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SUMARIO • SUMMARY • RESUMO

Editorial

Diversity in educational research perspectives continues to be the keynote in this final issue of 2024. It begins by addressing the issue of identity and plurality as part of school coexistence in a rural context in Colombia, within the official proposal of the Ministry. It is based on a qualitative experience. The results highlight the importance of recognition of self and other as part of the acceptance of difference between people.

In the Dominican Republic, the study on access and inclusion in public education is an interesting vision based on compulsory schooling as a challenge for the country's education system. SISNAE, a computerized tool to optimize the admission process to Dominican public compulsory schooling, is used as a basis. The research follows a qualitative methodology through observations, interview, questionnaire and document analysis. The results suggest that the use of software to automate the process of access and admission to compulsory schooling has a positive impact on families, especially those who are economically disadvantaged.

The following study deals with a case of a child with Oppositional Competing Disorder (OCD) in a family setting, using classical music. It is based on the method of the Austrian pedagogue Jacques Dalcroze, who proposes the use of three basic evaluation domains for the success of a musical pedagogical intervention: rhythm, solfège and improvisation. Specifically, the child had body movements influenced by the music and understanding of the score, but without being able to mark the beats with the use of the hands and with restricted musical externalization through the tactile-motor sense. The presence and motivation given by the father is seen as a success factor.

Dedicated to the teaching and learning process there are several contributions. The first from surgical practice and quality management, a study in higher education. The design was descriptive and documentary and the findings highlighted the importance of integration between surgical education and practice, and the need for significant changes in training. The relevance of critical analysis and personal reflection in the educational process was emphasized. On the other hand, the Universal Design for Learning (UDL) and its impact on inclusive education at the teacher education level are analyzed through a systematic review of the period from 2016 to 2022. Twenty-five articles were obtained referring to educational experiences developed at the tertiary level, and more specifically, in teacher training. This review led to the conclusion that the use of SAD in the classroom has a positive impact on educational inclusion and allows for quality education and educational continuity.

On the other hand, the gender perspective is addressed in a study conducted in the teaching community of the university center in Uruguay, which analyzes the participation of women in the center and compares gender relations. The main conclusion is that in the CURE vertical segregation, the accumulation of women in positions and lower levels of stratification of scientific systems, and their consequent underrepresentation in higher hierarchical positions, is deepening.

The effects of continuing education on teachers' competence in evaluation are analyzed, in another article, in relation to the deficiencies frequently observed in initial training. A study was carried out with the participation of 253 teachers who teach in the Pedagogical Zone of Lisbon and the Setúbal Peninsula (Portugal), who answered a questionnaire. The results highlight that teachers who attended specific courses on evaluation obtained significantly higher results than teachers who did not participate in

such training.

Another study analyzes the ICT competencies in the modality of virtual education in rural contexts of the students of the Secondary School Teaching Program in Pedagogy and Social Sciences of the Faculty of Education Sciences of Universidad Panamericana. In this case, the approach is quantitative and the instrument is a questionnaire. The results in the analysis show that students mostly perceive themselves with an intermediate level in ICT skills and knowledge, using virtual learning environments with WhatsApp and email, among others.

Learning styles are analyzed with the intention of proposing teaching strategies that promote meaningful learning and improvements in academic performance. The Honey - Alonso Questionnaire of Learning Styles (CHAEA) was used. It is found that all learning styles are present in the sample of students. It was also identified that a student with less developed learning styles can obtain higher grade point averages than those students with more developed learning styles.

The curriculum in the school context is the subject of another study, in this case focused more on reflecting on contemporary practice. The main motivation was to investigate the selection of contents by teachers working in a specific school of the municipal educational network of Salvador-Ba. Questionnaires were administered to teachers and staff. There was a contradiction between what is said and what is done, impacting teaching practice and, consequently, student learning.

The scientific training of students is a requirement in most countries. In the case of Ecuador, there is a normative declaration on the scientific and integral education of students in different areas. In order to confirm this fact, a project in the area of Natural Sciences was investigated at the high school level of an educational unit. The results allow asserting the significance and sufficiency of the project for the development of research skills in students, and the scientific and technological learning required.

The evaluation of the perception of university professors after the implementation of a pension fund to guarantee the stability of the pension system in a public university in Mexico, shows that at the University of Guanajuato (UG), the existence of this fund can reduce the subsidy currently covered by the institution, thus giving solidity to the university and that the academic staff is in agreement with its creation and operation for the welfare of job stability.

Antonio Pantoja Vallejo
Editor Jefe / Editor in chief / Editor Chefe

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IDENTITY AND PLURALITY WITHIN THE SCHOOL COEXISTENCE IN THE COLOMBIAN RURAL SCHOOL

LA IDENTIDAD Y LA PLURALIDAD DENTRO DE LA CONVIVENCIA ESCOLAR EN LA ESCUELA RURAL EN CUNDINAMARCA

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ABSTRACT

This research identifies the variables that influence the construction of identity and the recognition of plurality in the framework of Colombian rural school coexistence, from the implementation of the toolkit for the promotion of school coexistence and the prevention of abuse presented by the Ministry of Education of Colombia for the educational community of the country's public institutions. Based on a pedagogical and ethnographic experience carried out in the rural schools El Tablón and La Ramada, in Cundinamarca, during the year 2022 and the first semester of 2023, from the use of tools such as: observation, semi-structured interview and pre and post questionnaire, recognizing the impact of how some situations of violation of rights are strongly related to problems that affect the construction of identity, plurality in students from 5 to 11 years old. This research process highlights the importance of recognizing the self and the other as a fragile social bond that requires a free educational context for interaction and acceptance of difference, which is hopeful for all its members as far as possible from positive coexistence orientations and the use of inclusion tools within the school.

Palabras clave:
identidad, pluralidad, escuela rural, convivencia, estudiantes.

RESUMEN

Esta investigación identifica las variables que inciden en la construcción de la identidad y el reconocimiento de la pluralidad en el marco de la convivencia escolar rural colombiana, desde la puesta en práctica del kit de herramientas para la promoción de la convivencia escolar y la prevención del maltrato presentado por el ministerio de educación de Colombia para la comunidad educativa de las instituciones públicas del país. Con base en una experiencia

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	pedagógica y etnográfica realizada en las escuelas rurales El Tablón y La Ramada, en Cundinamarca, durante el año 2022 y el primer semestre de 2023, a partir del uso de herramientas como: la observación, la entrevista semiestructurada y el cuestionario pre y post, reconociendo el impacto de cómo algunas situaciones de vulneración de derechos se relacionan contundentemente con problemas que afectan la construcción de la identidad, la pluralidad en estudiantes de 5 a 11 años. Este proceso investigativo destaca la importancia del reconocimiento del yo y del otro como un frágil vínculo social que requiere de un contexto educativo libre ante la interacción y aceptación de la diferencia, que sea esperanzador para todos sus integrantes en la medida de lo posible desde orientaciones convivenciales positiva y el uso de herramientas de inclusión dentro la escuela.

Introduction

Education, together with the exercise of human rights, are instruments that guarantee the rational organization of society in which a game of mirrors is played between it and the individual, with the aim of establishing a social order based on equality, freedom and inclusion. In Colombia, the armed conflict and gender violence have substantially affected the construction of society, subject and individual, generating failures in the meaning of plurality and the identity of the community in general, which historically have forged emotional forms of the social bond, mediated by fear, indifference and rejection towards the other classified as different.

Under this scenario, the social bond has been altered, one of the Colombian contexts that evidence these damages are the rural schools of the department of Cundinamarca, as educational institutions forming citizens who respect and recognize their rights, where students belonging to floating communities are enrolled who are families from different parts of the country who live mobilizing for various reasons, among them, fleeing from local violence, recruitment of minors by armed groups, the need to work and the protection of their family members, therefore, Cundinamarca's educational centers receive visitors and locals without any previous convivial orientation, who in their interaction build and deconstruct the community, the association and the local tradition, therefore their identity and the very recognition of plurality are fractured.

This is why the rural school in Cundinamarca participates in the fragmentation of identity and the recognition of plurality among its community, becoming a wall of absorption of phenomena such as: harassment, inequality, physical and verbal aggression, mockery and discrimination towards minorities. A study conducted by the International NGO Bullying Without Borders for the biennium between 2022 and the first half of 2023, Colombia ranks ninth in bullying cases in the world with approximately 41,500 complaints and within the country, Cundinamarca - department where the municipality of Cucunubá is located where the focus group is located - ranks first, as the department at the national level with more cases of this type. Its director Dr. Javier Miglino says "children are not artificial intelligence, we must listen to them, accompany them and defend them... bullying is nourished by three poisons: loneliness, sadness and fear" Miglino (2023, p. 2) because when comparing this statistic with the immediately previous one of the biennium 2020 and 2021, the cases in Colombia were 8,981, that is, there was an increase of 500%.981, that is, there was an increase of 500%, shocking and worrying to the extent that the damage to school coexistence has become a daily torture for students from the early years of their schooling.

In these circumstances, plurality and identity in the child population are at risk, since the social conditions that allow reciprocity between these two elements are mediated by fear, insecurity and discrimination, now any reason is an excuse to damage coexistence, having child victims within the rural school who suffer blows, threats, mockery, harassment and negative forms of communication that hurt their self-definition, affecting the construction of identity and self, because "this process is surrounded by huge abysses that unleash in battles to leave or remain" Bauman (2006, p. 109). 109), hence the need for this research, to inquire about these problems and the effects produced by the application of the proposal of the Ministry of National Education in association with CISP (Comitsto Iternazionale, Pero Lo Sviluppo Dei Popoli) created in 2020, called: toolkit for the promotion of school coexistence and prevention of abuse, within a rural educational context, determined its effects around the construction of identity and

recognition of plurality in the framework of school coexistence in children between 5 and 11 years old belonging to the rural school in Cundinamarca-Colombia.

Initially, an ethnographic immersion is carried out based on the principles of Geertz's description, which consists in emphasizing "the meaning of the actions of individuals in a comprehensive way", (Geertz, 1973, p. 20) to understand how students fill their aggressive actions on their classmates. 20) to understand how students fill with meanings their aggressive actions on their classmates, on the other hand, the role that the school and teachers play in the formation of the subject is questioned, understanding the way in which ties and roles take different meanings around a constructed social identity, in turn, taking them as formers of meanings, symbols and imaginaries, a route is traced to understand how the student community is recognized within the framework of a plural society, starting from the representations and symbols that emerge in the daily life of the school: the classroom, classes and recess, to then apply the protocols, booklet and musical pieces proposed by the coexistence kit and to make a parallel of the before and after of this exercise from the application of an individual questionnaire.

To carry out this immersion and this route, a methodological distinction is made between the curriculum and the values that the pedagogical culture teaches about identity and plurality within the rural school, starting from "the educational heritage that Colombia adopts with respect to the population and its cultural, economic, political and social level" (Sáenz, 2007, p. 131), interpreting its meaning within the school coexistence context, needs and meanings that students find from the physical, psychological and behavioral characteristics that they assume within the conflict before and after the application of different strategies for the improvement of coexistence proposed by the Ministry of National Education.

Basic primary education in the rural context of Cundinamarca is a life experience that has a great impact on the future life of the students, hence the research question that guides this document: What are the variables that provide the construction of identity and recognition of plurality in children between 5 and 11 years of age who belong to the Rural School of Cundinamarca? Since the country is advancing in the necessary debates to put an end to the different forms of violence that transcend the educational process in the free formation of identity and subsequently of plurality within the framework of school coexistence, which has been affected by the increase in cases of school violence between students of the same or different grades, age or gender. These situations gained relevance in the MEN (Ministry of National Education of Colombia), to the point of launching the toolkit for the promotion of school coexistence and the prevention of mistreatment in 2020, from which an investigative work begins from its implementation, identifying the level of impact on the imaginary of coexistence, respect for difference and self-recognition in school life, to start possible proposals that significantly impact the training process in rural classrooms and thus achieve contributions that benefit and highlight the future of rural education, improve the behavioral and academic performance of those who rely on this type of training and therefore the care of the integral development from the first years of school life.

Finally, the application of the Kit within the rural educational context pursues the following hypothesis: *positive school coexistence has a decisive influence on the construction of identity and the recognition of plurality within rural school coexistence based on the implementation of a Colombian ministerial proposal*, which is being worked on through the results presented below and defines the cultural and social enrichment of the rural community that is part of the educational process in search of the development of its full potential.

Method

This research assumes a qualitative ethnographic ethnographic approach, with a qualitative character, in which three instruments are used to collect information: the model of classroom observations, rest and teacher observations, semi-structured interviews and the questionnaire, which were fundamental tools to answer the question that guides this research work. *What are the variables that provide the construction of identity and recognition of plurality within the framework of school coexistence in boys and girls between 5 and 11 years of age who belong to rural schools?* This produced "descriptive data: from elements such as: people's own words, spoken or written, and observable behavior" (Taylor and Bogdán, 1984, p. 20).

By relying on ethnography, the design of this research makes it possible to observe the practice, to reach the rural school of Cundinamarca from the role of researcher, in order to recognize its specific qualities in terms of the stated objective, when observing, it is possible to reflect on the knowledge and pedagogical actions within the educational process that takes place in the rural context of Colombia where 94% of the territory is rural, but the quality of life in the rural sector is lower than in the urban sector, this can be understood in terms of access to public services, social security, education and housing conditions that within the country have been relevant to define this area as the epicenter of the armed conflict and the struggle for land in the country, an example of this are the power relations that circulate in school, public and private spaces strictly rural and its effect on the configuration of identity and the recognition of plurality in the framework of coexistence. From this reading Clifford Geertz is quoted, with:

> What he actually faces (except when engaged in the more automatic routine of data collection) is a multiplicity of complex conceptual structures, many of which are overlapping or interlocking, structures that are at once strange, irregular, non-explicit, and which the ethnographer must somehow manage to grasp first and then to explain (Geertz, 1973, p. 35).

During this process, different conflict situations and other ways of facing reality are addressed, where different "reliable solutions to the problems posed are analyzed through the planned and systematic collection, analysis and interpretation of data" (Munarriz, 1992, p. 102). Thus, this qualitative research allows the construction of knowledge from those who live and participate in the reality of rural education in Cundinamarca. So much so that "they produced descriptive data: from elements such as: people's own words, spoken or written, and observable behavior" (Bogdán, 1984, p. 20). that are influenced by the scenario of violence, poverty and failed or unfinished reforms of which the rural community in Colombia, more specifically in Cundinamarca, has been victim throughout the last years.

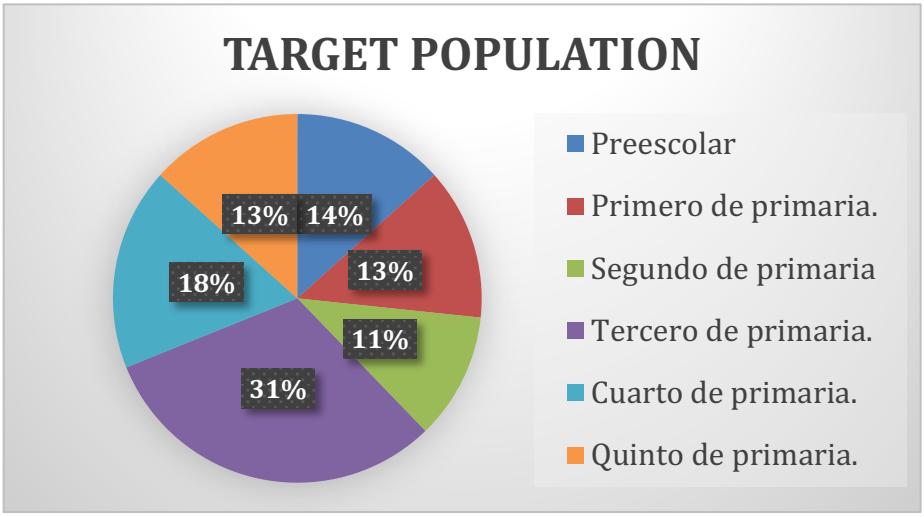
In turn, this type of approach is transcendental in the Colombian educational task, especially in times when the confinement and the return to normal school life due to the pandemic caused by COVID-19 left negative sequels that increased the problems, confrontations and aggressions related to coexistence in rural schools. Incorporating what students say, do and express verbally and non-verbally, allows me as a teacher-researcher to reflect on the teaching work and students on their actions in the educational experience.

The population participating in this study is exclusively from the rural community of the department of Cundinamarca in Colombia, where rurality is estimated at 24%, with

a tendency to increase given the conditions of mobility and job opportunities in the department. The target population is 116 students enrolled in preschool and elementary school at the Divino Salvador Departmental Educational Institution in the municipality of Cucunubá in the department of Cundinamarca. The focus group was composed of 57 students from different academic levels of elementary school and preschool, from two rural sites: La Ramada and El Tablón sites, as shown in Graph 1. These sites were chosen because: they have a high number of students enrolled, they are geographically separated from each other giving greater coverage in the population served and covering the total number of students in the same site allows observing behaviors, attitudes and verbal and non-verbal responses within the implementation of the strategies proposed by the coexistence kit.

Figure 1

Rate of participating students by primary school grade



Instruments

The information collected comes from "people's own spoken or written words, the development of the phenomena collected through detailed descriptions of the events observed" (Munarriz, 1992, p. 110), from the following information collection instruments:

Observation

Three observation instruments are created that are applicable in three moments of the school day during the execution of the strategies proposed by the coexistence kit; during classes, at break time and on the relationship that students establish with their regular teacher, each instrument has 30 items and two response options 1: it is fulfilled and 2: it is not fulfilled: not met, it should be clarified that recognizing the divergent realities among students, their influence on the physical characterization, the interpersonal traits that refer to their relationship with the family, school and social environment and the emotional traits that describe feelings within the pluralistic interactions and that are applicable in the decisions and attitudes they assume in the coexistence at school from the significance of their personal and cultural identity all this when a conflict occurs, under the themes proposed in the protocols of the kit.

The analysis is performed with the digitalization of the information collected, in a grid designed in Microsoft Excel, which allows the systematization of everything observed during the classes, the break and the teacher-student relationship, each of them is divided into moments within the observation, among which are: beginning and organization of class, development of the kit activity, evaluation of activity and verbal and nonverbal behaviors of the students, based on the analysis provided by the variables that guide the research. The analysis starts from the two possible answers, since the observation is used to recognize whether an item is fulfilled or not, thus extracting precise information for the achievement of the objective.

Semi-structured interview

The second data collection instrument is the semi-structured interview, which is "a limited and specialized interaction, conducted for a specific purpose and focused on a particular topic" (Deslauriers, 2005, p. 34). It is executed within the process of implementation of the activities designed in the coexistence kit. Within this conversation 11 basic questions are posed, sharing with the students several impressions and attitudes in relation to how they live the concept of community, self-definition and how these two influence within the process of coexistence in the rural school, in their educational formation focused on the construction of identity and the recognition of plurality. Another element that stands out in this dialogue is the impression that students from an early age have about the historical situation that the country is going through due to the armed conflict, violence and poverty, with the need to seek real solutions that prevent rural communities from moving to other places due to the lack of economic, labor and security opportunities that they lost in their place of origin.

The analysis of the information in this phase is carried out with the systematic transcription of the content of the interviews in a grid designed in Microsoft Word that is divided according to the variables of analysis of the objective of the research, the task of transcribing hours and hours of conversations of the students is arduous, but essential in order to have important information that contrasts and complements the data obtained in the other instruments applied.

The pre- and post-questionnaire

The last instrument was the questionnaire composed of two parts; in the first, all the sociodemographic information is collected and the second is composed of 14 questions designed from the systematic rigidity of the variables as shown in the results, with four Likert-type response options, its applicability is developed in two moments, the first of them was before starting the protocols proposed by the school coexistence kit, and the second at the end of its application. These are used to collect specific and comparative information on relationships, gestures, attitudes and other forms of behavior within the coexistence processes in rural schools, taking into account the Colombian ministerial proposal applied here.

After applying these techniques and analyzing the information collected, it is concluded that in the Colombian rural school there are a series of situations that affect the construction of identity and subsequent recognition of plurality affected to a great extent within the coexistence practices that are developed within the rural school in Cundinamarca.

Instrument validation and reliability process

The pre and post questionnaire was subjected to an analysis of internal consistency method as named (Bisquerra, 1987; Fox, 1987; Calvo, 1990) where one of the most used coefficients is Cronbach's Alpha which is applied in items with two or more values in the particular case this questionnaire has Likert-type polytomous answers, for this purpose the computer statistical analysis system IBM SPSS Statistics version 2 was used.9, obtaining a value of 0.905 showing that the internal consistency of the instrument is good with an acceptable reliability, which allowed its application before and after the execution of the coexistence kit.

The observation and the semi-structured interview went through a process of analysis by five expert judges in the area of rural basic education, showing them the instruments and asking them to rate them on a scale of two favorable or unfavorable options, leaving in the same all those who obtained a favorable rating and eliminating those whose merit was unfavorable.

Results

The construction of identity and the recognition of plurality within the rural school in Cundinamarca.

Colombia has been a Latin American country hit hard by armed violence and social discrepancies, the UN (United Nations Organization) in Colombia in response to this participates in the 2030 Agenda as "a new ethical and programmatic agreement between nations and people to face the challenges of contemporary society" (United Nations Organization [UN], 2018) as a response to the concerns caused by social inequalities, environmental damage and the yearnings for peace in all its dimensions, which is why within this agreement work on the 17 SDGs (Sustainable Development Goals) is presented as "a historic opportunity, in which with the termination of the armed conflict can move decisively towards closing the development gaps" (UN, 2018).

Within the framework of this agenda there are 17 objectives, two of which fit perfectly with the research intention of this work, number 4 focused on quality education, where it proposes that Colombia should guarantee an inclusive, equitable and quality education by promoting learning opportunities throughout school life for all, proposing that "at the rural level and even at the departmental level, full coverage and quality education should be achieved, demanding more exhaustive efforts, particularly in peripheral areas, where emphasis should also be placed on a local educational agenda that fosters diversity and the integration of cultural heritage... within the teaching process..." (UN, UNODC) within the teaching process" (UN, 2018). The second objective is number 5, which talks about gender equality, where gender equality is achieved throughout the Colombian territory and empowers all women and girls, from the creation and promotion of safer environments for women who are the population most at risk of suffering violence, in view of this problem we propose strengthening institutional and community capacities in the field with real implementation strategies to mitigate this problem.

Hence the need to apply strategies proposed by the Colombian governmental entities aimed at the fulfillment of the SDGs in Colombia, in the particular case of the School Coexistence Kit designed by the MEN, in response to the need to ensure an inclusive and egalitarian quality education for all Colombians, from where protocols that benefit school coexistence are applied but that will probably manage to transcend to other spheres of socialization, the family and the community.

The rural school in the department of Cundinamarca, Colombia, is the space in which students, through socialization processes, give meaning and resignify their self, from the construction of the other and the us. Sigmund Bauman in his book entitled Identity (2006) states that this can be defined as a project, a whole that must be invented instead of discovered, as an identifying element of a series of characteristics that account for what the person is and wants for his or her life.

Sadly, the rural reality in Colombia is being affected by situations of increasing poverty, land destitution and high rates of violence, poverty in the countryside has been increasing to the point of finding indigence in the same, a study conducted by Semana Magazine in 2018,says that in the countryside the poor are 65% and the indigent 33%, as a result of decades of neglect and government neglect, the shortage in access to basic needs shows the state of the rural population, reasons why they are forced en masse to leave their places of origin in search of better opportunities.

Thanks to this, the department of Cundinamarca is considered a recipient of the country's migrant population also identified as a floating population, being according to DANE (National Administrative Department of Statistics) one of the 4 departments of the country with the highest levels of migration, sheltering in its territories intercultural processes that enrich political, social, cultural and economic aspects of the communities, but which in turn are affected by the development of power relations, legitimization of violence and poorly resolved conflict, triggering forms of violence that are seen in the school because it is in this place where families converge around the educational process of minors.

The construction of identity is a surrounding process in which interaction, self-determination and empathy with the other, make it seek its definition based on the particular characteristics of its community, so much so that "*to survive, they need to appeal to their own members (...) guarantee their survival through individual choices and individual responsibility for that survival" (Bauman, 2002, p. 23).* This is a cooperative work between the individual and the subjects with whom he/she shares the same context, in this particular case the students of the local rural school, who manage intercultural educational and management processes towards the acceptance of diversity.

Taking into account all of the above, the following are the results of the analysis of the observation, the semi-structured interviews and the pre- and post-questionnaire, all detailed in five variables that account for the objective of this research, in each one three or four guiding questions that are reflected in the three data collection instruments are exposed, only the response graphs of the questionnaires applied are shown, evidencing the veracity of the results.

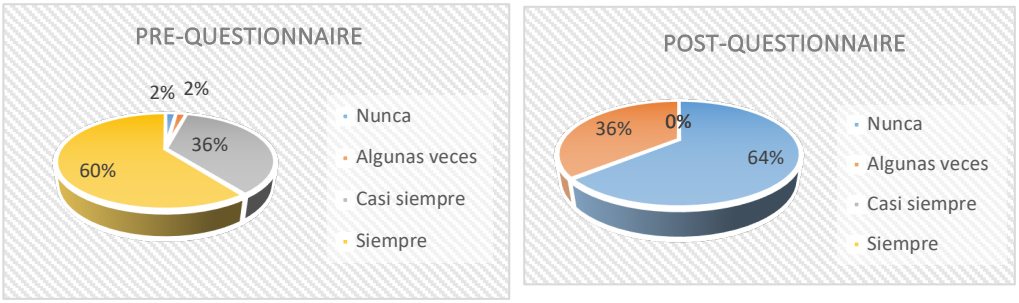
VARIABLE 1: The subject

Humanity has the need to define its personality from the qualities, defects and characteristics that differentiate it, defining the life plan from the consolidation of the self, there are situations of change between generations that hinder the definition of subject as new technologies, autonomous learning and virtual sociability, which make the experimentation to define it has a number of difficulties in its definition by generational changes we are all experiencing an increasing difficulty to define it, since in the course of sociability in different contexts assume various roles that contravene the definition itself.

Therefore, in rural schools in Cundinamarca, spaces and environments should be created that promote freedom of choice, avoiding from all economic, political, social and educational fronts, manipulating the subjects and imposing identity traits that differ from their own decision.

The first item, have you felt rejected by your schoolmates, reinforces the need to expose how within the socializing processes students conceptualize discrimination and respect for the difference of: race, gender, family, social class as basic elements for the recognition of plurality.

Figure 2
Comparison of peer rejection

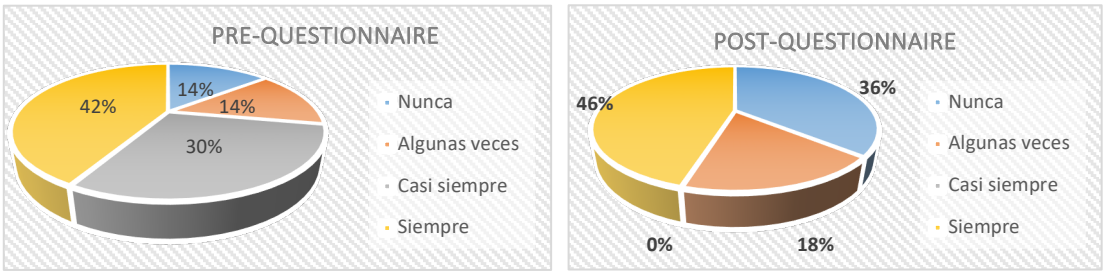


A comparison of the graphs shows an abrupt change between the options chosen. In the pre-questionnaire, 60% of the respondents stated that they were always rejected by their peers, supported by 36% for almost always, leaving 2% for never and sometimes, respectively. In the second one, we can see how the always option was nullified with 0% and never rose substantially with 64%, supported by sometimes with 36%. Thus, it is understood that the application of the kit has a positive effect insofar as it significantly nullifies the perception of rejection among students and allows "identity to be built from acceptance and its particular importance depends on the social context in which it is found and illustrates the need to see the role of choice in a way specifically associated with the context" (Sen, 2007, p. 43).

These assertions are reinforced by the answers obtained during the interview, where the students affirm that rejection has always existed, but that this is given to their weaker classmates, who find it difficult to defend themselves on their own, to which they believe that it is important to defend the weakest from respect and good treatment towards others. Likewise, classroom observations and during breaks showed the behavioral changes that students had during the application of the kit protocols, as evidenced by the fact that their behavior on their own initiative was more resilient towards those who had difficulties in the development of classroom activities or games.

Second item: they use nicknames or nicknames to greet their peers, since, in the semi-structured interview some of the respondents see that this type of words are negative and are used to systematically offend the other, being these words that reinforce the rejection of the existence of the other and damage the recognition of plurality.

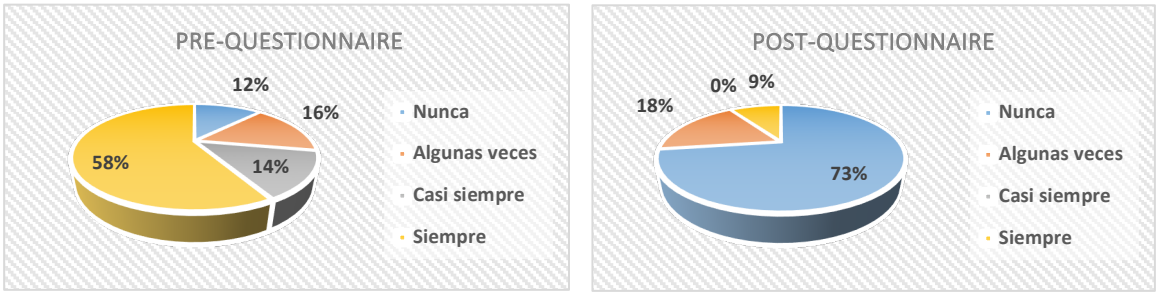
Figure 3
Use of nicknames or nicknames



In sum, Figure 2 shows that the identification of each subject in relation to the vision that their peers construct about them, is seen in the use of nicknames or nicknames associated with negative qualifying adjectives or similarities with animals, which hurt the definition of their identity, from the damage to the cultural significance that they bring from their places of origin, feeling rejected by the color of their skin, the shape of their hair, cultural customs, behavior and dialect that they bring learned from their places of origin. In the pre-questionnaire it can be seen that the options always and almost always account for 72% of the total, while in the post-questionnaire graph the always, even though it increased by 46%, the almost always was eliminated, this shows that the students affirm that the offensive and discriminatory nicknames decreased satisfactorily being highly beneficial the kit to delegitimize the use of verbal offenses, the use of the musical pieces that this one proposes is considered as a pedagogical strategy of high applicability, beneficial for the use of positive communicative bonds within the solution of conflicts.

Third item: For fear of being made fun of, you have stopped doing what you like, one of the repetitive results of the class observations were the behaviors of students who showed shame for acting or giving an opinion on a specific topic when the teacher develops the class, in turn, were an incentive to talk about the mockery in the interview, where the answers revolved around the importance given by students to the verbal and nonverbal gestures expressed by their classmates when giving an opinion or exposing a topic in public, leading this research to define how mockery builds a repressed and introverted identity by the decision of another.

Figure 4
Fear of ridicule



In relation to free choice and the influence exerted by peers, families, neighbors, Sen (2007) was emphatic in saying that influences are necessary and important in the

construction of a subject's identity, given that they are the line of choice within the subject. In the pre-questionnaire 58% said that they always stopped doing or expressing what they liked for fear of being rejected, 14% almost always, 16% sometimes and only 12% never, the reality of the rural school is highly violent, stigmatizing and excluding, reflecting the identity problems that exist in this context around self-identification.

When applying the activities, the discussions and the kit infographics, the situation changed, this is supported by the post-questionnaire, where 73% chose that they never stopped doing the things they liked for fear, 18% sometimes, 9% always and almost always with 0%, it is evident that talking about the issue of the right to identity and plurality, gives them another perspective on the ways of self-definition under their own freedom of decision. Demonstrating with facts that the rural school in Cundinamarca that houses a floating population contributes to the construction of a solid identity to the extent that it uses within its educational process strategies that encourage respect and acceptance of difference without distinction of gender, race or economic condition.

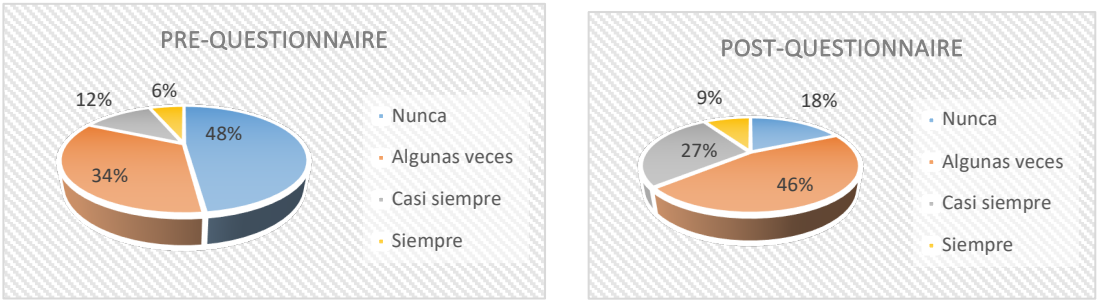
VARIABLE 2: construction of values

Within the process of identity construction and in turn the recognition of plurality it is necessary to appeal to the collective and individual conscience of the subjects who live together in a given context, in this particular case; the rural school environment of Cundinamarca, given that there are a number of fundamental elements involved in this process and are called "values that are the behaviors that respond to social changes" (Sen 2007, p.151), because in order to live together, coexist and establish relationships between subjects it is necessary to "respect a code of good conduct... the rules of the social game... respecting personal freedoms" (Touraine, 2012, p.15) which are ultimately the values that are acquired, respected and complied with to recognize the difference, in school contexts are defined as classroom pacts, defined and approved collectively.

Consequently, within the results of the research, three items were defined that clarify this variable, the first one is; classmates listen and respect the opinion of others, defining two fundamental values for the practice of an assertive educational process in the rural school; respect and active listening. Figure 4 shows the abysmal changes in the application of the "adventures to know and take care of myself" primer proposed in the coexistence kit.

Figure 5

Listening and respect



Within the process of defining the values required by the subject to participate in positive coexistence processes is respect and active listening. In the pre-questionnaire, 48% never listen, 34% sometimes, 12% sometimes and 6% always, the coexistence problems start from here, generating tense situations where the negative dialogue does not allow a beneficial solution for those involved, massifying the conflict in the school.

When applying the kit, especially the booklet, which talks about values and the importance of loving and valuing oneself for a healthy coexistence, the results were satisfactory, as shown in the graph, where the almost always increased by 27%, the always with 9%, the sometimes 46% and the most gratifying was the never, which decreased by 30%, to 18%. These are encouraging figures, but they require further reinforcement and inclusion in the academic and social processes of rural schools in Cundinamarca Cundinamarca.

This demonstrates that one of the activities proposed by the kit responds truthfully to the need expressed by the students in the interview, where when asked about how they perceive listening within the coexistence, they stated that it demands more attention in the way they talk among students because the problems are generated because those involved do not listen to each other but attack each other with words that offend and hurt those involved. In addition to the above, there are the results of the observations, which highlight the raised tone of voice that those who participate in conflict situations should have, which evidences the lack of listening within the socialization among students.

The second item is; the second item is: **"among peers obedience is demanded",** as a sign of the legitimization of vertical power of which students are victims from an early age, being evidence of the feeling of acting under stimuli of manipulation among students, when analyzing the information in the observation within the break it is seen how from the free play the students identified as leaders manage the rules as they wish and the others accept them as true, many times without objecting to them, in the same way, when asking the question in the interview, answers were found that reaffirm the existence of these behaviors that destroy the freedom of choice within the identity processes.

Figure 6
Freedom

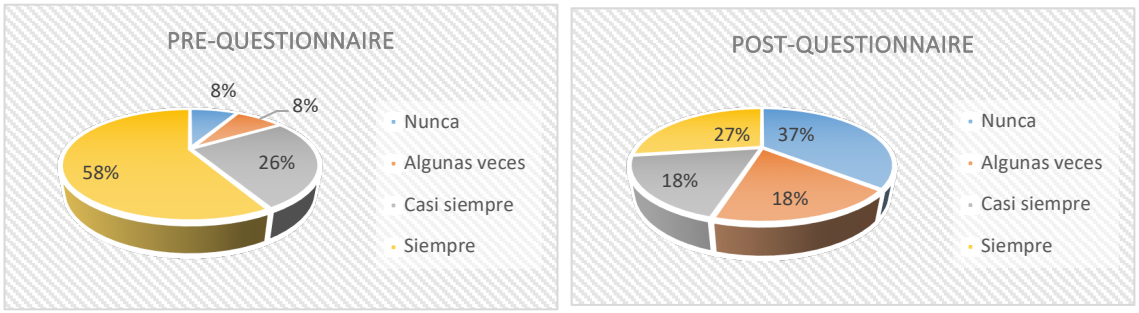


Figure 5 shows how another of the values prioritized in this process is freedom Appiah (2007) says that a person possesses a reasonable amount of common sense and experience, which allows him/her to choose freely in the exercise of autonomy.

When observing the graphs of the application of the kit, it can be inferred that the obligatory nature of school behavior is highly marked by the imposition of power; students recognize that socializing is difficult when the majority groups are not listened to; this is supported by the fact that 58% of respondents say that obedience is always demanded and 26% almost always. The second graph shows a change, given that the options always decreased by 31%, almost always by 8%, sometimes by 19% and never by 29%, these last two are comforting figures, insofar as they refer to the exercise of autonomy of decision within the students' behaviors, which strengthens the values of self and others within their capacity for observation, reasoning and social justice, because as

Sen (2007) clarifies that each subject has the capacity to think clearly about the identity options he/she has.

The third and last item of this variable is; have you helped or defended who your peers have bothered. It was essential to create a statement that analyzes positive attitudes and decisions in the face of situations of rejection, mockery or discrimination at school.

