rating scale measurement
Academic and professional information received from the enrolled course of study	16-19	Collects the information received by new students about academic information in general in the first year of their degree and professional opportunities. Measurement on a rating scale
Academic difficulties	20-30	Gathers information on the organization and habits of university academic work. Measurement in rating scale, among other formats
Perception about the studies they are pursuing at university.	31-40	Gather opinions of students about the studies they are taking at the university. Measurement on a rating scale, among others
Assessments of the need for university orientation.	41-45	Gathers opinions of the student body about the need for orientation in university education. Measured on a rating scale

Table 1. Questionnaire of University Orientation Needs of Students in Equatorial Guinea (Author).

The following steps were followed in the process of developing the questionnaire:

Bibliographic review of the elaboration of the instrument in Education and Social Sciences in general: (Callejo et al., 2010; Corbetta, 2010; García-Llamas et al., 2001; Río-Sardonil, 2005; Sánchez, 1999). The first version of the questionnaire is elaborated by copying questions from the "Cuestionario de Necesidades y Servicios de Orientación Universitaria en la Comunidad de Madrid" addressed to University Students" (Sánchez, 1999). We added other questions necessary for our research. Content analysis of the questionnaire with respect to the relevance and clarity of the questions and the language and instructions by Spanish experts (García-Llamas et al., 2001). Two Spanish experts offered to help us in this phase and provided many corrections and orientations for the improvement of the instrument. Pilot application of the questionnaire. This application was carried out with a small sample of 50 teacher training students in Malabo, in order to identify and eliminate possible problems in its elaboration (Rio-Sadornil, 2005): language comprehension, motivation towards the instrument, time to answer, among others. The results were positive, except for the response time, which was longer than expected. Minor modifications were introduced. Reliability analysis as internal consistency of the questionnaire in global correlations of the 35 questions in scales from the SPSS program obtaining a Cronbach's

Alpha value of 0.768. According to Morales (2013) the questions measured in scale provide consistent reliability results. Alpha values higher than 0.7 are considered sufficient in some of the documents consulted.

2.3 Statistical treatment of the questionnaire

The questionnaire was applied to each group of students during the months of February to May 2014 during school hours, after prior authorization from the directors of the centers that had been previously selected and the acceptance of the collaboration of the teachers of the previously selected groups. A schedule and timetable were established for the collection of information in each Faculty and University School.

During the application, the questionnaires were distributed by systematic randomization in each group or course of students. In the case of professors who did not want to lose their class hours, once the questionnaires were distributed, they were taken to be answered at another time, and most of them were not recovered.

Once the questionnaires that we considered valid had been selected, we proceeded to register, organize, codify and summarize the information in a data matrix. It should be noted that the data file was set up by a computer scientist. The subsequent analysis of the matrix data was carried out according to the type of variables (Pérez-Campanero, 1991). These analyses focused on: a) univariate descriptive analyses (Morales, 2007) using tables of absolute frequencies and percentages, with their respective figures (distributing the results among the different values of a single variable) and b) descriptive analyses using statistics of central tendency: mean, median and mode. It should be clarified here that these are not numerical variables; these analyses were carried out in some questions with valuation level responses.

All the above process of information processing and data analysis was carried out with the SPSS statistical program in its version 15.0 for Windows.

3. Results

The descriptive results are presented below in relation to the objectives - linked to the dimensions of the questionnaire - of the study.

3.1 Results of knowledge prior to choosing a university career

Among the specific objectives of this dimension was to analyze the students' prior knowledge for choosing a university career, based on the following variables: university information on their high school option, information on other careers of interest, information on the subjects of the career of their choice, and knowledge of their own academic abilities. The responses are expressed on a scale of 1 to 5. The distribution of the responses is shown in Table 2.

INFORMATION	Did not have information	Had little Information	Acceptable information	A lot of information	Lots of information	Total
Baccalaureate Option	65 16.1%	158 39.1%	115 28.5%	27 6.7%	15 3.7%	404 100%
Other careers of interest	75 18.6%	176 43.6%	111 27.5%	17 4.2%	25 6.2%	100%
Knowledge of career subjects	133 32.9%	149 36.9%	88 21.8%	19 4.7%	15 3.7%	100%
Own academic skills	47 11.6%	97 24.0%	132 32.7%	57 14.1%	71 17.6%	100%

Table 2. Distribution of frequencies and percentages of information prior to university career choices.

As can be observed and contrasted in Table 2, the majority of the students in the sample indicate having chosen their university studies with little information on all the variables proposed: (39.1%) on their choice of high school, (43.6%) on other careers of interest, (36.9%) on the subjects of the careers chosen, and (24.0%) on their own academic abilities.

Some unexpected impressions from the questionnaires confirm this lack of information throughout the student journey.

> I believe that the disorientation or the lack of information with which we arrive at the Faculties makes us make many mistakes, because they do not inform or put circulars in the Departments indicating what is taught in that Faculty and one comes and is surprised when one cannot go back. Recommendation: that the Faculties inform the students of what subjects and what things will be required throughout their careers, so that one knows where one is getting into, and not to get into it blindly (Respondent 61. Environmental Sciences).

3.2 Results of the reasons for choosing a university course of study

To know the possible motives that lead students to choose certain courses in order to be able to classify them according to these motives will help in the decision making process for future orientation actions. To this end, students were asked to rate the level of influence of the following motives for choosing their university studies: financial benefits, secure job, my skills, the value of my knowledge, vocation, pleasing my family. The answers are expressed on a scale of 1 to 5.

As can be seen and verified in Table 3, the highest average given by the sample to the reasons for influence belongs specifically to: the value of the knowledge of the chosen studies, and the concept of secure work (3.21 and 3.23). This is followed by the means of: my skills are related to my chosen studies, and financial benefits (3.12 and 3.04). On the other hand, the least influential motives are: vocation and pleasing the family (2.83 and 2.44). The median is relatively equal for all the influence motives, except for vocation and

pleasing the family. The distribution of responses is bimodal, with the maximum (Mo =5) corresponding to secure work and economic benefits. Thus, extrinsic motivations outweigh extrinsic motivations in the choice of studies (see Table 3).

MOTIVES	Economic benefits	Safe work	Value of your knowledge	My skills	Vocation	Pleasing the family
Valid	404	404	404	404	404	404
Mean	3.04	3.23	3.21	3.12	2.89	2.44
Median	3	3	3	3	3	2
Mode	5	5	4	3	1	1

Table 3. Distribution of means, medians, and modes of reasons for influence on college career choice.

Other reasons for the choice or the specificity of some of them were given by the respondents in their qualitative assessments in the questionnaire.

> I came to Malabo to enter a certain career, but due to lack of places I enrolled in another one. So, this sometimes makes us fail in higher education (Respondent 16 - Agricultural Engineering).

> The reason for enrolling in the career I am studying was because the one I really like is not studied in Equatorial Guinea (...) I had to choose the one I am studying as plan B (Respondent 178. Agricultural Engineering).

3.3 Student perceptions about the studies they are pursuing at the university

The objective of this dimension was to find out the students' perceptions about their current university studies. Among the questions in this dimension we have: What decision would you make if you could choose university studies again, with four response options: choose my current studies again, choose other university studies, choose non-university studies, I do not know what decision I would make.