Figure 7

Solidarity and empathy

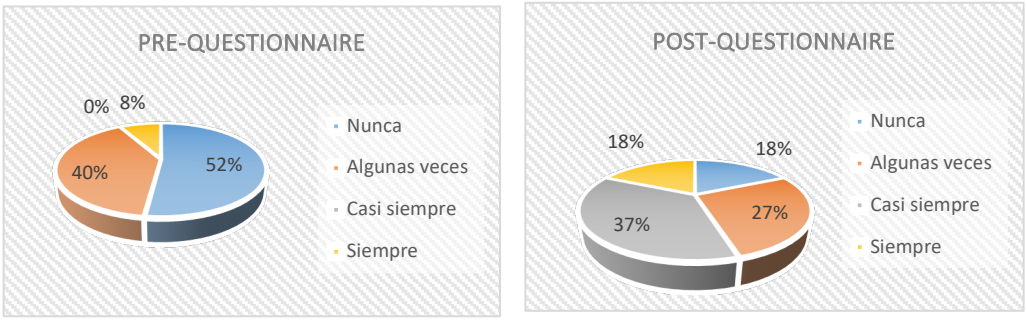


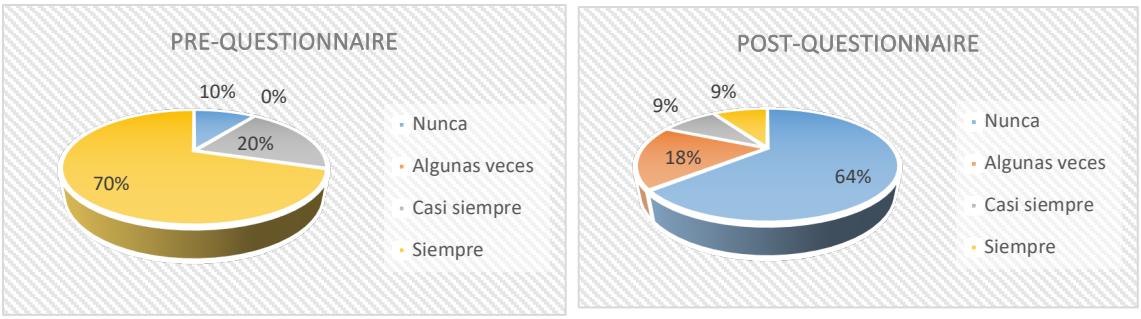
Figure 6 is evidence of the lack of solidarity and empathy - as reinforcement values in the construction of identity - among students, 52% have never defended or helped a classmate, 40% sometimes and 8% always, these last two percentages are the hope for coexistence, because it is required to intensify this action so that it can transcend to other spheres of life. The second graph shows that the activities applied and socialized with the student community had a positive effect, encouraging to continue working on strategies to improve school coexistence that mitigate situations of discrimination, given its condition as a center of diverse cultures and in the process of building their identities, because never obtained 18%, sometimes 27%, almost always 37% and always 18%, as a whole show that the group solidarity improved notoriously, the decisions and ways of acting of the students have respect for the other, the search for justice and good treatment among classmates.

VARIABLE 3: language.

Language is a fundamental element for the construction of identity, given its importance as a universal instrument in the establishment of social relations, therefore, that identities must allow to fit their narrative links, expanding their coverage and allowing the entry to those who so decide and respecting those who do not share it. In a rural school context, language is a fully social instrument from which positive and negative social relations are generated at the same time, with the use of verbal and nonverbal communicative tools, students have a high capacity to establish or break bonds through looks, gestural movements and the use of colloquial words, which strengthen or weaken their relationships with others. Anthony Appiah (2007), who in his book: The ethics of identity sought to recognize the importance of tradition within the discourse that arises around identity, he says that: this tradition more than a doctrinal body is a set of debates that ultimately form one and legitimize a form of political, social and cultural life, which in the end help the subject to define and retake what forms of life are good or bad.

From this, three items of analysis were chosen within the research, the first of which is: Your peers use foul language to address peers, where Figure 7 shows the change between the use of these words, from the application of the protocols and the musical pieces in the kit.

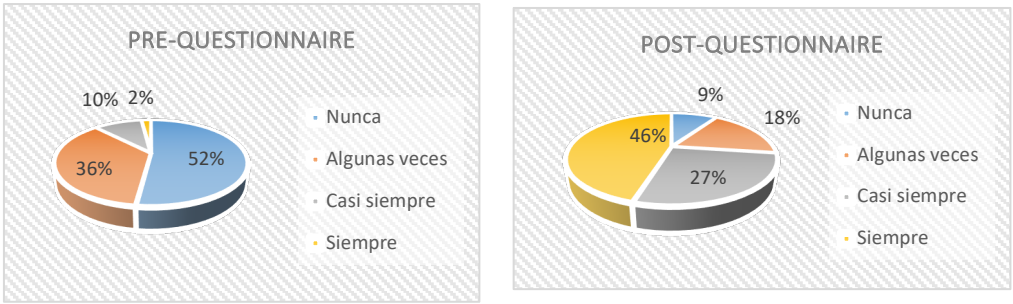
Figure 8
Profanity



The communicative processes at school are affected by the use of negative, foul or insulting words towards others, especially towards women. Appiah (2007) affirms that within the construction of identity an important role is given to the cultural discourse that is transmitted from past generations. In the first graph, it can be seen how communication among students is permeated by the continuous use of foul language, 70% have always seen how their classmates use these words, and 20% almost always, but 10% have never seen them used at school, opinions that are ratified with the results obtained in the classroom and break observations and the testimonies of the interviews to the extent that they become forms of response within conflicts or even more worrying, they are words legitimized as signs of affection from the greeting. Applying the kit and using the audiobooks, which are literary works that aim to promote the proper use of language, reinforcing the importance of using positive words, had beneficial effects as shown in the post graph, where never increased to 64%, sometimes 18% and decreased notoriously the almost always and always with 9% respectively, showing that the student community has reflected on the use and effects.

Figure 8 explains the results obtained in item 2: Messages on TV, radio or cell phones have taught you words that disrespect others.

Figure 8
Media and communications



For Tourine (2012) opinion movements are massified through radio, tv and cell phones, he says that the media exert a high influence on the opinion, decision and action of subjects. In the pre-questionnaire 52% consider that the messages given by the media to which they have access never teach messages about mockery towards the other and 36% say that sometimes, these figures are ratified by the opinion of the interviewees.

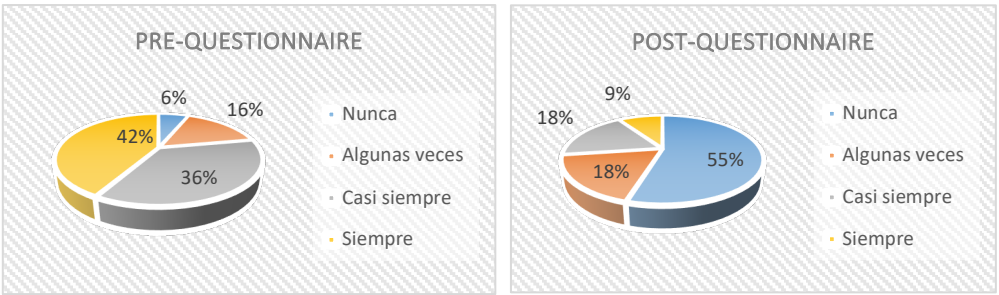
By applying the kit's infographics, which are a series of protocols whose purpose was to guide against the pedagogical approach and management of situations in which some rights of children and young people are violated in various environments in which they develop their lives, with the aim of providing guidelines for action against different situations that affect coexistence, it was possible to identify various types of violence that can occur within the school, around issues such as prevention of PAS consumption, suicide prevention, prevention of gender-based violence, prevention of xenophobia, prevention of racism and cyberbullying and crimes in digital media.

The impact, concreteness and clarity of the protocols of the infographic, allowed to change the way of identifying the messages that the media give to their public, discovering that definitely if they emit information that sometimes propitiates the mockery to others, in the second graph 42% say always and 27% almost always, being the majority that observes and listens to the messages with greater criticism and analysis, discovering information that does not benefit self-esteem and damages coexistence in the rural school, because students as subjects must survive or fight against this affirmation that says that "we no longer know who we are... given the repressive weight exerted on us by prohibitions, the law... those mass cultures or authoritarian communities" (Tourine, 2012, p. 64).

The last item of this variable is: You have rejected or mocked anyone who speaks differently from you. When observing Figure 9, there is a drastic change between one and the other, in some options there are significant variations, as in the case of the never option, which goes from 6% to 55% in the other, the always option, which in the first one is at 42% and in the second one is at 9%, and the almost always option, which started with 36% and was reduced to 18%. When examining the results as a whole, there is an important change of choice, given the reflection that has arisen from the application of the kit, where the damage caused by mockery and discrimination against differences within the framework of school coexistence has become visible. In turn, in the classroom observations and the teacher-student relationship it can be seen that the execution of the kit achieves a "positive and constructive significance, where people tend to ascribe to a shared history a collective meaning ...thanks to language and interaction with an equal other" (Sen, 2007, p. 43).

Figure 9

Teasing for the forms of communication



VARIABLE 4: social relations

The community and culture determine the social relations established within a collective, under patterns of thought and behavior viable for the survival of the subjects that coexist, it is necessary and urgent to recognize that "it is not possible to invoke any

criterion of rational conduct different from those prevailing in the community to which the person involved belongs" (Sen, 2007, p. 62) and these are given from the possibility of exchange of actions and understanding between cultures, for the consolidation of identity.

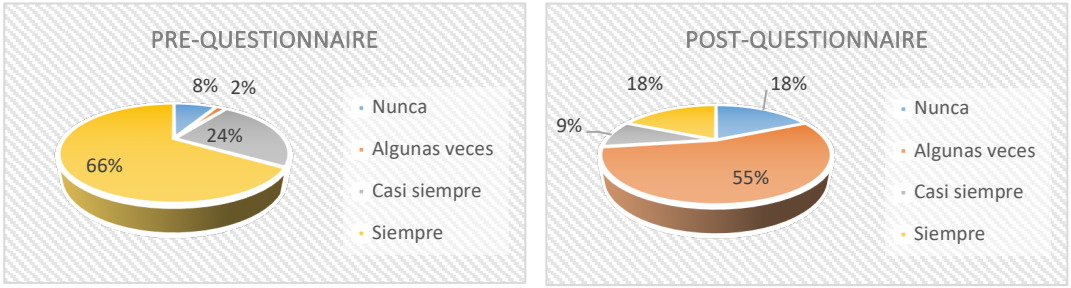
This leads us to think that the de-socialization of mass culture gives priority to values over technique, to innovation over tradition, to I over we, which is reflected in the way of assuming conflictive situations where individualization and the non-acceptance of different decisions detonates in violence and aggressive behaviors harmful to the members, based on this, three items of analysis are defined and explained below.

The first of these is: When work groups are imposed, the participation of a classmate is rejected, exemplified in Figure 10, shows that the rural school in Cundinamarca is an educational context conducive to the consolidation of social relations, where the student is a particular subject with the need to interact with the world around him. Tourine (2012) said that a regular order is not only the general imposition, but it is a principle of non-social equality, referring to the respect for difference within a social context with particularities that account for the importance of relating to others in order to survive in the world. This equality referred to by the author is seen at school when students are grouped together to perform a specific task. Looking at graph one, 66% accept that when working groups are imposed, i.e., chosen at random or by the head teacher, there are rejections in the integration of others, also supported by the testimonies of the interviewees who express dissatisfaction for not working as a team with their closest friends or colleagues, 24% say that almost always, 2% sometimes and 8% never. Demonstrating that rejection in school marks relationships, so that even the assignment of a homework does not establish a healthy coexistence.

When executing the school coexistence kit, three infographics were found that are related to social interaction: prevention of xenophobia, prevention of racism and prevention of gender-based violence, three situations that are established to sensitize the community about these naturalized phenomena and their impact within the school. By executing their action routes, positive results were obtained, such as the 48% reduction in the option of always rejecting colleagues in the imposed conformation of work groups, while the observation made after the execution of these infographics reveals that the behavioral changes for working without distinction of affinity were positive, permissible and executable for teamwork.

Figure 10

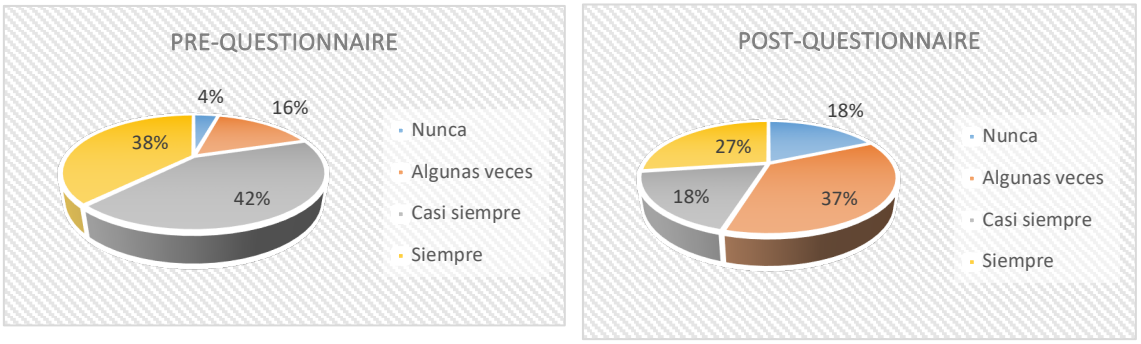
Rejection within the group work



The second item is that there are conflicts between boys and girls, which is explained from the observations of rest and development of the class, from where it is seen that gender relations have taken as an example that there is a visible and real female

empowerment within the rural school, girls want from their behaviors to claim their role in the educational process, allowing greater participation, legitimization of power and leadership in group activities, in Figure 11, significant and positive changes are seen in this situation.

Figure 11
Gender relations



At this point, the situation of gender relations in the rural school in Cundinamarca, takes power and shows the impact of the kit, where in the pre-questionnaire 38% of respondents say that there are always conflicts between boys and girls and 42% almost always, 16% sometimes and only 4% never, in the classroom there is damage to the imaginary of gender equality, girls are being victims of aggression, mockery and damage to their identity, figures that are corroborated by classroom observations and impressions gathered in the interviews.

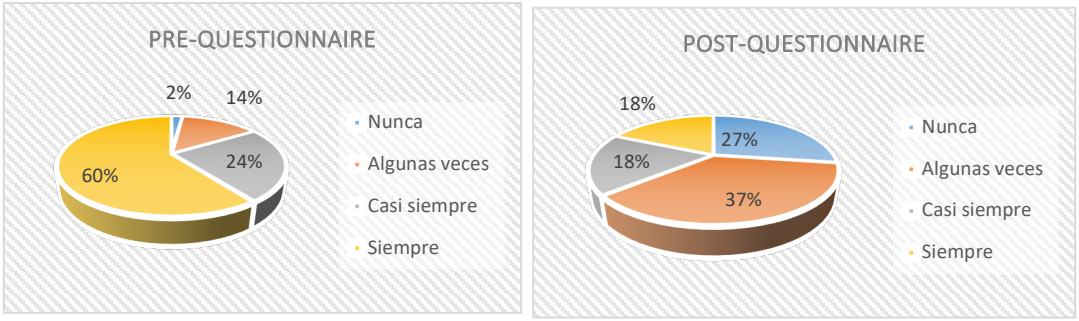
When the coexistence kit, the infographic on the topic and the booklet Adventures to know and take care of myself were applied, the situation changed, not drastically but the figures did vary, the conflict rates dropped in the options always with 27% and almost always 18%, and increased the option sometimes with 37% and 18% with never, which concludes that even when the topic of gender inequity and violence was worked on, the spectrum of the situation is still very broad, violence exists, and so do negative behaviors and forms of communication towards women. Therefore, it is recommended to continue working, reinforcing and enriching respect for women and their inclusion in all decisions in the school sphere, creating in them the power to define themselves, and from the male and female behavior, allowing them to open the field to the need for equal and respectful treatment for both genders.

The third and last item of this variable is: have been threatened by some situation that occurs at school, when analyzing Figure 12, it is ratified what was said before about the damages and affectations to minorities within the educational context, 60% have always seen how they are threatened at school, 24% almost always, 14% sometimes and 2% never, descriptive and justifiable figures on the high indexes of violence in the rural school given its condition of intercultural focus where migrant families from all over the country circulate, during the process of rest observation, in situations where the immediate presence of the authority figure was not present, forms of rejection of students with different traits were identified, such as new students in the school and girls who wish to play with the boys.

What gives hope for change in this situation is the application of pedagogical strategies that have a direct impact on coexistence in the school, an example of this is the school kit, because, as can be seen after its real and conscious implementation, the results changed, the options of always and almost always dropped to 18%, sometimes increased

to 37% and never to 27%, comforting figures for the teaching profession, because it is possible to reduce the inequality gaps in Colombia.

Figure 12
Threats within gender relations



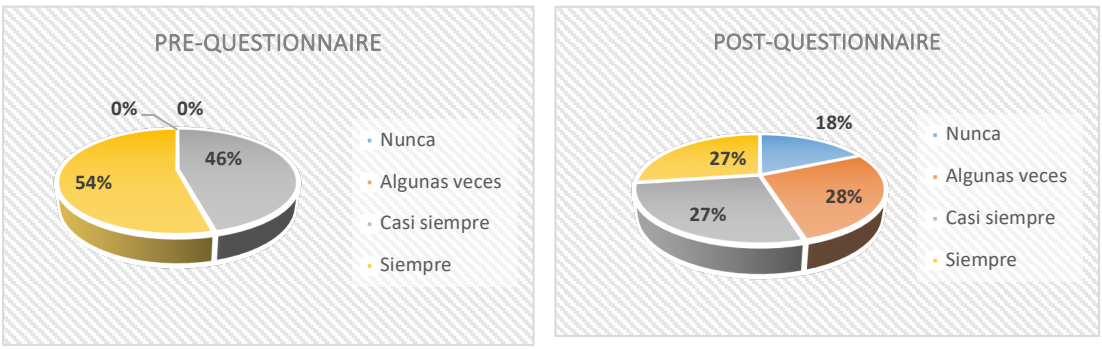
VARIABLE 5: culture and diversity

Culture in today's world has undergone a drastic change, where "it makes us live together to the extent that we make the same gestures and use the same objects, but without being able to communicate with each other beyond the exchange of modern signs" (Tourine, 2012, p.9)) that is to say, that the cultural identity that today is gestated among humanity is mediatic, changeable and fickle, that is to say, it depends on the place, the need and the people with whom the adopted meaning is related, the role of the state, religion, ethnicity, of those sovereignties legitimized through the transfer from generation to generation is lost, now the identity affinities depend on the behavioral accelerations of the subjects.

The first item is: in class they are forced to perform prayers or songs they do not agree with. culture and its meanings are nourished by inheritances that appeal to traditions transmitted from generation to generation, which mark decisions, characteristics and behaviors according to self-identification and how it is articulated with differentiation. But within this process of homogenization in the cultural tradition, religion no longer plays a decisive role in the educational process, but particular situations of imposition of beliefs in the school can still be seen.

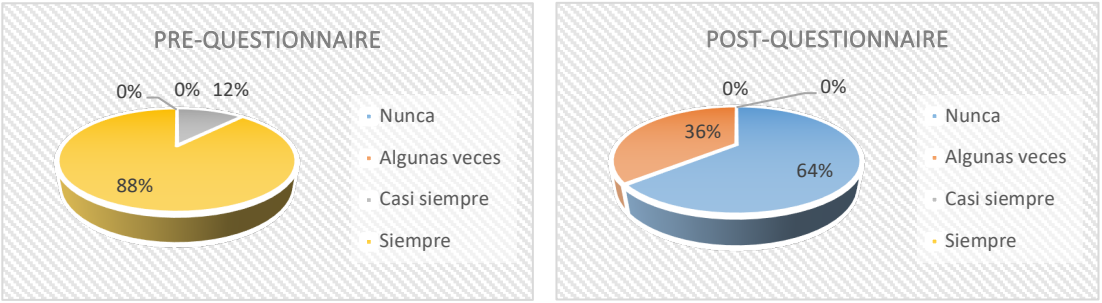
Talking about the acceptance of difference, freedom of expression, self-acceptance, and recognition of one's own and the other, from the practical strategies proposed by the kit generated highly positive effects for the student community, this is ratified in Figure 13, because going from 54% of students who see that religious songs and prayers are always being imposed in the first graph to 27% in the second graph, this is not because they have been eliminated from the school, but because it gives freedom to each student to choose whether to take part in these practices or not, leaving without execution time impositions that do not nurture the recognition of plurality from a healthy construction of identity. Another result that supports the success of the kit in terms of respect for difference were the classroom observations and the teacher-student relationship, which show the freedom of choice that began to take hold in the classroom.

Figure 13
Imposition of customs



the second item is: there is rejection for those who have learning problems or difficulties with class tasks or activities, as a form of rejection of the difference to the annulment of minorities, around the recognition of plurality.

Figure 14
Rejection of the difference

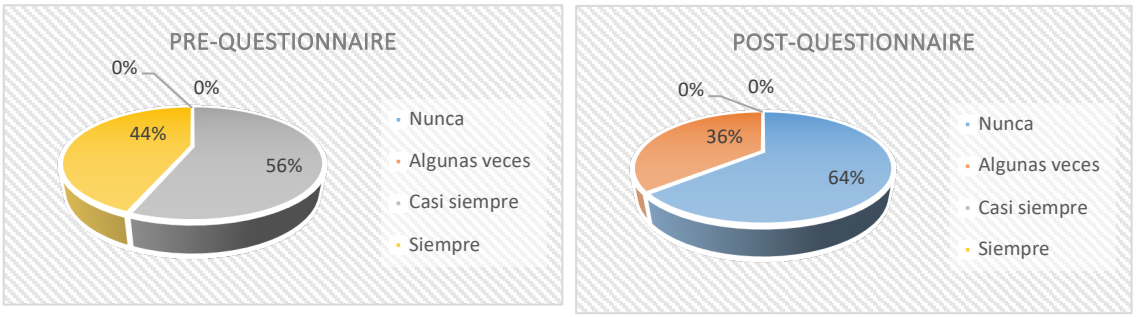


Tourine (2012) says that there is a cultural change when the system and the subjects are de-modernized, weakening codifying norms that standardize the community of those who are part of it, doing this in the reality of a rural educational community, allows to see if the acceptance of the difference is executed or on the contrary those who do not meet the established standards are excluded.

Rejection is seen from several fronts, one of them is the differentiation of intellectual abilities, in the first graph 88% have seen how students reject each other because of intellectual differences, their academic abilities determine whether they are accepted or not, the lower the ability the lower the acceptance and conversely the higher the ability the more accepted, a situation that again leaves minorities at a disadvantage within the circle of relationship building. But looking at graph two, we can see the effectiveness of the coexistence kit, because 64% never saw rejection towards those who present learning problems, building the first bonds of empathy and sorority within the rural community, and it is evident in the testimonies collected, where when asked about these situations the students reflected and showed ideas of empathy towards their peers.

The last item of analysis is peers mocking or isolating those who have different accents or cultural expressions. Lapresta (2004) asserts that in the social world there is a type of identity construction where the traditional axes are characterized by defending at all costs their cultural, religious, political, or economic traits called community values.

Figure 15
Cultural rejection



Within the world of diversity it is healthy to have pluralistic attitudes, where no paradigm or cultural thought pretends to be unique and homogenizing. Figure 15, reinforced by the testimonies and observations, shows that it is permissible to think that it is possible within an educational context to accept the difference of cultures, from the work of recognizing them, the forms of communication can become cumbersome due to the use of particular terms and expressions, but learning from them, allows their recognition and value.

When comparing the figures, it can be seen how the kit is beneficial to achieve this objective, because in the first graph 44% always see how students make fun of each other for their linguistic expressions and 56% almost always, but when looking at the second graph the situation of respect changed, 64% never saw this type of rejection again and 36% sometimes, notoriously reducing the rates of mockery and non-acceptance towards the difference.

Undoubtedly, the coexistence kit proposed by the Ministry of National Education is a pedagogical strategy that has a positive impact on school coexistence in rural schools in Cundinamarca. The process of identity building and subsequent recognition of plurality must be based on the consolidation of forms of communication with a diversely accepted language and the formation of social values that solidify respect for difference.

Discussion and conclusions

Social groups -communities- transmit values, customs, worldviews and ways of relating that shape the way students are building their identity according to the context in which they develop, known as their cultural identity "the rules, norms, forms of behavior and ways of being, as well as the relationships that arise in this interaction both with others and with their environment, are inherited by the culture in which a subject develops" (Arrona, 2012, p. 39), this is done through socialization processes that are given from the family and executed in other social spheres, which lead to the rural school and is manifested through behaviors, gestures and forms of communication marked by the difference between their peers.

In the rural school in Cundinamarca, socialization processes based on aggression, gender violence, mockery and the naturalized use of negative words were developed among minors, directly affecting the process of building their identity and the recognition of plurality, generating spaces that affected the academic and behavioral educational processes and increasing inequality among students, to the point of requiring a

pedagogical intervention to mitigate these problems and allow them to reflect on negative behaviors and broaden the spectrum of their actions.

The Ministry of National Education launched the toolkit for the promotion of school coexistence and prevention of abuse, as a strategy that intervenes themes from gender relations, language, community ties and respect for cultural difference, to put it into practice in the rural school cundinamarqués, beneficial results were obtained for the improvement of coexistence, academic and behavioral performance of students, therefore, from the results of this research, it is proposed its application in other institutions of rural or urban character not only of the department of Cundinamarca but of the country in general, the activities, protocols, the booklet "adventures to know and take care of myself**"** and the musical pieces are designed for the different political, cultural and economic contexts that exist in the country, since Colombia has a conflictive history, in which to promote the construction of the solid and conscious identity will allow not only the cultural independence but also the construction of a community for peace.

It is necessary to generate spaces for the construction of identity, free and decisive, because as demonstrated by the results of the application of the coexistence kit, class observations and student testimonies, in Cundinamarca there are diverse communities with unique identities, migrants from other parts of the country, who require monitoring and coexistence guidelines that allow them to promote respect and appreciation of the culture from their self-definition and recognition of the other as different. The rural school of Cundinamarca, a place of agglomeration of students with particular characteristics, should guide educational processes from the assertive use of language, the practice of values, the establishment of positive social relations and assertive gender relations, being agents of empowerment, inclusion and equity.

Socialization among peers is mediated by the respect of doing and being of each subject, the freedoms of expression and the forms of recognition of the other are permeated by social values where the subjects are recognized as different, but with equal treatment, this ideal is achieved to the extent that a joint work is executed among the members of an educational community, nothing is achieved with individual work, it requires a collective work where the rural educational institution has greater recognition before the governmental entities, where, from the field, bases are laid for the achievement of the peace community that the country is looking for.

In the rural school of Cundinamarca, a curricular intervention is required in the short term to focus the educational process towards the prioritization of school coexistence, with educational models of academic impact focused on the socialization of students, reinforcing emotional intelligence and its projection to today's world, where an environment of freedom is generated for the construction of their identity and the recognition of plurality.

The toolkit for the promotion of school coexistence and prevention of mistreatment, if it meets its objective, has a positive effect by "implementing pedagogical and social mobilization strategies to strengthen school coexistence..." Vargas (2020, p. 2) for being a dynamic intervention tool that provides general guidelines of greater clarity to act and prevent situations of violence that damage sociability in rural schools, allowing an effective intervention within the process of identity building and subsequent recognition of plurality, but it requires further work, where other members of the educational community of public education are involved so that its effects have greater coverage.

The fact that the community is a floating one is considered a limitation insofar as students are arriving to the rural sites throughout the school periods, which disorganizes

the line of work, because a contextualization of the activities to be carried out is required, delaying the execution time, another limitation is the lack of previous research on the specific topic of the relationship between the construction of identity, the recognition of plurality developed within the coexistence process in a rural educational context, leaving as a recommendation that in Colombia spaces are generated for the recognition of culture and the construction of community within rural schools.

Finally, the hypothesis raised in this research process is fulfilled since positive school coexistence has a decisive influence on the construction of identity and recognition of plurality within the rural school coexistence in Cundinamarca, because the results of the analysis of the information showed changes in behavior, attitude and forms of communication among students, demonstrating that it is possible to educate from the conscience of self-recognition and respect to the difference, which will allow thinking that the kit has an impact not only in school but also in the family because the students can ratify or exemplify what they have learned at school in their homes, it is worth mentioning that this is an assertion that opens the doors to future investigations.

References

Appiah, A. K. (2007). *La ética de la individualidad, la autonomía y sus críticos y el problema de la cultura.* In *La ética de la identidad*. Katz.

Arrona, A. A. (2012*). Identidad, inmigración y escuela.* [Tesis doctoral, Universidad Autónoma de Barcelona].

Bauman, Z. (1999). Tribu, nación y república y la democracia liberal y la república y multiculturalismo o polivalencia cultural y vivir junta en un mundo de diferencias. In *En busca de la política "tribu, nación y república*". (pp. 170-212). Fondo de cultura económica.

Bauman, Z. (2002). *Modernidad liquida.* Fondo de cultura económica.

Bauman, Z. (2006*). Identidad*. Lozada.

Bisquerra, R. (1987): *Introducción a la estadística aplicada a la investigación educativa.* PPU.

Bogdán, S. T. (1984). *Introducción a los métodos cualitativos de investigación.* PAIDÓS.

Deslauriers, J.-P. (2005). *Investigación cualitativa.* PAPIRO.

Geertz, C. (1973). *La interpretación de las culturas.* Nueva York Basic Books.

Heinson, R., Chaux, E., & Molano, A. (1987). La chispita que quería encender todos los fósforos: Percepciones, creencias y emociones frente a la intimidación en un colegio masculino. *Voces y Silencios: Revista Latinoamericana de Educación, 1*(1), 5-22.

Miglino, J. (2023). *estadísticas mundiales de bullying.* https://bullyingsinfronteras.blogspot.com/2018/11/estadisticas-de-bullying-en-colombia.html

Lapresta, C (2004). *La identidad colectiva en contextos pluringües y pluriculturales, el caso del Valle de Arán*. Universidad de Lleida, España.

Munarriz, B. (1992). *Técnicas y métodos en investigación cualitativa.* Universidad de Coruña.

Organización para la Naciones Unidas en Colombia. (2018). *ODS en Colombia: Los retos para 2030.*

Sáenz, J. (1997) *Mirar la infancia: pedagogía, moral y modernidad en Colombia*, 1903-1946. Colciencias.

Send, A. (2007). *Identidad y violencia, la ilusión del destino*. Katz.

Tourine, A. (2012). *¿Podremos vivir juntos? Iguales y diferentes.* Fondo de Cultura Económica.

Vargas, A., Lemus, B., Téllez, C., Pedroza, C., Caro, J., Ruiz, M., Jiménez, M., Torres, Y., & Trujillo, D. (2020). *Contexto y uso de Kit de Herramientas Convenio* N.º CO1.PCCNTR.1630701 de 2020. Ministerio de Educación nacional de Colombia.

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ACCESS AND INCLUSION IN PUBLIC EDUCATION: THE DILEMMA OF FAMILIES IN THE DOMINICAN REPUBLIC

ACCESO E INCLUSIÓN EN LA EDUCACIÓN PÚBLICA: EL DILEMA DE LAS FAMILIAS EN REPÚBLICA DOMINICANA

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ABSTRACT

Admission and access to compulsory Dominican public schooling is an issue that, for years, has represented a challenge for the educational system and the rulers. With this challenge, the general objective of the research is to contribute through SISNAE as software guaranteeing reliability and quality of said process in public educational centers. As specific objectives, it is proposed to know the characteristics of the qualification criteria for admission; identify the mechanisms, strategies and techniques applied in the access and admission process by public educational centers for compulsory schooling; analyze the strengths and weaknesses of the Dominican educational system reflected in admission to compulsory schooling; and contribute, through the proposal of an automated computer tool, to reduce the risks of arbitrariness in these processes. A computer tool is suggested to optimize the admission process to compulsory Dominican public schooling, guaranteeing a positive impact on society, due to the benefits in favor of educational equity and inclusion. Supported by the methods: hypothetical-deductive, historical-logical, through empirical systematization, through observations, interviews, questionnaires and document analysis. Results are obtained that offer a more efficient, effective service with the levels of effectiveness necessary to guarantee more equitable access to public schooling. Finally, the contribution consists of proposing software for the automation of the access and admission process to compulsory schooling in public centers, contributing to the debate on access to compulsory schooling, and its impact on economically deprived families.

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Palabras clave:
educación y tecnología, inclusión educativa, acceso escolar, proceso de admisión escolar, automatización, software.

RESUMEN

La admisión y acceso a la escolarización obligatoria pública dominicana es un tema que, por años ha representado un reto para el sistema educativo y los gobernantes. Con ese desafío, el objetivo general de la investigación, contribuir mediante el SISNAE como software garantizando confiabilidad y calidad de dicho proceso en los centros educativos públicos. Como objetivos específicos se plantea conocer las características de los criterios de calificación para la admisión; identificar los mecanismos, estrategias y técnicas aplicadas en el proceso de acceso y admisión por los centros educativos públicos de la escolaridad obligatoria; analizar las fortalezas y debilidades del sistema educativo dominicano reflejadas en la admisión a la escolarización obligatoria; y contribuir, mediante la propuesta de una herramienta informática automatizada, a disminuir los riesgos de arbitrariedad en estos procesos. Se sugiere una herramienta informática para optimizar el proceso de admisión a la escolarización obligatoria pública dominicana, garantizando un impacto positivo en la sociedad, por los beneficios a favor de la equidad e inclusión educativa. Sustentado con los métodos: hipotético-deductivo, histórico-lógico, mediante sistematización con carácter empírico, mediante observaciones, entrevista, cuestionario y análisis de documentos. Se obtienen resultados que ofrecen un servicio más eficiente, eficaz y con los niveles de efectividad necesarios para garantizar el acceso a la escolaridad pública más equitativo. Finalmente, el aporte consiste en proponer un software para la automatización del proceso de acceso y admisión a la escolarización obligatoria en los centros públicos, contribuyendo al debate sobre el acceso a la escolaridad obligatoria, y su impacto en familias carentes económicamente.

Introduction

In Latin America, most countries face great challenges regarding the advancement of their educational systems and the Dominican Republic is no exception, since the need to respond to a situation that year after year is reflected as a challenge, where public sector centers offer insufficient classrooms in relation to the existing demand, and many families are forced to enroll their children in centers far away from their residences, or be forced to enroll in private schools or simply be left out of the classrooms.

This reality generated concern and motivation for the study, allowing for an in-depth study of admission and access to Dominican compulsory public schooling, which merits reflection on what has been proposed, in this context, by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Organization for Economic Cooperation and Development (OECD), as well as what is established in the Dominican Constitution and in the General Law of Education.

The literature review identified research and authors with concerns on the subject, who focus on studying and investigating the family and the school, focusing their analysis on: a) the discontinuities and continuities between the two (Cabrera, Funes and Brullet, 2004); b) the participation, collaboration and involvement of families in educational institutions (García, 2003; Gareau and Sawatzky, 2005; Crozier and Reay. 2005); c) the characteristics of each institution to perceive possible family-school relationship models (Pérez, 2004; Ravn, 2005, 2007); d) family and education or family and school (Musitu and Cava, 2001; Marti, 2008; Comellas, 2009; Feito, 2010).

In their article "El aprendizaje cooperativo: estudio de una metodología emergente inclusiva", Sanz and Quesada (2021) emphasize the need for inclusive education and the role of cooperative learning in achieving inclusion, highlighting the benefits of teamwork and the development of attitudes and values in students.

Seye and Diakhate (2019) in their research on the organization of the Senegalese education system, address the need for an inclusive and equitable system through various measures. First, the Senegalese government believes that education and training should be a vehicle for development at both the individual and collective levels. To achieve this, the aim is to create a school based on equity and equal opportunities, which can implement the country's development objectives.

In addition, options such as PACKET-EF 2013-2030, which focuses on correcting disparities, professionalizing higher education and training young people in high-demand sectors, have been implemented. This seeks to ensure that students acquire the necessary skills to adapt to scientific and technological advances, as well as to innovate.

In terms of inclusive education, the Senegalese education system has placed increasing emphasis on meeting the specific educational needs of children, as well as on the massive enrollment of girls in schools. These strategies are perceived as ways to provide a more equitable and democratic educational service.

According to these authors, the Senegalese education system addresses the need for an inclusive and equitable system through measures such as the creation of a school based on equity and equal opportunities, the correction of disparities, the professionalization of higher education, and the addressing of the specific educational needs of students.

The contributions of this research are acknowledged; however, in order to solve the problem posed, it is necessary to delve deeper into issues that are not addressed.

Based on the postulates of UNESCO, which promotes human rights and the rule of law in its spheres of competence, advocating for the promotion of these, by monitoring

their application, the Dominican Constitution establishes the right to education for all persons born in the national territory, as well as the General Law of Education 66'97, guaranteeing the right to education to all the inhabitants of the country, the need for this research arises, highlighting its importance, which consists of the presentation, in addition to the theories and concepts related to admission and inclusion in Dominican public education, of the dilemma that communities and families live with respect to this issue, as well as the contribution made by proposing the development of a computer tool, in order to automate access and admission to public schools in the country.

Research can be a frame of reference for the educational system, seeking opportunities and quality improvements, guaranteeing and increasing the level of access to the classroom, thereby promoting inclusive education.

The results obtained make it possible to offer a more efficient and effective service in accordance with the needs of the environment and, in this way, achieve the levels of effectiveness necessary to guarantee fair and regulated access to public schooling. The feasibility of the research is considered taking into account the existence of material and human resources, in addition to the time for its realization and the proposed objectives. The research is considered feasible, since the institutions have been receptive enough to open their doors and provide the required information.

The social relevance lies in the fact that it describes what is related to access to Dominican public compulsory schooling and proposes a computer tool to respond to it, generating a positive impact on society, since both public schools and families will be the first to benefit from these improvements.

Methodologically, it is useful because the data and information obtained are used to identify the aspects that respond to the objectives set. In terms of its scope, it opens new paths for students and professionals who present situations similar to those presented here, serving as a frame of reference.

The feelings of frustration that prevail in the poorest families are aggravating. They identify a hostile environment of poor and unjustified quality of education in public schools, as reported in interviews.

In the practical aspects, it can be seen how the interested parties (guardians) form long lines from early in the morning and throughout the day, in order to obtain an enrollment for their children, which they do not always achieve.

As a result of research on the functioning of the Dominican educational system in terms of access and educational inclusion in the public sector, few studies and research on the subject were identified, which makes explicit the lack of interest and absence of discussions aimed at resolving or addressing the dilemma faced by families when enrolling their children in these centers.

The lack of background and theoretical or practical research on the subject suggests the need to respond and assist in the process of access and educational inclusion in the public sector, making available to the system and families, a tool where they can request enrollment for their children automatically. This implies a study opportunity that represents, in turn, a significant and functional contribution to the Dominican educational system.

Taking into account these investigations and based on a series of aspects that have been worked on in depth, it is considered necessary and opportune to define criteria that allow the admission and access, without arbitrariness, of students to public sector schools, based on the experiences, conceptions and what is established in the Dominican Constitution and the Education Law 66'97.

Dominican Republic initiatives regarding access to education.

The Dominican Constitution establishes in its Article 63, the right to education that every person born in the national territory has (Dominican Constitution, 2015). The purpose and scope of Education Law 66'97 is to guarantee the right to education to all inhabitants of the country. This law also channels the participation of the different sectors in the national educational process (General Education Law, 1997).

An introspection of what is stated in the Law reveals the weakness of the system and the way in which the established principles and the rights of citizens, as stated by UNESCO and cited in the Dominican Constitution, are violated.

The goal of the Education Agenda 2030 (SDG 4) coincides with the objectives of the national agenda in the field of education, defined in the National Development Strategy (END), the Ten-Year Education Plan 2008-2018 and the National Pact for Education Reform. The goals of the 2016-2020 Educational Proposal presented by the Ministry of Education of the Dominican Republic (MINERD) have been aligned with the goals of the Sustainable Development Goals (SDG 4) and other local and international commitments in the area of education.

It is necessary to contextualize SDG 4 at the national level, which implies the creation of new data sources and modification or improvement of existing sources to adequately measure progress towards the expected results.

Sustainable Development Goal 4 has 10 targets that encompass many different aspects of education. There are 7 goals, namely, that are expected results and 3 goals that are the means to achieve them:

Table 1

Targets that respond to SDG No. 4

GOALS	EXPECTED RESULTS
Universal primary and secondary education.	By 2030, ensure that all children complete primary and secondary education, which should be free, equitable and of good quality and produce relevant and effective learning outcomes.
Early childhood development and universal preschool education.	By 2030, ensure that all children have access to quality early childhood care and development services and preschool education so that they are ready for primary school.
Equal access to technical/professional and higher education.	By 2030, ensure equal access for all to quality technical, vocational and higher education, including university education.
Adequate skills for a decent job.	By 2030, substantially increase the number of youth and adults who have the necessary skills, particularly technical and vocational, to access employment, decent work and entrepreneurship.
Gender equality and inclusion.	By 2030, eliminate gender disparities in education and ensure equal access for vulnerable people, including persons with disabilities, indigenous peoples and children in vulnerable situations, to all levels of education and vocational training.
Universal youth literacy.	By 2030, ensure that all youth, and at least a substantial proportion of adults, have literacy and numeracy skills.
Citizenship education for sustainable development.	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including through education.

Plans and policies are being implemented in the following ways:

Effective learning environments: Build and adapt school facilities that are responsive to the needs of children and people with disabilities and gender-sensitive, and that provide safe, non-violent, inclusive and effective learning environments for all.

Scholarships: Substantially increase worldwide the number of scholarships available to developing countries to enable their students to enroll in higher education programs.

Teachers and educators: By 2030, substantially increase the supply of qualified teachers, especially in the least developed countries and small island developing states. Achieving SDG 4 requires increasing the fiscal effort in favor of education. Although since 2013 the country has doubled public spending on pre-university education (from around 2% of GDP to 4%), it is not sufficient to achieve the goals of the national education agenda. Annual budget allocations need to be increased to reach the levels of funding for public education set forth in the Ten-Year Education Plan (5.25% in 2017 and 5.60% in 2018) and in the END (6% in 2020 and 7% by 2030). The Fiscal Pact established in the END, aimed at improving the quality of spending and increasing tax revenues, would create the conditions to achieve and sustain such goals (INTERED, 2017).

The laws intended to regulate the Dominican educational system emanate from Art. 63 of the Constitution, which establishes the right to education and states: "Every person has the right to an integral, quality, permanent education, under equal conditions and opportunities, with no other limitations than those derived from his aptitudes, vocation and aspirations" (Dominican Constitution, 1844).

Numerous Ordinances are derived from it, which provide answers to the needs that arise in this system, depending on the circumstances. The report "Education for All 2000-2015: Achievements and Challenges", presented by MINERD and the Regional Office for Culture for Latin America and the Caribbean, Unesco-Havana (April 2015), states that as a result of the investment of 4% of GDP for education, the country made progress towards meeting the goals set at the World Education Forum, Dakar, 2000. (Germán, 2015).

Contribution of the automation of admission processes in education

In the educational field, the approaches used in terms of information systems are diverse; among them there are multiple advantages and in some cases, some disadvantages; however, only a few of the information management systems used have focused their efforts on optimizing the educational resources available, much less oriented to control admission processes in schools, since human resources management is more representative; however, in today's education, one of the great challenges is precisely to respond to the high demand of society with respect to the schooling of their children, which leads to a growth of needs that affect the quality of education.

Educational management information systems make it possible to measure what is valuable, to recognize the strengths and weaknesses of a school, to compare it with other schools, to identify common indicators that measure the same with a high degree of reliability, which can guide and channel the actions of the various participants, in order to propose alternative solutions (UNESCO, 2014).

Educational institutions base their organizational development on the proper management of information. In this management there are common factors, essential for the survival and progress of any entity, among which innovation, responsiveness, productivity and competence are identified. Information management seeks to ensure that the educational institution has the necessary information and capabilities for its continuous adaptation to internal and external changes in the situational context; the

implementation of quality management depends, to a large extent, on the correct management of information and knowledge (UNESCO, 2014).

Solid and reliable information systems contribute to the transformation and modernization of the education sector and represent a strategy within the efficiency policy outlined in the current educational reform.

Without an information system, it is tedious to execute actions or manage resources; organizations that are flexible, agile and more capable of learning, in a rapidly changing environment, present the best conditions for change. Without information management it is not possible to make reasonable decisions, just as it is not feasible to outline the policies, programs and design the methodological processes that the institution will follow (UNESCO, 2014)[2].

The implementation of information systems in school administration has generated a renewed interest in the analysis, management, interpretation and evaluation of the results obtained from it.

In short, information systems must consider the information resources, the people who process the information and the development of institutional intelligence, so that the results and data obtained provide the greatest possible objectivity to promote appropriate decision making.

Method

Design

The research is based on the positivist, interpretative and critical paradigms, since it is based on the testing of empirical hypotheses and can be generalized to other similar studies. In addition, variables are observed in their nature, in everyday life and not in a controlled environment. It also addresses a social issue, where political wills, ethical and cultural values, as well as economic issues interfere. According to (Guba and Lincoln, 1988), cited by (Godoy Rodríguez, 2019), a research paradigm comprises four elements, namely: epistemology, ontology, methodology and axiology.

The research is guided by the assumptions, beliefs, norms and values of the epistemological and methodological approaches. The first, because it focuses on the nature of human knowledge and the understanding that, as a researcher, one acquires of the subject in question, in order to broaden and deepen the understanding in the field of research. The second one is considered, since a well-planned research design, methods, approaches and procedures have been thought of to investigate the procedures applied in the admission of students to public educational centers of compulsory schooling.

In this sense, the participants (actors in the process), the instruments and the data analysis have been defined for data collection. The policy is analyzed to improve the admission processes to educational centers, generating a transformation in this process, so the researcher participates and interacts directly with the actors to experience firsthand, the lived reality.

The design is non-experimental, since the phenomena that affect preference were observed as they occur in their natural context, and then updated. Here the researcher is limited to the observation of existing situations, given the inability to influence the variables and their effects.

[2] UNESCO. (2014). Education Management Information System (EMIS). s.r.

Participants

The sample was selected randomly, since the population is known. Applying the formula of (Fischer & Navarro, 2002), starting from a population of 338 students, results in 180 applicants, knowing that the level of reliability is 1.96 and a margin of error of 5%, with a probability of success and failure of 50% each. In the case of teachers, 120 were applied, taking into consideration that the population is 174. Two members of the Management Team of each center. In the case of parents, the population of 101 was considered, resulting in a sample of 80 parents, because it happens that the same family may have an average of three children in the same center. With respect to the authorities, the survey was applied to a representation of two district and two regional technicians, for a total of 390 people (Table 2).

Table 2

Population and sample

Population					**Sample**					
Centers	Management Team	Students	Teachers	Families	Centers	Management Team	Students	Teachers	Families	Regional-District Authorities
17	17	952	493	286	**17**	**6**	**180**	**120**	**80**	**4**

The criteria for inclusion of the participants are based on the fact that they meet the characteristics that necessarily have to do with the admission processes for compulsory schooling in public schools. In the case of students (applicants), they are the main focus of the research; parents (families) are the guardians of these students.

Instruments

Different instruments were structured in order to collect real data using the objects of study as a source, focusing on the main actors of the educational communities. The questionnaires have dimensions, questions and alternatives, structured using the unipolar Likert scale, to evaluate the opinions and attitudes of the respondents. An observation guide was also designed and applied to the enrollment process of the centers, which includes the dimensions and qualitative evaluation criteria ranging from always, sometimes or never, with this guide first-hand information was obtained, as the process developed in each center.

Data analysis

Initially, the situation was identified and, based on the observations, the topic was defined. Subsequently, it was delimited and thus the title of the research was obtained. Based on the variables it encompasses, the problem, its justification and the objectives were defined.

Through bibliographic research, the existing literature on the subject was reviewed, starting from the general to the particular, outlining with a holistic view of the world, Latin American, Caribbean and the reality of the country. Subsequently, the methodology was defined, highlighting the design, identifying the universe, the population and the selected sample. The variables to be studied were identified and delimited, and the research instruments were defined and structured according to the object or subject of study.

Gradually, the surveys were applied to the different stakeholders and observations were made of the processes in the educational centers. The procedures for data collection

were implemented in several stages: a letter was sent to the management of each Educational Center requesting their authorization to access and survey their situation with respect to the access and admission process and the criteria taken into consideration to select their students. This survey and a preliminary investigation were carried out using closed and open questions in order to obtain initial information.

Thereafter, visits were scheduled to the Management Teams, which were observed at different times, upon formal notice, focusing basically on their role in the school admission process. At the same time, teachers were approached with a primary focus on determining the center's effectiveness and compliance in admitting students.

The survey to the parents was made in two visits, during the development of the different activities related to the admission of their children. In the case of the students, they were also surveyed on three occasions, without prior notice, so as not to alter the results of the research. Technicians were surveyed using Google Form.

Several bibliographic sources were consulted, as well as monographs and doctoral theses on topics related to the research, in order to use them as a frame of reference and analyze the conclusions reached by their authors. For data processing, the results were organized and ordered, from which each of the responses were tabulated, taking the results to diagrams or statistical graphs and complementing them with a general commentary, for which SPSS Stadistic software was used for tabulation and generation of figures (graphs) according to variables. This led to the definition of school admission criteria, which laid the foundations for defining the rules and procedures to carry out this process, allowing for the structure and operation of the proposal. After applying this procedure and sequence of events in the research process, the conditions were created to arrive at the final conclusions and implications.

Importance of the National School Admission System (SISNAE)

We have also worked to automate the teacher selection process in the Dominican Republic, following certain requirements and criteria that must be met, starting with the online filling out of a form. In the same way, a Web platform could be implemented, where each family fills out an online form.

This form would be linked to the Educational Centers Management System (SGCE) and to the School Management Information System of the Dominican Republic (SIGERD), from which each center will make a daily survey, while it is in this process and will determine its capacity and admit those applicants who meet the highest number of criteria and with the highest score according to their classroom capacity, in this way this database could be connected to the Power Bi of MINERD in order to generate reports and statistical graphs by educational indicators.

This process must be carried out at least three months before the beginning of each school year, i.e. the form must be filled out by the parents during the month of May, which will allow sufficient time for the centers to qualify and select their students and communicate the response to each parent.

Through this procedure, there will be greater control from the highest educational authorities of the reality of each center under their supervision, which, in turn, streamlines the process and national educational statistics. At the same time, it would address the issue of school inclusion, where parents or guardians are the ones who decide where their children will study and, finally, it fights arbitrariness in the selection of applicants for admission to each center.

System operation

To make the process feasible, an informative Web site will be available to explain the operation and methodology applied. This site will have an access button to register as an applicant, which must be completed by the applicant's proxy. In addition, you will be able to see, as you select the center(s) of your choice, the critical route to get there, using Google Map, which allows, in turn, to measure the time it would take the applicant to travel to and from the center. You will also be able to consult the academic offerings, infrastructure, the Center's Educational Project (PEC), and its achievements in terms of plans, programs and projects.

To understand the system, the application is divided into three stages:

First stage: The MINERD provides families with a platform where they can apply and which contains information on each establishment, such as: the PEC, which contains relevant information on each center.

When filling out the application form, the proxy may select three (3) educational establishments in order of priority, so that if he/she is rejected for any reason in the first one, he/she will automatically queue up to the second option and so on, a procedure that will be notified by SMS to his/her cell phone.

Second stage: If the school has available places, the system ensures that all applicants (meeting the priority criteria) are admitted. However, in the event that there are more applicants than places, the schools must randomly assign the vacancies to other schools that the parent has pre-selected as second or third choice. The order is made by means of an algorithm that takes as a reference the applicant's score based on the mandatory criteria, which ensures its randomness. The following priority criteria must be met when assigning your quotas:

1. Siblings in the establishment (graduates and/or active).
2. Vulnerable applicants (with motor disabilities, low family income, and others).
3. Children of employees of the facility.
4. Alumni who have not been expelled.
5. Proximity to your home or your proxy's work.
6. All other applicants.

In detail, the variables to be considered are shown in Table 3:

Table 3
School admission variables and criteria

Variable	Criteria	Rating (%)	
		Yes	**No**
a) Family ties	Siblings in establishment (active or graduated).	15	0
b) Vulnerability	Applicants who are economically vulnerable or have a disability.	20	0
c) Relationship with officials.	Children of employees of the facility.	15	0
d) Reintegration	Alumni who have not been expelled.	10	0
e) Geographic location of your home	Proximity to your home or to your proxy's place of work	20	0
f) General public (Number of criteria)	Meets all 5 of the above criteria	20	0
	Weighting	**100%**	
General public (Number of criteria)	Meets three of the above criteria	15	
	Weighting	**95%**	
General public (Number of criteria)	Meets two of the above criteria	5	
	Weighting	**85%**	
Does not meet any criteria		50%	
	Weighting	**50%**	

a) Existence of siblings enrolled in the center or legal guardians working at the center. In the event that several siblings apply for a school place in the same school and for the same or different grades, the admission of one of them will imply the admission of the others.

b) Concurrence of disability in the applicant, in his/her legal guardians, or in any of his/her siblings or foster children in the same family unit.

c) Existence of legal guardians who work permanently at the center.

d) The student has dropped out or deserted and wishes to return to the center, as long as he/she has not been expelled (former student).

e) Proximity to the proxy's family residence or place of work.

e.1) When the domicile is located in the area of influence or bordering the center.

e.2) When the proxy's place of work is located in the area of influence or bordering the center.

f) General public: The student who belongs to a large or single-parent family and is a minor or adult subject to extended parental authority or guardianship.

g) Any applicant who meets only some or none of the above criteria.

An applicant who meets all the criteria (5) would automatically receive 100% of the evaluation, which guarantees access to the establishment, provided there is space; while if he/she meets three (3) of the five, he/she would be at 95%, decreasing the possibility, and if he/she only meets two (2) of them, his/her evaluation is 85%, which indicates that his/her possibilities of access are reduced, but this does not mean that he/she will be rejected, but that the algorithm would place him/her at the bottom of the selection order. If the applicant does not meet any of the admission criteria, he/she will accumulate a 50% weighting, which reduces the possibility of being admitted, but, as long as there is space, access will be authorized and admission will proceed (table 3).

Third stage: The MINERD ensures that the quotas that are filled are in accordance with the preferences of parents and access priorities.

Parents have the option to accept or reject the facility where they were admitted. In case they reject their place, it is opened for another student on the list. Along with accepting or declining, they can indicate whether they want the waiting list to run.

Table 4

Applicants and non-applicants through SISNAE

MUST APPLY	SHOULD NOT APPLY
First-time entrants to a public educational institution	Those who wish to enter a private school.
Those who want to change centers.	Those who wish to continue in their center under the same modality.
Those who are in a center that does not have continuity in the next grade.	Those who want to enter day care centers or nursery schools.
Those interested in re-entering the public education sector.	Those who want to enter a special education center.
Those who wish to change modality.	Those interested in entering the youth and adult subsystem (PJA) or the PREPARA program.
Those who want to change centers due to the type of workday.	

Proxies: Proxies are those who comply with the following aspects:

1. First, the applicant's mother, father or legal guardian [3].
2. Secondly, grandparents (maternal and/or paternal).
3. Third, a simple tutor[4].

[3] They have the highest priority, in the event of a legal ruling.

[4] In order to be validated, you will have to go through a procedure at MINERD.

Figure 1

Flowchart with the sequence of events or path of SISNAE

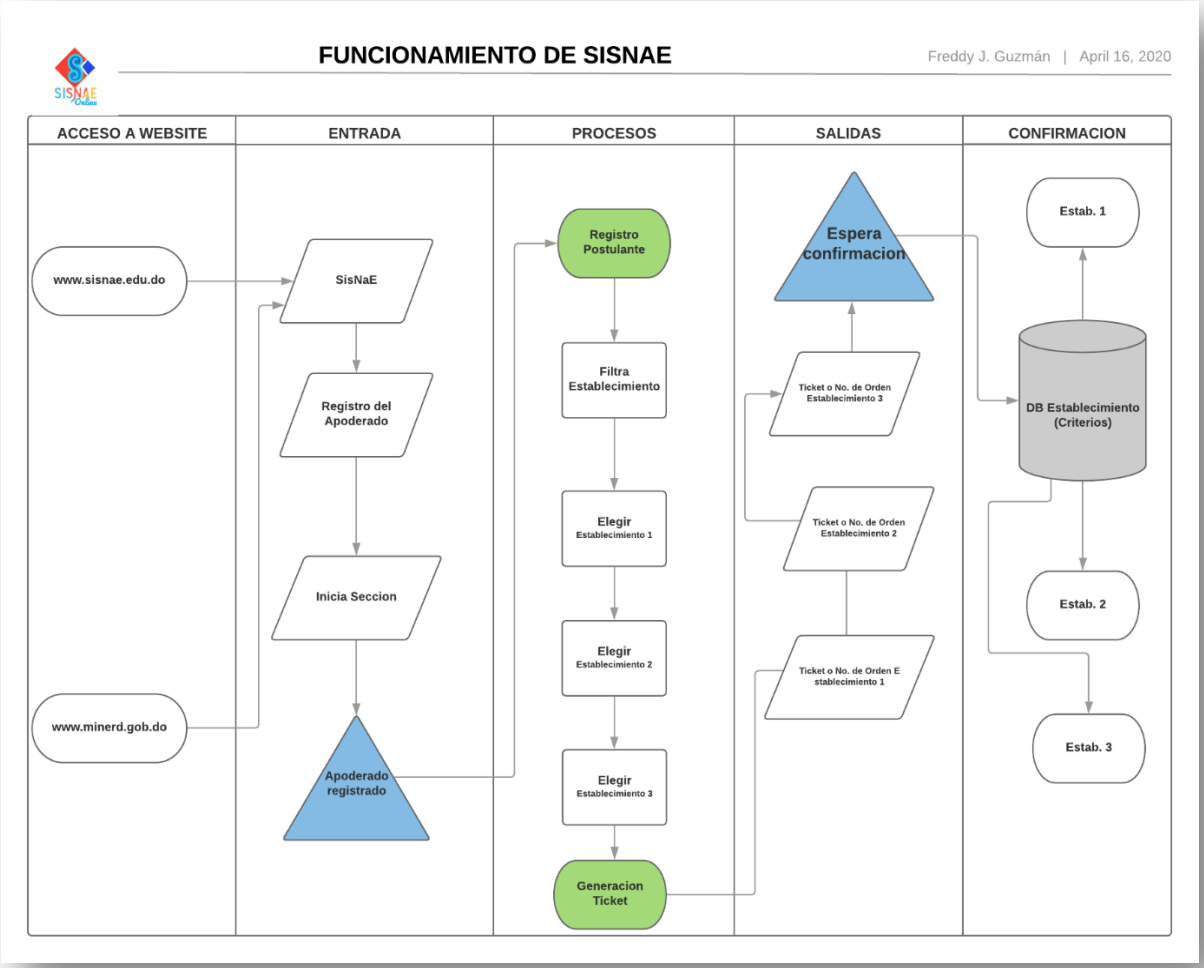


Figure 2
Entity-Relationship Diagram

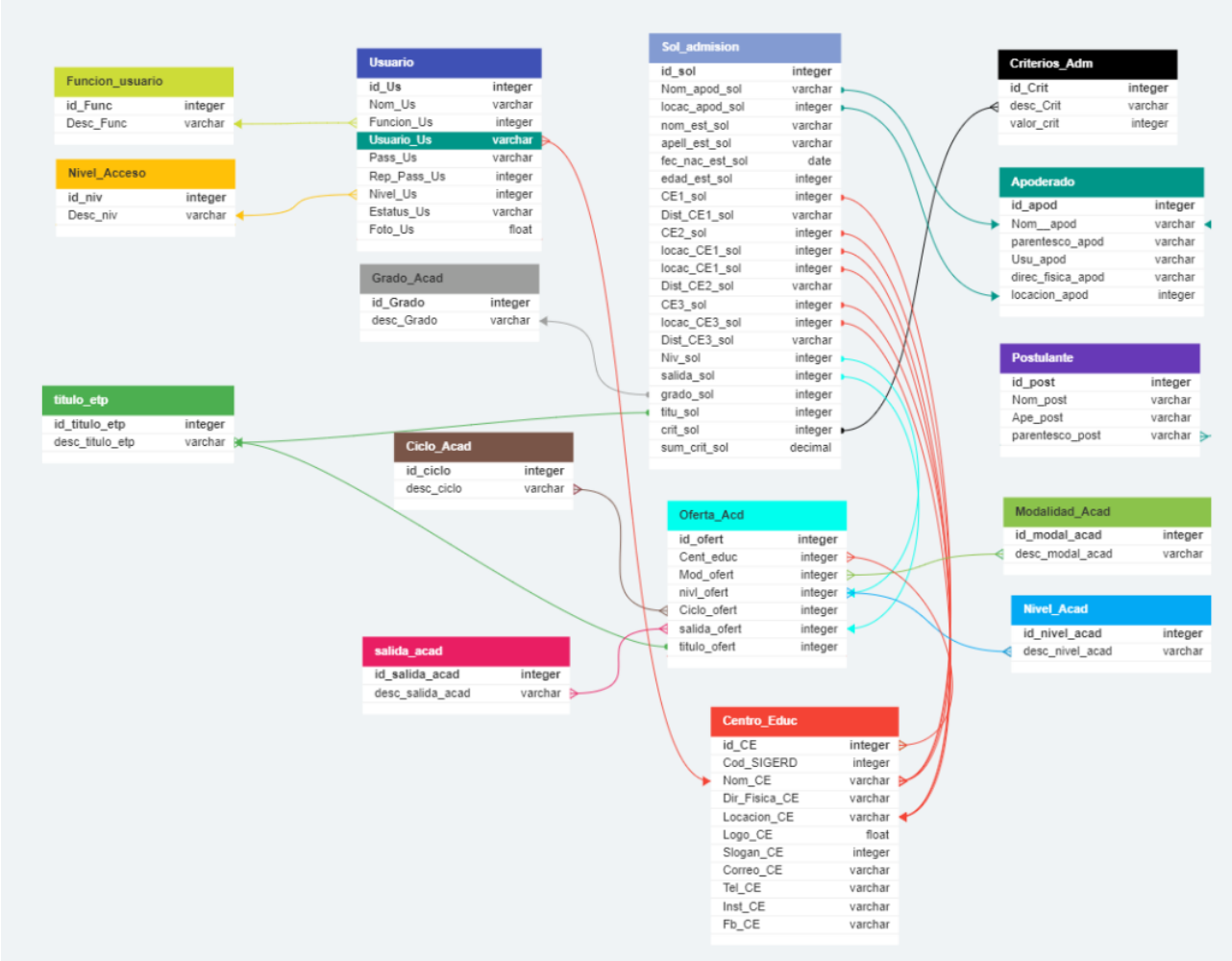


Figure 3
System Logic Sequence

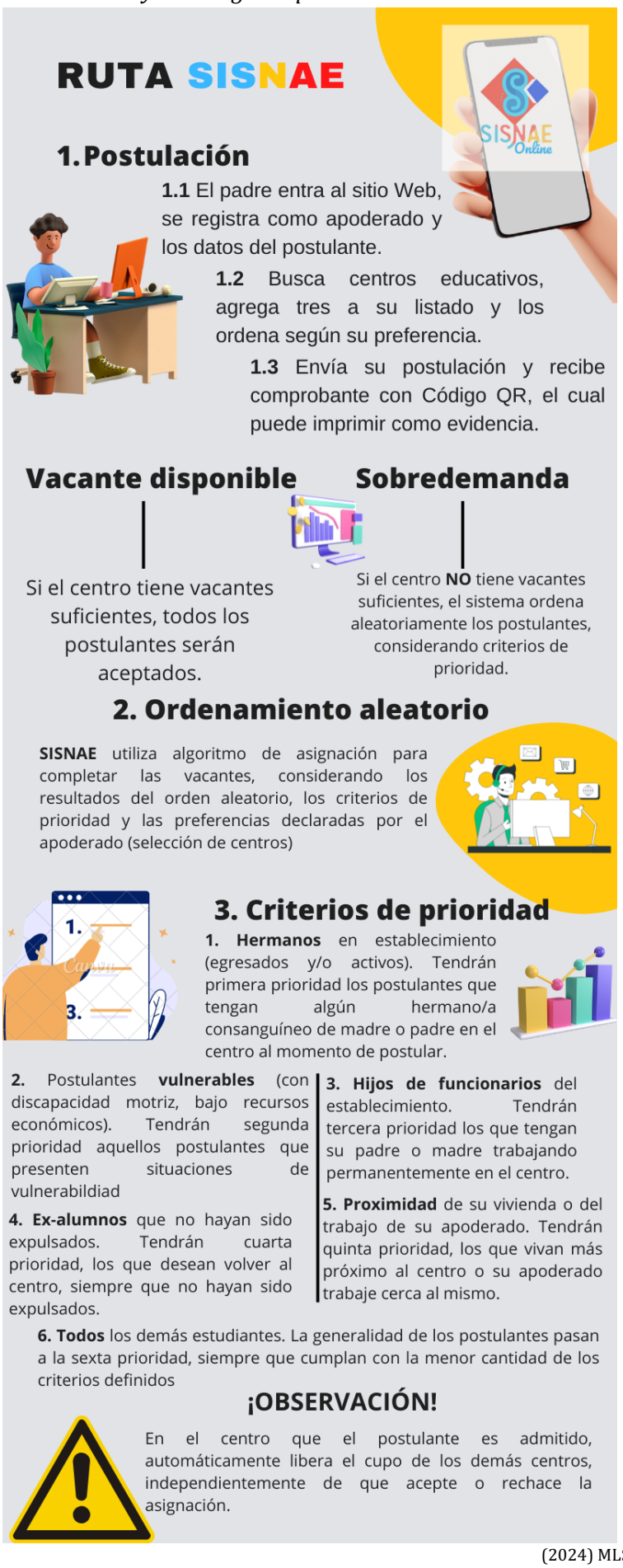


Figure 4

SISNAE Web home page.

Figure 5

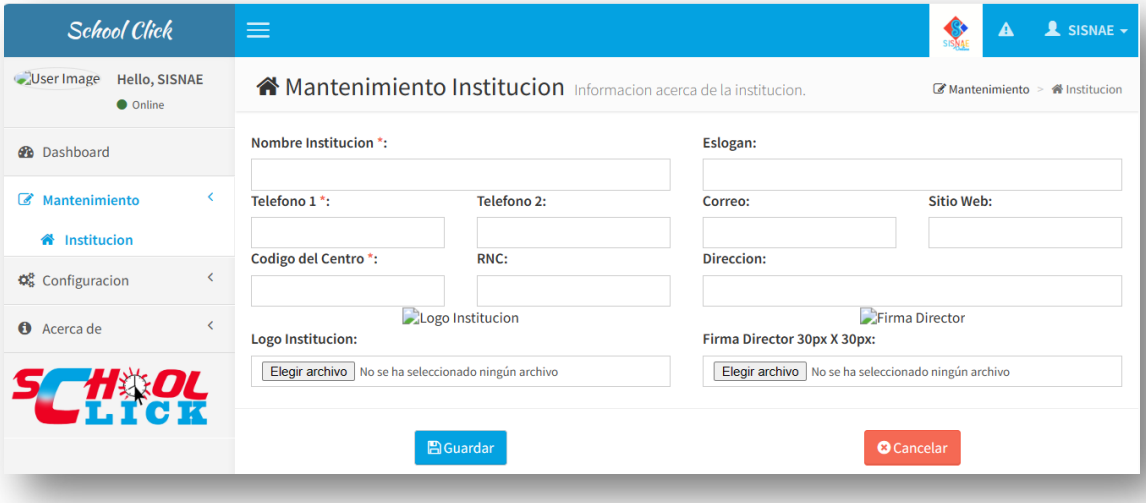
SISNAE Web site menu

Figure 6
TARE, SISNAE program information

Figure 7
Information about applicants and non-applicants, SISNAE

Figure 8
SISNAE: Dashboard

Figure 9
SISNAE: Maintenance of educational institutions



Results

According to the results, 43% of the management teams and 38% of the students, as well as 53% of the technicians somewhat agree with the procedure applied in public schools in their admission process; however, teachers (57%) and 46% of the parents strongly agree.

Regarding the accompaniment of regional and district authorities, 43% of the management teams and 59% of the technical staff say that the technical staff almost always accompanies these processes. However, 44% of students, 70% of teachers and 43% of parents say they never do.

71% of the management teams, 46% of the students and 85% of the teachers agree with 70% of the parents, where they strongly agree that the educational centers comply with the provisions of the constitution regarding the right to education; contrary to 65% of the technicians who somewhat agree.

Of the management teams, 43% and 35% of the students somewhat agree that the admission processes are carried out with a certain degree of arbitrariness. Of the teachers, 41% disagreed somewhat; 28% of the parents strongly disagreed, while 59% of the technicians neither agreed nor disagreed.

In reference to the existence of criteria, 100% of the management teams, 76% of the students, 80% of the teachers and 70% of the parents/guardians consider that criteria are required of applicants for admission. On the other hand, all the actors agree that the way of developing the admission processes in the centers is carried out manually, with 57% of the management teams, 55% of the students, 52% of the teachers, 63% of the parents and 77% of the technicians agreeing with this criterion.

57% of the management teams and 41% of the technicians state that there is no technological tool in the public education system to automate the admission process. However, 46% of students, 48% of teachers and 42% of parents believe that such a tool does exist. It should be noted that most teachers do not get involved in these processes, nor do the students, as they are usually enrolled by their parents or guardians.

Discussion and Conclusions

Regarding the systematization of definitions and concepts related to the automation of school processes, it is proposed that in the educational sector it is an ally for the simplification and optimization of workflows and operational processes, generating direct benefits for the administrative and pedagogical areas.

As stated by UNESCO in 2014, educational institutions support their organizational development in the proper management of information, in which there are common factors, essential for the survival and progress of any entity, among which innovation, responsiveness, productivity and competence are identified.

That said, there is a clear need for a tool that automates the school admission selection process, where families are the ones who decide the center where their children will study.

In reference to the characteristics of the qualification criteria for student admission, it is concluded that half of these centers require applicants to meet criteria, but not all of them explain what they consist of. All stakeholders were of the opinion that criteria are required for applicants to be admitted.

Through the application of the observation guide, it was determined that, with respect to the procedure for admitting students, the centers sometimes apply admission tests. As a whole, arbitrariness is often observed on the part of the authorities in the selection of their students.

These results show that in the country there are no standardized criteria for admission, nor is there legislation, i.e., there is no legal reference where the criteria for selecting students in public schools are specified and defined.

It is imminent that criteria be defined to make the admission process transparent and reduce arbitrariness, where families participate as active entities in the process and are the ones who choose the centers for their children.

Regarding the identification of the mechanisms, strategies and techniques applied in the access and admission process, the management teams, students and technicians are somewhat in agreement with the procedure applied. However, teachers strongly agree.

It is obvious that, due to the manual execution of the admission process, there is no absolute control of the data or of the process itself, so the proposal of a computerized

system guarantees parents some certainty that their children will be admitted to the centers that, according to them, could be convenient for them or the one of their preference.

The strengths and weaknesses of the Dominican educational system as reflected in admission and access to schooling were analyzed. The following was considered: the accompaniment of the centers by regional and district authorities, of which the management and technical teams state that they almost always accompany these processes. However, students, teachers and guardians say that they never do; regarding compliance with the provisions of the law on the right to education, management teams, students, teachers and guardians strongly agree that the centers comply with the provisions of the constitution; contrary to the technicians who are somewhat in agreement.

The management teams and students are in some agreement that the admission processes in the schools are carried out arbitrarily. The teachers and proxies disagreed; the technicians were neutral in this regard.

It has been demonstrated that there are weaknesses in the system, violating the rights of citizens with respect to access and admission to public schools.

Law 66'97 on education establishes parameters and indications regarding school admission; the management and teaching teams said that it is always complied with; in contradiction with the students and families, assuring that it is never complied with, although the technicians are of the opinion that it is almost always complied with.

All of this represents a scourge in the public education system, since a student who is enrolled where he or she does not feel comfortable has a pretext for not focusing and demonstrating maximum academic achievement. It is important that families feel identified with the educational institution where their children study, thus guaranteeing the integration and support needed in the school-family relationship.

The objective was to propose software to reduce the risks of arbitrariness in admission and access to public schools as a result, the members of the management and technical teams stated that there is no technological tool to automate it. In this sense, the "Sistema Nacional de Admisión Escolar (SISNAE)" (National School Admission System) is proposed, an online platform where parents can apply to public schools and also receive information about the process.

After the SISNAE was created, several tests were carried out to determine its behavior and possible application. In such tests, the proxies completed a registration form and then made the application. The educational center is notified and, based on the applicant's accumulated criteria score and taking into consideration the availability of places for the grade requested, accepts or rejects the application. Subsequently, the proxy is notified by the center. The software performed effectively, so it is concluded that it applies its functionality and effectiveness to automate the admission processes in the country's public schools.

If this software is applied, the weaknesses of the system will be addressed, significantly improving the attention to diversity and inclusive education in the country, minimizing the iniquity and arbitrariness reflected in this process.

In response to this approach, SISNAE would revolutionize Dominican education, guaranteeing access to all applicants in a center selected or preferred by their guardians, thereby increasing the coverage rate and responding to the high demand for places in the public sector. It also addresses school dropout rates, promoting educational inclusion, which is the same as preventing students from dropping out of school, and with this the country is on its way to achieving SDG No. 4 and the provisions of Article 26 of the UN

Universal Declaration of Human Rights (UDHR), in compliance with Article 63 of the Dominican Constitution and Law 66'97 on education, regarding the right to education.

Limitations

Not all of the selected centers accepted the invitation and it was necessary to identify another center to carry out the study. There is little evidence of initiatives by legislative bodies to implement public policies regarding access to compulsory schooling. On the other hand, no sources were found in the country where the subject was studied. The budget also suffered alterations, since the consultants' responses were very late and an extension had to be requested regarding the deadline for delivery of the final product.

References

Cabrera, D. Funes, J. y Bullet. C. (2004). *Alumnado, familias y sistema educativo*. Octaedro.

Comellas, Mª. J. (2009). *Familia y Escuela: compartir la educación***.** Graó.

Crozier, G. & Ready, D. (Ed.). (2005). *Activating participation: parents and teachers working towards partnership.* Trentham Book Limited.

Estrategia Nacional de Desarrollo. (2015). *Artículo 23, líneas de acción 2.1.1.1 a 2.1.2.3***.**

García, F. (2003). *Familia y escuela.* Editorial CCS-ICCE.

García, I. (2019) Automatización de Procesos: Qué es y por qué deberías pensar en hacerlo. https://trends.inycom.es/automatizacion-de-procesos-que-es-y-por-que-deberias-pensar-en-hacerlo/.

Feito, R. (2010). Familia y escuela. Las razones de un desencuentro**.** *Educación y Futuro, 22*, 87-107.

Germán, A. (2015). El sistema educativo dominicano muestra avances significativos. [Versión electrónica]. *Periódico de economía y finanzas elDinero*.

InteRed (2017). El ODS 4 en República Dominicana: Articulación con la agenda educativa nacional. Boletín No. 17. https://www.intered.org/sites/default/files/boletin_17_fse_ods4.pdf.

Ministerio de Educación y Formación Profesional. (2019). Panorama de la educación. Indicadores de la OCDE 2019**.** Informe español. Madrid. www.publicacionesoficiales.boe.es/.

Musitu, G. y Herrero, J. (1994). La familia: formas y funciones. In Musitu, G. Allatt, P. *Psicosociología de la familia*. Albatros Educación.

Noticias ONU. (2018.). Artículo 26: Derecho a la educación**.** https://news.un.org/es/story/2018/12/1447521.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO), (s.f.). https://www.un.org/ruleoflaw/es/un-and-the-rule-of-law/united-nations-educational-scientific-and-cultural-organization/

Pérez, R. Mª. (2004). *Les relacions entre familia i esola.* In *6ª. Jornada del Maresme*, Mataró.

Ravn, B**.** (2003.). Cultural and Political Divergences in Approaches to Cooperation between Home, School and Local Society in Europe. In Castelli, S. Mendel, M & Ravn, B. (eds.). (2003). *School, Family, and Community Partnership in a World of Differences and Changes***.** Uniwerssytetu Gdanskiego.

Sanz Peinado, R., & Quesada Zaragoza, N. (2022). El aprendizaje cooperativo: estudio de una metodología emergente inclusiva. *MLS Inclusion and Society Journal, 1*(1), 132-147. https://www.mlsjournals.com/MLS-Inclusion-Society/article/view/965

Senado de La República. (1997). Ley General de Educación 66'97.

Seye Djité, S., & Diakhate, M. (2019). Organización del sistema educativo senegalés. *MLS Educational Research (MLSER), 3*(1), 79-92. https://doi.org/https://doi.org/10.29314/mlser.v3i1.86

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CASE STUDY OF A CHILD WITH OPPOSITIVE CHALLENGING DISORDER (ODD) IN A FAMILY ENVIRONMENT USING CLASSIC MUSIC

ESTUDO DE CASO DE UMA CRIANÇA COM TRANSTORNO DESAFIADOR OPOSITIVO (TDO) EM AMBIENTE FAMILIAR COM USO DE MÚSICA CLÁSSICA

ESTUDIO DE CASO DE UN NIÑO CON TRASTORNO DE COMPETENCIA OPOSITIVA (TCO) EN UN ENTORNO FAMILIAR UTILIZANDO MÚSICA CLÁSICA

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ABSTRACT

This article aims to observe, analyze, discuss and propose possibilities for improving a pedagogical activity proposed for a child with oppositional defiant disorder (ODD) with his family under an inclusive focus. This is a case study with a qualitative background, from the point of view of a proposal for pedagogical differentiation, which presents a musical practice on the piano, lasting 50 minutes, for a five-year-old boy, at in the light of the method of Austrian pedagogue Jacques Dalcroze, who proposes the use of three basic domains of evaluation for the success of a musical pedagogical intervention: rhythmic, solfeggio and improvisation. There were movements of the child's body influenced by the music and understanding of the musical score, but without being able to mark the beats with the use of the hands and with restricted musical exteriorization through the tactile-motor sense. The presence and motivation given by the father is seen as a success factor. There is a need for better planning of the intervention, counting on the family from the beginning, and the presence of the father was a motivator for the successful moments of the practice.