In Figure 1, we can observe and contrast a slightly higher percentage of the answer to choose my studies again (41%) given by the total number of students in the sample in reference to the 38% who say they would choose other university studies, 12% think they would opt for non-university studies, and the remaining 9% doubt the decision they would make.
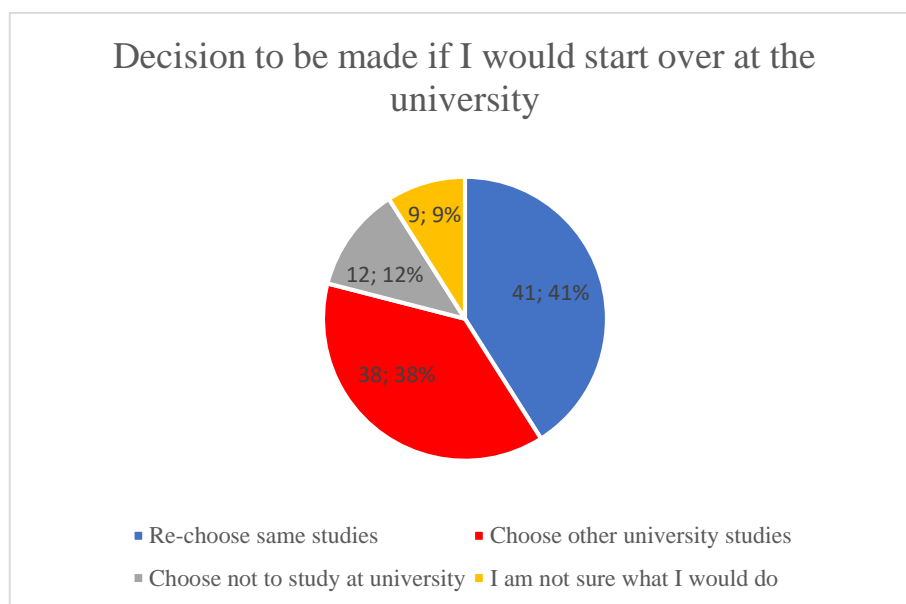
Figure 1. Distribution of percentages of the decision to be able to choose university studies again. Source: (Author)

From the empirical results, textual impressions related to personal orientation not expected from the questionnaires and, in aspects not contemplated in our research, were added.

> What would make me not be able to finish my studies is because of the disease. I have had testicular inflammation for 10 years (Respondent 57. Pedagogy).

> I have personal and tutor problems that cause me stress, anxiety and depression. In fact, when I am in class I cannot concentrate and follow the classes, I only think about these problems (Respondent 178. Agricultural Engineering).

> I do not live with my parents and this affects my studies because I do not live well with them and I have to work harder to study (Respondent 371. Law).

> Ma'am, I am a student of Petroleum Technology at UNGE, I participated in your questionnaire. It is said that crude oil has lost value, what do I do now with my career? (A graduate student, years later, I have been a student at UNGE).

Other questions in this dimension were: do you have thoughts of wanting to drop out of college because of failure? are you studying the career you were really interested in? Figure 2 shows that 45.8% say yes compared to 54.2% who do not study their preferred career.

In terms of thoughts of dropping out due to failure, 39.1% say yes compared to 60.9% who do not have these thoughts of desires to drop out of college due to failure.
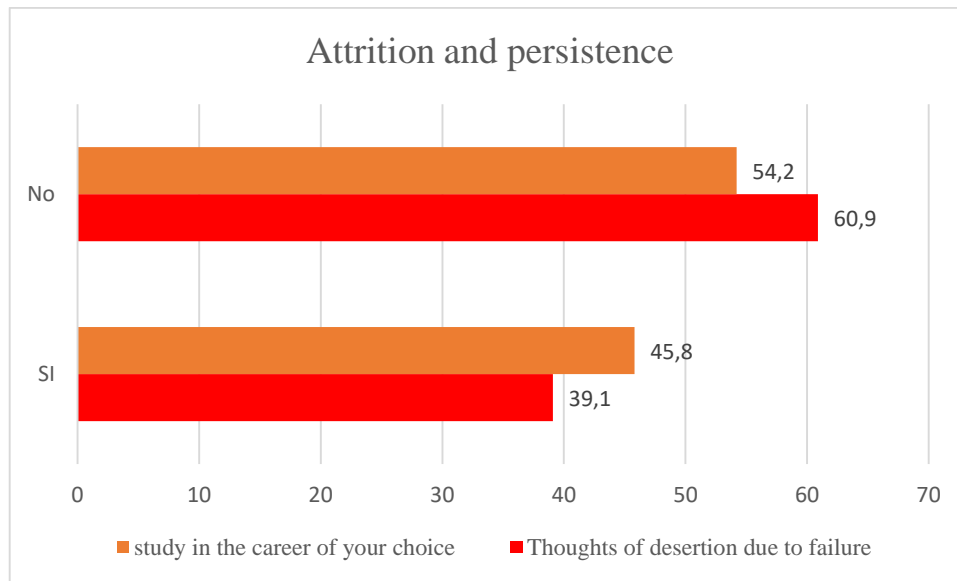
Figure 2. Percentages of dropout thoughts and studies preferred career. Source: (Author)

In addition, the students' assessment of the need for guidance in university education was specifically studied.

The question on the valuation of the need for university guidance in the following aspects: in the high school cycle, choice of university careers, university learning, academic itineraries, professional guidance and personal guidance. The responses are expressed on a scale of 1 to 5. In the data in Table 4, it can be observed and contrasted that the majority of participants value university guidance as "very necessary in all the variables proposed. This is followed by the responses of necessary and quite necessary. On the other hand, those who say that it is not necessary or not necessary at all obtain very low values.

Need	Nothing	Little	Fairly	Required	Much needed	Total
High School	24(5.9%)	66(16.3%)	77(19.1%)	82(20.3%)	155(38.4%)	404(100%)
Choosing a career	26(6.4%)	50(12.4%)	60(14.9%)	83(20.5%	185(45.8%)	404(100%)
Apprenticeship	24(5.9%)	59(14.6%)	68(6.8%)	78(19.3%)	175(43.3%)	404(100%)
Itinerary	25(6.2%)	52(12.9%)	74(18.3%)	91(22.5%)	162(40.1%)	404(100%)
Professional	33(8.2%)	49(12.1%)	51(12.6%)	86(21.3%)	185(45.8%)	404(100%)
Staff	33(8.2%)	71(17.6%)	81(20.0%)	74(18.3%)	145(35.9%)	404(100%)

4.   Table 4. Assessment of the need for university orientation

4. Discussion

In view of the results obtained in relation to prior knowledge for choosing university education (see Table 2), a large proportion of the students in the sample choose their careers without sufficient information for making this decision. Hence, the group of students consulted presented demands for training, information and academic-professional

orientation. These results have some similarities with those obtained by Salmerón et al. (2014) and Álvarez and Álvarez (2021).

The results found in relation to the motives that led them to opt for one or another university education show that the respondents valued, in the first instance, a part of their personal motives (my aptitudes, the value of knowledge), and their professional (secure job) and economic motives. Intrinsic and extrinsic motivations in this case are evenly matched in determining the choice. In fact, in the fashion study, extrinsic motivations are perhaps more relevant for taking this step. Data in partial agreement with other studies such as that of Llanes et al. (2021) or Conde-Vélez et al. (2022). In contrast, vocation and family have little presence in the choice of studies. Some of these results are similar to those obtained by Cortés and Conchado (2012) and Santana and García (2009). All these motivation profiles point to the need for guidance for students to clarify the different aspects of the career they are motivated to pursue, thus facilitating more free choices.