Palavras-chave:
ODD, inclusion, Dalcroze, music and family.

RESUMO

Este artigo possui o objetivo de observar, analisar, discutir e propor possibilidades de melhoria de uma atividade pedagógica aplicada para uma criança portadora do transtorno desafiador opositivo (TDO) com a sua família sob um foco inclusivo. Trata-se de um estudo de caso de fundo qualitativo, sob o olhar de uma proposta de diferenciação pedagógica, que apresenta uma prática musical ao piano, de 50 minutos de duração, para um menino de cinco anos de

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idade, à luz do método do pedagogo austríaco Jacques Dalcroze, que propõe o uso de três domínios básicos de avaliação para o sucesso de uma intervenção pedagógica musical: a rítmica, do solfejo e da improvisação. Ocorreram movimentos do corpo da criança, influenciados pela música e entendimento da partitura musical, mas sem conseguir a marcação dos tempos com o uso das mãos e com restrita exteriorização musical por meio do sentido tátil-motor. A presença e motivação dada pelo pai é vista como um fator de sucesso. Existe a necessidade de melhor planejamento da intervenção contando com a família desde o início, bem como a presença do pai foi motivadora para os momentos de sucesso da prática.

RESUMEN

Palabras clave:
TND, inclusión, Dalcroze, música y familia.

Este artículo tiene como objetivo observar, analizar, discutir y proponer posibilidades de mejora de una actividad pedagógica propuesta para un niño con trastorno negativista desafiante (TND) con su familia bajo un enfoque inclusivo. Se trata de un estudio de caso con antecedentes cualitativos, desde el punto de vista de una propuesta de diferenciación pedagógica, que presenta una práctica musical en el piano, con una duración de 50 minutos, para un niño de cinco años, en a la luz del método del pedagogo austríaco Jacques Dalcroze, quien propone el uso de tres dominios básicos de evaluación para el éxito de una intervención pedagógica musical: rítmica, solfeo e improvisación. Hubo movimientos del cuerpo del niño influenciados por la música y comprensión de la partitura, pero sin poder marcar los tiempos con el uso de las manos y con exteriorización musical restringida a través del sentido táctil-motor. La presencia y motivación dada por el padre es vista como un factor de éxito. Existe la necesidad de una mejor planificación de la intervención, contando con la familia desde el inicio, y la presencia del padre fue un motivador para los momentos exitosos de la práctica.

Introduction

The difficulty of dealing with children who behave differently from the standard of normality is one of the great challenges facing education today, even considering all the inclusive policies that are in force, which seek to provide guidance so that teaching practices should contain a proposal to prepare for social inclusion. These practices have their own characteristics for being operationalized in a classroom in a school institution which, in theory, should be prepared for this type of activity with a focus on inclusion. However, the inclusive process is much broader, as it has a systemic characteristic and cannot be restricted to the school, i.e. the student's home environment must be considered as a place where the inclusive exercise must take place. In this world, inclusive pedagogical practices in the home environment for pre-literate children can be a further support in the challenge of including children and should therefore be encouraged. (Lopes, Castro & Santos, 2022).

In this inclusive perspective, there is the challenge of dealing with children with oppositional defiant disorder (ODD), whose technical definition and characterization of the disorder can be found on page 462 of the "Diagnostic and Statistical Manual of Mental Disorders - 5th edition (DMS-5) published in 2014" (Varela, 2022, p. 20), with the revision of this document carried out in 2022: DSM-TR (*The Diagnostic and Statistical Manual of Mental Disorders 5th Edition, Text Revision*) (Sousa, 2022). It is worth noting that Cortes (2021) shows that this type of disorder "has a prevalence of 2 to 16% of the school-age population" (p. 9).

From an objective point of view, this type of disorder can be translated into a behavioral syndrome that generally manifests itself in boys (Lobo & Mamedes, 2020; Côrtes, 2021; Varela, 2022) in childhood, bringing not only relationship problems at school, but also great difficulty in the child's socialization with their parents and other residents of their home (Teixeira, 2014). Thus, in the view of Alves *et al*. (2023), can be "characterized by negativistic and hostile behaviors" (p. 7), which makes it a challenge to deal with children who have this type of dysfunction of self-control of emotions (Peixoto & Assis César, 2023, p. 98) in their family environment. This makes the family's role in building an inclusive process for the child in their own home more challenging. In other words, specific practices and tools within a proposal for pedagogical differentiation in the child's home, which are complementary to school or medical clinic treatments, can be of great value to the child's well-being. From all these perspectives, we can see the researcher's concern, which translates into the problem that she intends to seek a solution to routine situations in her practical life as a clinical therapist, as she realizes that many families and, specifically, parents, are unable to establish inclusive pedagogical practices at home that are more consistent for children with ODD (Lobo & Mamedes, 2020).

As a characteristic of its own, this article aims to contribute to the subject, since there are currently few studies available that relate this type of disorder to the methodology of Émile Jacques Dalcroze (Vienna, July 6, 1865 - Geneva, July 1, 1950), who created a system of music teaching based on expressive body movement, which became widespread in the 1930s. Under this veil, this academic paper deals with the important issue of inclusion, analyzing a child with oppositional defiant disorder (ODD) when practicing music pedagogy in the family home. It develops the hypothesis that the use of classical music, observed using an evaluation method established in academic literature, brings important inputs that translate into more efficient and effective family relationships for the benefit of the child. This can therefore be an opportunity to leverage

the inclusive process in the family itself, as well as bringing systemic improvements in the child's universe outside the home. That's why it makes perfect sense to say that the family's involvement is crucial to the success of this child with ODD, because "it's not just what happens in the relationship between the parents and the child before the child goes to school. It runs through the entire development process, and the relational dimension is familiar to the inclusive journey" (Franco, 2011, p. 4).

From this point of view, the project's guiding research problem is to propose a practice based on the pedagogy of differentiation to help parents who have difficulties dealing with this type of disorder in their homes. Thus, the research question arises: how can we present, observe, analyze, discuss and propose improvements in a familiar and inclusive pedagogical practice involving a child with ODD? In addition, the article has the general objective of presenting, observing, analyzing, discussing and proposing improvements to an inclusive pedagogical practice at home for a child with oppositional defiant disorder (ODD), using classical music. In order to achieve the general objective, the specific objectives are to list the stages of the practice and discuss its dynamics in the light of the selected academic literature.

This academic article is divided into six sections: introduction, development, materials and methods, results and discussion and, at the end, final considerations.

Oppositional defiant disorder can be found in academic literature as "oppositional defiant disorder", "oppositional disorder" or "defiance and oppositional defiant disorder" (Cortês, 2021). It predominates in male children, who apparently tend to have more energy at home, and "the initial symptoms ... usually occur between 6 and 8 years of age" (Teixeira, 2014, p. 21). These symptoms can, according to Varela (2022), "appear at any stage of life [...] and are usually accompanied by other associated disorders" (p. 22), however, they "usually begin between the ages of six and eight, rarely after the onset of adolescence" (Oliveira & Costa, 2021, p. 361),

It should be noted that the disorder should be treated as soon as it is diagnosed, as Teixeira (2014) advises, since "early intervention is an important way of treating and avoiding the deteriorating course of the disorder" (p. 11), which can evolve into a "conduct disorder which, characterized as a more serious disorder, presents persistent patterns of dissocial, aggressive or defiant conduct" (Oliveira & Costa, 2021, p. 361).

Studies on ODD are presented in many works surveyed in the academic literature, such as Teixeira (2014), Lobo & Mamedes (2020), Oliveira & Costa (2021) and Varela (2022), who agree with the premise that the child, due to the disorder, is unable to follow the rules at home and can evolve into a "contempt for or transgression of social norms" (Guimarães, 2023, p. 7). As a consequence, they display behaviors such as disrespect, greater impulsiveness, more conflicts, rebelliousness, aggression and stubbornness, making them extremely defiant children, which creates an overload for parents and siblings, in other words, difficulties in family relationships (Lobo & Mamedes, 2020).

As a result, there is a climate of disharmony and anxiety in the child's family environment, which makes it difficult for the family to integrate into an inclusive participatory process. As a result, there is a clear difficulty in implementing pedagogical and planned actions in the family so that the child can grow up in an inclusive family environment. It should be borne in mind that, in general, there is discontinuation of treatment for disorders in family homes, and this situation becomes more complex when a child with ODD is involved, due to their own difficulty in following the family's organization (Teixeira, 2014).

On the other hand, it highlights the importance of musical sound, which can be an instrument of great importance in the lives of these children with this type of disorder, as

it contributes to a harmony that should be present in various aspects of their daily lives. Among other benefits, it provides deep relaxation, stimulates creativity, emotional intelligence, thoughts, as well as transmitting tranquility and confidence to the child (Miranda, 2021). In the same vein, Neves (2021) argues that "music has a visible effect on education and on students' personal and social lives, since it can affect feelings, moods, memory and concentration" (p. 25).

As a result, musical sound can be seen as a vector of inclusion, because, through selected music, composed of sounds of melodic quality, it can bring the sensation that students feel free to create their own fantasies and exercise creativity in children's magic through musical dynamics It should be added that this virtuous ensemble ends up collaborating for an inclusive process in their home, which tends to have the good result extrapolated to the school and, consequently, to the whole of society.

Among the options for interventions that can be proposed to support families, there is the possibility of teaching through music-based play, which is based on the view of Lopes *et al*. (2022), because "when children play make-believe, they appropriate the culture in which they live, exploring their imagination and constructing different meanings and situations." (p. 163). For this reason, according to Amado (2019), practical musical activities are recommended within Dalcroze's active method, "such as quick reaction and rhythmic marching exercises; interrupted or continuous canons and rhythmic and melodic improvisation" (p. 37). In addition, the same author points out the use of exercises such as "rhythmic and melodic readings in playful games; the articulation of notes, body relaxation and posture; diaphragmatic breathing and body balance exercises and continuity of movement" (p. 38).

The act of playing contributes to a child's integral development, building skills and potential in the cognitive, motor, psychological and social aspects (Amado, 2019). This development can be seen in all children, including those with special educational needs, including those with ODD, for whom the use of game-like activities enables them to interact better with those around them (Teixeira, 2014).

From this perspective of playfulness, the use of music can be a major contributory factor to a pedagogical practice that gets children involved in music education dialogues, because, normally, interventions planned in a playful model tend to make the student more sociable (Carvalho, 2018). From this point of view, we find in recent academic literature the works of Lopes, Castro and Santos (2022) and Neves (2021), which highlight the great importance of working with music, because it is known that each development is unique, which makes it important to monitor the child's progress in education.

The practice of music therapies should be used in interventions using a model that has already been validated in the academic world, which can be seen, for example, in the research by Amado (2019), Cerqueira (2020), Miranda (2021) and Neves (2021). These authors applied a musical system within a pedagogical differentiation proposal, bringing the "concepts of Dalcroze's proposal with the three basic tools that are: rhythm, solfeggio and improvisation" to the environment of children with behavioral disorders (Miranda, 2021, p. 68).

Therefore, after the theoretical contextualization, the justification and relevance of the research are imposed, by presenting an inclusive background study, under a musical approach method, in a pedagogical practice so that it can be better worked on or adapted to the family reality. As a result, the aim is to develop greater parental competence to better deal with ODD in the search for their children's longed-for social integration and, at the same time, to make a synergistic contribution to the school.

It should be added that, in addition to providing family members with a new option for pedagogical action in the development of children with this type of disorder, this scientific article contributes to a topic that is still underdeveloped in academic literature in the area of Pedagogy, which "highlights the need for discussion due to the great lack of information surrounding it" (Varela, 2022, p. 12) and corroborates the role of the family as support in treatment, since, in this process, parents must be entrusted with "the role of strengthening good family relationships" (Oliveira & Costa, 2021, p. 365).

The article is developed under the general objective of presenting, observing, analyzing, discussing and proposing improvements to an inclusive pedagogical practice at home for a child with oppositional defiant disorder (ODD) using classical music.

Methodology

The research is of a qualitative nature applied to a descriptive and observational study through a case of musical exercise, under the prism of the Jacques-Dalcroze methodology, focusing on the behavioral reactions of a student with ODD. It should be noted that Gil (2009, p. 33) shows that the qualitative approach to research is aimed at "the pursuit of objectivity, as it is being considered here, basically refers to the methods and techniques adopted in the collection of data and analysis of research results". The qualitative nature of the method, in the researcher's view, can best be used to answer the research question, which is characterized by the challenge of proposing an inclusive pedagogical practice for a child with oppositional defiant disorder (ODD) in the family environment.

In order to carry out the practice, the materials used had to be prepared with a view to answering the research question, and the participants had to be aware of what was expected. On the other hand, it is worth noting that it is a challenge to propose a practice involving learning to a child with ODD, because "without any disorders or special needs, the teaching-learning process is complex, but for a child with ODD, it will be even more complicated" (Varela, 2022, p. 24).

The participants were a male child with a medical and psychological diagnosis of ODD, who attends basic pre-school in a public kindergarten, aged 5 (five) and family members (parents and sister), from the perspective of early intervention, which, according to Côrtes (2021) can be "the key to the therapeutic success of behavioral changes" (p. 9).

The experiment was carried out on October 10, 2022, at the child's home in the city of Viana do Castelo, Portugal. In order to better record the practice, we asked the parents for permission to take some photographs of the proposed pedagogical practice, which was duly authorized, on the condition that the faces of all the participants were completely covered.

The methodological proposal of the scientific article brought the method and materials inspired by the Dalcroze methodology, which Amado (2019), Castilho (2020), Cerqueira (2020), Neves (2021) and Miranda (2021) applied in their research, within a proposal of pedagogical differentiation, "with the three basic tools which are: rhythm, solfeggio and improvisation" (Miranda, 2021, p. 68). The metrics adopted by the researcher to observe the child's behavior were the three tools of the Dalcroze method, which are shown in Table 1:

Table 1

Basic tools of Jacques Dalcroze's method

Tools	Characterization
Rhythmic dynamics	Characterized by the observational study of body movements through the musical influence on the child's perception.
Solfege	The child's ability to understand the musical score, with a possible marking of the time with the use of the hands.
Improvisation	Combination of the notions acquired in rhythm and solfeggio and their musical externalization through the tactile-motor sense.

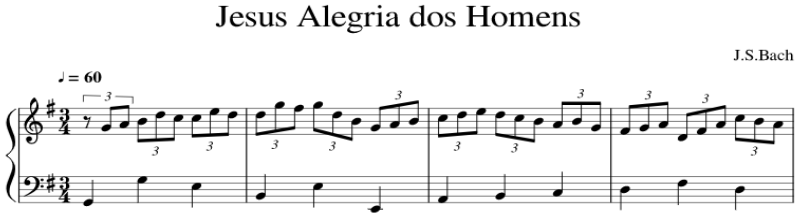
Source: Adapted from Miranda (2021).

Thus, the proposed practice, which was carried out with the family, was characterized by the performance of the initial part of a piece of classical music that was performed with the child with ODD and their family members. This melody was chosen because the child was already familiar with music and had practiced it with her mother before, but without any academic background.

The material used was the score of the introduction to the classical song "Jesus, the Joy of Man", composed in 1716 by the German musician Johann Sebastian Bach, which is shown in figure 1:

Figure 1

Section of the score to be worked on with the child



Note. Source: Authors' personal archives (2023).

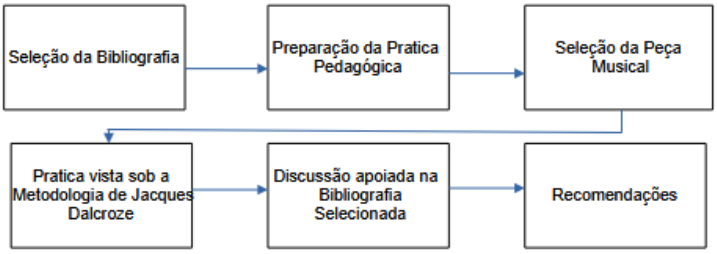
The preparation for the dynamic consisted of installing a keyboard piano on the living room table in the family home, as Castilho (2020) points out that this musical instrument is the "main one in rhythm" (p. 118). In addition, three chairs were placed with the following arrangement: the child's chair in front of the keyboard, occupying the central position. Another chair to the left of the child, which was intended for the father, and a third chair to the right of the child, for the mother's seat. The researcher stood in front of the family to observe the experiment.

In addition to the researcher's observations to gather data and information, the bibliographic prism was used for analysis and discussion by comparing the selected academic literature with the applicability of the Jacques-Dalcroze methodology.

The search for references was carried out in a systematic and advanced way in the databases of the CAPES/MEC Brazilian Periodicals Portal, the Portuguese RENATES Platform, which collects official information on doctoral theses and master's dissertations carried out in Portugal, and in the Portal of the Portuguese Journal of Sciences and Health. The search took place on May 21, 2023, considering the last five (5) years of publication, in Portuguese, using the descriptors "oppositional defiant disorder" or "Jacques-Dacroze".

The methodological construction of the article follows the specific rationale of a basic process flowchart, which is shown in figure 2:

Figure 2
Basic flowchart of the article's methodological process



The field notes during the experiment were taken in their own records and were made through direct observation of the participants according to the proposed taxonomy, and the data and information was collected according to Severino's (2010) instructions that it should be "recorded with the necessary rigor and following the procedures of field analysis" (p. 121).

The prism that guided this case study was guided by the integrative set of characteristics, which were the musical concept, content to be developed, skills to be developed under the domains of listening and musical interpretation, musical activities developed with the use of the piano and, at the end, the verification of strengths and opportunities for improvement for inclusive family practice.

Against this backdrop, with verbal guidance from the researcher, the intervention began at 10 a.m. on October 15 and ended at 10:50 a.m. on the same day, with the participation of the father, mother, sister and child with ODD. The practice lasted 40 minutes, taking into account the trajectory of seven main events listed in a chronological line, which were decisive for its realization, the results of which are presented and discussed below.

Results

The results of the practice are presented and discussed in the light of Jacques Dalcroze's basic tools and the bibliography identified. The temporal dynamics of these events are shown in Table 2:

Table 2
Temporal development of the ODD child's exercise with the family

Events	Timetable	Basic description of the observation
1	10:00 a.m	Keyboard and seating arrangement tested
2	10:10 a.m	Explaining the practice to the child
3	10:20 a.m	Start of supervised score practice with parents
4	10:25 a.m	Interaction with the father directly on the keyboard
5	10:31 am	Supervised score with sister
6	10:46 am	The child's lack of interest
7	10:50 a.m	End of practice

It should be noted that events 1 and 2 are part of any basic intervention by a pedagogy professional, linked to the planning of practice. From this point of view, the experiment was prepared from a Dalcrocian perspective, since this can be taken as a rhythmic-muscular education of the body, in order to regulate the coordination of movement with rhythm (Castilho, 2020). The playfulness of the practice can be a success

factor, as playful activities tend to "be more fun, more dynamic and less boring, fostering group spirit and improving interpretation and expressiveness" (Amado, 2019, p. 62), in order to create a favorable environment (Cerqueira, 2020) for the child for inclusive dynamics in the family environment.

In other words, we sought to avoid what would be characteristic of children with behavioral disorders by having natural restrictions "in the interaction of these people with non-motivating environments or situations that make it impossible for them to develop in the social environment" (Miranda, 2021, p. 69).

In relation to event 3, symbolized by figure 3, there is the practice in execution, after the verbal signal to begin the activity of playing the score, with the parents proposing active listening in the child's care, since "persistent stubbornness is to be expected from children with this syndrome; they are resistant to orders and seem to test their parents' limits at all times". (Teixeira, 2014, p. 21).

Figure 3

Capturing the execution of the practice - Event 3

It was positively noticeable that the child was motivated and had an expression of contentment, which was enough for him to start reading the score and using the keyboard with both hands, demonstrating an effective rhythmic dimension, with the ability to translate the first musical notes into melodic sound, because his rhythm exercises attention, intelligence and sensitivity at the same time. This fact corroborates Castilho (2020) when he shows that "through attention, the individual feels and immediately registers what is happening; with intelligence, he understands and analyzes what he has felt and, using sensitivity, he feels the music and penetrates its movement" (p. 118).

At this point, the child showed assertiveness in pressing the keys, as well as turning his head a few degrees in order to better hear the sound of the melody he was developing. She also showed engagement through her facial expressions and lip movements, smiling several times and saying words that had some similarity to the rhythm of the piano.

These characteristics of the child, observed in the initial phase of the practice, were not continuous, as it was found that there was no specific action of the child's tactile-motor sense that could be considered improvisation, in the combination of rhythm and solfeggio, where "expression, creativity and musicality as a whole" were developed (Miranda, 2021, p. 71).

With regard to event 4, represented by the capture of the practice in figure 4, about five minutes into the practice, the child began to show a tendency to lose concentration,

repeating the initial chords constantly and then pressing the keys in an uncoordinated manner.

Figure 4
Capturing the execution of the practice - Event 4

At this point, we noticed that she clearly indicated that she would no longer be able to walk rhythmically on her own, showing discontent with the activity. Because of this, the researcher recommended that the father, who has basic musical training, take the initiative to share the keyboard with the child, in order to provide motivation and encouragement to try to return to the previous dynamic.

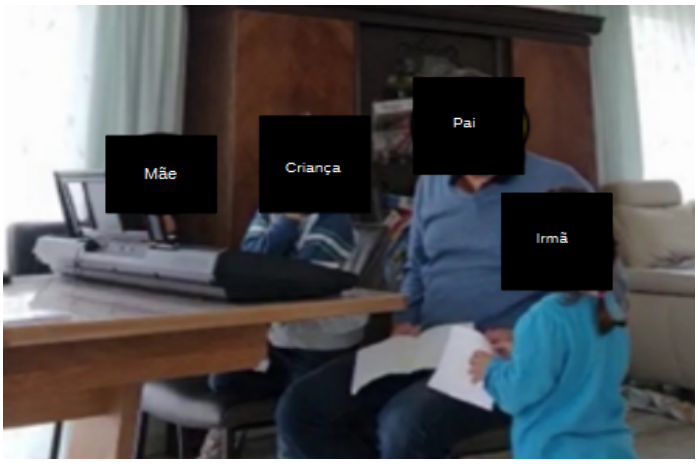
With the father's participation, the practice took the desired turn again, when the child showed a greater interest in returning to the rhythmic process and solfeggio that he had been developing.

He also showed body movements and tried to verbalize the music he was playing on the keyboard. It was clear how important the father's presence was for the activity, initially, in a model of active listening that served as a stimulus for him to start practicing and afterwards, motivating the child to return to the dynamic.

It can therefore be understood that, at this stage of the dynamics, we observed a set of perceptions of the child that were translated into "bodily movement, its developmental dynamics through active listening, movement and reflection, together with mental, sensitive and sensory-motor factors." (Miranda, 2021, p. 73).

With regard to event 5, represented by the capture of the practice in figure 5, the child instinctively stopped the practice when it was recommended that she approach her sister in order to integrate her into the dynamic.

Figure 5
Capturing the execution of the practice - Event 5



It should be noted that a possible conflict with the sister could already be expected in this type of family pedagogical practice for a child with the disorder, as ODD follows an expected trend of ending up "interfering a lot in the relationship with family members" (Teixeira, 2014, p. 33). Furthermore, Amado

In relation to event 6, represented by the capture of the execution of the practice in figure 6, after the attempt to integrate the sister into the pedagogical practice, the request was made for the sister to no longer take part in the practice.

Figure 6
Capturing the execution of the practice - Event 6

It was observed that the child became totally uninterested in continuing with the pedagogical practice, showing discomfort with the presence of the sister, even with the encouragement brought by the mother and great effort by the father for the child to resume the practice by stimulating the application of the three Dalcrozian tools.

After these actions, which had a pedagogical background, the sister was asked to move away from the practice area, coordinated attempts to return to the rhythmic dynamics, the child showed a reactive behavior and signs of aversion to the parents'

approach, with the consequent demonstration of animosity to continue being part of the intervention. This type of characteristic is typical of the disorder, as children with it "have difficulty controlling their temper and emotions" (Teixeira, 2014). In this case, in the eyes of the researcher, it is understood that the parents' attitude of insisting that the child return to the activity was the best decision at the time.

As a result, an emotional reaction was observed in the child's behavior, as he laid his head down and folded his arms in a clear sign of dissatisfaction to continue with the activity. Aware that the practice would not yield any more pedagogical results without more incisive action on the part of the parents, the decision was made to end it, with the notion that the objective of the practice had been achieved. Therefore, the mother took care to explain to the child the reason for the termination, keeping her voice firm so as not to encourage the construction of a figure of "little kings, dictators and little tyrants who dominate, manipulate and boss around their own parents" (Teixeira, 2014, p. 125).

Discussion

Starting the critical analysis by looking at the positive points, it can be seen that the presence of the mother and father participating directly, from the conception of the intervention, its planning and execution, was very symptomatic of the child's motivation and interest in participating. The initial period of practice was taken as very positive, as it was important for the child to be able, within a playful approach and wrapped in the affection of their parents, to "familiarize themselves with the elements of music through integral body movement, improving learning in the process" (Miranda, 2021, p. 61), as "working in a playful and affective way leads to a pedagogical intentionality that values the moment of play" (Pacheco & Nascimento, 2023, p. 5343). As an added value, the child's attempts to oralize the musical piece are also pointed out, indicating a path that could be developed so that the child's voice could work out its own melody for greater interaction with their parents.

It's worth noting that the father's participation brought security to the child, which can be seen when they used the keyboard together, managing to advance in the rhythmic dynamics, as well as the solfeggio process, which was considerably more robust.

This set showed a moment of synergy between the three participants, bringing to light a characteristic achieved by the highlighted Dalcrozian method that would be more harmonious, "active, more dynamic, less predefined, more differentiated and suited to the profile and level of knowledge of each student, leaving the student room for a degree of autonomy and initiative" (Amado, 2019, p. 61). It is worth mentioning that the child is from a family with good economic and socio-educational conditions, which can be taken from the structure that was set up for the practice in the child's home, which tends to favor a more conscious action by the family towards the child's inclusion in society (Neves, 2021).

There were no characteristics or behaviors that indicated the existence of a "dysfunctional, hostile, violent or negligent family, which are some of the worst prognostic factors for those with oppositional defiant disorder" (Teixeira, 2014, p. 35). On the contrary, a stable and harmonious environment was observed, demonstrated by the extreme affection and love that the parents devoted to the child, as well as their patience for many attempts at continuity, such as in the final moments of the intervention. Following on from the critical analysis, and addressing opportunities for improvement, no behaviors were observed that demonstrated actions in this sense by the child, within

the principle of improvisation, which may have been the result of the absence of "varied teaching resources, for example, colored objects" (Amado, 2021, p. 38) that could have been built by the child with the help of their parents.

In addition, it can be mentioned that the parental guidance given to the child so that the rules of the practice were followed, it seems, may have significantly influenced the playfulness of the intervention, which may have led to the child not feeling comfortable with natural cases of improvisation. Another point worth mentioning was that when the sister was introduced during the practice, she influenced the child's lack of concentration, which may have been a determining factor in the difficulty of resuming the intervention, suggesting that the sister should have been introduced from the beginning of the practice. In addition, the parents' insistence that the child resume the activity was another contributing factor to the child's irritable behavior, which led to the end of the intervention.

Conclusion

This scientific article is about presenting, analyzing, discussing and providing recommendations for improving a pedagogical practice using the tool of classical music for an elementary school child with ODD. Within an inclusive approach, an activity is proposed that can be carried out in the family environment. As a result, the stages of the pedagogical practice were also presented, bringing their evaluation under a critical analysis, presenting points of possible improvement for future interventions of this type. We believe that this case study is an important guiding input for parents and family members to look for concrete possibilities within an inclusive pedagogical criterion, so that they can better deal with this challenging issue of ODD outside the traditional support of the school or specialized clinics.

By presenting a practice, from the point of view of differentiated pedagogy, that can be carried out in the home of a child with ODD, it was shown that the three fundamental domains of Jacques-Dalcroze's methodology (rhythm, solfeggio and improvisation) are vectors that facilitate activities with low complexity, which confirms the hypothesis that supports the argument for using Dalcroze's methodology as a pedagogical process and as a therapy to support the family and the child. In addition, we wanted to show that musical expressiveness and body dynamics are factors that, if well directed by parents, can be decisive for a good family relationship with the child and the rest of the family. However, all activities should start with the whole family with more flexible rules that encourage the child's improvisation.

The importance of the father figure is confirmed, because through his presence, participation and collaboration in the pedagogical activity, he has developed a strong interaction in the family environment. It was possible to provide the child with strength, emotional stability, self-confidence, security and protection by being in the company and presence of the father. In addition, it is important to strengthen the bonds and affective ties between father and son, involving the mother, to participate and strengthen harmony in the family environment, which should be worked on to avoid conflicts with brothers or sisters.

The child, alongside his parents, showed collaborative behavior at various times, under a balanced emotional state and with a lot of security, as well as calm, interested and focused on the pedagogical practice, demonstrating that initial planning and preparation are very important for the success of an intervention with a child with ODD. They need a

well-organized and well-planned structure for increased interest in social and family interaction activities, with the support of melodious music that stimulates a bridge of attention in their homes. They also need more affection, attention, praise, recognition and encouragement from the whole family so that the child feels safer and happier, within a climate of positivity established by their families, which should be extrapolated to social life.

As a limitation of the research, it is understood that the pedagogical practice with the child with ODD was carried out only once and generated a single case study. Therefore, it deserves the recommendation that it be repeated other times, under the prism of the Dalcroze method, with the aim of tracing a structured line of the child's reactions to the inclusive environment. Another limitation of the study is the researcher's possible subjective bias in analyzing the case and her conclusions, since she had a friendship with the child's parents.

With regard to future research, it is recommended as a proposal for continuity that the subject demands, involving children and families, in the period of early childhood education with ODD under the prism of the Dalcroze methodology, in pedagogical practices. It can be seen that ODD is a little explored topic in the Portuguese academic environment and research with planned interventions in family environments would be a great asset to contribute to a better relationship with parents, support for the mainstream school and the child's social inclusion.

References

Alves, J. de O., Borges, A. C. N., Castro, M. C., & Lima, P. M. A. P. (2023) Aspectos clínicos, diagnóstico diferencial e tratamento de jovens com Transtorno do Déficit de Atenção com Hiperatividade (TDAH) *Research, Society and Development*, *12*(2), e0112239941. http://dx.doi.org/10.33448/rsd-v12i2.39941

Amado, I. L. C. C. (2019). *Contributos do Método de Jacques-Dalcroze para a Formação Musical/Iniciação e Classe de Conjunto/Coro: dois estudos de caso*. [Dissertação, Escola de Artes, Universidade Católica Portuguesa]. https://repositorio.ucp.pt/bitstream/10400.14/28896/1/IrmaAmado_RelatorioFinal.pdf.

Carvalho, A. M. (2018). *Algumas questões que todo profissional da atenção à criança precisa saber.* (1ª Ed.). NECON/UFMG. https://ares.unasus.gov.br/acervo/handle/ARES/13686

Castilho, F. M. C. (2020) *Perfil do docente vs perfil do aluno: processos de ensino-aprendizagem na disciplina de Formação Musical*. [Dissertação, Instituto Politécnico de Castelo Branco]. https://repositorio.ipcb.pt/bitstream/10400.11/7500/1/Filipa%20Castilho%20-%20.pdf.

Cerqueira, A. I. L. (2020). *A descoberta da rítmica de Dalcroze num contexto pré-escolar. Relatório Final de Prática de Ensino Supervisionada II*. Instituto Politécnico de Viana do Castelo – IPVC- Portugal. http://hdl.handle.net/20.500.11960/2457

Côrtes, L. de O. (2021). Transtorno Desafiador Opositor na Infância. *Revista Portuguesa de Ciências e Saúde*, *2*(01), 1-11. https://revistas.editoraenterprising.net/index.php/rpcs/article/view/351.

Franco, V. (2011). A inclusão começa em casa. In D. Rodrigues, *Educação Inclusiva – dos conceitos às práticas de formação*. Instituto Piaget. http://hdl.handle.net/10174/3419

Gil, A. C. (2009). *Estudo de caso*. (1ª Ed.). Atlas.

Guimarães, A. (2023). Ontologias da adolescência e ato infracional: uma revisão integrativa da década (2011-2020). *Physis: Revista de Saúde Coletiva*, *33*, e33008, https://doi.org/10.1590/S0103-7331202333008.

Lobo, J. G. & Mamedes, R. F. (2020). Metodologias Práticas em sala de aula para Crianças Desafiadoras. In *VII CONEDU – Congresso Nacional de Educação.* https://editorarealize.com.br/editora/anais/conedu/2020/trabalho_ev140_md4_sa_id5844_02092020113755.pdf

Miranda, A. M. (2021). *Música e inclusão: uma análise legal, política e teórico-metodológica*. [Dissertação, Universidade Federal do Amazonas, Manaus]. https://tede.ufam.edu.br/bitstream/tede/8654/2/Disserta%c3%a7%c3%a3o_AxonMiranda_PPGE.pdf

Neves, I. M. F. (2021). *O papel da música na educação inclusiva*. [Dissertação, Universidade Nova de Lisboa]. https://run.unl.pt/handle/10362/135872

Oliveira, D. C. B., & Costa, D. R. M. da. (2021). Revisão da literatura sobre Transtorno Opositivo Desafiador e Transtorno de Conduta: causas/proteção, estratégia escolar e relação com a criminalidade. *Ciências & Cognição*, *26*(2). http://www.cienciasecognicao.org/revista/index.php/cec/article/view/1651

Pacheco, W. da C. F., & Nascimento, J. C. (2023). O ressoar do coco seco na musicalização: reflexões sobre a interdisciplinaridade e as práticas pedagógicas. *Brazilian Journal of Development*, *9*(1), 5339–5354. https://doi.org/10.34117/bjdv9n1-364.

Peixoto, T. de M., & Assis César, M. R. de. (2023). Histórico e análise da concepção de transtornos do comportamento disruptivo. *Cadernos Brasileiros e Saúde Mental/Brazilian Journal of Mental Health*, *15*(42), 83–105. https://doi.org/10.5007/cbsm.v15i42.74314.

Severino, A. J. (2010). *Metodologia do trabalho científico*. (25ª Ed.). Cortez.

Sousa, B. M. F. V. de (2022). *Validação da versão portuguesa da escala de luto prolongado (versão reduzida)*. Universidade Lusófona. Portugal. http://hdl.handle.net/10437/13664

Teixeira, G. O (2014). *Reizinho da Casa: manual para pais de crianças opositoras, desafiadoras e desobediente*. (1ª Ed.). Best Seller.

Varela, M. O. U. (2022). *Inclusão de crianças com Transtorno Opositor Desafiador (TDO) na educação básica*. [Trabalho de Conclusão de Curso, Universidade Federal de Goiás]. http://repositorio.bc.ufg.br/handle/ri/21497

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http://mlsjournals.com/Educational-Research-Journal
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THE TEACHING PROCESS-LEARNING OF SURGICAL PRACTICE: A VIEW FROM QUALITY MANAGEMENT

EL PROCESO DE ENSEÑANZA–APRENDIZAJE DE LA PRÁCTICA QUIRÚRGICA: UNA VISIÓN DESDE LA GESTIÓN DE LA CALIDAD

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ABSTRACT

The research entitled "The teaching-learning process of surgical practice: a vision from Quality Management" focused on the detailed study of quality management in surgical education in higher education. Its primary objective was to explore and analyze how quality management influences the teaching and learning of surgical practice. The methodology was carried using a descriptive and documentary design, an exhaustive bibliographic review was carried out in Google Scholar, UNAM Digital Library (BiDi-UNAM) and the ERIC platform. The selection of samples included articles, books, and documents, and a critical analysis and categorization of the key ideas was carried out. The review revealed a diversity of approaches to teaching-learning in surgical practice. Thematic categories such as "Pedagogical Approaches", "Quality Management", "Reform in Surgical Education", and "Critical Analysis" were identified, reflecting the complexity and multifaceted nature of quality management. The findings highlighted the importance of integration between education and surgical practice, and the need for significant changes in training. The relevance of critical analysis and personal reflection in the educational process, and the proper interpretation of quality indicators, were highlighted. These results offer a comprehensive overview of the teaching-learning of surgical practice from quality management, underlining the need to approach it from multiple perspectives.

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Palabras clave:
gestión de calidad, educación quirúrgica, enseñanza médica superior, proceso de enseñanza-aprendizaje, evaluación del proceso educativo.

RESUMEN

La investigación titulada “El proceso de Enseñanza-aprendizaje de la práctica quirúrgica: una visión desde la Gestión de la Calidad” se enfocó en el estudio detallado de la gestión de la calidad en la educación quirúrgica en la enseñanza superior. Su objetivo primordial fue explorar y analizar cómo la gestión de la calidad influye en la enseñanza y el aprendizaje de la práctica quirúrgica. La Metodología se llevó a cabo utilizando un diseño descriptivo y documental, se realizó una revisión bibliográfica exhaustiva en Google Scholar, Biblioteca Digital UNAM (BiDi-UNAM) y la plataforma ERIC. La selección de muestras incluyó artículos, libros, y documentos, y se llevó a cabo un análisis crítico y categorización de las ideas clave. La revisión reveló una diversidad de enfoques sobre la enseñanza-aprendizaje en la práctica quirúrgica. Se identificaron categorías temáticas como "Enfoques Pedagógicos", "Gestión de la Calidad", "Reforma en la Educación Quirúrgica", y "Análisis Crítico", que reflejaron una complejidad y multifacética naturaleza en la gestión de la calidad. Los hallazgos resaltaron la importancia de la integración entre educación y práctica quirúrgica, y la necesidad de cambios significativos en la formación. Se destacó la relevancia del análisis crítico y la reflexión personal en el proceso educativo, y la interpretación adecuada de los indicadores de calidad. Estos resultados ofrecen una panorámica comprensiva de la enseñanza-aprendizaje de la práctica quirúrgica desde la gestión de la calidad, subrayando la necesidad de abordarla desde múltiples perspectivas.

Introduction

Quality management is a complex task that must be approached from a holistic perspective, considering social and cultural aspects. It is defined as a system of interconnected standards that manages the quality of an organization, focusing especially on educational processes. The implementation of this system requires compliance with standards and legal frameworks that are in line with the geographical area and type of organization (Almaraz, 1994). In addition, it is essential to recognize that quality is not a static entity, but requires constant evaluation and reassessment to adjust to changing stakeholder demands and expectations.

In the educational context, teaching-learning procedures are essential and comprise a series of chronological actions aimed at achieving established goals, such as academic achievement and meaningful learning. These procedures must be effective, efficient and effective, concepts that reflect the alignment between objectives, resources used and products or services delivered (Neri & Aguirre, 2015). Careful implementation of these principles ensures a more robust and resilient education, adapting to the individual needs of each student and the collective goals of society.

In health care, quality is defined by the WHO as the adequacy of diagnostic and therapeutic services to achieve optimal care, with minimum risk and maximum patient satisfaction. In healthcare, it is vital to focus on the unique needs of each patient and act ethically (Hamui et al., 2017). Quality in healthcare encompasses not only the application of correct treatments, but also open and empathetic communication and a thorough consideration of the patient's values and expectations.

Quality management in healthcare educational institutions, such as teaching hospitals, is considered a philosophy with humanistic principles. It should involve the entire work team, including authorities, teachers, medical and administrative staff, and have the patient as the center of the process, ensuring that their needs are met in a unique and differentiated manner (Lizaraso, 2015). The integration of these ideas strengthens an organizational culture focused on respect and dignity, creating a synergy between the various roles and responsibilities.

Quality teaching in education focuses on achieving complex goals, including the development of critical thinking, creativity, and the learning of theoretical knowledge and skills in the specific area of study. The teacher plays a central role in this process, requiring diverse skills and competencies such as the ability to design courses, use technology, motivate students, and promote ethical and humane attitudes, particularly in medical education (García-Perdomo, 2016). These elements are fundamental to form reflective and conscious citizens, capable of applying their knowledge effectively in society.

Medical-surgical education, on the other hand, studies the norms and techniques to perform surgical interventions, integrating theoretical knowledge, skills, abilities and a deep understanding of ethics and legality in medical practice. This includes the management of informed consent and the mastery of basic competencies such as communication, leadership, empathy and stress management (Woodhouse, 1996). These skills are vital not only to the technical outcomes of the interventions, but also to the overall experience and recovery of the patient.

The connection between these concepts and the previous text on quality management lies in the emphasis on a holistic and integrative approach. Quality management in education, particularly in medical and health education institutions,

focuses on high quality teaching, where the patient is central and professionals are highly trained. Procedures in both education and health care must be effective, efficient and effective, aligned with specific goals and regulated by relevant standards and legal frameworks. This integrative approach creates a harmonious and cohesive system that benefits both providers and recipients of health care and education.

Quality becomes an integral property that encompasses teaching, health care and management, ensuring optimal care and training excellence, reflected in both academic results and patient care (de Cos, 2011). This comprehensive framework emphasizes interconnectedness and collaboration among different disciplines and practices, promoting an environment in which quality is not simply a goal, but a continuous process of improvement and adaptation to changing needs and circumstances.

The literature review is a valuable methodological resource that allows researchers to synthesize existing advances in a particular field and to project new research directions. This paper delves into an area of great relevance in the field of medicine: the teaching-learning process of surgical practice under the quality management approach. Ten representative studies published between 2008 and 2022 were selected and subjected to a comparative analysis to examine their objectives, methodologies and contributions to quality management in surgical education.

The procedure involved a careful review of each study, highlighting key aspects and then contrasting them with each other. The objective was to build a clear picture of the predominant trends and approaches in the field, as well as to identify variations and evolution of ideas over time. Subsequently, key ideas and concepts were grouped into categories, providing a conceptual framework for analysis.

This work is of great importance to the academic community for several reasons. First, it highlights the multiple dimensions of teaching and learning surgical practice, showing how it has been approached and understood through different approaches and methodologies. Second, the identification and categorization of key ideas provides a useful framework for future research in this area. Finally, comparing and contrasting the various contributions to quality management offers a valuable resource for those interested in improving the quality of surgical education, allowing them to do so in a more informed and effective manner.

The expectation is that this literature review will foster greater understanding and reflection on the teaching and learning of surgical practice from a quality management perspective, inspiring both educators and quality managers to explore new ways to improve in this field.

Method

The present research, of a descriptive and documentary nature, focused on the bibliographic review of articles and texts related to quality management in higher education in health, specifically in surgical education. The methodology used is described below:

Search Strategy

The initial search was carried out in Google Scholar with the purpose of identifying various articles, books and documents related to the topic of interest. Subsequently, systematic reviews were searched in the UNAM Digital Library (BiDi-UNAM) and in the ERIC (Educational Resources Information Center) platform, including the RIE (Resources

in Education) and CISE (Current Index to Journal in Education) files. The purpose of this strategy was to consolidate a coherent and exhaustive documentary review of quality management in surgical education, as well as the concepts and factors relevant to the subject.

Key words:

1. Quality management
2. Surgical education
3. Higher medical education
4. Teaching-learning process
5. Evaluation of the educational process

Temporal filtering of the bibliographic search

A search was conducted for studies published from January 2007 to December 2022.

Inclusion and Exclusion Criteria

To ensure a consistent and meaningful review, specific criteria were used in the selection of documents, carefully designed to reflect the objectives and scope of the research:

Inclusion

1. Relevant sources: Documents containing specific data on quality management in higher education in the surgical teaching process.
2. Intervening factors and current concepts: Inclusion of texts that address factors associated with quality in medical and surgical higher education, as well as contemporary concepts that are relevant to research.
3. Scientific quality: Selection based on the authority and credibility of the sources, such as indexed journals, impact factor, number of citations, and recognition in the scientific community.
4. Geographic and Temporal Scope: Studies conducted in regions that are relevant to the research context and published within the established time frame.

Exclusion

1. Non-relevant sources: Documents that did not provide relevant data in relation to the topic consulted, or that were beyond the scope of the investigation.
2. Insufficient scientific quality: Sources without adequate scientific rigor, including non-peer-reviewed publications or with weakly substantiated methodologies.
3. Data duplication: Exclusion of studies or sources that presented duplicate or redundant data.
4. Language and accessibility: Texts that were not available in Spanish or that presented access restrictions that prevented their complete evaluation.

Procedure

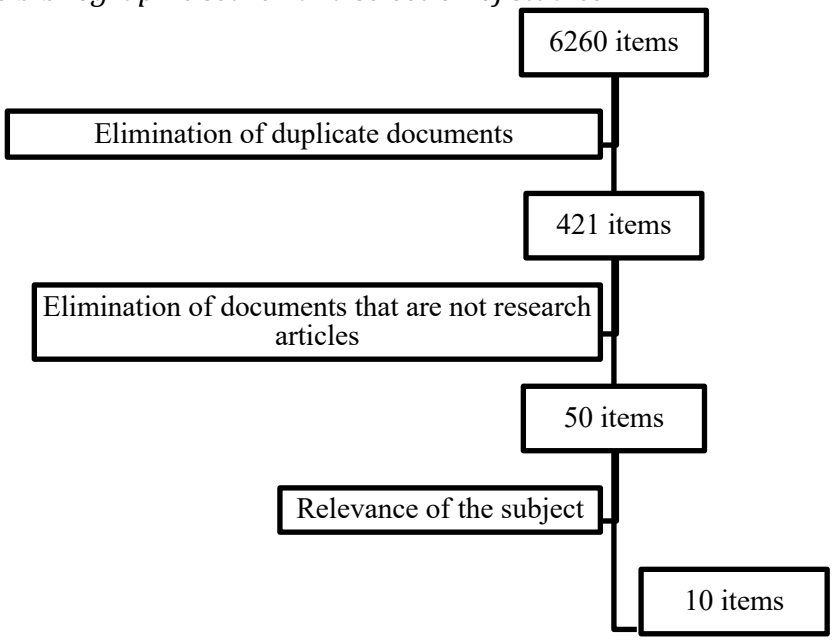
1. Initial search: The process begins with an initial search in which 6260 items were found. This is the starting point and represents the total set of documents identified using the previously defined keywords and search criteria.

2. Elimination of duplicate documents: A review is then performed to identify and eliminate duplicate documents. This reduces the total number of articles to 421. Duplicate elimination is a critical step to ensure that each document is considered only once in the review process.
3. Elimination of non-relevant documents: At this stage, a review is performed to eliminate documents that are not research articles. This could include opinions, editorials, letters and other types of publications that do not meet the inclusion criteria. This further reduces the number of items to 50.

Evaluation of the Relevance of the Topic: Finally, a detailed assessment of the relevance of the topic is carried out. At this stage, the remaining articles are examined to determine if they are directly related to the research objectives. Papers that do not meet the relevance criteria are excluded, leaving a total of 10 articles that fully meet the objectives and scope of the research. The route of action is shown in Figure 1.

Figure 1

Route of the bibliographic search and selection of studies



Results

In the field of quality management in medical and surgical education, the studies reviewed cover a variety of objectives, methodologies and contributions. There is a focus on evaluating the quality of medical education and patient care through a variety of methodologies, including literature review, survey analysis, questionnaires and bibliometric reviews.

A recurring theme is the need to assess and improve not only technical competence but also soft skills such as professionalism and communication. The studies propose a range of assessment methods, from comprehensive assessment models that incorporate various dimensions of higher education to the implementation of learning portfolios to encourage continuous reflection.

Surgical patient safety and the prevention of medical errors are also crucial aspects. Patient-centered approaches are suggested, with meticulous attention to

professional competence, ethical principles and risk prevention. Likewise, the professionalization and didactic preparation of teachers is highlighted as a critical element for quality teaching. Innovative teaching methods, including technology, are suggested to improve teaching and learning.

Studies also consider the changing context of medical education, as evidenced by a bibliometric review focusing on the impact of the COVID-19 pandemic on virtual teaching-learning processes. Finally, competency-based training is identified as a crucial approach to improving quality in both education and surgical practice, extending to aspects such as competency certification and continuous formative assessment.

Table 1

Summary of the results obtained from the analyzed studies

Author and Year	Target	Methodology	Contribution to Quality Management
Castellanos, M., Cañellas, J., Ocampo, M., and Aguila, M. (2008)	To evaluate the quality of medical education at the University Polyclinic, applying an evaluation model that includes teaching, research, extension, student quality, infrastructure, and academic environment.	Application of an evaluation model that includes the determination of the state of affairs, comparative study and value judgment. The model encompasses the three classic functions of higher education and the quality of students, infrastructure, and the academic environment.	It provides a comprehensive evaluation model that can be used to assess the quality of medical education at the University Polyclinic, highlighting the importance of quality assessment in higher education and offering a useful tool for improving the quality of medical education.
Aguirre, H., Zavala, J., Hernández, F., and Fajardo, G. (2010)	Analyze and discuss quality of medical care, surgical patient safety, medical error, malpractice and professional liability.	Comprehensive literature review and analysis based on the author's experience and expertise in the field.	It provides a detailed overview of the concepts of quality of care, patient safety, medical error and malpractice. It proposes a patient-centered approach, which includes providing care with timeliness, professional competence, safety and respect for ethical principles. Emphasizes the importance of preventing risks and adverse events to improve patient safety. Useful for healthcare professionals and administrators seeking to improve quality and safety in healthcare.
Guzman, J. (2011)	Analyze research to define what constitutes quality teaching in higher education. Identify ambitious goals such as the development of complex skills.	Review and analysis of research conducted in the last decade.	1. It highlights the need for greater professionalization and didactic preparation of teachers. 2. Emphasizes the importance of experiential knowledge in teaching practice. 3. Emphasizes the creation of a respectful and

			caring environment for learning. It offers practical suggestions for improving the quality of teaching in higher education, with potential applicability to surgical practice.
Education (2011)	1. To know the perception of the competencies acquired in undergraduate medical training and in specialized health training. 2. Introduce specialized training based on competencies. 3. To present a system for collecting errors in the Neonatal Unit.	1. Questionnaire applied to physicians in their specialized health training program. 2. Implementation of seminars, portfolio design, creation of a group of experts, inclusion in the strategic plan. 3. Anonymous and voluntary declaration of 'medical errors', analysis of unsafe practices.	1. Identification of competence deficits that require the development of complementary programs. 2. Introduction of new methods of formative evaluation and continuous assessment of the acquisition of learning indicators. 3. Use of incident collection and analysis systems to improve patient safety, and introduction of aspects in training programs.
Arreciado Marañón, A., & Cónsul Giribet, M. (2011)	Build and consolidate an assessment design through the Learning Portfolio (LO) that engages students and nurses in the process of reflection of care learning in the surgical process.	Carried out as part of the clinical practices of the Postgraduate Course in Surgical Nursing during 2008-09 with 45 students, 2 teachers and 62 surgical nurse tutors. It included several stages such as design of the minimum content of the CA, presentation, follow-up during clinical practice, analysis of the CA performed, and assessment sessions with surgical nurse tutors at the end of the course.	It provides an evaluation design through the Learning Portfolio that allows a deep reflection and continuous evaluation of learning in surgical practice. It facilitates the active participation of students and tutors in evaluation and provides a tool for continuous quality improvement in surgical education.
Porras, J. (2016)	To evaluate the relationship between total quality management (TQM) and organizational performance in manufacturing companies in Mexico.	Survey of 150 manufacturing companies in Mexico. Use of structured questionnaire to collect data on TQM implementation and multiple regression analysis.	It focuses on the importance of competency-based training to improve the quality of surgical practice. Emphasizes the importance of competency certification and argues its relevance to ensure quality in surgical practice. It offers criteria for evaluating a surgeon's effectiveness and safety and notes that the full impact of this approach has yet to be demonstrated.
Herney, A. (2016)	Highlight the importance of surgical education not only in terms of technique, but also in terms of knowledge in basic and clinical sciences, clinical judgment,	Literature review and author's experience in surgical education. It proposes a comprehensive and formative teaching model	It suggests that the implementation of technology-based pedagogical strategies can improve the quality of surgical education. It

	and general competencies such as patient care, interpersonal and communication skills, professionalism, leadership, feedback skills, stress and fatigue management, and decision making.	based on assessable competencies.	provides guidelines for the teaching and assessment of surgical competencies and proposes a comprehensive and formative competency-based teaching model.
Tapia, J. (2018)	To analyze and discuss the needs and challenges of postgraduate surgical education and propose actions to improve its quality.	Review and analysis of current practices in surgical education based on the literature and the author's experience.	It contributes with recommendations and strategies to improve surgical training, taking into account the new needs of students and the reality of medical practice. It proposes concrete actions that can improve the quality of surgical education, such as the development of a competency-based curriculum, the introduction of surgical simulation, the improvement of supervision in the operating room, and the implementation of formative assessment.
Fonseca, F. (2019)	Analyze and discuss educational quality, how to measure and improve it. Discuss the limitations of quality indicators and propose alternatives.	Bibliographic review and conceptual analysis.	It highlights several ways in which the Total Quality model can contribute to quality management in higher education. It proposes several indicators of quality in education that go beyond learning outcomes and include factors such as student motivation, teacher perception, and learning environment.
Romero, L. C. E. (2022)	To conduct a bibliometric review of e-learning processes during the COVID-19 pandemic and analyze their impact on the quality of medical and surgical education.	Based on a bibliometric review of the literature published during the COVID-19 pandemic, using content analysis techniques to identify emerging themes.	Contribution to quality management through a detailed bibliometric review of e-learning processes during the COVID-19 pandemic. It identifies emerging issues such as the rise of virtual learning, the importance of technology training for teachers and students, and the impact of the pandemic on student competencies.

Source: prepared by the authors with information from the cited authors

Analysis of the objectives of the ten articles reveals an interesting diversity of approaches to the teaching-learning process of surgical practice from a quality management perspective.

To begin with, Castellanos et al. (2008) and Aguirre et al. (2010) focus on aspects related to the evaluation of the quality of medical education and patient safety. Both share the view that rigorous evaluation is crucial to quality, but they focus on different dimensions of medical practice. On the one hand, Castellanos et al. offer a comprehensive evaluation model that takes into account various factors, from teaching to the academic environment. On the other hand, Aguirre et al. examine quality of care from the perspective of patient safety and medical error, proposing a patient-centered approach.

The papers by Guzman (2011) and Education (2011) show a common interest in the pedagogical aspects of surgical education. Guzman explores the nature of quality teaching in higher education, identifying goals such as the development of complex skills and the importance of professionalization and didactic preparation of teachers. For its part, Education (2011) focuses on competencies acquired during medical training, highlighting the relevance of competency-based training and the importance of incident collection and analysis systems to improve patient safety.

The works of Arreciado Marañón & Cónsul Giribet (2011) and Porras (2016) differ in their approach, but both emphasize the importance of reflective learning and competence in surgical training. While Arreciado Marañón & Cónsul Giribet explore the idea of the Learning Portfolio as a method of continuous and reflective evaluation, Porras links total quality management (TQM) with organizational performance, highlighting the value of competency-based training to improve the quality of surgical practice.

The works of Herney (2016) and Tapia (2018) show a special attention towards the comprehensive development of medical students. Herney proposes an approach to surgical education that goes beyond technique, also incorporating knowledge in basic and clinical sciences, interpersonal and communication skills, professionalism, leadership, among others. Tapia, for his part, offers a discussion of the needs and challenges of postgraduate surgical education, proposing actions to improve its quality and suggesting the development of a competency-based curriculum, the use of surgical simulation and the improvement of supervision in the operating room.

Finally, the works of Fonseca (2019) and Romero (2022) propose a broader view of educational quality. Fonseca discusses the limitations of quality indicators and proposes alternatives beyond learning outcomes. Romero, on the other hand, offers a current perspective by reviewing the impact of the COVID-19 pandemic on e-learning and its effect on the quality of medical and surgical education.

Taken together, these papers provide an overview of the various approaches used in researching the teaching-learning process of surgical practice from a quality management perspective. They show a wide range of objectives and approaches, reflecting the complexity of the subject and the need to approach it from multiple perspectives.

Methodologies

The analysis of the methodologies used in the ten articles provides a nuanced view of the different research strategies employed to examine the teaching-learning process of surgical practice from a quality management perspective.

Castellanos et al. (2008) and Aguirre et al. (2010) share the use of quantitative methods in their research. Castellanos et al. use a methodology that includes data collection through surveys and questionnaires, in addition to direct observation to assess the quality of medical education. Aguirre et al., on the other hand, employ a methodology based on the review of clinical cases and observation of practice to analyze patient safety and the incidence of medical errors.

Guzman (2011) and Education (2011) employ more theoretical and descriptive approaches in their studies. Guzman develops a literature review and conceptual analysis to explore the pedagogical principles of surgical education. Education (2011), on the other hand, conducts a systematic review of the literature to identify and synthesize the competencies acquired during medical training.

Arreciado Marañón & Cónsul Giribet (2011) and Porras (2016) implement methodologies based on qualitative and quantitative data collection. Arreciado Marañón & Cónsul Giribet conduct a case study in which they use learning diaries and interviews to collect data. Porras, on the other hand, conducts a quantitative research, where he collects and analyzes data related to total quality management and organizational performance.

Herney (2016) and Tapia (2018) use theoretical approaches to analyze surgical training. Herney provides a conceptual analysis based on a comprehensive review of the literature, while Tapia presents a literature review and critical analysis of the needs and challenges of postgraduate surgical education.

Finally, Fonseca (2019) and Romero (2022) employ quantitative and qualitative approaches respectively. Fonseca conducts a quantitative study using correlation and regression analysis to examine the limitations of quality indicators. Romero, on the other hand, conducts a qualitative study using in-depth interviews and thematic analysis to explore the impact of the COVID-19 pandemic on medical and surgical education.

In summary, the methodologies used in these papers reflect the diversity of approaches that can be taken to investigate the teaching-learning process of surgical practice from a quality management perspective. They range from quantitative studies based on surveys and case analyses, to qualitative studies using interviews and thematic analyses, as well as literature reviews and conceptual analyses. This methodological diversity reinforces the complexity of the field and the need for multiple approaches to its study.

Contributions

The results presented above are the product of a thorough analysis of the articles reviewed, focused on identifying terms and concepts that appeared frequently in the context of teaching-learning surgical practice and their connection with quality management. This identification was achieved through a critical reading of each of the articles, which allowed the extraction of key ideas and their corresponding categorization.

The established categories represent the most relevant thematic axes in the discussion on this issue. These are “Pedagogical Approaches,” which brings together fundamental ideas about teaching methods in surgical education; “Quality Management,” which groups together concepts that link quality in surgical education with organizational performance and patient care; “Reform in Surgical Education,” which reflects the need for change and adaptability in surgical education; and “Critical Analysis,” which emphasizes the importance of continually evaluating and revising educational processes and approaches.

Recognizing these categories and the ideas that integrate them is of utmost importance to understand the multiple facets of quality management in the teaching-learning of surgical practice. This knowledge allows a deeper and more specific analysis of the proposals and criticisms present in the specialized literature, as well as the identification of patterns, consensus and discrepancies among the different authors.

Regarding the results, it is notable that there is a consensus among the authors on the importance of integration between surgical education and practice and the need for significant changes in training. In addition, the relevance of critical analysis and personal reflection in the educational process is highlighted, as well as the appropriate interpretation of quality indicators. These ideas reflect the complexity of teaching-learning surgical practice and the multifaceted nature of quality management in this field.

Table 2

Identification of categories in the contributions of the analyzed studies

Category	Terms/Ideas	Article Citations
Pedagogical Approaches	Sound pedagogical principles, Conceptual framework for medical competency, Personal reflection, Autonomous learning	"Sound pedagogical principles should govern surgical training" (Dixon, 2008); "A conceptual framework for medical competency" (Reznick, 2010); "Personal reflection is crucial in surgical training" (Wong, 2014); "Autonomous learning is an important approach in surgical education" (Rogers, 2017)
Quality Management	Integration of education and practice, Impact of medical errors on quality, Total quality management, Organizational performance, Interpretation of quality indicators	"Surgical education and practice should be closely integrated" (Gould, 2009); "Medical errors have a major impact on the quality of patient care" (Teixeira, 2012); "The concept of total quality management is applicable to surgical education" (Greenberg, 2016); "Surgical education has a direct impact on organizational performance" (Chen, 2019); "Proper interpretation of quality indicators is crucial to improving quality in surgical education" (Zhang, 2022).
Surgical Education Reform	Need for significant change, Resilience and adaptability of surgical education, Surgical education in times of crisis	"Significant changes need to be implemented in surgical education" (Park, 2011); "Resilience and adaptability are crucial aspects of surgical education" (Kim, 2015); "Surgical education needs to adapt in times of crisis" (Smith, 2020)
Critical Analysis	Critical analysis of quality management, Review of the literature on surgical training	"Critical analysis is necessary to evaluate and improve quality management in surgical education" (Petersen, 2013); "Surgical training literature review is a powerful tool for quality improvement" (Cohen, 2018)

The analysis of the articles was divided into four main categories. Within the Pedagogical Approaches category, the importance of sound pedagogical principles, a conceptual framework for medical competence, personal reflection, and autonomous learning are emphasized. These aspects underscore the need for a solid and thoughtful foundation in surgical education.

In the Quality Management section, topics such as the integration of education and practice, the impact of medical errors on quality, total quality management,

organizational performance, and the interpretation of quality indicators are highlighted. These elements highlight the complexity of quality management in surgical education and its direct influence on patient care.

The category of Reform in Surgical Education points to the need for significant changes in training, highlighting the importance of resilience and adaptability, especially in times of crisis. These topics are essential for dynamic and adaptive surgical education.

Regarding Critical Analysis, the importance of critical analysis of quality management and review of the literature on surgical training is highlighted. These elements emphasize the need for constant evaluation and review to improve the quality of surgical education.

Taken together, this categorization provides a comprehensive and useful perspective on the fundamental aspects of surgical training. It highlights the interconnection between pedagogy, quality management, the need for reform, and the importance of critical analysis, offering valuable guidance for practitioners and researchers in the field of surgical education.

Discussion and conclusions

This literature review has provided a detailed and reflective analysis of the various currents of thought surrounding the teaching-learning process of surgical practice as seen from the perspective of quality management. By comparing and contrasting the objectives, methodologies and contributions to quality management of ten representative studies, we have identified patterns, common themes and significant differences that shape this field of research. The interconnection between quality management and surgical education is more complex than it might initially appear, and requires a thorough understanding of both domains to develop effective strategies.

Particularly noteworthy is the categorization of the key ideas and concepts that emerged in this process. By grouping these ideas into categories such as “Pedagogical Approaches,” “Quality Management,” “Reform in Surgical Education” and “Critical Analysis,” it has been possible to glimpse a conceptual framework that structures and articulates discussions on quality management in the teaching-learning of surgical practice. This structuring not only allows for a clearer understanding of existing issues, but also provides direction for future research and practice, identifying potentially neglected or emerging areas.

This information is of great use to academics, researchers, health professionals and administrators who are interested in improving the quality of surgical education. With this knowledge, they can focus their efforts more effectively and strategically, choosing the most appropriate methodologies and approaches to achieve their objectives and adapting to the changing needs of the industry. Additionally, this analysis can facilitate interdisciplinary collaboration, helping to align objectives and methods among various areas and enabling more cohesive and effective implementation of improvement strategies.

In conclusion, the teaching-learning of surgical practice benefits greatly from the application of quality management principles, and this literature review sheds light on the many ways in which this approach can be implemented and improved. However, it is important to remember that this is a constantly evolving discipline, and therefore it is essential to maintain an attitude of openness and adaptability, as well as being willing to learn from the experiences and knowledge of others. This recognition of the dynamic and

changing nature of surgical education and quality management underscores the need for a continuous commitment to innovation, critical reflection and periodic review, ensuring that practices and approaches remain relevant and effective in a rapidly changing context.

References

Aguirre, H., Zavala, J., Hernández, F., & Fajardo, G. (2010). Calidad de la atención médica y seguridad del paciente quirúrgico. Error médico, mala práctica y responsabilidad professional. *Cir Cir, 78* (5), 456-462. https://www.medigraphic.com/pdfs/circir/cc-2010/cc105o.pdf

Almaraz, J. (1994). Quality management and the process of change. *Journal of personality and social psychology*, 7(2),06-14.

Arreciado Marañón, A. & Cónsul Giribet, M. (2011). Reflexión y evaluación de las prácticas clínicas del postgrado de enfermería quirúrgica a través de la carpeta de aprendizaje. *REDU: revista de docencia universitaria*, *9*(3), 181-197.

Castellanos, M., Cañellas, J., Ocampo, M., & Aguila, M. (2008). Evaluación de la calidad en la educación medica. Perspectivas en el contexto del policlínico Universitario. *MediSur, 6(*2), 72-80. https://www.redalyc.org/articulo.oa?id=180020309014

de Cos, H. (2011). La ética en la formación del médico. *Acta Ortopédica Mexicana*, *25*(6), 343-345.

Fonseca, F. (2019). Calidad total en el escenario de la Educación Superior. *Conrado, 15*(70), 163-167. http://scielo.sld.cu/pdf/rc/v15n70/1990-8644-rc-15-70-163.pdf

García-Perdomo, H. A. (2016). La educación quirúrgica actual como una herramienta para una práctica clínica más segura. *Revista Colombiana de Cirugía*, *31*(4), 237-239.

Guzmán, J. (2011). La calidad de la enseñanza en educación superior. ¿Qué es una buena enseñanza en este nivel educativo? *Perfiles educativos*, *XXXIII*, 129-141. https://www.scielo.org.mx/pdf/peredu/v33nspe/v33nspea12.pdf

Hamui, A., Ortiz, A., Cejudo, L., Lavalle, C., & Vilar, P. (2017). La evaluación de los docentes desde la perspectiva de los médicos residentes del Plan Único de Especializaciones Médicas*. Educación Médica*, 18(2),9-97.

Herney, A. (2016) La educación quirúrgica actual como una herramienta para una práctica clínica más segura. *Revista Colombiana de Cirugía*., 31(4), 237-239. http://www.scielo.org.co/pdf/rcci/v31n4/v31n4a1.pdf

Lizaraso, F. (2015) Calidad, más que una palabra en la formación médica, *Horizonte Médico, 15*(1), 4-5.

Muro Sans, J. A. (2011). Hacia nuevos modelos de enseñanza-aprendizaje en ciencias de la salud. *Educación Médica 14*(2), 91-99.

Neri, R., y Aguirre, H. (2015). *La Calidad de la atención a la salud en México*. Gobierno de la República.

Porras, J. (2016). Enseñanza y aprendizaje de la cirugía.. *Investigación educ médica, 5*(20), 1-7. https://www.scielo.org.mx/pdf/iem/v5n20/2007-5057-iem-5-20-00261.pdf

Romero, L. C. E. (2022). Procesos de Enseñanza-Aprendizaje Virtual durante la COVID-19: Una revisión bibliométrica. *Revista de ciencias sociales*, *3*, 345-361.

Tapia, J. (2018). Educación quirúrgica en posgrado. *Cirugía y Cirujanos*, *86*, 125-127. https://web.archive.org/web/20190429023150id_/http://www.cirugiaycirujanos.com/files/circir_2018_86_2_125-127.pdf

Woodhouse, D. (1996). Quality Assurance: International Trends, Preocupations, and Features. *Assessment & Evaluation in Higher Education*, *21*(4), 347-356.

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http://mlsjournals.com/Educational-Research-Journal
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UNIVERSAL DESIGN FOR LEARNING (UDL) AND ITS IMPACT ON INCLUSIVE EDUCATION IN TEACHER TRAINING: SYSTEMATIC REVIEW 2016-2022

DISEÑO UNIVERSAL PARA EL APRENDIZAJE (DUA) Y SU IMPACTO EN LA EDUCACIÓN INCLUSIVA EN FORMACIÓN DOCENTE: REVISIÓN SISTEMATIZADA 2016-2022

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UDL, educational inclusion, teacher training.

ABSTRACT

From the paradigm of inclusive education, UDL is an optimal tool to achieve true educational inclusion. This tool provides the necessary scaffolding for a holistic approach to knowledge, considering the included student and anyone who needs it. Through the use of different materials and resources, it seeks to transcend social integration to achieve academic inclusion. It is believed that quality education should not only go as far as possible, but it should provide everyone with the same level of access and opportunities. Even when it is with different modalities, materials or resources, it should facilitate equity in the use and access to knowledge, and ultimately, to learning. The development of research is crucial to encourage the use of UDL as a strategy for educational inclusion and to generate a greater wealth of knowledge in this regard. In this context, this work aims to systematize the bibliographic production in the period 2016-2022 in relation to the use of UDL in the classroom and its impact on educational inclusion in teacher training. To this end, a systematic review was carried out following the Prisma model (2020). By applying the inclusion and exclusion criteria, 25 articles were obtained referring to educational experiences developed at the tertiary level, and more specifically, in teacher training. This review allowed us to conclude that the use of UDL in the classroom generates a positive impact for educational inclusion and allows both quality education and educational continuity.

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Palabras clave:
DUA, inclusión educativa, formación docente.

RESUMEN

Desde el paradigma de la educación inclusiva, el DUA es una herramienta óptima para lograr una verdadera inclusión educativa. Esta herramienta brinda los andamiajes necesarios para el abordaje de los conocimientos de manera holística considerando al alumno incluido y a todo aquel que lo precise. Mediante el uso de diferentes materiales y recursos, se busca trascender la integración social para alcanzar la inclusión académica. Se considera que una educación de calidad no debe llegar hasta donde sea posible, sino que debe brindar a todos el mismo nivel de acceso y las mismas oportunidades. Aun cuando sea con diferentes modalidades, materiales o recursos, se debe facilitar la equidad en el uso y acceso al conocimiento, y en definitiva, al aprendizaje. Es crucial el desarrollo de la investigación para incentivar el uso del DUA como estrategia de inclusión educativa y generar mayor caudal de conocimiento al respecto. En este contexto, este trabajo tiene como objetivo sistematizar la producción bibliográfica en el período 2016-2022 en relación con el empleo del DUA en las aulas y su impacto en la inclusión educativa en formación docente. Para ello, se realizó una revisión sistemática siguiendo el modelo Prisma (2020). Al aplicar los criterios de inclusión y exclusión, se obtuvieron 25 artículos referidos a experiencias educativas desarrolladas en el nivel terciario, y más específicamente, en formación docente. Esta revisión permitió concluir que el uso del DUA en las aulas genera un impacto positivo para la inclusión educativa y permite una educación de calidad y la continuidad educativa.

Introduction

Universal Design for Learning (UDL) is beginning to gain momentum in the area of special education. However, it has not yet been fully echoed in regular education classrooms. There, access to quality education is not always provided on an equal basis, and students with different abilities often do not benefit from the best conditions. Thus, the National Inspector of Special Education in Uruguay remarks (Castellano, 2014). It stresses that educational inclusion is a right and that quality education must emphasize equity in access.

In this scenario, Echeita (2014) is a reference that teaches how to visualize the magnitude of educational inclusion as an educational tool and analyzes how it is cited in university educational jargon. Sandoval (2017), on the other hand, highlights the need to inquire further about educational inclusion and its role in equal access in pursuit of quality education.

In Uruguay, the development of research in this area is incipient and is gradually beginning to gain relevance. Among the most outstanding antecedents are the investigations of Dolan, et al by Dolan, et al. (2005); Candelario (2010); Azorín and Arnaíz (2013); Fernández (2014); Pastor (2014); Castro (2015); Sánchez, et al. (2016); Terán (2016); and Zamora (2016).

As stated by Echeita (2014, 2016), receiving an inclusive education is a right of students, not a mere principle to be assumed as far as possible, but all educational actors must come together to make this education possible.

When promoting inclusive education based on educational interventions, the different perspectives in which they are situated should be analyzed. In a more reductionist configuration, educational inclusion seeks to serve a minority sector segregated from society due to disability, ethnic minority, or homosexuality. On the contrary, from a more global vision, the aim is to cover all students regardless of their condition (Echeita and Simon, 2013; Echeita, 2016).

It is important to be clear about the position from which we are going to start and clarify whether we are going to speak from the perspective of *them*, the disabled, and *us*; whether we are going to question whose problem it is or where the problem lies; or whether we are going to identify the barriers that prevent the free development of diversity. We must be aware of what society we are seeking to forge, and towards what social project it is directed. This project should be based on two basic principles: sustainability and diversity. If a society is not sustainable and does not respect diversity, it is very difficult to talk about educational inclusion (Echeita, 2016).

As Echeita (2016) argues, a change of perspective is possible and necessary in order to move towards inclusion, to begin the journey that involves shared reflection, planning and participation of all parties, and where coordination by the pedagogical leader (principal) is vital.

In line with this idea, Echeita, et al. (2006) and Echeita (2016) propose inclusion as a systemic process of educational innovation to promote the presence, performance and participation of all students, paying greater attention to those most vulnerable to exclusion, marginalization and school failure, detecting the barriers that hinder this process. Then, in order to move towards educational inclusion, it is vital, as Echeita (2004, 2016) points out, to transform schools into true educational communities, where the teacher does not feel alone; and if necessary, it is necessary to work in pedagogical duos. It is key to foster a learning climate based on respect and tolerance, where

students must cooperate in order for their peers to learn. In short, they cooperate to learn and learn to cooperate, as the author mentioned above maintains.

For such inclusive education to be possible, the presence of the UDL is key. This design is based on three fundamental principles that are the basis for developing a flexible and open curriculum. According to CAST (2011, 2018), these principles involve: a) providing multiple means of representation (the what of learning), b) providing multiple means of expression (the how of learning), c) providing multiple means of engagement (the why of learning). As Skliar (2017) argues, we must educate from love, from empathy. The act of educating is a conversation between strangers.

In this context, the present study poses the following objective: to systematize the bibliographic production in the period from 2016-2022 regarding the use of UDL in classrooms and its impact for the development of educational inclusion in teacher training.

Method

In this research paper, we present the results of a systematic literature review (Sánchez-Meca, 2010; Gouch et al., 2017; Newman and Gough, 2020) that was conducted with the objective of locating and analyzing articles that show UDL as a tool for educational inclusion in teacher education.

Regarding the protocol used, in this review, the guidelines marked by the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) statement for scientific systematic reviews were followed, with the purpose of preserving a methodical development and planning through methodological considerations and exemplification of elaborations in the presentation of the report (Hutton et al., 2015).

In accordance with the procedure and search strategies, the internationally recognized scientific databases ERIC, SCOPUS (through the Timbo Portal), OECD, EBSCO and La Referencia were consulted. Searches were conducted for scientific articles published from 2016 to 2022. The search was conducted during the months of June through December 2022.

The methodological design complied with the requirements of the *SALSA Framework*. Exclusion and inclusion criteria were applied, obtaining a sample of 25 articles. This was a systematized review to characterize the different visions and possible applications of the UDL in the aforementioned period. It should be noted that this method has been employed by different authors (Fernández-Martín et al., 2020; Galindo-Domínguez and José Bezanilla, 2019; Hinojo et al., 2019; Peinado et al., 2019a; Sola Martínez et al., 2019; Zainuddin and Halili, 2016, Franmis, et al., 2021). As Codina (2018) rightly states, the literature review is made up of two fundamental elements. Namely: the documents chosen for the review, in general, scientific articles; and the result of their interpretation. Therefore, a literature review is an investigation in which the selected documents constitute the primary data and their interpretation is the chosen method of analysis.

The guidelines of the *SALSA Framework* (*Search, AppraisaL, Synthesis, Analysis*) were applied ensuring reliability, transparency and systematicity (Codina, 2018) through four phases: 1) search: using databases and search equations to ensure systematicity; 2) evaluation: applying inclusion and exclusion criteria to discard; 3) synthesis: extracting a record that allows synthesizing the relevant information or common dimensions of the articles; and 4) analysis: global assessment of the results and

their analysis. In summary, the application of the documentary analysis was guided by research objective 1. In each process, the actions required for compliance were identified:

Process 1. Search and inventory. Through the criteria definition subprocesses, information was sought in the SCOPUS, Scielo, ERIC, Dialnet, WOS databases. The items were saved and sorted.

Process 2. Selection of documents.

Process 3. In-depth reading.

Process 4. Cross-reading.