Both the results obtained on the decision they would make, if they had to choose education again, and on the current feelings that could lead them to drop out or continue are worrying. Specifically, the data obtained on whether they would choose the same studies again in the first instance shows the importance of including guidance and accompaniment programs between educational stages. As well as the results found on the large number of students who indicated that among their future options would be to drop out of their studies, either due to academic failure or because of a lack of preference in relation to the career studied. This data again shows the importance of personal orientation or academic-professional reorientation at this university level (Álvarez and Álvarez, 2021; Álvarez et al., 2011).

From the results obtained in relation to the assessment of the needs for university guidance, it is clear that this group of students feels, demands and values the need for guidance at the different stages of university studies. Results that coincide with research such as those of Sánchez (1999), Sánchez-Herrera, et al., (2005) or Rodríguez-Álvarez (2015) where studies demand orientation throughout their university journey.

5. Conclusions

According to the results of the research presented above, we can determine that:

In general, the greatest demands of the student body in this research are related to academic orientation, vocational orientation, professional orientation, personal orientation, and professional academic reorientation, before and during university studies. In relation to prior information for choosing a university career, the students in the sample lack sufficient information for this decision. Regarding this situation, the students in the sample suggest that the Faculties and University Schools provide them with this information. In relation to the reasons for the choice of studies, those of a personal, professional and economic nature stand out. Vocation and family have practically no influence on these decisions. This means resolving the information needs by a guidance professional in all aspects of the career according to each motivational profile.

The needs for information and academic and professional orientation of the career enrolled also stand out in the case of students who are entering university for the first time. The opinions of the students about the studies chosen at the time show personal dissatisfaction with these studies. Other demands for personal orientation are highlighted in the textual impressions of the questionnaires (physical health, social health, psychological health). Aspects not considered in our research will be taken into account in future research.

The high valuation of the need for university guidance in the results implies the level of need for guidance services felt by this group of students. The country has people with university training in school guidance and psychopedagogy, and they do not work as guidance counselors, despite the potential demand for their services in educational centers. Only the government and international organizations working on university guidance can make possible the implementation of these services in the student population in Equatorial Guinea.

The lack of background studies on the subject in our country has been an important turning point to contextualize the research to the context of analysis. However, this diagnostic research is already considered a reference framework for future research on the problem studied, from different methodologies and fields of study. The next studies to be carried out will deal with: a) The design of proposals for the creation of University Guidance Services in the UNGE, b) The design of proposals for the creation of Guidance Departments in the National Secondary Schools of Malabo and, c) A pilot study of collaborative work between the UNGE and the Guidance Departments created in the Secondary School, for the guidance in the processes of election of university degrees to students who will continue their studies at the university. The creation of a line of research on the problems of Guidance in Equatorial Guinea will also be taken into consideration so that students can carry out their undergraduate work on this subject. Although the data were collected in the 2013-2014 academic year, given the contextual events in the country and in the world arising from different economic and health crises, no progress has been made on guidance since the beginning of this study. Today, more than ever, it is still valid at the National University of Equatorial Guinea the data presented to continue on the path of orientation.

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Functionality of research competencies in the application of the Integrating Knowledge Project with undergraduate students

Funcionalidad de las competencias investigativas en la aplicación del Proyecto Integrador de Saberes con estudiantes de pregrados

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Resumen

El Proyecto Integrador de Saberes (PIS) con las competencias investigativas y el desarrollo del aprendizaje colaborativo de los estudiantes se presenta como requisito para superar el problema actual; ellos ya no desean seguir escuchando las disertaciones de sus docentes, sino participar activamente en la construcción de sus aprendizajes. Mirado así el problema, resulta importante, pues, es necesario lograr un cambio en la metodología desarrollada por sus profesores que durante mucho tiempo estuvo sustentada solo en la participación de ellos para que sus alumnos escuchen, tomen notas y se aprendan de memoria para rendir una prueba oral o escrita. Se ha realizado varios intentos de mejoramiento en las diferentes facultades de la Universidad Central del Ecuador, se ha introducido el desarrollo de talleres con el empleo de guías de aprendizaje, que solo se ha aplicado en la ejecución de esos eventos académicos. Sin embargo, para el desarrollo de la teoría, se continúa con la metodología tradicional. Se analiza la incorporación del PIS como una solución más profunda y como una estrategia de aprendizaje innovadora, que cambie el rol de docentes y estudiantes. Los primeros tendrán que asumir la formación de competencias

investigativas en sus alumnos, y los segundos tendrán que desarrollar el aprendizaje colaborativo. Los principales resultados obtenidos son una mejor interacción docente y estudiantes, que conduzcan a un cambio de la metodología utilizada. Las limitaciones que se presentaron fueron que los docentes, con mayor tiempo de experiencia se resisten a cambios innovadores; y los estudiantes, los más pesimistas, no deseaban asumir nuevos retos y compromisos.

Palabras clave

Aprendizaje colaborativo, competencias investigativas, disciplinas –integradas, proyecto integrador de saberes, vinculación-contexto.

Abstract

The Integrating Knowledge Project (PIS) with research competencies and the development of collaborative learning of students is presented as a requirement to overcome the current problem; they no longer wish to continue listening to the lectures of their teachers, but to actively participate in the construction of their learning. In this way, the problem is important, since it is necessary to achieve a change in the methodology developed by their teachers, which for a long time was based only on their participation so that their students would listen, take notes and learn by heart in order to take an oral or written test. Several attempts at improvement have been made in the different faculties of the Central University of Ecuador, the development of workshops has been introduced with the use of learning guides, which has only been applied in the execution of these academic events. However, for the development of theory, the traditional methodology continues. The incorporation of the PIS is analyzed as a deeper solution and as an innovative learning strategy that changes the role of teachers and students. The former will have to assume the formation of research competencies in their students, and the latter will have to develop collaborative learning. The main results obtained are a better interaction between teachers and students, leading to a change in the methodology used. The limitations that were presented were that the teachers, with more time of experience, are resistant to innovative changes; and the students, the most pessimistic, did not wish to take on new challenges and commitments.

Keywords

Collaborative learning, research competencies, integrated disciplines, knowledge integration project, context-linkage, etc.

1. Introduction

The research developed revolves around the functionality of research competencies in the application of the PIS with undergraduate students. The problem has been specifically addressed by trying to answer the question: how does the application of the PIS influence the development of research competencies? To find an answer, this study was based on the perception of students regarding how the application of knowledge integration projects influences the learning of research competencies, and how it contributes to the future professional pedagogical performance of undergraduate students of the Faculty of Philosophy, Letters and Educational Sciences, Universidad Central, Quito, Ecuador.

With this background it is determined that the nature and scope of the investigated problem are around the great university aspiration that is to train professionals in all areas of knowledge to assume the commitment to build functional scientific thinking, and thus respond to current demands (Alarcón et al., 2021; Lema et al., 2022). Scientific research

becomes an essential expertise of teachers and students, who in the teaching-learning processes must transcend the educational practice with autonomy and freedom of expression, based on deep reflection processes.

Considering that research competencies are the key to the new methodology, research promotes the development of research skills in students through: fostering curiosity, critical spirit, inquiry, analysis and reflection. The incorporation of research projects in the curriculum where they explore topics of their interest; the encouragement, collaboration, and teamwork allow them to share ideas, collect and analyze data to present the results jointly; promotes their participation in conferences, and the publication of research papers that favor the mentoring of teachers as experts in their field.

From this point of view, the problem is very important, since it is necessary to overcome methodologies that have ruled for a long time in university teaching, under the premise that teachers only had to prepare well the oral dissertations before their students, and the students had to remain very attentive, silently take notes, which then had to be memorized and presented in an oral or written test. With the current research proposal, the main idea of what we intend to do is to promote the importance of PIS to structure interdisciplinary contents that are articulated with the development of capacities and skills in the cognitive, affective and social areas. This will lead to criteria of curricular flexibility and knowledge that link the university with society within the framework of the defined productive needs, with student participation through scientific research based on a humanistic paradigm of innovation and integral formation of the human being. As a methodological and evaluative research strategy, the PIS is based on the approach and solution of problems related to professional practice and quality of life; for this it requires the articulation of subjects of the level, and career, in teamwork with a systemic vision to discover the connections that the curricular proposal of each discipline raises with concrete learning operations decided with student participation in the construction of new and complex knowledge. In this way, the Universidad Central del Ecuador, Faculty of Philosophy, Literature and Educational Sciences, is framed with its mission in the objectives of the PIS by:

> To train professionals in Educational Sciences, in a humanistic, integral, secular, interdisciplinary, scientific and technological manner, with social, ethical and cultural awareness and commitment; through critical reflection, research and linkage, for the solution of socio-educational problems, with a focus on rights, interculturality, inclusion and equity (Universidad Central del Ecuador, 2020, p. 17).

In this position, the Faculty of Philosophy, Letters and Educational Sciences n:

> It responds to the guidelines of the Secretary of Education, Science, Technology and Innovation (SENESCYT).

> It responds to the guidelines of the Secretary of Education, Science, Technology and Innovation -SENESCYT- which, as an entity of the Ecuadorian government, has the obligation to govern public policy in the areas of its competence. In compliance with its mission, it created the Proyecto Integrador de Saberes -PIS- as a teaching methodology and a learning strategy for the development of research competencies through the approach and solution of professional problems with collaborative work groups (Nivela et al., 2019).

As a consequence of the above, a set of research questions arise. The most relevant are:

- What is the new role that teachers should develop?
- What research competencies should students assume?
- Will the scientific and methodological basis of the PIS be fully accepted by the members of an educational community?

As in all research work, this proposal has some limitations; in the present case, the most latent element is the age and length of service of the teacher; the more experience he/she has in his/her classical conception of teaching, the more difficult it will be to convince him/her to assume a new didactic position. In the case of students, it will be complex to embark them on new processes that demand responsibility and effort in the initial stage, but later they will accept it willingly. The purpose of the article is to contribute with innovative ideas to achieve students with a spirit of research more supportive and committed to their environment, it is no longer the simple repetition of what they have learned in theory, but it is the emergence of their ideas and creativity to accept that their commitment is social in favor of human beings located in a certain context.

This article has been developed considering the following aspects: introduction; literature review: PIS, research competencies, linkage with the context, integrated disciplines, collaborative learning; methods and materials; results; discussion of results; conclusions. Finally, acknowledgements and bibliographical references.

2. Literature review

2.1 Knowledge Integration Project - PIS

It is a strategy that seeks to change the style of teaching and learning in educational centers. Precisely, Rodriguez-Borges (2020) states that:

> The PIS as a methodology is based on the search for strategies and resources to put into practice the theoretical contents taught in the classroom, through an interdisciplinary research project that allows the integration of knowledge and skills of the discipline of the career. The current economic and social context requires professionals with socioemotional skills to work in multidisciplinary teams. Given this demand, the PIS as a methodology becomes ideal, since students must investigate, hypothesize and then provide a solution to a defined problem, from a role of innovators and entrepreneurs, from which they are able to apply knowledge to transform and create, supported by the institution of which they are part, facilitating the development of professional skills and collaborative work (parr. 2).

The PIS seeks to unite theory and practice, in this search, to strengthen the research competencies of students to create in them the predisposition to be entrepreneurial and seek solutions to the problems they face in their university studies and in their future professional practice. Torres (2019) expresses a relevant issue as a previous step to the adoption of the PIS:

> The training process has been fundamentally focused on teaching, in which the only one who knows is the teacher, who transmits his knowledge to the students of what he knows or has mastery of, with traditionalist strategies. On the other hand, students assume a passive

> attitude towards their learning, they become mere receivers of information and repeaters of what they have learned, the master class predominates and the evaluation is focused more on the result than on the process (p. 63).

This methodology is no longer desired by students, who prefer to be more participatory entities during the teaching and learning process. The PIS as a methodological strategy contributes to the formation of professionals capable of facing the challenges of today's world, and who can apply their knowledge in real situations (Pereira, 2019). PIS fosters creativity, innovation and allows students to develop a global vision of their profession. Toapanta-Pinta (2021) emphasizes that "the knowledge integration project (PIS) is a research exercise under teacher mentoring, where the student acquires knowledge; it constitutes a new teaching-learning methodology" (para. 1). It is reiterated that it is a new teaching-learning methodology based on teacher tutoring. It implies that the two fundamental actors: teachers and students must be predisposed to a change of methodology.

2.1.1   Phases of a knowledge integration project

The PIS is carried out in three fundamental phases: preparatory, development and evaluation of results.

Preparatory phase, with some emerging actions: analysis of the curriculum at macro, meso and micro levels; determination of the current situation in the career; formulation of the contents to be integrated with the identification of theories, knowledge and competences; designation of tutors to carry out the process with their due training.

Development phase, which basically covers the elaboration of the project, its implementation and development in practice, assuming the successes and difficulties that will arise, for which it should be socialized among all participants.

Results assessment phase, as a very responsible activity, the results, both positive and negative, should be presented in order to receive feedback from all those involved and at the same time motivate to continue incorporating more participants in the process (López-Peña, 2017; Torres et al., 2020).

It is a process that responds to the main stages of an innovation project. The initial conditions must be analyzed to specify the situational state in which the venture is taken, and in accordance with this reality foresee what must be considered to ensure future success. This is followed by the execution phase; during this stage, all the successes and difficulties encountered should be socialized. Limitations are aspects that, if well managed, motivate and involve most of the participants. To reach the last stage, in which all the results obtained should be externalized, in order to have a valuable input for the future.

2.1.2 Advantages of the application of the knowledge integration project

The knowledge integration project constitutes a valuable contribution to the curricular innovation of the different careers of the Faculty of Philosophy, Literature and Education Sciences of the Universidad Central del Ecuador, because:

> The PIS is an innovative proposal that facilitates student participation in research processes.
>
> It uses critical pedagogy to facilitate the relationship between research, teaching and community involvement.

It allows gathering the reality of educational institutions regarding their problems and difficulties.

It contributes to the professional training of future teachers through collaborative work.

Develops students' critical thinking, linking them with the educational reality from the beginning of their studies.

It emphasizes research as an element of reflection of the educational reality.
It considers self-evaluation, co-evaluation and heteroevaluation processes in the evaluation (Calderón-Guevara et al., 2021, pp. 10-11).