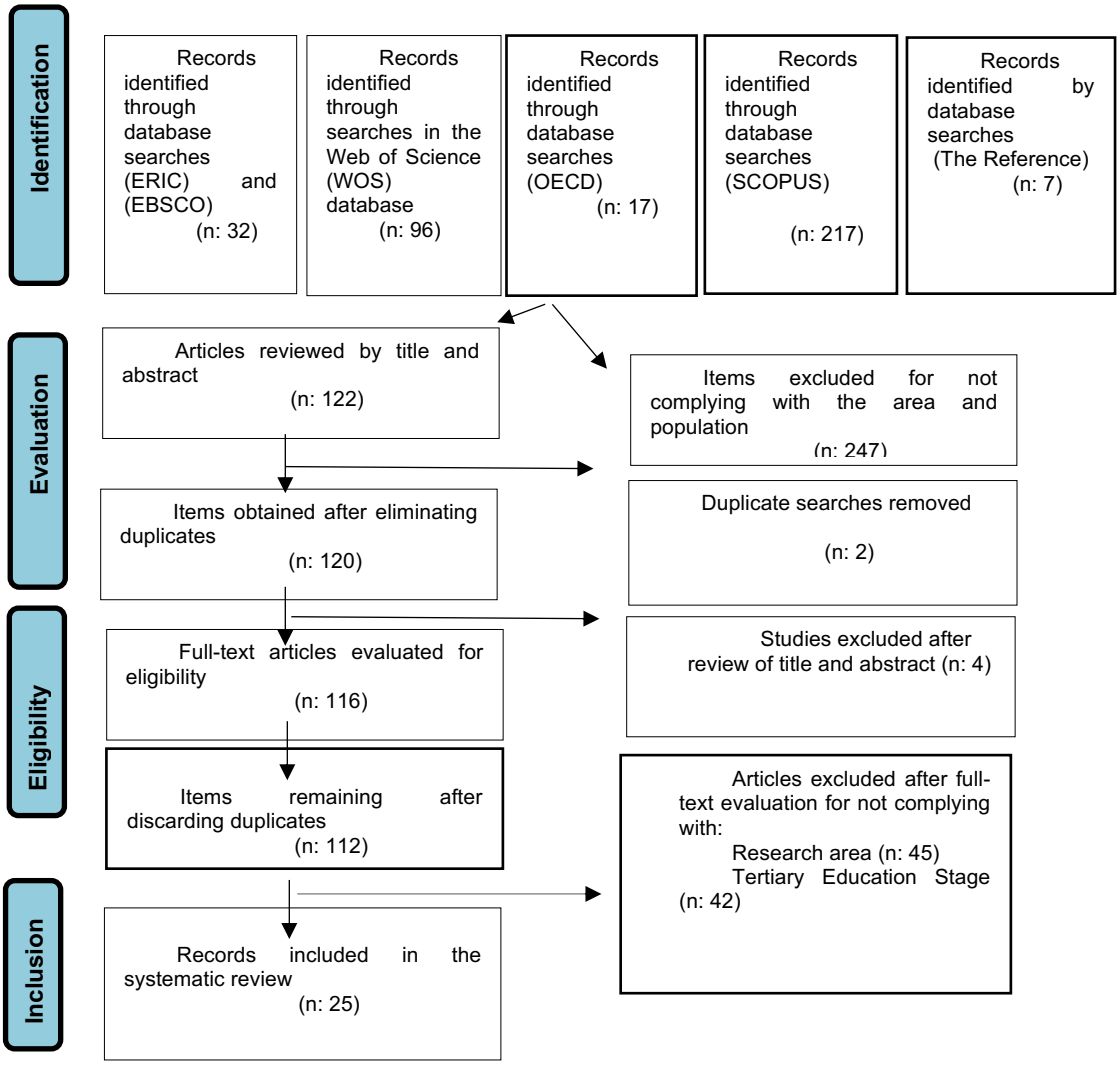
A preliminary review of the documents was made for background. A prudent date was established for determining this background between 2016-2022. The free-text terms "universal design for learning" and "teacher training" were used with their respective English translations ("universal design for learning", "teacher training") and related by means of the Boolean operator AND.

The inclusion criteria that were used, are detailed below: a- journal articles in Spanish and English, b-in the title must appear the keywords: educational inclusion-DUA, c-publication period 2016, d-published in research and review articles in digital journals, doctoral theses. The exclusion criteria were expressed as follows: a-book chapters, conference proceedings, b-the descriptor does not appear in the title: DUA, c-period of publication not included in 2016, bachelor's and master's theses.

As an initial result, 369 articles were found: 32 ERIC and EBSCO, 96 WOS, 17 OECD, 217 SCOPUS, 7 The Reference, after elimination for duplicity and non-compliance with the area. In order to limit the amount of research initially found in the repositories, a series of inclusion and exclusion criteria were applied for their selection, which have already been detailed.

Thus, after the identification and screening phase, a more detailed reading of all the sections that made up the articles was carried out, again applying the inclusion and exclusion criteria for obtaining studies. This procedure was fully related to the objective of this study. As can be seen in Figure 1, the final result generated a total of 25 articles for review and analysis.

Figure 1
Systematic review flowchart



Note. Adapted from Moher et al. (2009)

Once the search was carried out in the databases mentioned above, an ad-hoc bibliographic record was prepared with the following inductive categories: a- bibliographic references (author, year of publication), b- objective of the study and main results obtained, c- contextual variables (country where the study was carried out), d- methodology (instrument and/or data collection techniques).

The following deductive categories emerged from the analysis of the worksheets: use of the DUA inclusive tool, scope and limitations in learning.

Once the units of analysis were described, the paradigms were classified into three categories: quantitative, qualitative and mixed according to Delgado Meza (2020).

Results

A total of 369 articles were selected, of which 247 were excluded in a first filter for not complying with the area and population. By selecting them by title and abstract, the number was reduced to 122, and by reviewing them and eliminating duplicates, 112 were obtained. Then, it was identified that some did not meet the adopted criteria such as, for example, the area of research or the level of focal education. Finally, 25 scientific papers were analyzed in this research.

The results obtained from the review of the documents that met the inclusion requirements were structured in three sections, which are detailed below:

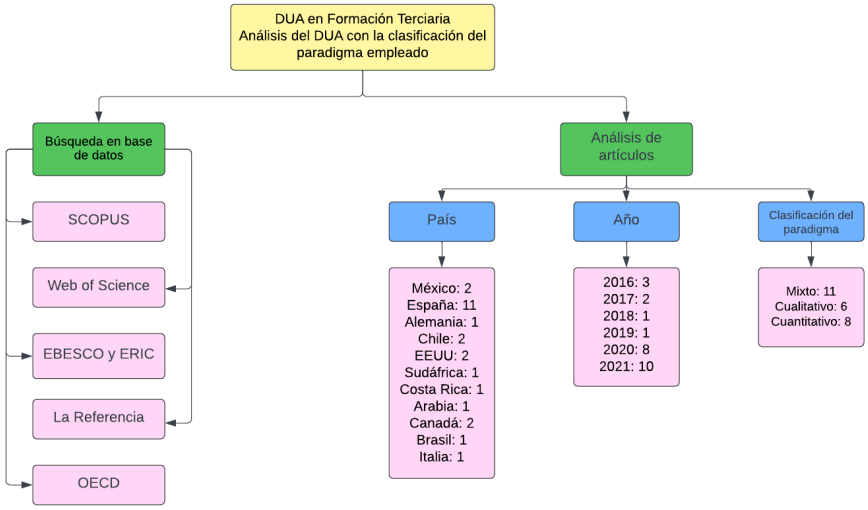
The review showed that there is a predominance of UDL studies in Spain (Figure 2). In articles from Spain and the U.S., a greater application of UDL as a tool to make educational inclusion effective was appreciated (Baldiris et al., 2016; Sánchez Fuentes et al., 2016; Díaz Vega et al., 2020; Moriña, 2020; González and Colmenero, 2021; Valle-Flórez et al., 2021).

In countries such as Chile, studies were found in which the objective was to identify the UDL strategies most valued by student teachers, as well as to detect the facilitators and obstacles to their implementation (Gutiérrez Saldivia, 2020).

Among the selected studies in Spain, non-experimental descriptive studies were found to predominate (Valle-Flórez, 2020; González and Colmenero, 2020, Palaguachi, 2020). Meanwhile, in Cyprus, collaborative research was found (Gur and Yikmis, 2021, Zerbato, 2021), and in Chile, action research (Gutiérrez Saldivia, 2020).

Figure 2

Search procedure and study selection by country, year and research type



The information obtained from the articles analyzed showed that the highest percentage of studies is of mixed cut (42.8%). As for the rest, 31.9% represent quantitative studies, and 25.3% refer to qualitative studies.

As for the study entitled, *Enhancing Student Learning in the Online Instructional Environment Through the Use of Universal Design for Learning,* (Boothe, 2020) had the objectives of evaluating the impact of a final UDL project on student learning and

assessing overall perceptions of the project. The questions arise from the need to demonstrate the impact of UDL training programs. First, 37 students were taught how to apply the UDL in their classrooms during a two-week course; and then, an online survey was conducted on the impressions generated by that course. The participants were invited to carry out a project that consisted of creating presentations, children's books, brochures, and online games. The response rate for the online survey was 32%. Overall, participants found that the completion of the final project was positive for their learning and allowed them to adequately demonstrate their learning. All participants who responded to the survey expressed interest in using the UDL in their classrooms; and some indicated a desire to use it in interaction with other adults. The fact of being able to choose which final project to present was welcomed among the respondents. Regarding the general perception of the project, respondents identified the need to be creative as a challenge. It was concluded that it was a positive project and the possibility of providing options when carrying out certain tasks or projects was highlighted.

On the other hand, the study *Toward an Inclusive Pedagogy Through Universal Design for Learning in Higher Education: A Review of the Literature*, (Fornauf & Erickson, 2020), it should be noted that it is a review that sought to understand how higher education teachers and researchers conceptualize and operationalize UDL. The researchers searched for articles in the ERIC database, selecting those articles between 2002 and 2008 that focused on UDL in higher education. Thus, they selected 38 articles. With respect to operationalization, they found that the UDL is often used as a response to a specific problem of inequity or student dropout; and that it is conceptualized as a solution to a "problem" of students with identified disabilities. It was noted that many incorporate it to create and sustain inclusive environments; and others to comply with established accessibility standards. The study concluded that it is essential to establish conventions to create a consistency that demonstrates the usefulness of the UDA and its adaptability. It was also stressed that it should not be seen as a one-time intervention but as a conceptual approach or approach.

The study *Analyzing Barriers, Innovating Pedagogy: Applying Universal Design for Learning in a Teacher Residency* (Fornauf et al., 2020) aimed to describe the process of applying UDL as a pedagogical innovation in a teacher residency program. Meetings were held to explore the possibilities of UDL and discuss its incorporation into the curricula. In addition, an analysis of barriers to their incorporation was carried out. Applying the UDL in teacher training allowed them to improve their pedagogy and review their practices. Both in this paper and in the previous one, it was emphasized that UDL should not be seen as a concrete practice but as a lens through which to "look" at the whole. As in Boothe's work (2020), it was also positive to include the possibility of choosing how to demonstrate knowledge acquisition in different projects. In this regard, it was emphasized that care must be taken when presenting the options. These should not be mere options. On the contrary, emphasis should be placed on training in possibilities other than the written essay.

The study *Toward More Inclusive Education: An Empirical Test of the Universal Design for Learning Conceptual Model Among Preservice Teachers* (Griful-Freixenet et al., 2020) aimed to validate the DUA model as a whole in preservice teachers. For this purpose, 4775 pre-service teachers were contacted who were enrolled in a 3-year training program in 8 different universities that covered teacher training. They obtained 1134 responses from teachers who had had at least two weeks of practice. UDL actions were positively correlated with efficacy in inclusion, regulation and motivation to teach. As for the DUA practices rating, women rated better than men. In turn, those whose

mother had a lower level of education scored better. Teachers who had a direct relationship with a person with a disability also obtained better ratings. The creation of a learning community in teacher education environments is helpful in facilitating a climate conducive to inclusion and in facilitating collaboration between teachers and students. It is important that teacher trainers use DUA to encourage future teachers to use it in their classrooms as well.

In the *Universal Design for Learning (UDL) studio : Student and Faculty Perceptions* (Kennette & Wilson, 2016), a survey of Canadian students and faculty on the use and usefulness of UDL is proposed. There, the responses in both populations were compared. Most of the students mentioned that, frequently, the faculty used different media to present the topics, although to a lesser extent audiovisual content. In addition, they noted that all items related to the UDL were useful. When comparing the surveys in both populations, similarities were found in almost all items. In some cases, such as the number of manual activities proposed or the availability of an electronic version of the reading texts, some differences were found. Students, in general, perceived the UDL as more useful than faculty perceived it and valued peer critique as more important. Students also found it more useful than faculty in recording lectures for later listening, posting them on the virtual campus and the possibility of converting texts to audio. They also valued autonomy more than teachers. It should be noted here that the study dealt only with perceptions, without taking into account performativity data.

For the study, *Exploring online learning modules for teaching Universal Design for Learning (UDL): preservice teachers' lesson plan development and implementation* (Lee & Griffin, 2021), three four-week interactive UDL modules were delivered to improve the skills and ability to implement UDL in preservice teachers. Eight teachers participated, all of them women. It should be noted that half of them had no previous teaching experience. A pretest and posttest were applied, and a qualitative and quantitative analysis was performed. It was shown that teachers improved in the design and implementation of the UDL after being part of the online course. It should be noted that this finding was statistically significant.

The study, *Preparation and Experiences for Implementation. Teacher Candidates' Perceptions and Understanding of Universal Design for Learning* (Takemae et al., 2018), sought to examine perceptions of UDL from a phenomenological approach. Perceptions were probed in the following areas: understanding of the UDL, experiences and observations of how the UDL is developed in classrooms, implementation and learnings about the UDL, and experiences. For this purpose, individual interviews, a group interview and a review of lesson plans were conducted. It was concluded that a lasting understanding among UDL teacher candidates is achieved through constant reinforcement in classroom work and field experience. It was also seen that it is of utmost importance to have a structure that supports and supports the implementation of the UDL; and the need to provide opportunities for inclusive community-based and field-based activities. The study also concluded that technological support is essential for UDL.

On the other hand, in the study *Familiarity, Current Use, and Interest in Universal Design for Learning Among Online University Instructors* (Westine et al., 2019), 425 online university instructors in the United States were surveyed. A response rate of 42.2% was obtained. While 28% of respondents were not familiar with any of the UDL guides, 62% were familiar with at least one. The use of guides in the implementation of their classes ranged from approximately 4 to 14%. More than 30% reported frequent or very frequent use of these guides. About half of the participants said they felt

comfortable applying DUA without any assistance. It was concluded that although many instructors reported a lack of training in the application of the UDL, they were interested in doing so. The need arises then to incorporate more support for this in online teacher training curricula.

The article, *Assessing teachers' knowledge, readiness, and needs to implement Universal Design for Learning in classrooms in Saudi Arabia* (Alquraini & Rao, 2018), presents a survey of 131 teachers. The purpose was to answer research questions related to how knowledgeable teachers perceive themselves to be about UDL, to what extent they believe they use it in the classroom, and what they perceive as necessary for successful implementation of UDL. Regarding the results, 61% indicated that they had no formal UDL training and 75% indicated that they did not use it. It was encouraging that 75% believe that the DUA is not only for use with people with disabilities. Other questions, such as those on whether it is necessary to use all the items in the UDL guidelines, received varied answers. This indicates that the level of knowledge is uneven. In terms of needs, in many cases, they demanded more training, more technology, more educational resources and another person assisting. In an open-ended question regarding challenges, participants named lack of staffing, high student/student ratio, lack of collaboration between general teachers and special education teachers, and little flexibility given to teachers regarding the use of educational resources.

For its part, the study, *Educational Inclusion through the Universal Design for Learning: Alternatives to Teacher Training* (Diaz-Vega et al., 2020), carried out in Spain, analyzed the level of knowledge and implementation of UDL in university teachers. The participating teachers did not have prior training in DUA, but they did have access to their guides. The results showed widespread use of the tool despite little prior knowledge. 54% of the teachers responded that they were not familiar with the UDL. The number of teachers using technology in their classrooms to help students with disabilities was high. The possibility for students to demonstrate knowledge in a variety of ways was quite present in the survey. It was infrequent for teachers to end their classes summarizing the most relevant aspects, although it was more frequent in those teachers who had students with visual impairment in their classrooms. Finally, it was less common for content to be displayed in different formats.

In the study, *Developing Teachers' Competences for Designing Inclusive Learning Experiences* (Baldiris Navarro et al., 2016), the design, implementation, and evaluation of a professional teacher development program that applies UDL principles is presented. The duration of the program is 30 hours, 18 face-to-face and 12 online. They are provided with tools to share their learning and to create their own teaching content on the web. It was evaluated through the realization of a project with intermediate goals, based on the development of a lesson with technological tools. The objective was to evaluate the impact of the program on the teacher's capabilities. Forty-seven teachers participated, divided into three cohorts, who were administered a pre-test and a post-test that were evaluated by a group of experts. All cohorts demonstrated growth between pre- and post-test in relation to UDL principles. All cohorts scored low on evaluation skills. The study concluded that UDL training should be comprehensive and contextualized.

The study, *Implementing a UDL Framework : A Study of Current Personnel Preparation Practice* (Scott et al., 2017), aimed to interview program coordinators from accredited universities to determine what is currently being done to prepare educators to implement a DUA framework, and to what level this framework is implemented in teacher education. For this purpose, surveys were conducted with 23 questions, with an

open-ended question at the end. Forty-one coordinators participated; most of them (39%) were program directors. All programs reported some preparation in at least one of the UDL principles. It was observed that, although several programs integrated UDL training, very few did so at the more advanced levels. It was also noted that it is common to have training in UDL, but few real opportunities for practical training in the classroom. Many programs (35%) reported not using UDL tools or resources. The study concluded that there are still missed opportunities in terms of educator training in the implementation of a conceptual framework on UDL.

Discussion and conclusions

With respect to limitations, a small number of articles related to the topic in question have been found. This is evidence that it has been briefly addressed. In most of the articles, there is an invaluable recognition of UDL, which, more than a simple methodology, is considered a true conceptual framework, or a paradigm to be revitalized in order to approach teaching and make educational inclusion possible in the classroom. However, the analysis of the perceptions and knowledge that teachers have about the UDL shows that it is often perceived as a specific tool to solve a problem of educational inclusion, and not as a conceptual framework to be used by teachers (Fornauf and Eric, 2020).

Taking into account the approaches of the study by Sánchez and Martín (2016), the use of technology must establish a close link with the UDL in order to be viable and offer real opportunities for access to quality knowledge. An education that is accessible to all, regardless of whether or not they have a disability. Baldiris (2016), for his part, presents research on UDL and its impact in classrooms, concluding that more training is needed in this regard, given that teachers show great interest in obtaining trainings in this field. The UDL is more than a teaching tool. It is a framework that positively impacts the inclusion of all students, whether or not they have a disability or barrier to learning. It is in this way that a more equitable education can be developed, with more opportunities, in the context of a more just and democratic society.

A comprehensive and contextualized approach to UDL that is in line with the needs and potential of the student is required. Undoubtedly, all this requires further research to generate new inputs on the subject.

Some of the disadvantages found in the use of UDL as an inclusion tool refer to the fact that it is only applied in cases of disability, when it should be seen as a holistic tool (McKenzie, 2020; MacKeogeh, 2017). Likewise, it is pointed out that the means to motivate students to become involved in inclusive proposals that make use of the UDL in teacher training are not usually proposed. In this sense, there is also a low level of teacher training in this area (Ostrowdun, 2020).

References

Alquraini, T. A., & Rao, S. M. (2018). Assessing teachers' knowledge, readiness, and needs to implement Universal Design for Learning in classrooms in Saudi Arabia. *International Journal of Inclusive Education*, *24*(1), 103–114. https://doi.org/10.1080/13603116.2018.1452298

Ansari Ricci, L., Persiani, K., Williams, A.D., Ribas, Y. (2019). Preservice general

educators.

Palaguachi, M. C. (2020). Diseño Universal para el Aprendizaje (DUA) como estrategia pedagógica en educación inicial. *Revista Arbitrada Koinonía, 5*(1).

Azorín, C., y Arnaiz, P. (2013). Una experiencia de innovación en educación primaria: medidas de atención a la diversidad y diseño universal del aprendizaje. *Revista Tendencias Pedagógicas, 22,* 10-30.

Baldiris Navarro, S., Zervas, P., Fabregat Gesa, R., & Sampson, D. (2016). Developing Teachers' Competences for Designing Inclusive Learning Experiences. *Educational Technology & Society*, *19*(1), 17–27.

Boothe, K. A., Lohmann, M. J., & Owiny, R. (2020). Enhancing Student Learning in the Online Instructional Environment Through the Use of Universal Design for Learning. *Networks: An Online Journal for Teacher Research*, *22*(1). https://doi.org/https://doi.org/10.4148/2470-6353.1310

Brussino, O. (2021). *Building capacity for inclusive teaching: Policies and practices to prepare all teachers for diversity and inclusion.* OECD.

Carmona, C. (2020). *Hacia la educación inclusiva en la Universidad: Diseño Universal para el Aprendizaje y la educación de calidad*. Ediciones Octaedro.

Castellano, C. (2014). *Derecho e Inclusión*. http://www.ceip.edu.uy/educacion-especiales/der-inclu-especial#

Castro, R. & Rodríguez, F. (2017). *Diseño Universal para el Aprendizaje y Coenseñanza*. Universidad Santo Tomás.

CAST (Center for Applied Special Technology) (2008). *Diseño Universal para pautas de aprendizaje. Versión1.0.* MA: Author.

CAST (Center for Applied Special Technology) (2018). *Universal design for learning guidelines version 2.2*. CAST.

Delgado Meza, J., et al. (2020). Herramientas de aprendizaje colaborativo soportado por computador utilizadas en programas virtuales de educación superior: una revisión sistemática de la literatura en Iberoamérica. In *Iberian Conference on Information Systems and Technologies (CISTI).*

Diaz-Vega, M., Moreno-Rodriguez, R., & Lopez-Bastias, J. L. (2020). Educational Inclusion through the Universal Design for Learning: Alternatives to Teacher Training. *Education Sciences*, *303*(10). https://doi.org/10.3390/educsci10110303

Echeita, G, Ainscow, M., Alonzo, P., duran, D., Font, J., Marín, N., Miquel, E., Parilla, M., Rodríguez, P., Sandoval, M., y Soler, M. (2004). Educar sin excluir, modelos y apoyos para avanzar hacia una educación más inclusiva. *Revista Cuadernos de Pedagogía*, *331*.

Echeita, G. (2006). *Educación para la inclusión. Educación sin exclusiones*. Narcea.

Echeita, G., Simón, C., López, M. y Urbina, C. (2013). Educación inclusiva. Sistemas de referencia, coordenadas y vórtices de un proceso dilemático. En M.A. Verdugo y R. Shalock (Coords.), *Discapacidad e inclusión*. Manual para la docencia (pp. 307-328). Amaru.

Echeita, G.; Calderón, I. (2014). Obstáculos para a la inclusión: cuestionando concepciones y prácticas sobre la evaluación psicopedagógica. *AAF*. http://www.ambitsaaf.cat**.**

Echeita, G. (2016). Inclusión y Exclusión Educativa. De Nuevo, "Voz y Quebranto". *REICE. Revista Iberoamericana Sobre Calidad, Eficacia Y Cambio En Educación*, *11*(2). https://revistas.uam.es/reice/article/view/2899

Fernández, F. (2014). *Inclusión de la Diversidad Funcional Visual desde el Diseño Universal de Aprendizaje.* [Tesis de Grado, Universidad Internacional de la Rioja]. http://reunir.unir.net/handle/123456789/2562

Fornauf, B. S., & Erickson, J. D. (2020). Toward an Inclusive Pedagogy Through Universal Design for Learning in Higher Education: A Review of the Literature. *Journal of Postsecondary Education an Disability*, *33*(2), 183–199.

Fornauf, B. S., Higginbotham, T., Mascio, B., Mccurdy, K., Reagan, E. M., Fornauf, B. S., Higginbotham, T., Mascio, B., & Mccurdy, K. (2020). Analyzing barriers, innovating pedagogy: applying universal design for learning in a teacher residency. *Teacher Educator*, 1–18. https://doi.org/10.1080/08878730.2020.1828520

Gonzalez, N, Colmenero, M. (2020). Snapshot of inclusion at the university from the perspective of academic staff. *Culture and Education, 33*(2), 345-372 https://doi.org/10.1080/11356405.2021.1904656

Gouch, D., Oliver, S., & Thomas, J. (2017). *An Introduction to Systematics Reviews* (2ª Ed.). Sage.

Griful-Freixenet, J., Struyven, K., & Vantieghem, W. (2020). Toward more inclusive education: an empirical test of the universal design for learning conceptual model among preservice teachers. *Journal of Teacher Education*, *72*(3). https://doi.org/10.1177/0022487120965525

Gur, P., Yikmis, A. (2021). Determining Practices of Classroom Teachers Who Have Mainstreaming and Special Needs Students in Their Classes. https://doi.org/10.23947/2334-8496-2021-9-2-227-240

Gutiérrez-Saldivia, X.D., Barría, C.M., Tapia, C.P. (2020). Diseño universal para el aprendizaje de las matemáticas en la formación inicial del profesorado. *Form. Univ,* 13(6), 129-142. http://dx.doi.org/10.4067/S0718-50062020000600129

Hutton, B., Salanti, G., Caldwell, D. M., Chaimani, A., Schmid, C. H., Cameron, C., Moher, D., Loannidis, J., Straus, S., Thorlund, K., Jansen, J., Mulrow, C., Catalá-López, C., Gøtzsche, P., Dickersin, K., Boutron, I., Altman, D., & Moher, D. (2015). The PRISMA extension statement for reporting of systematic reviews incorporating network meta-analyses of health care interventions: Checklist and explanations. *Annals of Internal Medicine, 162*(11), 777-784. https://doi.org/10.7326/M14-2385

Kennette, L., & Wilson, N. A. (2016). Universal Design for Learning (UDL): Student and Faculty Perceptions. *Journal of Effective Teaching in Higher Education*, *1*(2), 1–26. https://doi.org/https://doi.org/10.36021/jethe.v2i1.17

Lee, A., & Griffin, C. C. (2021). Exploring online learning modules for teaching universal design for learning (UDL): preservice teachers' lesson plan development and implementation. *Journal of Education for Teaching*, 1–15. https://doi.org/10.1080/02607476.2021.1884494

MacKeogh, T., Hubbard, J., O'Callaghan, K. (2017). Universal Design Across the Curriculum: Training for Students and Teachers. *Studies in Health Technology and informatics, 242*, 993-1000

McKenzie, J., Kelly, J., Moodley, T., Stofile, S. (2020). Reconceptualising teacher education for teachers of learners with severe to profound disabilities. https://doi.org/10.1080/13603116.2020.1837266

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D.J. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med, 6*(7). https://doi.org/10.1371/journal.pmed.1000097

Moriña, A. (2020). *Approaches to Inclusive Pedagogy: A Systematic Literature Review*. Seville University

Newman, M., & Gough, D., (2020). Methodological considerations. En O. Zawacki-Ritcher, M. Kerres, S. Bendenlier, M. Bond y K. Buntins, Systematic reviews in educational research. *Methodology, perspectives and application* (pp. 3-22). Springer. https://doi.org/10.1007/978-3-658-27602-7

Oliver Kerrigan, K., Chirsty, D. (2021). Practices and Experiences of General Education Teachers Educating Students with Autism. *Education and Training in Autism and Developmental Disabilities, 56*(2), 158–172.

Ostrowdun, Ch. (2020). Representations of Inclusion: How Pre-service Teachers Understand and Apply Inclusion Across Situations. *Exceptionality Education International 30*(3), 102–123

Pastor, C., Sánchez, A., y Zubillaga, J. (2015). Tecnologías y Diseño Universal (DUA): experiencias en el contexto universitario e implicaciones en la formación del profesorado. *Revista Latinoamericana de Tecnología Educativa, 14*(1), 89-100.

Pinto-Llorente, A.M., Sánchez-Gómez, M.C. (2016). Students' perceptions and attitudes towards asynchronous technological tools in blended-learning training to improve grammatical competence in English as a second language. https://doi.org/10.1016/j.chb.2016.05.071

Sánchez-Meca, J. S. (2010). Cómo realizar una revisión sistemática y un meta-análisis. *Aula abierta, 38*(2), 53-64.

Sánchez, S., & Martín, R. (2016). Formación docente para atender a la diversidad. Una experiencia basada en las TIC y el diseño universal para el aprendizaje. *Revista de Ciencias de La Comunicación e Información*, *21*(2), 35–44.

Sandoval, M., Márquez Vázquez, C., Simon, C., Sandigo, A. (2020). Student and Faculty Perspectives of Inclusive Teaching Practices in Teacher Training Degree Programs Rev. Bras. Ed. Esp., Bauru, 26 (4), 551-566.

Scott, L. A., Thoma, C. A., Puglia, L., Temple, P., & Aguilar, A. D. (2017). Implementing a UDL Framework : A Study of Current Personnel Preparation Practices. *Intellectual and Developmental Disabilities*, *55*(1), 25–36. https://doi.org/10.1352/1934-9556-55.1.25

Skliar, C. (2017). *Pedagogías de las Diferencias*. Noveduc.

Specht, J. (2016). Pre-service teachers and the meaning of inclusion. https://doi.org/10.1111/1471-3802.1 12347

Zamora, P. (2014). *Potenciación de aprendizajes: Una propuesta metodología basada en el Diseño Universal de Aprendizaje, dirigida a los docentes de enseñanza básica*. [Tesis de Maestría, Universidad Andrés Bello]. http://repositorio.unab.cl/xmlui/handle/ria/3288

Zerbato, A. (2020). The universal design for learning in teacher training: from investigation to inclusive practices. *Educ Pesqui*, *27*.

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THE TEACHING COMMUNITY OF THE EASTERN REGIONAL UNIVERSITY CENTER, URUGUAY. AN ANALYSIS WITH A GENDER PERSPECTIVE

LA COMUNIDAD DOCENTE DEL CENTRO UNIVERSITARIO REGIONAL DEL ESTE, URUGUAY. UN ANÁLISIS CON PERSPECTIVA DE GÉNERO

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ABSTRACT

This work seeks to characterize the generalities of the scientific community in the Eastern Regional University Center (CURE) of the University of the Republic (Udelar) in Uruguay, and especially, the participation of women in this field. Additionally, the gender relations present in the CURE will be compared with the average of the Udelar. Academic and scientific women, although they have a high rate of participation in the generation of knowledge, do not have equal access to positions of power and prestige as their male peers. The statistical technique of cluster analysis, PAM and hierarchical clusters, was applied to a sample of 167 teachers. Clustering has proven to be a useful tool, with both techniques, showing the presence of 2 well-differentiated groups in the CURE teaching community, where it can be seen that the differences between them are consistent with the gender inequalities present in the scientific community. of the country, particularly in the Udelar. As a main conclusion, we can affirm that in the CURE vertical segregation is deepened, the accumulation of women in positions and lower levels of stratification of the scientific systems, and in their consequent underrepresentation in the highest-ranking positions. This work invites reflection on the change in thinking regarding the representation of women, in society in general and in the scientific community in particular, as an absolutely necessary imperative.

Palabras clave:
clústers, brechas de género, poder, docentes universitarios.

RESUMEN

Este trabajo busca caracterizar las generalidades de la comunidad científica en el Centro Universitario Regional del Este (CURE) de la Universidad de la República (Udelar) en Uruguay, y especialmente, la participación de la mujer en este ámbito. Adicionalmente, se compararán las relaciones de género presentes en el CURE con la media de la Udelar. Las académicas y científicas, si bien tienen una alta tasa de participación en la generación de conocimiento, no

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poseen igualdad de acceso a las posiciones de poder y prestigio que sus pares varones. Se aplicó la técnica estadística de análisis de clústers, PAM y clústers jerárquicos, a una muestra de 167 docentes. El clustering ha mostrado ser una herramienta útil, con ambas técnicas, que muestra la presencia de 2 grupos bien diferenciados en la comunidad docente del CURE, donde se pueden ver que las diferencias entre ellos son consistentes con las desigualdades de género presentes en la comunidad científica del país, en particular en la Udelar. Como principal conclusión podemos afirmar que en el CURE se profundiza la segregación vertical, la acumulación de las mujeres en cargos y niveles más bajos de estratificación de los sistemas científicos, y en su consecuente subrepresentación en los puestos de mayor jerarquía. Este trabajo invita a la reflexión acerca del cambio de paradigma respecto a la representación de las mujeres, en la sociedad en general y en la comunidad científica en particular, como imperativo absolutamente necesario.

Introduction

The integral development of research in the country, basic, fundamental, applied and technological, and in all cognitive areas, is an inalienable principle (Bianchi & Snoeck, 2009). Caring for the diversity of knowledge points to the preservation of culture, contributes to the creation of productive opportunities with high added value, and highlights the importance of the existence of independent scientific and technological thinking, as this strengthens the sovereignty of any nation. It is particularly relevant in countries such as Uruguay, where transferring knowledge from academia to the productive, economic and social fabric is a key factor in promoting development. The participation of women and men in the world in this field is not equal. A clear difference is inferiority, given both by the lower numbers and the various barriers that have hindered women's access to science and perpetuated their inferior epistemic status (González-García & Pérez-Sedeño, 2002).

Currently in Uruguay, the overall participation in research is equal, however, women have a significant minority participation in decision-making areas (Bentancor et al., 2020). In the National System of Researchers, 77% of Level III researchers are men and in the University of the Republic (Udelar) 69% of Grade 5 researchers are men.

According to statistics presented by UNESCO (2021) currently less than 30% of the world's researchers in STEM (science, technology, engineering and mathematics) are women; in Latin America this figure is higher, reaching 45%. Numerous studies have found that women in STEM fields publish less, are paid less for their research, and do not progress as far as men in their careers (UNESCO, 2016). However, there is very little data at the international or even national level to show the extent of these disparities.

If we analyze the figures for Udelar, the institution that carries out the largest amount of research and in which at least 70% of the academics with doctoral degrees in Uruguay are working (Burone & Méndez-Errico, 2022), the teaching community is no stranger to the distribution by area of knowledge presented in international reports referring to other scientific communities (UNESCO, 2012). Statistics show that the greatest number of women are at the bottom of the pyramid, grades 1 and 2, but as the teaching career progresses, this is reversed at higher grades.

Table 1
Distribution of teaching staff by grade and gender at Udelar

Genre	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Female	58,4%	58,6%	51,9%	45,7%	34,2%
Male	41,6%	41,4%	48,1%	54,3%	65,8%
Posts	3461	4065	2679	796	624

Note. Integrated Personnel Administration System - SIAP (April, 2021).

The same logic is repeated for full-time teachers. For the researchers, seeing that their peers are promoted and they are in the same place shows gender inequalities in job positions that are not right. Injustice generates unhappiness and dissatisfaction, and unhappiness is reflected in the job satisfaction of our female researchers (Burone & Méndez-Errico, 2022). The ability of academic institutions to judge them and treat them fairly is closely linked to the motivation of women who want to invest in science and move up the career ladder (Miranda, 2021).

Table 2
Distribution of Total Dedicated Teachers at Udelar

Genre	Grade 2	Grade 3	Grade 4	Grade 5	Total
Female	56%	56%	44%	31%	49%
Male	44%	44%	56%	69%	51%
Total	233	475	257	212	1177

Note. Integrated Personnel Administration System - SIAP (April, 2021)

This trend is repeated in the distribution of research professors who are members of the National System of Researchers (SNI). As one moves up the hierarchical structure of research levels, female participation decreases. Women represent 50.8% at the lowest levels of the system (Initial and Level 1) and only 30.2% at the highest levels (Levels II and III). In addition to this, women have a lower probability of being accepted into the SNI, the difference in terms of the probability of entering is 7.1 percentage points (Bukstein & Gandelman, 2016).

The culture of power and gender bias in organizations.

Gender is a category of analysis that must be taken into account when explaining organizational processes and the functioning of organizations in general. The paradigm that women and men have competencies and characteristics indivisibly associated with gender, and by virtue of these, they should be linked to an appropriate role in different organizations has lost its validity. Organizations are not neutral, so it is necessary to take into account the influence of gender in their structure, functioning and relations (Acker, 2000).

Today, where women and men legally have the same rights and obligations, discrimination is produced by hidden practices, interactions and discourses that go unnoticed (Carrasco Macías, 2004). It is therefore necessary to study and analyze the unequal participation of women and men in scientific activity from a gender perspective that problematizes power relations in all social spheres, including science as a social institution with its own particular normative arrangements (Bianco & Sutz, 2014, p. 149).

In reference to the classic concept of power as a synonym of domination we can cite Max Weber's definition (1993) which states that "power is the probability of imposing one's own will, within a social relationship, even against all resistance and whatever the basis of that probability may be" (p. 43). While Weber argues that power always refers to the intentionality and will of the individual, for the philosopher Hannah Arendt, power is the human capacity to act in concert and is therefore inherent to every community, "it arises whenever people come together and act in concert" (Arendt, 2006, p. 48).

Arendt (2006) arendt points out that the survival of power is closely linked to the degree of adhesion it manages to arouse and maintain in the members of the community, as she explains in her work On Violence:

> Power is never the property of an individual; it belongs to a group and continues to exist as long as the group remains united. When we say that someone is 'in power', we really mean that they have a power of attorney from a certain number of people to act on their behalf. The moment the group, from which the power has originated (*potestas in populo*, without a people or group there is no power), disappears, 'its power' also disappears. (p. 60)

If we analyze the scientific community through this lens, we can recognize the existence of a dominant masculine culture and an acceptance of it, shared or at least

consented to, by the majority of its members. Domination relations are not based on conscious decisions, but are hidden to both the dominant and the dominated, and are expressed in long-lasting, spontaneous perceptions and habits (Bourdieu, 2000). Power is tacitly or explicitly based on the number of people who grant their support and obedience to this way of operating "and the question of that obedience is not decided according to the relation of command and obedience, but by the opinion and, indeed, by the number of those who share such an opinion." (Arendt, 2006, p. 67).

Regarding the relationship between power and gender according to Scott (2013) "Gender is a primary form of signifying power relations. (...). It is the primary field within or through which power is articulated." (p. 292). When we refer to gender, we are proposing a relational study, in that it is not exclusive to women but to the relations between women and men, and to social relations based on gender as a whole. Society determines and expects different things for the masculine and the feminine, as a result of the historical and social context in which it is framed, and in turn as a construction that is manifested in the social relationship and in the construction of the models themselves (Gómez Quinelli, 2012).

Gender participation and equality is not only about doing science, but also about managing institutions and integrating the spaces where science policies are defined. Decision-making positions related to the allocation of resources and the implementation of scientific policies are privileged areas for promoting strategies that contribute to the creation of equal opportunities. Stimulating more equitable collective associations, open to the participation of women in decision making will result in better organizations, with more tools to participate in the elaboration and definition of scientific policies of better quality for the country and impact for the whole society, "power can be divided without diminishing it, and the reciprocal action of powers with its counterweight and balance is even prone to generate more power, at least while such reciprocal action is still alive and does not end up stagnating" (Arendt, 2009, p. 213).

Therefore, it is necessary to incorporate the gender perspective in the understanding of processes such as teaching and research career evaluation, management and leadership, for which we must analyze social relations, organizational reality and the existence of biases in an environment dominated by male leaders. Both scientists and academics recognize objectivity and impartiality as their own values, yet paradoxically, they are more likely to engage in this type of gender bias, even without deliberately making discriminatory decisions (García Dauder & Pérez Sedeño, 2018). Transformation must go beyond the individual level of empowering women; it is about the historical context in which we live, the organizations, their culture and power relations.

Women in the field of science: we are all products of ideas.