2.1.3 Limitations in the application of the Knowledge Integrating Project

These same authors are very self-critical when they express a series of difficulties that arise during the implementation of an ISP. They are listed below:

There are no precise procedures to evaluate the progress of an Integrating Knowledge Project; they must be elaborated with the direct participation of teachers and students.

Research skills must be developed, considering that students are subjects that must be gradually trained in this area.

It is necessary to deepen the knowledge of interdisciplinarity as the axis of development of a PIS.

It is difficult, in certain occasions, to overcome the separate vision of the subjects, on the part of the teachers; for the students there has been no other vision.
It is difficult for teachers and students to work in a different way, they break their previous schemes (Calderón-Guevara et al., 2021, pp. 10-11).

2.2 Research competencies

In the application of the knowledge integration project, research competencies are a key element in the activities of teachers, students and the educational community. In the pedagogical pre-professional practice of higher education, they are a transversal component that generates teaching-learning experiences by discovery and construction of knowledge, focused on the potential of each student (García-Gutiérrez and Aznar-Díaz, 2019; Torres et al., 2019).

The indispensable research competencies for future higher education professionals may vary according to authors, theoretical perspectives and methodological requirements. Those identified in recent literature stand out: research design and development, use of tools and technologies, effective communication, critical and reflective thinking, teamwork and collaboration, ethics and responsibility (Hernández et al., 2019; Perozo et al., 2019).

In the different careers and specialties of higher education "it is necessary to strengthen the research competencies of teachers, so that they build in their daily pedagogical practices an

investigative environment, that they are concerned about educational innovation and their own self-training as professionals" (Perozo et al., 2019, p. 93). These investigative competencies have an "integrative character, they develop cognitive, affective, and procedural dimensions that enhance a positive attitude, interest, self-confidence and self-regulation" (Erraéz et al.,2020; Ravelo at al., 2019). In school classrooms, the application of these competencies enables students in the fulfillment of their pre-professional practices to learn to be critical, reflective and autonomous by acquiring skills and abilities to discover, investigate and construct knowledge (Álvarez, 2019; Buendía-Arias et al., 2018).

In the learning process, research competencies are acquired and perfected in a sequential and permanent manner. The following lines explain those suggested for students in early childhood education, basic general education and unified general baccalaureate. Specific primary competencies for children in initial and general basic education: observation and recording, formulation of questions, collection and organization of information. Their learning builds capacities to elaborate accurate descriptions of what they see, especially of their immediate world, develop inquiry and curiosity skills, identify problems and pose solutions with skills to communicate their findings and ideas orally or in writing with clarity and coherence (Buendía-Arias et al.,2018; Coral, 2021).

The competencies for baccalaureate students vary depending on the discipline and area of study. Its objective is "to connect domain-specific educational research with the development of teaching practices. Its basis, is the systematic use of empirical research evidence that connects to transformative teaching actions" (Rodelo et al., 2021, p. 289). The most important research competencies are: identification of the problem, search for relevant, pertinent and updated information, research design and planning, data collection and analysis, interpretation and discussion of results, communication and dissemination of results (Zacarias, 2021). At the conclusion of the PIS application process, it is expected that teachers in training develop competencies to question, observe, reflect, with propositional, technological, interpersonal and communicative skills because new professionals should not only possess the working knowledge of their area, but and above all, demonstrate abilities, attitudes and skills, which allow them to discover problems, and creatively propose possible solution alternatives, based on the knowledge incorporated in their professional training (Márquez-Specia et al., 2019). In this regard, Butigué et al. (2021) state that.:

> For teachers in this knowledge society, where information and technological advances are occurring at an ever-increasing speed, it is essential that teachers possess research skills in order to be up-to-date and offer a quality education to their students because research skills allow teachers in interaction with students to identify educational problems, design research projects, collect and analyze data, and draw conclusions and recommendations based on evidence (p. 84).

The learning of research competencies is done through pedagogical strategies that facilitate the application in pre-professional pedagogical practice, activating factors such as motivation, usefulness for life, problem solving. In addition, it is important to consider that its teaching should not be isolated, it should be integrated in the teaching-learning process in a transversal way.

2.3 Linkage with the context

In the PIS, the linkage with the context opens spaces for local, regional and global communication. It is a structural element in the formation of students, it supports: the

positioning of universities in the immediate context, the knowledge of the political, socio-cultural and economic reality of the country, the teacher-student interrelation with research and dissemination of scientific and technological knowledge in professional practice. In the social field, "Higher Education Institutions (HEIs) are agents that adapt to global demands according to their capabilities and the opportunities provided by the environment" (Atrizco and Martínez, 2022, p. 2). The academic practices of university-society linkage are recognized in agreements that urge HEIs to become actively involved in solving the social, environmental and sustainable development challenges of their respective countries and communities (CRES, 2018). The UN 2030 agenda for sustainable development highlights the importance of universities in achieving the sustainable development goals and requests HEIs to contribute to the solution of global challenges (Andrade et al., 2020).

Also, legal instruments recognize the value of the link with society: Organic Law of Higher Education (LOES), "Art. 13. The functions of the Higher Education System are: a) To guarantee the right to higher education through teaching, research and its link with society, and to ensure increasing levels of quality, academic excellence and relevance..." (SUPERIOR, L. O. D. E., 2018, p. 18). General Regulations LOES Art. 24.- Liaison with society. - The linkage with society refers to the planning, execution and dissemination of programs and projects that guarantee the social responsibility of higher education institutions and their effective participation in society in order to contribute to the solution of the needs and problems of the environment, from the academic and research environment (León et al., 2019).

In practice, the Faculty of Philosophy, Letters and Educational Sciences identifies the needs and problems of the context, establishes strategic alliances with social organizations, institutions and local businesses, designs projects that involve students in their implementation and evaluates the results on an ongoing basis to determine which are the most urgent needs for solution (Peralta, 2020)..

At the international level in the United States and Europe, the following are successfully developed: service-learning; professional internships in real contexts; volunteer programs and participatory research are programs that allow students to acquire competencies and skills for their future professional practice (Serrano and Roig, 2018).

As can be seen, the importance of the linkage is one of the university's tasks that is growing as the practice experiences advance and become more generalized in that:

> in the context of Ecuadorian higher education, the link with society has become a factor of interaction and strategic intervention in the local, regional and national socio-political and cultural development, making possible a high quality training that tends to excellence and relevance of the Ecuadorian Higher Education System and consequently of its students in training and graduates (Barreno et al., 2018, p. 44)..

The link with society is thus a permanent challenge for HEIs because it has created social relevance in pedagogical practice. In this research they have experienced new perspectives of action that teachers and students are inserting in their daily actions as new work alternatives or perhaps as lines of research. The pending challenges are enunciated with an approach of activities that are to be fulfilled: to create work connections between the productive and educational sectors, respecting the social needs of the community, their knowledge, an element that will generate empowerment, from the pre-professional training

of students and in the pedagogical practices of academics, a means to become aware of the reality in the solution of problems at local, regional and national level (Valencia, 2021).

To propose projects that allow understanding linkage as a social and human phenomenon, and a transforming activity that is constituted in the process of change of (HEIs) with an integrative approach (Barreno et al., 2018). Organize projects that allow the incorporation of strategic alliances of inter-institutional cooperation to manage the linkage with society in places that require external support due to their precarious reality (Ayala and Sanchez, 2021). Train those responsible for the operation of the system of linkage with society, in a conceptual and technical manner with the participation of all sectors of society. Create research councils that systematically gather the opinion of the social and productive sectors to create new lines of research and enrich the policies established by the authorities and bodies responsible for coordinating the linkage with society in the HEIs. Organize events: workshops, talks, presentations, congresses, at national and international level, for the exchange of successful experiences of linkage in higher education, so that the socialized production becomes a theory of linkage with society in a work of social praxis. The linkage with society as:

> One of the challenges of higher education is to solve and dissipate these challenges through the interaction of university students, authorities and teachers in general, who are in charge of executing projects that are duly planned, organized, executed, controlled and the respective follow-up of this process (Once et al., 2020, p. 251).

The research shares the need to plan processes that relate academic aspects, research and linkage with the context, as interdependent elements to prepare future professionals with an integrative approach that will allow them to put into practice what they have learned in the future, in accordance with the provisions of relevant laws and regulations.

2.4 Integrated disciplines

In the process of curricular organization, the integration of disciplines is an educational approach that changes the current paradigm, it seeks to integrate different areas of study to "show them a holistic view of knowledge, presenting cores of content analyzed from different areas of knowledge" (de Pablos et al., 2019, pp. 150-151). To achieve this objective in the knowledge integration project, it was necessary to develop interdisciplinary activities that involve teachers and students in the structure of the learning topics.

The process was planned in two stages: the first to raise awareness of the need to change teachers' opinions, an aspect that was complex and required a continuous and sustained effort; the second with the objective of planning the curricular development of each specialty in the different careers with the participation of pre-professional practice students. The basic activities are summarized below.

First stage:

▪ Organize interdisciplinary workshops and meetings. The events are an opportunity for teachers from different disciplines to discuss and share existing experiences on curriculum integration (Majjul, 2022). It is important to highlight the use of various tools and strategies to address integration in the classroom.

- Apply interdisciplinary research. Research competencies motivate the management of a set of activities in which teachers from different disciplines participate around a topic of common interest (Zapata, 2021). Interdisciplinary research projects involving teachers and students from different careers and specialties are planned.
- Create interdisciplinary working groups. The interrelation between teachers from different disciplines is an opportunity for them to meet on a regular basis to discuss and develop curricular integration activities. These groups are led by teachers committed to integration, collaboration and teamwork (Guzmán, 2019).
- Encourage interdisciplinary feedback and evaluation. The results generate curricular tools for the integration of disciplines, and also allow socializing experiences on joint activities as a basis for the sustainability of the Integrating Knowledge Project with a creative approach to improve the quality of education (Jarquín, 2022)..

The importance of planning with integrated disciplines is recognized for a change in the culture of teachers and students of higher education, where it is necessary to manage an updated theoretical framework as a support tool in the curricular work of each career and specialty (Torres et al., 2021).

The practice experience allows discovering that the concept of integrated discipline is a key element of the interdependence of the factors to be integrated, establishes the points in common, creates fabrics that reinforce the union networks, generate adhesion without agglutinating or bundling them because they organize the learning contents through a curricular planning that works as a system (Medina-Zuta and Deroncele-Acosta, 2019).

Second stage:

- Conduct interdisciplinary research projects. Students work together to analyze a topic in depth, based on the results of research in pre-professional communities of practice: they use tools and knowledge from different areas to do so (Ramos, 2015).
- Participate in interdisciplinary discussions: Students discuss current or controversial topics from the theoretical assumptions of each subject of study to foster understanding and respect for different points of view depending on the specialty (Jarquín, 2022).
- Prepare interdisciplinary simulations: Students simulate complex situations that require the collaboration of different disciplines for their resolution. It is worth highlighting the positive results of this activity, especially due to the tutoring provided by the teachers of the different curricular disciplines (Lescano, 2020).
- Elaborate community service projects: Students develop projects that address real problems of the practice sites with the management of knowledge from different areas to find innovative solutions (Jácome-León and Ilvis-Vacacela, 2020).).

The process of disciplinary integration is a formative methodology because at the same time that it teaches, it allows the application of what is suggested in the theory. It is based on the following principles that enhance the organization of integrated disciplines with a holistic approach: principle of attention to the foreseeable professional profiles required to determine the competences proper to the profession; principle of oral, written communication and interpersonal relations, it refers to creating a culture of debate, exposition of results, teamwork and development of scientific work; principle of attention to the specificities of science that propitiates to raise optional subjects where the most updated contents are reflected for the resolution of real problems (Medina-Zuta and Deroncele-Acosta, 2019).

Teachers recognize the importance of integration activities for their results in relation to the academic development of students because they become authors of the Integrating Knowledge Project with teacher mentoring, mobilize a set of resources, value and evaluate the achievement of their competencies and understand that planning with integrated disciplines is an action of "metacognition conceived as a structure where the multiple skills, abilities, knowledge and competencies that teachers need for their performance as teachers have a place" (Torres et al., 2021, p. 135).

2.5 Collaborative learning

The main element for incorporating new teaching-learning strategies in Ecuadorian higher education is the introduction of collaborative learning, which, in essence, is to form teams among students of a subject in the curriculum of a career to take on a problem, search for scientific information, jointly determine causes and consequences of that problem, and build the alternative or alternatives for a solution. The role of the teacher in this new methodological position is to help the organization of collaborative learning groups among students, providing them with updated scientific information.

In this regard, Guerrero and del Campo (2019) state that.:

> Collaborative learning activities include, among others: knowledge integration projects, construction of models and prototypes, problem solving and problem or case resolution projects, systematization of research and intervention practices, which include learning methodologies, with the purpose of promoting the use of diverse information and communication technologies, as well as network methodologies, on-site tutorials or virtual environments (p. 134).

Collaborative learning presents a variety of situations to develop it, all aimed at greater student participation. Morillo (2021) states that "collaborative learning has become a much more suitable way of acquiring new knowledge. This educational approach seeks to enable people to learn actively, but in direct contact with other individuals with particular interests" (para. 1). It is a way of learning in communion of objectives, ideas, and interests among students at the same level. On this level, the teacher's role is different. They must provide them with updated, varied and valid information so that their students can incorporate new knowledge.

Another author clearly maintains that there is a direct relationship between the development of a knowledge integration project and collaborative learning. Rodriguez-Borges (2020) states that:

> The PIS as a methodology becomes ideal, because students must investigate, hypothesize and then provide a solution to a defined problem, from a role of innovators and entrepreneurs, from which they are able to apply knowledge to transform and create, supported by the institution of which they are part, facilitating the development of professional skills and collaborative work (p. 240).

These authors insist that the PIS provides the theoretical and methodological basis for students to take on the challenge of facing a problem in their environment, which is curricularly linked to one or more subjects of the course they are studying, and to do so through the use of collaborative work. This task involves the students in the search for the antecedents and consequences of the problem and the proposal of possible solutions.

In summary, collaborative learning has some characteristics: it is based on the interaction of the members of the group; it achieves synchrony of interaction. Each member of a collaborative learning group reflects and issues value judgments on the achievements obtained in collaborative learning; there is a positive interdependence, the effort of each group member benefits everyone equally. A commitment to group success is created, individual achievement does not appear; it produces a stimulating interaction, all members of the group must share the information found and analyze together the possible benefits in favor of the work they are developing; they must work to achieve consensus around the purposes that have been set. This type of learning enhances individual and group responsibility, which gradually benefits the consolidation of a climate of trust (Damián et al., 2021; Jaramillo-Valencia and Quintero-Arrubla, 2021; Sepulcre, 2021; Sepulcre, 2021).