History tells the story of great scientific achievements always starring men, with exceptions such as Marie Curie, Rosalind Franklin or Paulina Luisi in Uruguay, the lack of knowledge by the general population of the participation of women over time in the creation of knowledge is real. Today it is known that numerous women scientists who made significant contributions to the development of science had the authorship of their achievements taken away from them, their male relatives, husbands or colleagues taking credit for their discoveries and, of course, the recognition of the community and even noble prizes[2]. It was sociocultural factors, discrimination and machismo that led women

[2] Only 3% of the Nobel Prizes in science have been awarded to women since the prizes were established in 1901.

to remain in the shadows of science, and when they have been recognized, it has been belatedly or posthumously.

Women's participation in epistemic and social activities is as old as human culture (Jesús Santesmases, 2019). Many factors have hindered, and still do to some extent, the entry and development of scientific careers by women on equal terms with their male peers (CSE-Udelar, 2021). The reasons for low participation are complex and multi-causal, and vary according to the woman's stage of life, and may be individual, family, social and/or economic factors (Hernández Herrera, 2021; Guevara, 2021).

Studies and analyses from a gender perspective constitute a fertile field for identifying aspects of the scientific-technological community and the existing power relations (Acker, 2000; Borrell et al., 2015; Mandiola Catroneo, 2020; Ortiz Gómez, 1997; Osborn, 2008). A priori, it could be said that in institutions where knowledge, skills and competencies are imparted, which are made up of qualified people with greater cultural resources to question and analyze realities, there should be no segregation of any kind. However, horizontal and vertical segregation is present in them (Ramírez Saavedra, 2019).

To explain the exclusion of women in the upper levels of the scientific professions, most research focuses on individual factors, social influences or institutional practices (Miranda, 2021). In addition, there is a strong case to be made that the ability of academic institutions to judge and treat fairly women who want to do science and move up the scientific career ladder is a key motivating factor. A crucial aspect is the performance evaluation of women scientists, when they apply for competitive funds for research, scholarships, prizes or positions, there is a bias, often unconscious and rooted in organizations that leave them in the background (Vargas et al., 2020).

Along these lines, the results of research conducted at Yale University in 2012, popularly called "the John & Jennifer effect", (Moss-Racusin et al., 2012) concluded that, in general, science faculty at American universities consider female students to be less competent than male students with identical ability and preparation. On the other hand, Alice Wu, a young American economist at the University of Berkely in 2017, demonstrated in her graduate thesis using as evidence the institutional language of universities, the existence of gender stereotypes and the clear and forceful differentiation of males in the treatment towards women and men.

Society perceives that women do not have the necessary qualities to be successful scientists, which contributes to fuel discrimination and prejudice (Carli et al., 2016)this contributes to discrimination and prejudice, the result of gender stereotypes that are perpetuated from generation to generation, imperatives of a male-dominated culture. No one is free from the influence of the community to which he or she belongs, and from the ascendant position of science in today's world, to a greater or lesser extent each of us is both a beneficiary and a victim of scientific invention... (Hustvedt, 2016). Faced with this overwhelming reality, it is to be expected that even today, women's participation is a consequence of a hostile environment that perpetuates past practices and outdated conceptions. The lack of female role models in which the new generations can recognize and be inspired by is both a cause and a consequence of the same reality.

In the words of García Dauder and Pérez Sedeño (2018):

> The presence of women in science (as in other groups) is not a sufficient condition for better science, but it *is necessary*. Because (...) when science is done from the point of view of groups traditionally excluded from the scientific community, many fields of ignorance are identified, secrets are revealed, other

> priorities are made visible, new questions are formulated and hegemonic values are criticized, sometimes even causing real paradigm shifts. (p.11)

Research question

The research question that guided this work was: is it possible, based on demographic and academic characteristics, to compare the gender relations of the CURE teaching community with respect to the Udelar average? The objectives were to describe the main characteristics of the CURE teaching community and to compare the characteristics of the CURE teaching community, especially gender relations, with the Udelar average.

Method

Domain description

The dataset is composed of 167 teachers belonging to CURE-Udelar as of June 2022. Teacher data are related to sociodemographic and academic characteristics. These are: gender, age, number of children, position, area of knowledge, SNI level, membership in the full-time program and teaching grade. The information was obtained from Udelar's Personnel Administration System, from the public consultation of the National System of Researchers and from Udelar's Central Commission of Central Dedication.

The variables measured were as follows:

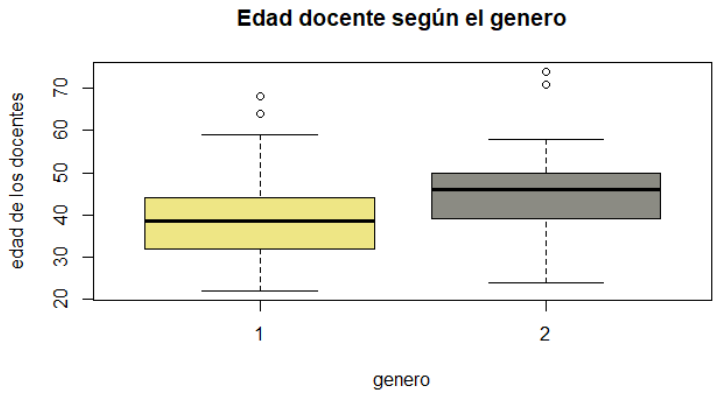
1. Gender: female or male.
2. Age
3. Number of children: grouped in 3 categories 0, 1 and 2 or more.
4. Teaching grade:
   - Grade 1
   - Grade 2
   - Grade 3
   - Grades 4 and 5
5. Cargo
   - Hired
   - Interim
   - Cash
6. Research area:
   - None
   - Natural and exact sciences
   - Humanities
   - Agricultural sciences
   - Social sciences
7. Degree in the National Research System:
   - Initiation
   - Level I
   - Level II
   - Level III
   - Not a member of the SNI

8. Total Dedication: dichotomous variable (yes, no)

The analysis was performed in R software[3]. R is an open source programming language and software environment for statistical computing and graphics creation. Different packages were used, which will be mentioned throughout the report, and which are extensions of R, allowing to perform certain functions that are not available by default in the system.

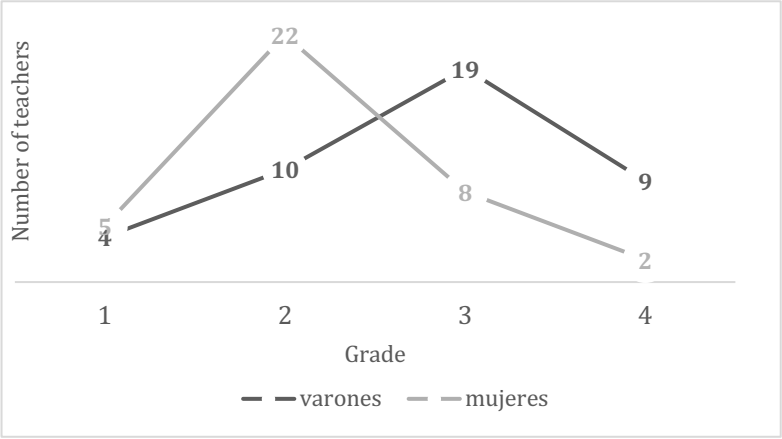
Regarding the description of the teaching community and as characteristics to be highlighted: 53% are women (88 cases), with an average age of 39 years for women and 46 years for men. Women are, on average, 7 years younger than their male counterparts.

Figure 1
Teaching age by gender (1-female, 2-male)



Fifty-eight percent of females (51 cases) and 47% (37 cases) of males are childless. In the case of teachers who are fathers and mothers (42 and 37 cases, respectively), it is noteworthy that the relationship is even at the level of grade 1, and at the level of grade 2, mothers represent more than twice as many as fathers. (22 mothers to 10 fathers) This difference is reversed at grade level 3 and deepens at higher grades.

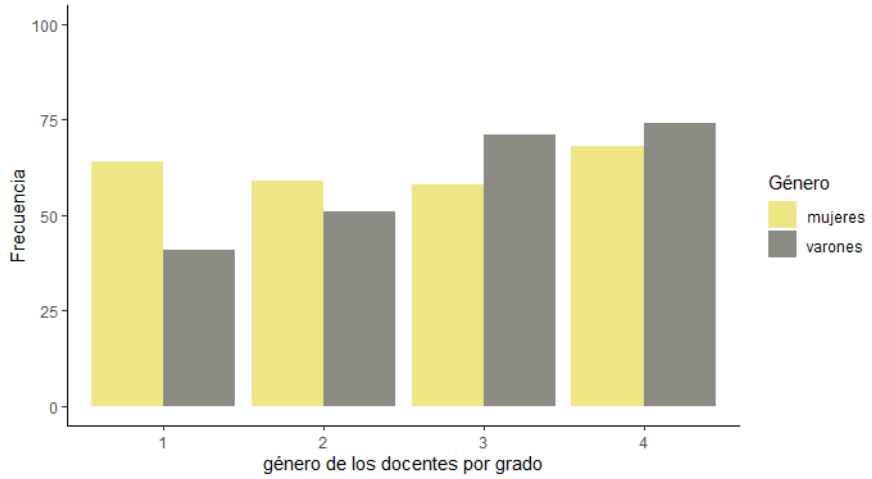
Figure 2
Number of mothers and fathers by grade



[3] https://www.r-project.org/

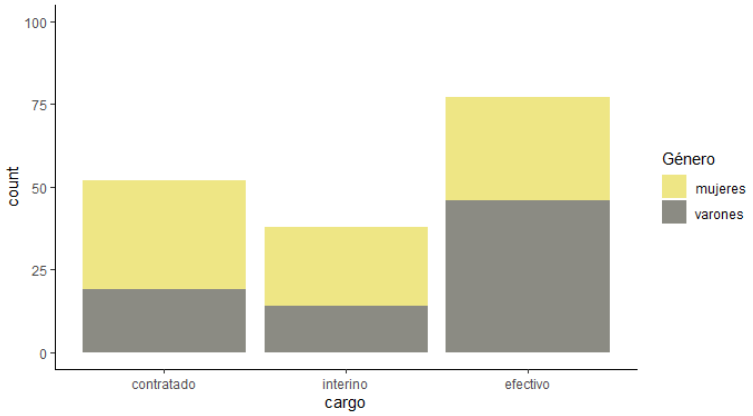
Regarding the gender distribution by grade in grades 1 and 2, the majority are women (68% and 63% respectively) and from grade 3 onwards, men are in the majority (65% in grades 3 and 82% in grades 4 and 5).

Figure 3
Gender distribution by grade



Thirty-one percent are contract teachers, 23% are interim teachers and 46% are permanent teachers. Sixty-three percent of contracted and interim teachers are women, while 60% of the effective teachers are men. The precariousness of women's working conditions compared to those of men is already evident here.

Figure 4
Number of women and men according to teaching position



Of the total set, 35% belong to the full-time regime (23 women and 35 men). As for the SNI (composed of 24 women and 38 men), 7% are in initiation, 25% level I, 4% level II, 1% level III (100% men), while the remaining 63% are not.

Unsupervised techniques

Cluster analysis (CA) consists of finding patterns or groups from a data set. The formation of such groups makes it possible to see what characteristics determine them, so that the elements of the group are as similar as possible to each other, while at the same time differing as much as possible from the observations of other groups. CA is an unsupervised learning method where only X values are available and there are no class labels identifying the observations. In contrast to classification problems, the (possible) structure of the groups is unknown a priori, including the number of classes or clusters (Bourel, 2021).

Partitioning Clustering: k-medoids

In this research we have a mixed data set with numerical and nominal (categorical, unordered) covariates, and therefore we will use the distance matrix obtained from the daisy function (dissimilarity matrix calculation) with Gower's coefficient. After calculating the dissimilarity matrix, cluster analysis techniques will be applied with the PAM (Partitioning arounds medoids) clustering algorithm and the silhouette coefficient to select the optimal number of clusters.

R tip: from the cluster package the daisy() function with metric = "gower" and pam() for k-medoids clustering.

Daisy and Gower coefficient: calculation of the dissimilarity matrix

The Daisy function is described in detail in Chapter 1 of Kaufman and Rousseeuw (1990). Gower's coefficient (1971) is highly recommended for multivariate databases, both quantitative and qualitative in nature. Features are first automatically standardized, re-scaled to fall into a range [0 1]. Distance is a numerical measure of how far apart individuals are, i.e., a metric used to measure the proximity or similarity between them. The Gower distance is calculated as the average of the partial differences between individuals, each partial dissimilarity (or Gower distance) ranges in [0 1].

$$d(i,j) = \frac{1}{p}\sum_{i=1}^{p} d_{ij}^{(f)}$$

1Gower's distance formula

The calculation of partial differences (dijf) depends on the type of variable being evaluated. This implies that a particular standardization will be applied to each feature, and the distance between two individuals is the average of all feature-specific distances. For a qualitative characteristic, the partial dissimilarity f is equal to 1 only if the observations yi and yj have a different value. Zero otherwise.

K-medoids clustering (PAM: partitioning arounds medoids)

K-medoids is a clustering method that groups observations into k clusters, where k is preset by the analyst. It is more resistant to noise and outliers compared to k-means (due to the properties of the distances used) and produces a typical individual for each group, called medoids, for which the average dissimilarity between him and all other

group members is minimal. The medoid corresponds to the most central element of the cluster, and therefore can be considered as a representative example of the members of that group.

The most commonly used algorithm for applying K-medoids is known as PAM. To estimate the optimal number of clusters, k, we will use the silhouette coefficient method, a technique that measures the quality of a cluster. The optimal number of groups is the one that maximizes the average silhouette coefficient over a range of possible values for k (Kaufman & Rousseeuw, 1990) . On the other hand, the fact that it does not work with the mean, but with an element of the domain that approximates it, the medoid, is important because it allows its graphical identification if the cluster does not have too many elements (Cabalo & Caetano, 2001).

Internal validation metrics can be used to choose the best clustering algorithm as well as the number of clusters. To assess the consistency within the data sets, as discussed above, we will use the silhouette coefficient approach in order to rate the relevance of the chosen number of groups. This coefficient contrasts the average distance to items in the same cluster with the average distance to items in other clusters, i.e., how close you are to individuals in your cluster and how far from other clusters. Objects with a high silhouette value are considered well grouped, objects with a low value may be outliers. Keep in mind that the analyst's criterion is always necessary to evaluate the results of the technique and the relevance of the number of clusters according to the objective pursued.

Hierarchical clusters

Hierarchical clustering is an alternative to partitioning clustering methods. One of the disadvantages of MAP is that the number of groups k. must be specified in advance, whereas hierarchical clustering does not require us to commit to a certain choice of k (James et al., 2013). The results of hierarchical clustering are usually represented by a hierarchical tree diagram, known as a dendogram. Groups or observations that are more similar are combined at low altitudes, while those that are more dissimilar are combined at higher altitudes.

R tip: hclust()and cutree(), from the dendogram and with a given k returns the clusters.

For interpretation, if you choose any height along the y-axis of the dendrogram, and move through the tree counting the number of lines you cross, each line represents a group, identified when the objects are joined into segments. The observations of this group are represented by the branches of the dendrogram that expand below this line.

For the clustering process to be carried out, it is necessary to define how the similarity between two clusters is quantified. In this case, we will use the linkage average which calculates the distance between all possible pairs formed by an observation from cluster 1 and one from cluster 2. The average value of all of them is selected as the distance between the two clusters (mean intercluster dissimilarity). This method is chosen because the generated dendogram is more balanced.

Some considerations exposed by James (2013) concerning clustering is that it can be a very useful tool in data analysis in an unsupervised setting, however, there are a number of problems that arise when performing clustering. In the case of hierarchical clustering, what dissimilarity measure should be used, what type of linkage should be used, where should we cut the dendogram to obtain clusters? With these methods, there is no single correct answer: any solution that exposes some interesting aspects of the data should be considered. In practice, we try several different options and look for the one that has the most useful or interpretable solution. Whenever clustering is performed on a

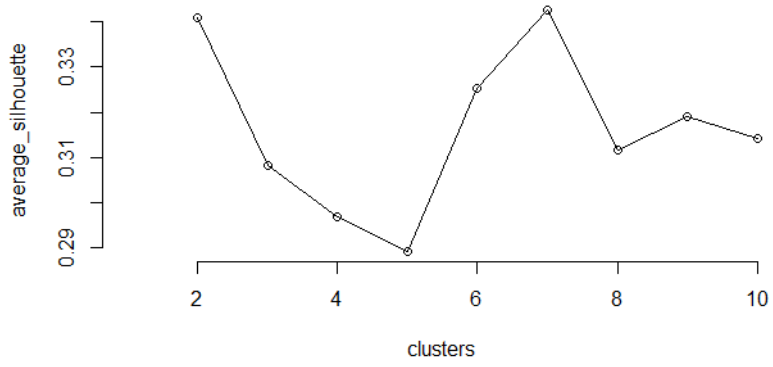
dataset, we will find clusters. It is therefore necessary to analyze whether the groups that have been found represent true subgroups in the data, or whether they are simply the result of grouping by applying the algorithm. The question we should ask ourselves is if we were to obtain an independent set of observations, then would those observations also show the same set of clusters?

Results

K-medoids clustering (PAM: partitioning arounds medoids)

The silhouette coefficient showed that the 2 groups with the highest coefficient are 2 and 7. From the analysis carried out, despite having equal coefficients for k=2 and k=7, the partition into two groups will be chosen as it allows for easier interpretation of the characteristics of the groups. The partition into 7 groups presents mixtures in the characteristics of the covariates representing each group. We also sought to study how the gender variable plays in the groups formed, being dichotomous, it is consistent with the choice of 2 clusters

Figure 5
Silhouette coefficient

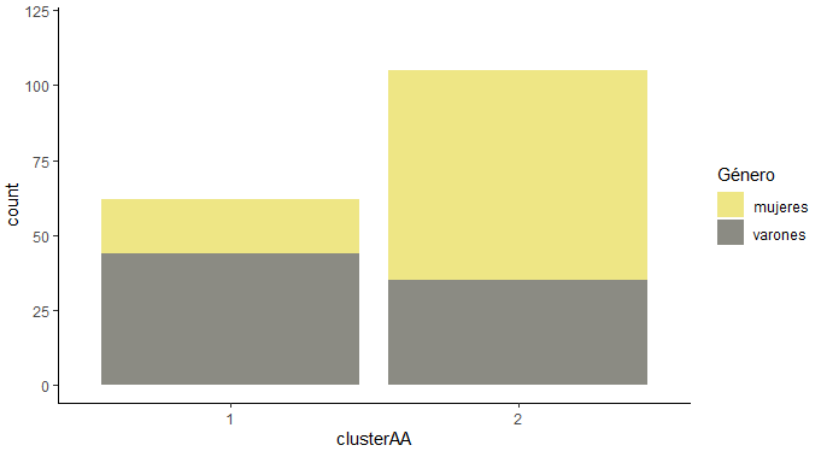


From the summary of each cluster, using the summary function in R we conclude that:

The first group (clusterAA 1) is made up of 62 individuals (37% of the cases), mostly full-time teachers (47 cases), 95% of the teachers belong to the SNI, 90% are grade 3 or higher, 82% have effective positions, their average age is 48 years, and 67% are male. The medoid of the group is teacher 87, his characteristics are grade 3, 49 years old, with 2 children, effective, belonging to the SNI level I), with total dedication, and male.

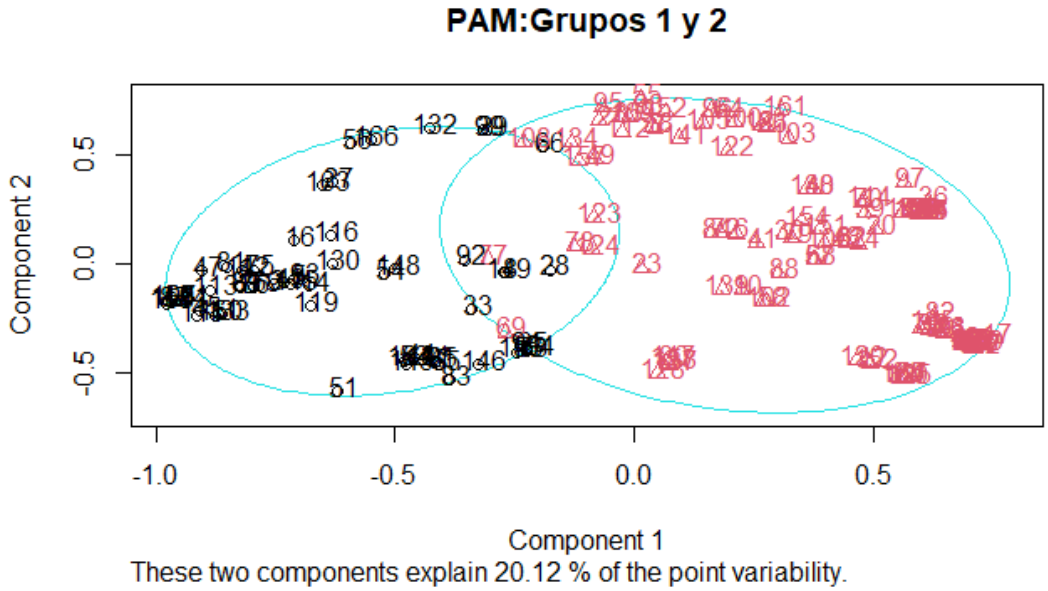
The second group (clusterAA 2) is made up of 105 teachers (63% of the cases), most of them are not full-time (94 cases), 88% do not belong to the SNI, they are all in grades 1 and 2, 75% are hired and interim positions, they have an average age of 38 years, and 65% are women. The medoid of the group is individual 90, grade 2, 35 years old, has no children, is hired, does not belong to the SNI or the full-time regime, and is a woman.

Figure 6
2 Clusters



The 2 groups generated by PAM are shown in Figure 7:

Figure 7
Graphical representation of the 2 clusters (PAM)



Hierarchical clusters

A second statistical technique of cluster analysis was used to analyze the formation of groups. From the average method, k=2 was identified in order to compare the results obtained with the previous technique (PAM). Once the dendogram is created, with the cutree() function we cut the tree to generate the 2 groups.

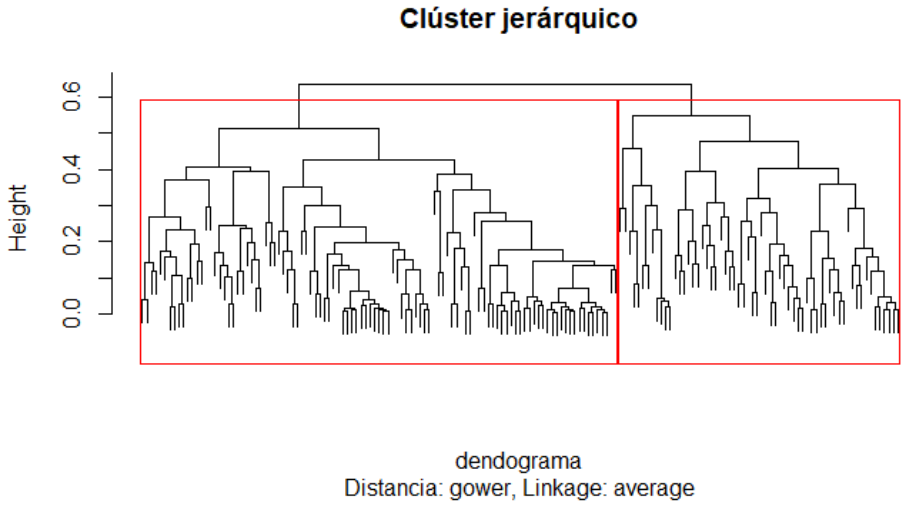
The hierarchical agglomerative clustering method with linkage average and k=2 was able to group the observations into 2 groups, of 62 and 105 teachers respectively. We will see below the characteristics of each one.

Group 1 (62 teachers) is made up mostly of men (71%), 97% of them have a grade 3 or higher, 62% hold effective positions, 76% are full-time teachers and 76% are members of the SNI.

Group 2 (105 teachers) is composed of 67% women, all of them are grade 1 and 2 (41 and 64 respectively), 75% are hired or interim positions, 90% are not in the full-time regime, and 86% are outside the SNI.

A priori we could say that these groups are consistent with those generated by k-medoids. Visually, the dendogram obtained is as follows, each rectangle representing a group.

Figure 8
Dendogram



Comparison of results with PAM and HCLUST

For the purpose of measuring the relative validity of the techniques, the table function can be used to compare the results of the hclust and PAM solutions for k=2, referring the rows for HCLUS and the columns for PAM and the matches between the two methods are totaled on the main diagonal. In this case, both methods classified 55 teachers in group 1 and 98 teachers in group 2.

Table 3
Comparison between hclust and PAM

HCLUST/PAM	Group 1	Group 2
Group 1	55	7
Group 2	7	98

They had a difference in classification of 7 teachers in group 1 (PAM classifies them in 1 and HCLUST in 2) and 7 teachers in group 2 (PAM classifies them in 2 and HCLUST in 1). Coincidence was very high at 91.6%.

Discussion and conclusions

Let us recall the question posed, is it possible, based on demographic and academic characteristics, to compare the gender relations of the CURE teaching community with respect to the Udelar average? We use unsupervised k-medoids clustering and hierarchical clustering techniques to answer this question.

The first question is whether the information obtained from the description of the CURE teaching staff can be used to draw conclusions that allow us to analyze gender relations in the academic structure. Firstly, in the Udelar teaching staff average, 55% are women and 45% men, (Universidad de la República, 2021)while in the CURE these figures are 53% and 47%, respectively, so we could say that the distribution by gender in quantity in CURE follows the trend of Udelar.

However, when analyzing the gender distribution by grade, we see that there are dissimilar situations. In levels 1 and 2 at CURE there are more women than the Udelar average, 68% and 64%, compared to 58% and 59% respectively. This situation is reversed from grade 3 onwards, with CURE having 35% versus 52%. And this difference is widened in the higher grades (18% CURE and 41% Udelar).

Table 4

Comparison of females and males by grade: CURE and Udelar

Grade	CURE Women	Udelar Women	Men CURE	Men Udelar
Gº1	68%	58%	32%	42%
G°2	64%	59%	36%	41%
G°3	35%	52%	65%	48%
G°4-G°5	18%	41%	82%	59%
Total	53%	55%	47%	45%

At CURE, 40% of the teachers who belong to the full-time program are women and 60% are men. At the Udelar level, these figures are 49% and 51% respectively. In addition, working conditions at CURE are more precarious for women than for men. Sixty-three percent of contracted and interim teachers are women, while 60% of the effective teachers are men.

Clustering has shown to be a useful tool, with both techniques, showing the presence of 2 well differentiated groups in the CURE teaching community, where it can be seen that the differences between them are consistent with the gender inequalities present in the scientific community of the country, particularly in Udelar. In conclusion, we can affirm that vertical segregation, the accumulation of women in positions and lower levels of stratification of scientific systems, and their consequent underrepresentation in higher hierarchical positions, is deepening in the CURE.

As a final reflection, we can say that women have been left behind in the scientific environment, as in so many other areas, for the most diverse historical, social and cultural reasons. A substantial body of literature has been developed that illustrates the numerical numbers of women in science and technology at various educational and professional levels. All the data coincide in the scarce participation of women in decision-making and power areas. In recent decades, numerous political movements of resistance to oppression and for the recognition of new rights, new actors and new strategies have

emerged. The paradigm shift regarding the representation of women, in society in general and in the scientific community in particular, is an absolutely necessary imperative so that science is not identified with a single gender and for which it is worth fighting.

In the words of the Rector of Udelar Ec. Rodrigo Arim (Universidad de la República, 2021):

> Gender inequality is an evil that affects all societies, and Udelar is not exempt from this problem (...) Gender inequality is present in multiple forms and in multiple expressions. Recognizing this problem is, above all, an ethical obligation of the institution and a measure to address its resolution in the medium and long term. (...) We are the institution that produces the most knowledge in Uruguay, and in this sense we have the responsibility to focus on this problem and find internal and external solutions, for the University and for society (...) to effectively advance in the eradication of these inequalities. Representation is key to making the issue visible.

References

Acker, J. (2000). Jerarquías, trabajos y cuerpos: Una teoría sobre las organizaciones dotadas de género. In *Cambios sociales, económicos y culturales* (pp. 111-139).

Arendt, H. (2006). *Sobre la violencia*. Alianza editorial.

Arendt, H. (2009). *La condición humana*. Paidós.

Bentancor, A., Kamaid, A., Musso, M. N., Pantano, S., Piattoni, C. V., & Prieto-Echagüe, V. (2020). *Calidad con equidad de género: Diagnóstico del Institut Pasteur de Montevideo - 2018*. Zenodo. https://doi.org/10.5281/zenodo.3934408

Bianchi, C., & Snoeck, M. (2009). *Ciencia, Tecnología e Innovación en Uruguay: Desafíos estratégicos, objetivos de política e instrumentos. Propuesta para el PENCTI 2010-2030.* https://www.anii.org.uy/upcms/files/listado-documentos/documentos/libro-cti-anivelsect.pdf

Bianco, M., & Sutz, J. (2014). *Veinte años de políticas de investigación en la Universidad de la República: Aciertos, dudas y aprendizajes*. Ediciones Trilce. https://www.colibri.udelar.edu.uy/jspui/handle/20.500.12008/4149

Borrell, C., Vives-Cases, C., Domínguez-Berjón, M. ª F., & Álvarez-Dardet, C. (2015). Las desigualdades de género en la ciencia da un paso adelante. *Gaceta Sanitaria*, *29*(3), 161-163. https://doi.org/10.1016/j.gaceta.2015.03.005

Bourdieu, P. (2000). *La dominación masculina*. Anagrama.

Bourel, M. (2021). *Clustering*. https://eva.fing.edu.uy/mod/resource/view.php?id=134020

Bukstein, D., & Gandelman, N. (2016). *Glass ceiling in research: Evidence from a national program in Uruguay*. Universidad ORT Uruguay. https://dspace.ort.edu.uy/bitstream/handle/20.500.11968/2733/documento-de-investigacion-109.pdf

Burone, S., & Méndez-Errico, L. (2022). Are women and men equally happy at work? Evidence from PhD holders at a public university in Uruguay. *Journal of Behavioral and Experimental Economics*, *97*, 101821. https://doi.org/10.1016/j.socec.2021.101821

Cabalo, R., & Caetano, S. (2001). *Clustering: Aplicación a ruteo de vehículos*. https://www.colibri.udelar.edu.uy/jspui/handle/20.500.12008/3011

Carli, L. L., Alawa, L., Lee, Y., Zhao, B., & Kim, E. (2016). Stereotypes About Gender and Science: Women ≠ Scientists. *Psychology of Women Quarterly*, *40*(2), 244-260. https://doi.org/10.1177/0361684315622645

Carrasco Macías, M. J. (2004). Participación y poder de la mujer en las organizaciones educativas. *XXI. Revista de educación*, *6*, 75-88.

CSE-Udelar, C. (2021). *Las desigualdades de género y la ciencia económica. La perspectiva de la economía feminista*. https://www.cse.udelar.edu.uy/blog/documento/las-desigualdades-de-genero-y-la-ciencia-economica-la-perspectiva-de-la-economia-feminista/

García Dauder, S., & Pérez Sedeño, E. (2018). *Las mentiras científicas sobre las mujeres* Catara.

Gómez Quinelli, G. (2012). *Transversalización de la perspectiva de género en la educación primaria* [Tesis Doctoral, Universidad de la Republica de Uruguay]. https://www.colibri.udelar.edu.uy/jspui/bitstream/20.500.12008/8905/1/TTS_G%25C3%25B3mezQuinelliGabriela.pdf+&cd=1&hl=es-419&ct=clnk&gl=uy&client=firefox-b-d

González-García, M., & Pérez-Sedeño, E. (2002). Ciencia, Tecnología y Género. *CTS+I: Revista Iberoamericana de Ciencia, Tecnología, Sociedad e Innovación, 2,* 5.

Gower, J. C. (1971). A General Coefficient of Similarity and Some of Its Properties. *Biometrics*, *27*(4), 857-871. https://doi.org/10.2307/2528823

Guevara, M. E. (2021). Factores que influyen en la participación de la mujer en carreras de ciencia, tecnología, ingeniería y matemática. *Ciencia, Cultura y Sociedad*, *6*(2), 66-82. https://doi.org/10.5377/ccs.v6i2.12159

Hernández Herrera, C. A. (2021). Las mujeres STEM y sus apreciaciones sobre su transitar por la carrera universitaria. *Nova Scientia*, *13*(27). https://doi.org/10.21640/ns.v13i27.2753

Hustvedt, S. (2016). *La mujer que mira a los hombres que miran a las mujeres. Ensayos sobre feminismo, arte y ciencia*. Seix barrial. https://digibug.ugr.es/flexpaper/handle/10481/14698/Feminismo.pdf?sequence=1&isAllowed=y

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An Introduction to Statistical Learning.* Springer.

Jesús Santesmases, M. (2019). Mujeres, ciencias y género. *Tiempo de Paz*, *134*, 61-67. Fuente Académica Plus.

Kaufman, L., & Rousseeuw, P. (1990). *Finding Groups in Data—An Introduction to Cluster Analysis*. John Wiley & Sons Inc.

Mandiola Catroneo, M. (2020). La mirada de género en la práctica de la gestión y las organizaciones. *Facultad de Economía y Negocios*. https://fen.uahurtado.cl/2020/articulos/la-mirada-de-genero-en-la-practica-de-la-gestion-y-las-organizaciones/

Miranda, C. E. L. (2021). Mujeres, género y ciencias: ¿un sexismo moderno?: traducción de "Femmes, genre et sciences: un sexisme moderne?" de Nicky Le Feuvre. *Revista de estudios de género: La ventana*, *6*(54), 366-379.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, *109*(41), 16474-16479. https://doi.org/10.1073/pnas.1211286109

Ortiz Gómez, T. (1997). *Feminismo, mujeres y ciencia*. Universidad de Granada. https://digibug.ugr.es/handle/10481/14698

Osborn, M. (2008). *Cómo lograr la equidad de género en ciencia*. https://www.sebbm.es/revista/repositorio/pdf/158/d02158.pdf

Ramírez Saavedra, F. (2019). *Políticas públicas de género. Propuesta técnica para la implementación de la institucionalidad de género en universidades.* Editorial académica española.

Scott, J. (2013). El género una categoría útil para el análisis histórico. En *El género. La construcción de la diferencia sexual.* (4ª Ed.). Miguel Ángel Porrúa.

UNESCO. (2012). *Atlas mundial de la igualdad de género en la educación*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000217311

UNESCO. (2016). *Women in Science*. http://uis.unesco.org/en/topic/women-science

UNESCO. (2021). *Women in higher education: Has the female advantage put an end to gender inequalities?* https://www.iesalc.unesco.org/2021/03/10/informe-de-unesco-iesalc-afirma-que-la-desigualdad-de-genero-en-la-educacion-superior-sigue-siendo-un-problema-universal/

Universidad de la República. (2021). *Síntesis Estadística – diciembre 2021 – Dirección General de Planeamiento*. https://planeamiento.udelar.edu.uy/publicacion_generica/sintesis-estadistica-diciembre-2021/

Universidad de la República (2021). *Lanzamiento «A tu nombre».* Udelar. https://www.youtube.com/watch?v=bTK6HaTzhkM

Vargas, C., Lutz, M., Papuzinski, C., & Arancibia, M. (2020). Género, mujeres e investigación científica. *Medwave*, *20*(02). https://doi.org/10.5867/medwave.2020.02.7857

Weber, M. (1993). *Economía y sociedad*. Fondo de Cultura Económica.

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THE EFFECTS OF CONTINUOUS TRAINING ON TEACHERS' ASSESSMENT LITERACY

OS EFEITOS DA FORMAÇÃOS CONTÍNUA NA LITERACIA EM AVALIAÇÃO DOS PROFESSORES

LOS EFECTOS DE LA FORMACIÓN CONTINUA EN LA COMPETENCIA EN EVALUACIÓN DE LOS PROFESORES

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ABSTRACT

The present study aimed to analyse the impact of continuous assessment training on teachers' literacy, particularly regarding the frequently observed gaps in initial education. Assessment is an essential skill for educators, but many report feeling unprepared to tackle the challenges of this complex and multifaceted task. A total of 253 teachers teaching in the Pedagogical Zone of Lisbon and the Setúbal Peninsula (Portugal) participated in the study, responding to the Assessment Literacy Questionnaire (QALA), an instrument that assesses various aspects of assessment competence, including understanding educational objectives, appropriate selection of assessment methods and instruments, as well as the interpretation and use of obtained results to enhance student learning. The findings emphasize the importance of continuous assessment training. Teachers who attended specific assessment courses showed significantly better results compared to those who did not, demonstrating greater confidence and competence in conducting formative and summative assessments. These results support the need to invest in professional development programs focusing on empowering teachers in assessment. Educational institutions and policymakers should prioritize offering specific courses and workshops to enhance teachers' assessment skills, addressing the identified gaps in initial education.

Palavras-chave:
avaliação, literacia em avaliação, formação contínua de professores, professores do ensino básico e secundário.

RESUMO

O presente estudo teve como objetivo analisar o impacto da formação contínua em avaliação na literacia dos professores, especialmente em relação às lacunas frequentemente observadas na formação inicial. A avaliação é uma competência essencial para os docentes, mas muitos relatam sentir-se despreparados para enfrentar os desafios dessa tarefa complexa e multifacetada. Participaram 253 professores a lecionar na Zona Pedagógica de Lisboa e na Península de Setúbal (Portugal) os quais responderam

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ao Questionário de Aferição da Literacia em Avaliação (QALA), um instrumento que avalia diversos aspetos da competência em avaliação, incluindo o entendimento dos objetivos educacionais, a escolha adequada de métodos e instrumentos de avaliação, bem como a interpretação e utilização dos resultados obtidos para melhorar a aprendizagem dos alunos. Os resultados obtidos destacam a importância da formação contínua em avaliação. Professores que frequentaram cursos específicos em avaliação apresentaram resultados significativamente superiores aos professores que não frequentaram tais formações, demonstrando maior confiança e competência na realização de avaliações formativas e sumativas. Estes resultados corroboram a necessidade de investir em programas de desenvolvimento profissional que foquem na capacitação dos professores em avaliação. Instituições educacionais e formuladores de políticas necessitam de priorizar a oferta de cursos e workshops específicos para aprimorar as habilidades de avaliação dos docentes, preenchendo as lacunas identificadas na formação inicial.

RESUMEN

Palabras clave:
evaluación, competencia en evaluación, formación continua de profesores, profesores de educación primaria y secundaria.