At the end of each stage of the process, the teacher must know how to lead the students, so that they carry out a group evaluation, not an individual one, and thus avoid competitive processes. It is worth highlighting the benefits that collaborative learning offers, in a very specific way, it can be stated that gradually decreases the fear of new learning, students gain confidence that everyone grows. In addition, it develops critical thinking, as each of the students express their ideas, not in a mechanistic way, but with arguments that make their way of thinking known. Consequently, with this position, the teacher must ensure that, for the fulfillment of a task, all students must assume the commitment; for this purpose, he/she will be prepared in the search for stimulating actions so that all participate with enthusiasm from their possibilities. What must be avoided is the emergence of gifted positions.

The detractors of this learning strategy put forward three key ideas: the participants with a lower development of potentialities will be disadvantaged, they will not be able to catch up with the more advantaged ones. Another detrimental aspect is that teachers, in some cases, are not prepared to lead this process and avoid leaving their comfort zone, give their classes orally, and not all institutions have facilities to make virtual strategies available.

3. Methods and materials

The research work was carried out under a quantitative and qualitative approach, with the purpose of collecting impressions and thoughts of students and teachers. The survey technique was used with the students and its instrument was the questionnaire, while for the teachers the interview technique was used with its respective guide. In order to make this decision, precise information was sought from renowned authors, as Hernández-Sampieri (2020) states that "the research problem under the quantitative approach allows analyzing phenomena, emphasizing their quantitative dimension, as well as describing these phenomena from the point of view that they have already been explored" (p. 26). Objectivity in the interpretation of the results is determined with numerical information, synthesized in frequency tables, percentages and graphical representation, which allows establishing comparisons and exposing future projections, based on previously collected data.

In qualitative research, Fuentes-Canosa and Collado (2019) indicate that in this approach "the processes of creation and organization of knowledge have an essential communicative component, which makes it possible for more users to access and take advantage of this knowledge" (p. 159). It is also explained that in all scientific research there must be validity and reliability criteria, related to: reflexivity, previous experience of the researcher in the study context; credibility, permanence of the researcher in the study center; transferability, possibility that the results can be applied in other contexts; dependence, that the research can be repeated in other environments with the same instruments; and, confirmation,

presentation of evidence in fragments of the discourse collected in the interviews (Diaz, 2019). In Table 5 of results, the ideas expressed by the teachers in the in-depth interviews are visualized, in which what was expressed by (Diaz, 2019) is confirmed. Quantitatively, 714 students of the Faculty of Philosophy, Letters and Education Sciences, of the Central University of Ecuador were investigated, classified into 523 males and 191 females, these students, with a questionnaire of 13 questions, each one with four alternatives to issue its corresponding answer. The questionnaire initially posed questions related to the sociodemographic dimension: gender, age, career, semester in which they are located, whether they work or not, if they work whether they are located in an area related to what they are studying, place of birth. These students came from the careers in which they were selected. Data visualized in Tables 1, 2, 3 and 4 of the results.

In the qualitative research, the teachers were selected from the following careers: Early Education, General Basic Education, Educational Psychology and Guidance, Pedagogy of History and Social Sciences and Pedagogy of Experimental Sciences, Mathematics and Physics, after receiving an initial explanation, they expressed their informed consent and commitment to confidentiality. The questions referred to the different aspects of the knowledge integration projects, as follows:

- What are the most significant aspects of the knowledge integration projects for the future professional performance of your students?
- How do you integrate the disciplines of the different subjects of the syllabus for the integration of knowledge?
- Which research competencies helped the students in a more significant way in the development of the knowledge integration projects?
- List the aspects that most hindered the development of research competencies in the knowledge integration projects?
- From your experience, what would you suggest to improve the current processes of the knowledge integration project??

There are similar opinions in the responses, so the most relevant ones were selected, as explained in Table 5. The answers were very enriching, the teachers responded in a broad manner.

4. Results

Table 1 shows the students' perception of how the application of the PIS contributes to the learning of research competencies, as evidenced by the results of the following questions.

Alternative	Quantity	Percentage	Rounded percentage
Always	267	37.4 %	37 %
Frequently	292	40.9 %	41 %
Occasionally	141	19.7 %	20 %
Never	14	2.0 %	2 %
Total	714	100 %	100 %

Table 1. Did the PIS, the teacher developed with his participation and allowed him to acquire research competences?

The results showed that 78% of the respondents (between the options of always and frequently) stressed the importance of student participation in the development of research competencies, while 22% responded with the options of occasionally and never. Data that

confirmed that learning is preparing for life with the acquisition of research competencies, to face problems, solve them and participate directly in the satisfaction of achieving academic achievements. Table 2 showed that the previous integration of disciplines supported learning in a functional way.

Alternative	Quantity	Percentage	Rounded percentage
Always	240	33.6 %	34 %
Frequently	334	46.8 %	47 %
Occasionally	122	17.1 %	17 %
Never	18	2.5 %	2 %
Total	714	100 %	100 %

Table 2. With the application of the integration of disciplines, does learning become more functional?

Thirty-four percent of students placed themselves in the option always; 47% in frequently; 17% in occasionally and 2% in never. These results are analyzed from a double perspective: that of teachers empowered with the integrative model, who constitute an example recognized by their students. And that of the teachers who wish to maintain their comfort zone, issuing their knowledge orally, as the sole owners of scientific knowledge, where most of the students no longer wish to continue. Table 3, referring to the use of the PIS by the teacher as a collaborative learning strategy, facilitates the organization of work teams, optimizes the relationship between teachers and students with the attainment of achievements that improve learning results and enhance the performance of each team member, eliminating competitive positions.

Alternative	Quantity	Percentage	Rounded percentage
Always	350	49 %	49 %
Frequently	253	35.4 %	35 %
Occasionally	91	12.7 %	13 %
Never	20	2.8 %	3 %
Total	714	100 %	100 %

Table 3. Is the PIS used by your teacher as a collaborative learning strategy applied by organizing work teams?

Forty-nine percent stated that this strategy is always applied; 35% selected the option frequently; 13% the option occasionally and 3% responded never. It was evident that most of the students supported collaborative learning, where, divided into small groups, they developed their research potential, determined the background of a problem, envisioned its possible consequences and collectively established tentative solutions. Table 4 shows that the PIS prepared students to participate in leadership and community outreach processes when they graduate from the program.

Alternative	Quantity	Percentage	Rounded percentage
Always	311	43.6 %	44 %
Frequently	267	37.4 %	37 %
Occasionally	109	15.3 %	15 %
Never	27	3.8 %	4 %
Total	714	100 %	100 %

Table 4. Is the PIS a vehicle so that when you graduate from the program you will be able to lead processes of innovation, transformation and linkage with society?

The option of always was answered by 44 %; frequently was answered by 37 %; occasionally answered by 15 % and never was the answer assumed by 4 %. The difference between the majority and minority options is notorious, which is favorable for locating leadership processes. It is reiterative the confirmation that the development of the PIS will influence pre-professional preparation, an innovative methodology that trains them sequentially and continuously to acquire knowledge, skills and competencies that will facilitate the task of leading community participation processes in their future performance. Consequently, teachers must be prepared to coordinate the elaboration of the different projects in the field work, linking the members of the immediate environment in the analysis of the problems as a key element of the university-society linkage. Table 5 shows the results of the criteria expressed by the teachers in the in-depth interviews (qualitative approach) through an interview guide, whose comments are summarized as follows:

In-depth interview guide	Teachers interviewed	Comentaries
1. What are the aspects of the PIS that are very significant for the future professional performance of your students?	Pedagogía de las Ciencias Experimentales: Matemática y Física Psicología Educativa y Orientación Educación General Básica	I conceived the teaching of Mathematics and Physics in a different way, putting the knowledge in function of the community reality. PIS as a methodology is ideal because students investigate, hypothesize and solve specific problems with mutual agreements. It contributes to the training of professionals by confronting them with the challenges of today's world by applying their knowledge in real situations.
Which research competencies helped students most significantly in the development of the PIS?	Initial Education History and Social Sciences Pedagogy Experimental Sciences Pedagogy: Mathematics and Physics	Special emphasis on: posing questions in simple language; selection of updated scientific information; and learning strategies for data interpretation. Strengthening of research competencies with an integrating character of the active cognitive and procedural dimensions. I learned to work with a holistic vision of knowledge integrating content cores.
What are the aspects that most hindered the development of research	Pedagogy of History and Social Sciences Educational Psychology and Guidance	The aspects that made it difficult can be summarized as: difficulties in formulating research questions; and, inexperience in the interpretation of results.

competencies in the PIS?	Pedagogy of Experimental Sciences: Mathematics and Physics	Applying interdisciplinary research, teachers did not agree on integrating curricular activities. Poor ability to demonstrate professional skills in collaborative work. Linking pedagogical practice with the needs of the immediate community environment.
According to your criteria, which aspects applied by you contributed the most to the success of the students in the application of the PIS?	Educational Psychology and Guidance Initial Education	Rescue the importance of psychological knowledge by providing constant and timely feedback throughout the process, as well as fostering collaboration between students, teachers and the community. To propose projects that raise awareness about the reality in the solution of local problems.

Table 5. Teachers' comments in the in-depth interviews.

4.1 Triangulation of esults

It consists of a methodological strategy that guides the reception of data to strengthen the reliability and validity of the findings. Below is a matrix that correlates the quantitative data from the student questionnaire with the qualitative data from the in-depth interviews with teachers. In both cases, the most relevant information has been selected

Objective	Ítems de Resultados		Correlation
	Students	Teachers	
To determine the theoretical foundations that support the PIS in the initial formation of students of the Undergraduate Careers of the Faculty of Philosophy, Letters and Educational Sciences.	5, 12, 13	2, 9, 10	Both students and teachers prioritize: • The formation of learning communities to apply the theoretical foundations of the PIS in the training of future professionals. • The interrelation of disciplines to favor the transformation of the educational process. • The importance of monitoring and innovation in the improvement of processes.
To verify if the learning of research competencies generates appropriation and integration of knowledge in the learning outcomes. .	4, 6, 9, 10	1, 3, 7	Teachers give importance to the PIS as a tool for learning research competencies that facilitate interdisciplinarity between contents of different subjects. This criterion is also shared by the students who ratify its importance in the learning outcomes.
Value the experiences developed in the PIS with collaborative learning as a contribution to the improvement of the curricular proposal.	7, 8, 11	4, 5, 6, 8	Collaborative learning makes students the actors of their own learning. Most students prioritize the effectiveness of collaborative learning; however, 13% request that lectures be replaced by team work with teacher-student interaction. Data confirming the consistency and convergence of the information collected.
What are the pedagogical strategies that you applied to achieve the linkage with the community context in the implementation of the PIS??	General Basic Education Pedagogy of History and Social Sciences		Carry out some pedagogical strategies, including constant accompaniment in the process, timely and accurate feedback with the creation of opportunities for collaboration among them. Organize workshops and discussions to socialize successful experiences.

Table 6. Correlation of Results

5. Discussion

The research data from both teachers and students prove that the PIS is a methodological strategy for the permanent transformation of the educational process with strong support for the development of research skills. They reaffirm what has been expressed by researchers that "research skills constitute a demand in the training process in the university student..., the knowledge society... demands new profiles to address the requirements of an increasingly demanding occupational market and in accordance with its needs" (Barbachán et al., 2020, p. 96). This pre-professional preparation allows them to develop their creativity and innovation, skills that are essential for their future performance, in any field that requires the ability to solve complex problems creatively.

Also, the research confirms what is expressed by Torres et al. (2019) who consider that "initial teacher education must go through an internal process of reorientation and personal transformation, which takes advantage of and builds on previous acquisitions and precedes lasting and sustainable external change" (p. 47), because it links theory with practice in the development of research competencies, which "enable teachers in interrelation with students to identify educational problems, design research projects, collect and analyze data, and develop conclusions and recommendations based on evidence" (Butigué et al., 2021, p. 84). This experience is confirmed by (Guzmán , 2019; Herrera-Durán and Castro-Carrasco, 2021). The PIS with the development of research competencies becomes an innovative strategy that confirms what is stated by UNESCO (2009) which defines, in general terms, competence as: "the educational strategy based on the identification, evidencing and learning of the knowledge, skills, attitudes and behaviors required to perform a specific role, exercise a profession or carry out a given career" (p. 1).

Regarding Collaborative Learning (CL), the results are an important finding because "CL is directly and systematically related to the practical component..., in works that integrate the contents of the subjects in the form of projects" (Guerrero and del Campo, 2019, p. 136). Its effectiveness is confirmed by a teacher of the Faculty when in the in-depth interview he expresses: "collaborative learning... is overcoming the conception of the teacher who only gives expository lectures..., his new role is that of a trained guide..., to form collaborative groups..., that exchange opinions among students who are the builders of their knowledge" (Results of the interviews developed with teachers, 2022, p. 199...).).

6. Conclusions

The research values the functionality of research competencies in the application of the PIS with undergraduate members and becomes a proposal that deserves to be incorporated as suggested by SENESCYT, since it requires a set of "more accurate methodological and research supports, so that, from a curricular fabric, harmoniously built, it guarantees the approach to science with a sense of social responsibility and knowledge production, which is enriched from experience and transformed into it" (SENESCYT, 2013, p. 1; Quinatoa, 2019; Registro Oficial N°227, 2023).

The research provided an answer to the problem of how to go from theory to practice, based on the theoretical assumptions established by different national and international organizations and the UCE itself, on how to reach agreements between careers to apply what is foreseen by SENESCYT, which suggests unifying contents in an interdisciplinary work, achieving the link with the context, encouraging teachers about their change of role and involving students in this process. The PIS practice facilitated teachers and students to integrate curricular contents to modify learning outcomes, as an academic action that

allowed developing research skills and applying knowledge effectively in the pre-professional internship work. The application of creative strategies for the integration of disciplines, collaborative learning and linkage with society, as basic aspects of the methodology, were fundamental for the success of the PIS. Teachers and students emphasized the importance of creating an interdisciplinary and collaborative work environment because they shared knowledge, experiences and learned from each other.

The functionality of the research competencies when correlated with the PIS shows that this academic effort should continue to be deepened in the conceptual and methodological dimensions in the different faculties of the Universidad Central del Ecuador. Under the approach of the research line of institutional collaboration, the PIS should be strengthened among different universities in the country so that teachers and students can exchange experiences, achievements, limitations, and improve the processes in a permanent way..

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