El presente estudio tuvo como objetivo analizar el impacto de la formación continua en evaluación en la competencia de los profesores, especialmente en relación a las deficiencias frecuentemente observadas en la formación inicial. La evaluación es una habilidad esencial para los docentes, pero muchos informan sentirse despreparados para enfrentar los desafíos de esta tarea compleja y multifacética. Participaron 253 profesores que enseñan en la Zona Pedagógica de Lisboa y la Península de Setúbal (Portugal), quienes respondieron al Cuestionario de Evaluación de Alfabetización en Evaluación (QALA), un instrumento que evalúa varios aspectos de la competencia en evaluación, incluyendo la comprensión de los objetivos educativos, la elección adecuada de métodos e instrumentos de evaluación, así como la interpretación y utilización de los resultados obtenidos para mejorar el aprendizaje de los alumnos. Los resultados destacan la importancia de la formación continua en evaluación. Los profesores que asistieron a cursos específicos en evaluación obtuvieron resultados significativamente superiores a los profesores que no participaron en tales formaciones, demostrando mayor confianza y competencia en la realización de evaluaciones formativas y sumativas. Estos resultados respaldan la necesidad de invertir en programas de desarrollo profesional que se centren en la capacitación de los profesores en evaluación. Las instituciones educativas y los formuladores de políticas deben priorizar la oferta de cursos y talleres específicos para mejorar las habilidades de evaluación de los docentes, abordando las deficiencias identificadas en la formación inicial.

Introduction

The process of assessing students has always been considered one of the most important responsibilities of teachers, as well as one of the tasks where the most time is spent (Mertler, 2003; Ramesal, 2011). It is therefore the possession of knowledge and skills in evaluation that are fundamental elements that should be possessed by all teachers. In very general terms, the set of knowledge and skills in evaluation is called evaluation literacy.

The concept of evaluation literacy was first presented by Richard Stiggins (1991) as in-depth knowledge of evaluation-related issues. According to Stiggins, educators/teachers with high levels of assessment literacy know what to assess, why to assess, how to assess, the problems related to assessment and how to prevent these problems from occurring (Stiggins, 1995). Brown (2008), in turn, considers assessment literacy to be the ability to design, select, interpret and make appropriate use of the information resulting from the assessment process, so as to enable appropriate educational decisions to be made.

Research into this area of evaluation has revealed two important and equally worrying aspects. On the one hand, it shows that teachers are inadequately prepared to assess student learning (DeLuca & Klinger, 2010; Koh, 2011; Xu & Brown, 2016) and, on the other hand, that teachers, regardless of their teaching experience, show a considerable lack of confidence in assessing students adequately and accurately (Koh, 2011; Yamtim & Wongwanich, 2014; Volante & Fazio, 2007). This is due to a clear gap in assessment content in initial teacher training, as well as a lack of assessment studies that allow teachers to deepen their knowledge in this area (DeLuca, Chavez, Bellara & Cao, 2013). These aspects help to explain why a large proportion of teachers have shown a significant weakness in developing and applying diversified forms of assessment, as well as an inability to interpret the data resulting from the application of assessment instruments (Koh, 2011). Mertler (2003) also suggests that in initial training, trainee teachers rarely attend programs that teach them, for example, the role of assessment in the teaching and learning process or approaches that have significant impacts on learning. This idea is reinforced by Xu and Brown (2016) when they point out that many initial teacher training programs only offer an introductory course on assessment-related issues or, in some cases, do not offer such a course at all. The main consequence of these gaps is the use of bad practices in assessment, leading teachers, in many cases, to assess their students in a similar way to how they were assessed as students (McGee & Colby, 2014).

However, as already mentioned, the task of assessment is one of the main responsibilities of teachers, as it is a fundamental process for verifying and improving student learning (Hailaya, Alagumalai & Ben, 2014, McGee & Colby, 2014). Assessment literacy is therefore one of the main characteristics that all teachers should develop, even before they start their teaching career, i.e. from their initial training. Newfields (2006) highlights three reasons why evaluation literacy is so important. The first concerns the universalization of evaluation in the school context, i.e. evaluation is present in the vast majority of school systems worldwide. This factor means that teachers all over the world spend a great deal of their time on activities directly or indirectly linked to assessment. Secondly, Newfields (2006) highlights the need to understand the educational literature on assessment issues. Greater familiarity with the concepts and statistical processes inherent in assessment makes it easier for teachers to keep up to date in these areas, and they are better able to introduce new methods that improve student learning and, consequently, assessment. Finally, the author points out that a teacher with high levels of

assessment literacy is able to communicate school results more effectively to students (feedback).

Gottheiner and Siegel (2012) highlight another aspect that gives a better understanding of the importance of evaluation literacy. The authors state that the use of diversified assessment tools should be one of the main characteristics of an assessment literate teacher. Thus, teachers with such characteristics are able to adopt and develop instruments that are more appropriate and in line with the educational objectives to be assessed (Gottheiner & Siegel, 2012, p. 534), making it fairer and more reliable. Malone (2013) also points out that strong and properly implemented assessment provides teachers, students and all stakeholders with important information about student performance and the extent to which educational goals are or are not being met. Thus, assessment can and should be integrated with teaching, forming a relationship in which it informs and improves teaching and vice versa. However, this reciprocal relationship cannot flourish when teachers do not have sufficient training to carry out all the actions involved in good assessment. Consequently, a low level of assessment literacy jeopardizes both student assessment and the entire teaching and learning process. The better teachers master the notions and processes that lead to decision-making when it comes to student assessment, the better the choices they will make for their students. Popham (2018) even points out that, from the outset, a teacher's success increases the higher their assessment literacy, as they avoid typical mistakes that are usually made by teachers with low levels of assessment literacy. The typical errors referred to by Popham (2018) usually fall into the following categories: a) use of inappropriate assessment tools; b) incorrect use of appropriate assessment tools; c) non-use of formative assessment tools.

The use of inappropriate assessment tools is one of the most serious mistakes made by teachers with low levels of assessment literacy. Popham (2018) points out that a common mistake is the use of standardized tests to assess student learning, since, according to the author, there is no evidence that such tests are appropriate for such an important assessment task. The second error identified by Popham occurs when assessment instruments developed for a particular purpose are used for other purposes. Although there is nothing to stop a teacher from finding new uses for an assessment tool, it is necessary to ensure that the tool is suitable for its intended purpose, otherwise the information gathered could be biased. An illustrative example of this type of error could be the application of a test to a student with special educational needs that does not take into account their characteristics and difficulties. Although the test may be correct and appropriate for most students, it may not be for the student in question. The third category of error is closely related to formative assessment. While it is recognized that formative assessment is the one that most contributes to the development of student learning, when it is not applied, or is used incorrectly, it does not produce the effects it should. Teachers with high levels of assessment literacy know the value and usefulness of formative assessment and therefore make better decisions about which tools to use to develop student learning. On the other hand, teachers with low levels of assessment literacy tend not to use this type of assessment, or to use it incorrectly (Koh. 2011; Yamtim & Wongwanich, 2013).

Considering, on the one hand, the importance that assessment literacy has in the whole teaching and learning process and, on the other, the shortcomings shown by teachers in this area (due to initial training that in many cases neglects this area) many feel the need to deepen their knowledge and develop skills in assessment by attending, for example, continuous training courses.

In this context, continuing education is considered to be all deliberate and organized forms of professional development for teachers, whether through lectures,

seminars, courses, workshops or other proposals (Santos & Silva, 2009). However, it should be borne in mind that ongoing training is not just something that happens occasionally, nor is it an instrument designed to make up for the shortcomings of poor initial training, but should always be an integral part of the teacher's professional practice (Laranjeira, Abreu, Nogueira & Soligo, 1999). According to Libâneo (1998), the continuous training of teachers should lead them to reflective action. Only in this way will teachers be able to reformulate their practice, rethinking the positive and negative points that occur during the course of teaching activities. In other words, in-service training should enable teachers to develop their skills and abilities with the aim of reorienting their current practices as a result of the introduction of new teaching methodologies, the diversification of working contexts, changes in management procedures or expectations or as a result of a change in roles in the school (Logan & Sachs, 1988).

The purpose of this article is to analyze the impact that continuous training in assessment has, on the one hand, on teachers' perceptions of their knowledge and skills in assessment and, on the other, on their levels of assessment literacy. The results show that attending continuous training courses in assessment significantly improves both teachers' perceptions of their knowledge and skills in assessment and their levels of assessment literacy.

Method

Participants

A total of 253 primary and secondary school teachers teaching in the Lisbon and Setúbal peninsula (Portugal) took part in this study. As can be seen in Table 1, the vast majority of participants were female (79.45%). Regarding the subject area of the participating teachers, it can be seen that Languages is the most represented (27.21%), followed by Primary School teachers (22.07%), Mathematics and Experimental Sciences teachers (21.03%), Social Sciences and Humanities (15.17%) and, lastly, Expressions (14.48%). More than half of the participants teach in the 3rd Cycle of Basic and Secondary Education (51.02%), followed by 2nd Cycle teachers (27.21%) and 1st Cycle teachers (21.77%). In terms of teaching experience, the majority have between 7 and 25 years of service (52.96%), followed by participants with between 26 and 35 years (28.46%) and more than 35 years (10.67%). Finally, it should be noted that the vast majority of teachers (73.12%) admitted to having attended continuous training courses in assessment.

Table 1
General participant data

Variables		*N*	*%*
Sex	Female	201	79.45
	Male	52	20.55
Subject area	1st Cycle of Basic Education	64	22.07
	Mathematics and Experimental Sciences	61	21.03
	Social Sciences and Humanities	44	15.17
	Languages	79	27.24
	Expressions	42	14.48
Level of Education	1st Cycle of Basic Education	64	21.77
	2nd Cycle of Basic Education	80	27.21
	3rd Cycle of Basic and Secondary Education	150	51.02
Teaching experience (years)	6 or less	20	7.91
	7-25	134	52.96
	26-35	72	28.46
	More than 35	27	10.67
Continuous training in evaluation	Yes	185	73.12
	No	68	36.88

Instrument

To analyze teachers' perceptions of their knowledge and skills in assessment, the Questionnaire for Assessing Assessment Literacy (QALA) developed by Almeida (2021) was used. The QALA consists of four parts. The first corresponds to collecting general information from the respondents. The second part aims to collect information on teachers' perceptions of their knowledge and skills in assessment. It consists of 20 *Likert*-type items with a scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The third part is made up of 40 dichotomous items (True/False) and aims to gather information on teachers' knowledge of classroom assessment. The fourth part is made up of 20 multiple-choice items and aims to collect information on the teachers' knowledge of evaluation in relation to 5 hypothetical scenarios.

The items in the second, third and fourth parts are organized around four domains of evaluation literacy, inspired by the proposal by Abell and Siegel (2011):

- *Knowledge of the objectives and functions of evaluation*: The aim is to verify knowledge of the objectives and functions of assessment in general and of diagnostic, formative and summative assessment in particular. This dimension also includes knowledge of the differences between criterial and normative evaluation;
- *Knowledge of the curriculum and what is important to learn and assess*: In this area, it is important to check teachers' knowledge of the different types of curriculum, the curriculum documents in force in Portugal (Essential Learning and the Profile of the Student Leaving Compulsory Education), the legislation in force in the field of assessment in primary and secondary education, knowledge of domains of cognitive complexity such as Bloom's Taxonomy, proposed by Bloom (1956), Marzano's taxonomy, proposed by Marzano (2000), and Depth-of-Knowledge, proposed by Webb (1997), as well as knowledge of tools to help build assessment instruments;

- *Knowledge of the construction and use of different assessment tools*: In particular, diagnostic, formative and summative assessment tools. It is also important to check the teachers' knowledge in constructing different assessment items and the inclusion of students in the assessment process;
- *Knowledge of how to interpret and use the information gathered in the evaluation process*: This dimension seeks to verify teachers' knowledge and skills in calculating measures of location and dispersion, as well as some psychometric properties of assessment instruments. It was also considered relevant to assess knowledge and skills in the construction of assessment recording instruments and the use of feedback in the classroom.

The QALA showed good psychometric qualities, measured using the *Rasch* model, and good levels of internal consistency in Parts 2 and 3, with *Cronbach* 's alpha values of 0.94 and 0.74 respectively (Almeida, 2023). Part 4 presented *Cronbach* 's alpha values of 0.59, which, although a modest value, according to some authors is acceptable, satisfactory and sufficient (Taber, 2017).

Procedures

Due to the pandemic situation resulting from COVID-19, with the specific recommendations regarding social distancing and avoiding crowds, it was not possible to collect data in person from teachers. As an alternative, an online version of the QALA (Questionnaire for Measuring Assessment Literacy) was developed and then sent to the heads of various educational institutions, both in the public and private sectors, covering the Lisbon Pedagogical Zone and the Setúbal Peninsula, as long as they offered at least one of the study cycles considered in this research.

In order to minimize the possible effects of social desirability bias, the anonymity of the respondents was ensured and no information was requested that could identify them. In addition, participants were informed that their answers would be grouped by subject area, rather than by recruitment group, further reinforcing the anonymity of the data collected.

Adopting an online data collection approach had several advantages. In addition to complying with the necessary health and safety guidelines during the pandemic, it has facilitated the wider participation of a diverse range of educators, involving various educational institutions. By eliminating the need for physical presence, this method allowed teachers from remote areas to contribute to the study, ensuring a more complete and representative sample.

The response to the online version of the QALA was encouraging, with a significant number of teachers providing valuable information about their assessment literacy. The willingness of educators to take part in this study, even in such challenging circumstances, demonstrates their commitment to professional development and their dedication to improving their assessment practices.

In conclusion, the adoption of an online data collection approach was a pragmatic response to the pandemic situation, allowing for a comprehensive study despite the challenges posed by the circumstances. The use of technology enabled greater participation and guaranteed the anonymity of respondents, reinforcing the integrity of the data collected. The cooperation of teachers in sharing their experiences and perspectives through this new data collection method exemplifies the resilience and adaptability of the educational community in times of crisis.

Statistical Analysis

The data obtained was analyzed using descriptive and inferential statistics, thus providing a complete analysis. The descriptive analysis used measures of central tendency, such as mean, mode and median, as well as measures of dispersion, including standard deviation, minimum and maximum.

As for the inferential analysis of the data, we opted to use a set of non-parametric techniques. The decision to use non-parametric methods was motivated by the fact that the assumption of normality of distribution was not met, as evidenced by the *Kolmogorov-Smirnov* test. As such, the *Mann-Whitney U-test* for two independent samples was used in the inferential analysis, allowing significant comparisons to be made between groups. The significance level adopted for the inferential analysis was 5%, thus guaranteeing a rigorous approach to interpreting the results. In addition, the statistical tool used to conduct these analyses was the JASP program (Linux version), developed by the University of Amsterdam, which is renowned for its efficiency and precision.

The combination of descriptive and inferential statistics enabled a comprehensive and in-depth understanding of the data collected. The measures of central tendency provided information on the central values of the data, while the measures of dispersion highlighted the variability of the results. On the other hand, inferential analysis made it possible to compare different groups, revealing important patterns and relationships between the variables studied.

The use of non-parametric techniques in the inferential analysis gave the study robustness and reliability, even when faced with non-normal distributions. In this way, by ensuring the accuracy of the results obtained, the research provided valuable insights into understanding the phenomena under analysis.

Results

The results obtained in Part 2 of the QALA, which deals with perceptions of knowledge and skills in evaluation, have been systematized in Table 2. When analyzing the data, it is clear that teachers who have attended continuous training courses in assessment have substantially higher values compared to those who have not attended such courses. This trend can be seen both in each of the domains considered and in the overall results.

By applying the *Mann-Whitney* test, the results of which are shown in the last column of the table, it was found that both for the total set of domains and for 3 of the 4 specific domains, the differences between teachers with continuous training in assessment and teachers without such training are statistically significant for the variable under analysis. The only exception was in domain 3, which deals with knowledge about the use of different assessment tools. However, it is important to note that the p-value for domain 3 was very close to the established level of statistical significance (p=0.054).

These results are very relevant, as they reinforce the importance of continuous training in assessment for the development of teachers' skills in this crucial area of teaching practice. The results clearly indicate that participation in specific assessment courses has a positive impact on teachers' perceptions of their knowledge and abilities to assess student learning.

The teachers who undertook ongoing training in assessment showed a greater awareness of their competencies and skills in this area, which reflected positively on their educational practice. This more solid knowledge of assessment allows them to approach assessment tasks in the classroom more effectively and confidently, resulting in significant benefits for the teaching and learning process.

Table 2

Results obtained in Part 2 of the QALA - Perceptions of evaluation knowledge and skills

	With ongoing training in evaluation (N=185)		**No ongoing training in evaluation** (N=68)		***p-value***
	Average (Max.=5)	**DP**	**Average (Max.=5)**	**DP**	
Domain 1: Knowledge of the objectives and functions of evaluation	4.09	.62	3.87	.54	**.005**
Domain 2: Knowledge of the curriculum and what is important to learn and assess	3.88	.62	3.64	.44	**.001**
Domain 3: Knowledge of the use of different assessment tools	4.32	.57	4.17	.51	.054
Domain 4: Knowledge of how to interpret and use the information gathered in the evaluation process	3.79	.73	3.54	.67	**.010**
Overall results	4.02	.55	3.80	.44	**.001**

Table 3 systematizes the results obtained in Part 3 of the QALA, i.e. knowledge of evaluation. Two aspects stand out from the analysis of the results. On the one hand, there is a clear gap in teachers' knowledge of various aspects of assessment. It should be noted that the domain with the highest hit rate was Domain 2 (Knowledge about the curriculum and what is important to learn and assess), with around 67.5%, achieved by teachers with continuous training in assessment. The domain with the lowest rate of correct answers was Domain 4 (Knowledge of how to interpret and use the information gathered in the assessment process), with around 37.2%, achieved by teachers without continuous training in assessment. On the other hand, it is clear that, as was the case in Part 2 of the QALA, teachers with ongoing training in assessment have substantially higher results than teachers without this type of training. In Domain 1 (Knowledge of the objectives and functions of assessment), the difference between these two groups of teachers is practically non-existent (only 0.27 percentage points), and the differences between these two groups are not statistically significant, as verified by the *Mann-Whitney* test.

In domain 2 (Knowledge about the curriculum and what is important to learn and assess), teachers with continuous training in assessment obtained an average hit rate of around 67.5%. On the other hand, teachers without in-service training achieved an average hit rate of around 61.5%, which represents a difference of 6 percentage points. The *Mann-Whitney* test shows that the differences in the results achieved by these two groups of teachers are statistically significant (p=0.008).

In domain 3 (Knowledge of the use of diversified assessment instruments), teachers with continuous training in assessment achieved an average hit rate of around 61%, while teachers without continuous training achieved an average hit rate close to 54.3%, which represents a difference of around 6.7 percentage points between the two groups. The *Mann-Whitney* test shows that the differences in the results achieved by these two groups of teachers are statistically significant (p=0.017).

Domain 4 (Knowledge of how to interpret and use the information gathered in the assessment process) is the one with the most modest results, both in the group of teachers with ongoing training in assessment (average of 45.19% correct) and without this type of training (average of 37.21% correct). The difference between the two groups is around 8 percentage points, making it the area where the differences are most significant. This was

confirmed by the *Mann-Whitney* test, which found that the difference between the two groups was statistically significant (p=0.001).

Given the differences in each of the domains considered, Part 3 of the QALA (Knowledge of Assessment) also shows that teachers with ongoing training in assessment have more satisfactory results than teachers without this type of training. Even so, the weaknesses in the field of knowledge under evaluation are notable given the low results achieved.

Table 3

Results obtained in Part 3 of the QALA - Evaluation Knowledge

	With ongoing training in evaluation (N=185)		**No ongoing training in evaluation** (N=68)		***p-value***
	%	**DP**	**%**	**DP**	
Domain 1: Knowledge of the objectives and functions of evaluation	66.59	14.63	66.32	13.48	.856
Domain 2: Knowledge of the curriculum and what is important to learn and assess	67.46	18.84	61.47	16.51	**.008**
Domain 3: Knowledge of the use of different assessment tools	60.97	19.81	54.26	18.15	**.017**
Domain 4: Knowledge of how to interpret and use the information gathered in the evaluation process	45.19	18.18	37.21	15.63	**.001**
Overall results	60.05	13.34	54.82	10.77	**.001**

Table 4 summarizes the results achieved in Part 4 of the QALA, which deals with Scenarios in an evaluation context. Unlike what was observed in Parts 2 and 3, in this section of the QALA there is no special emphasis on teachers with ongoing training in assessment, when compared to teachers who have not attended such training. Surprisingly, teachers without continuous training in assessment obtained better results in two specific domains - Knowledge about the curriculum and what is important to learn and assess (Domain 2) and Knowledge about using diverse assessment tools (Domain 3) - as well as performing better overall in Part 4.

The results obtained and the *Mann-Whitney* test applied to this part of the QALA suggest that there is no particular relationship between the results achieved and attendance at, or lack of, in-service training courses in assessment. In fact, no domain was identified with a statistically significant *p-value*, which indicates that continuous training in assessment does not seem to be directly associated with the results obtained in that specific section of the questionnaire. This finding may raise pertinent questions about the factors that influence teachers' performance in assessment scenarios, in addition to ongoing training. Other contextual factors, teachers' professional experience or even the pedagogical approaches adopted can play a relevant role in this context.

It is essential to interpret these results with caution and consider the complexity of the interactions between different variables that can affect teacher performance in assessment scenarios. This diversity of factors may require further investigation and complementary studies to better understand the dynamics behind these apparently contradictory results.

Table 4

Results obtained in Part 4 of the QALA - Scenarios in an evaluation context

	With ongoing training in evaluation (N=185)		**No ongoing training in evaluation** (N=68)		***p-value***
	%	**DP**	**%**	**DP**	
Domain 1: Knowledge of the objectives and functions of evaluation	63.36	21.36	62.06	22.70	.798
Domain 2: Knowledge of the curriculum and what is important to learn and assess	62.82	18.67	65.00	17.06	.373
Domain 3: Knowledge of the use of different assessment tools	66.82	20.51	70.3	19.08	.296
Domain 4: Knowledge of how to interpret and use the information gathered in the evaluation process	45.94	19.82	42.06	18.00	.125
Overall results	59.73	13.62	59.85	12.73	.921

Discussion and Conclusions

Initial training is the first step in building a teacher's professionalism, but it has been shown that it is clearly insufficient to prepare teachers for all the tasks they will have to face throughout their careers. One of the areas that has been notably neglected in initial training is school assessment. However, it is common knowledge that a large proportion of classroom time is devoted to tasks directly or indirectly related to assessment, whether formative or summative.

The deficiencies found in initial training mean that teachers have relatively low levels of assessment literacy, which is worrying given the importance of the task of assessment throughout the teaching and learning process. As a result, many teachers opt for ongoing training, particularly in the area of pedagogical assessment, in order to overcome the weaknesses they feel.

In this article, the main objective was to compare, on the one hand, the perceptions that teachers with and without continuous training in assessment had in relation to their knowledge of assessment and, on the other hand, to measure their levels of assessment literacy. Based on the comparison between the two groups analyzed, we sought to establish a relationship between teachers' levels of assessment literacy and whether or not they had attended continuous training courses in assessment.

Two fundamental conclusions were drawn from the results. The results seem to show that teachers who had attended continuous training courses in assessment had a better perception of their knowledge and abilities to assess students' learning. In addition, teachers with ongoing training in assessment showed higher levels of assessment literacy when compared to teachers who had not attended such training. Thus, the positive effects of continuous training on assessment literacy levels are clear, thus making up for the weaknesses found in initial teacher training.

The results of this study highlight the importance of considering evaluation as a central element in pedagogical practices and underline the need to promote and encourage the participation of teachers in specific courses and workshops on evaluation. These initiatives can be implemented by both educational institutions and those

responsible for education policy, with the aim of ensuring that teachers are prepared to face the challenges of classroom assessment.

In short, continuous training in assessment represents an effective tool for raising teachers' literacy levels in this critical area. By strengthening their evaluation skills, these professionals have the opportunity to improve their practices, providing a more enriching and effective educational environment. Promoting a culture of continuous professional development is fundamental to ensuring educational progress and, at the same time, meeting the needs of educators in their professional growth.

References

Abell, S., & Siegel, M. (2011). Assessment Literacy: What science teachers need to know and be able to do. In D. Corrigan et al. (Eds.), *The Professional Knowledge Base of Science Teaching*. Springer. https://doi.org/10.1007/978-90-481-3927-9_12

Almeida, L. (2023). Qualidades Psicométricas do Questionário de Aferição da Literacia em Avaliação. *Revista Portuguesa de Educação*, *36*(1), e23007. http://doi.org/10.21814/rpe.24079

Almeida, L. (2021). *Literacia em Avaliação de Professores: Desenvolvimento e Aplicação do Questionário de Aferição da Literacia em Avaliação*, [Tese de Doutoramento, Universidade Lusófona de Humanidades e Tecnologias].

Bloom, B. (1956). *Taxonomy of Educational Objectives*. Book I: Cognitive Domain. David Mckay.

Brown, G. (2008). Assessment literacy training and teachers' conceptions of assessment. In C.M. Rubic-Davis and C. Rawlinson (Eds.), *Challenging Thinking about Teaching and Learning*. Nova Science Publishers.

DeLuca, C., & Klinger, D. (2010). Assessment literacy development: identifying gap in teacher candidates' learning. *Assessment in Education: Principles, Policy and Practice*, *17* (4), 419-438. https://doi.org/10.1080/0969594X.2010.516643

DeLuca, C., Chavez, T., Bellara, A., & Cao, C. (2013). Pedagogies for preservice assessment education: Supporting teacher candidates' assessment literacy development. *The Teacher Educator*, *48* (2), 128-142. https://doi.org/10.1080/08878730.2012.760024

Gottheiner, D., & Siegel, M. (2012). Experienced Middle School Science Teachers' Assessment Literacy: Investigating Knowledge of students conceptions in Genetics and ways to shape instruction. *Journal of Science Teacher Education*, *23*, 531-557. https://doi.org/10.1007/s10972-012-9278-z

Hailaya, W., Alagumalai, S., & Ben. F. (2014). Examining the utility of Assessment Literacy Inventory and its portability to education systems in the Asia Pacific region. *Australian Journal of Education*, *58* (297), 297-317. https://doi.org/10.1177/0004944114542984

Koh, K. (2011). Improving teachers' assessment literacy through professional development. *Teaching Education*, *22* (3), 255-276. https://doi.org/10.1080/10476210.2011.593164

Laranjeira, M. I., Abreu, A. N., Nogueira, N. & Soligo, R. (1999). Referências para Formação de Professores. In Bicudo, M. A. V. & Silva, Junior C. A. (Orgs.). *Formação do Educador e Avaliação Educacional: Formação Inicial e Contínua*. Unesp.

Libâneo, J. (1998). *Adeus Professor, Adeus Professora? novas exigências educacionais e profissões docente*. Cortez.

Logan, L., & Sachs, J. (1988). Inservice Education in Queensland: Some Lessons. South Pacific *Journal of Teacher Education*, *16* (1), 63-69. https://doi.org/10.1080/0311213880160105

Malone, M. (2013). The essentials of assessment literacy: Contrasts between testers and users. *Language Testing*, *30* (3), 329-344. https://doi.org/10.1177/0265532213480129

Marzano, R. J. (2000). *Designing a new taxonomy of educational objectives*. Corwin.

McGee, J., & Colby, S. (2014). Impact of an assessment course on teacher candidates' assessment literacy. *Action in Teacher Education*, *36* (5-6), 522-532. https://doi.org/10.1080/01626620.2014.977753

Mertler, C. (2003). *Preservice versus inservice teachers' assessment literacy: Does classroom experience make a difference?* In *The Mid-Western Educational Research Association*. Columbus, Ohio.

Newfields, T. (2006). Teacher development and assessment literacy. Authentic Communication. In *5th Annual JALT Pan-SIG Conference*. (pp. 48-73).

Popham, W. (2018). *Assessment literacy for educators in a hurry*. ASCD.

Ramesal, A. (2011). Primary and secondary teachers' conceptions of assessment: a qualitative study. *Teaching and Teacher Education*, *27*, 472-482. https://doi.org/10.1016/j.tate.2010.09.017

Santos, J., &Silva, P. (2009). Formação continuada dos docentes na contemporaneidade: desafios e possibilidades. *I Encontro da Associação Nacional de Política e Administração em Educação*. AMPAE-AL. VI EPEAL, Alagoas.

Stiggins, R. (1991). Assessment literacy. *Phi Delta Kappan*, *72*, 534-539.

Stiggins, R. (1995). Assessment literacy for the 21st century. *Phi Delta Kappan*, *77* (3), 238-246.

Taber, K. (2017). The use of Cronbach's alpha when developing and reporting research instruments in Science Education. *Research in Science Education*, *48*, 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Volante, L., & Fazio, X. (2007). Exploring Teacher candidates' assessment literacy: implications for teacher education. *Canadian Journal of Education*, *30* (3), 749-770.

Webb, N. L. (1997). *Criteria for alignment of expectations and assessments in mathematics and science* (Council of Chief State School Officers and National Institute for Science Education Research Monograph No. 6). Madison: University of Wisconsin–Madison, Wisconsin Center for Educational Research.

Xu, Y., & Brown, G. (2016). Teacher assessment literacy in practice: A reconceptualization. *Teaching and Teacher Education*, *58*, 149-162. https://doi.org/10.1016/j.tate.2016.05.010

Yamtim, V., & Wongwanich, S. (2014). A study of classroom assessment literacy of primary school teachers. *Procedia – Social and Behavioral Sciences*, *116*, 2998-3004. https://doi.org/10.1016/j.sbspro.2014.01.696

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ICT COMPETENCIES IN VIRTUAL EDUCATION IN RURAL CONTEXTS: A STUDY WITH HIGH SCHOOL STUDENTS IN PEDAGOGY AND SOCIAL SCIENCES AT UNIVERSIDAD PANAMERICANA.

COMPETENCIAS TIC EN EDUCACIÓN VIRTUAL EN CONTEXTOS RURALES: UN ESTUDIO CON ESTUDIANTES DE ENSEÑANZA MEDIA EN PEDAGOGÍA Y CIENCIAS SOCIALES DE LA UNIVERSIDAD PANAMERICANA

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ABSTRACT

The objective of the research was to analyze the ICT competencies, in the modality of virtual education in rural contexts of the students from Secondary School Teacher Training in Pedagogy and Social Science of the Faculty of Education Science of Universidad Panamericana. With a quantitative approach and an exploratory/descriptive design, collecting data through a questionnaire applied to 120 students of the Faculty, of which 75% are women and 25% men. The results of the analysis show that most students perceive themselves as having an intermediate level of ICT skills, abilities, and knowledge. The findings show that the means of communication used in virtual learning environments are WhatsApp and email, students recognize the support for the development of ICT, abilities and knowledge provided by Universidad Panamericana. The form of Internet connectivity by students is through Wifi at home and mobile data on their own devices. Based on the results, it can be inferred that the use of ICT supports educational environments that involve activities in virtual mode, such as receiving online classes through educational platforms, as well as the management of receiving and sending homework electronically and virtually. It is important that, at the time of applying ICT in the classroom, the planning, content, activities, and evaluation phases are developed to meet the stated educational objectives in the teaching and learning processes with an inclusive approach in virtual environments for students.

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Palabras clave:
competencias TIC, educación virtual, entornos educativos, modalidad virtual, plataformas, ruralidad.

RESUMEN

El objetivo de la investigación fue analizar las competencias TIC, en la modalidad de educación virtual en contextos rurales de los estudiantes del Profesorado de Enseñanza Media en Pedagogía y Ciencias Sociales de la Facultad de Ciencias de la Educación de Universidad Panamericana. Con un enfoque cuantitativo y un diseño exploratorio/descriptivo, recolectando datos a través de un cuestionario aplicado a 120 estudiantes del Profesorado, de los cuales el 75% son mujeres y el 25% hombres. Los resultados en el análisis muestran que los estudiantes en su mayoría se perciben con un nivel intermedio en habilidades y conocimientos TIC. Los hallazgos muestran que los medios de comunicación utilizados en los entornos de aprendizaje virtual son WhatsApp y correo electrónico, los estudiantes reconocen el apoyo para el desarrollo de habilidades y conocimientos TIC que proporciona Universidad Panamericana. La forma de conectividad a internet por parte de los estudiantes es por Wifi en casa y datos propios en sus dispositivos móviles. Con base a los resultados, se puede inferir que el uso de las TIC apoya los entornos educativos que implican actividades en modalidad virtual, como recibir clases a través de plataformas educativas, así como, la gestión de tareas por medios electrónicos y virtuales. Es importante que, al momento de la aplicación de las TIC en el aula, se desarrollen las fases de planificación, contenidos, actividades y evaluación para cumplir con los objetivos educativos planteados en los procesos de enseñanza y aprendizaje con un enfoque inclusivo en entornos virtuales para el estudiantado.

Introduction

Currently, there is a demand for a change in the traditional educational model. This change emphasizes a competency-based approach that develops social, personal, academic and professional practices in human beings. Particularly, in university education, processes of updating towards this competency-based educational model are being followed. The concern for using a competency-based approach in the different universities in Latin America is based on offering society human resources capable of managing effective knowledge for the performance of their functions in the different work environments, which in turn has an impact on the economic, political, social and cultural development of the different societies.

This competency-based approach to education requires that the teaching and learning process be of high quality and rigorous, while taking into account the incursion and impact of technological trends and the rise of digital or virtual education tools.

As a precedent for the priority given to a competency-based model in the different universities around the world, reference is made to the Tuning Project initiated in Europe in 1999. In the case of Latin America, the Alfa Tuning Latin America project was created. As a result of the Tuning LA project, a final report of the Tuning LA Project (2004-2007) was prepared, establishing four lines of action: generic and specific competencies, teaching and assessment approaches, academic credits, and quality and transparency: international comparability of degrees.

In correspondence with the line of generic competencies established in the Tuning AL project, two are directly related to ICT. Firstly, competencies related to skills in the use of information and communication technologies and, secondly, those related to the skills to search for, process and analyze information from different sources.

However, in order to adopt competency-based models for education, it is important to consider the socioeconomic environment of society and, in the case of ICT competencies, the existence of a technological and digital infrastructure. In this sense, it is a political, economic and sociocultural challenge for societies such as the Guatemalan society to establish a competency-based model in higher education. Pérez, Mena and Elicerio (2020) argue that "it is evident that technology builds and opens opportunities for inclusion in the new contemporary educational models. The potential of their implementation has been a milestone in the history of education and has contributed to significant improvements in the pedagogical approach" (p. 24), i.e., the implementation of technology and the development of ICT competencies are necessary in modern social education systems.

Godoy and Calero (2018), emphasize that it is important to distinguish, between students who are digital natives and students who are digital immigrants, since these should be considered with different teaching and learning strategies, in which specific competencies are required for both teachers and students with flexible methodologies that strengthen ICT knowledge, skills and abilities.

Islas (2017) states that ICTs and the internet are undisputed protagonists of the changes experienced by society, in daily activities, work and human behavior. The level of importance reached by ICTs and their transversality mean a series of transitions and changes for citizens, which fundamentally affect how relationships are established in the different social networks and also in the way personal, academic and professional activities are carried out.

In addition, due to the change brought about by ICT and as a consequence of the COVID-19 pandemic, educational models necessarily introduce digital and virtual

processes, although in countries such as Guatemala, in public or private educational institutions the transition to hybrid or virtual models of education is limited in terms of technological infrastructure, knowledge and mastery of ICT skills and abilities for educational environments.

However, despite the limitations related to technological infrastructure or factors such as access to technologies for education, especially in rural areas, by students, universities in Guatemala seek to develop programs that link the use of technologies and digital tools. Regarding the use of technology in higher education, Godoy and Calero (2018) published the study "Critical thinking and technology in university education. A theoretical approach" in which they conclude that in the field of higher education the use of technology corresponds to a meaningful learning strategy having a positive impact on the development of knowledge and skills for its application in the academic and professional training of students.

In Guatemala, according to data, from the I Digital Divide survey, published by FONDETEL (2019, p. 41) the simple digital divide for Guatemala is 72%. The I survey established that "52% of the surveyed households correspond to urban areas and 48% to rural areas" it was also established that "77% of the respondents self-identified as mestizos while 21% considered themselves of Mayan origin and 2% in other groups". It was established that only 4% (3,756 people surveyed) have a university education.

The data provided by FONDETEL (2019, p. 41) refer to an approximation of the Guatemalan reality in which educational environments take place. In addition, given that Guatemala is a multilingual and multicultural country, access to connectivity, internet use and technological integration for higher education is different for an urban sector compared to the rural sector, as a consequence of the country's planning in aspects of technological and digital infrastructure, quality and access to connectivity services and digital tools that impact on the knowledge and technological skills that university students develop.

One of the difficulties that some students have is the difficulty in downloading audios and videos to their digital devices. Other difficulties, depending on the geographic characteristics of the communities, are the lack of Internet connectivity, the cost of equipment, technical limitations and communication barriers.

The incorporation of new technologies has led to a drastic transformation in what is now known as an information society and since the emergence of technological media, the learning process has improved, however, there are limitations for teachers and students, for example, situations in which Internet connection is a problem that mainly generates a social, generational and, to a lesser extent, geographic gap; not all the applications used by each student to learn are freely available; in addition, the electronic devices used, such as computers, laptops, tablets or cell phones are usually low-end due to economic limitations, Montenegro Conce et al., (2020) cited by Perez and Reeves (2023).

It is important to mention that there are innovative teachers who adapt to new educational trends that respond to an inclusive approach, where ICT are essential in a transformative technological education, although some still use a traditional paradigm. Based on this information, it is important to highlight the commitment to a modern education that addresses values of inclusion, such as equality, equity and justice Perez and Reeves (2023).

Therefore, it must be ensured that the application of ICTs is developed as a pedagogical activity within the classroom, in order to reduce the uncertainty spaces developed through planning, content, activities and evaluation to meet the educational objectives set out in the teaching and learning processes of the student body.

For this reason, it is crucial for universities in Latin America to identify the ICT competencies required for e-learning in rural contexts. In this regard Islas (2017, p. 867) highlights the transcendence of ICT for universities and that in the educational field it is important to investigate digital competencies, due to the fact that, "...the students' perception of ICT management is overvalued to face the integration of technological tools in the learning processes. Somehow these are integrated mostly in a social sense and only as a consultation, they are little used in collaboration, construction and exhibition of knowledge". In other words, the use of ICT for virtual education requires students to develop specific competencies, since the more ICT knowledge, skills and abilities they have, the more significant the impact on the teaching and learning process will be. A student who has an adequate level in relation to the use of ICT, for the academic environment, is predisposed to successfully manage the knowledge and learning of what he/she studies and intends to internalize, understand and apply as part of his/her technical and professional training.

It is important to consider that the Internet, as an informatics and digital structure, represents a benefit for technological development and for educational processes because education is decentralized and allows participants in the educational process to access education with advantages such as: immediate access to data and information, flexibility in study schedules, minimizing geographical barriers (moving from one place to another to study), a recursive educational system because the student has the possibility of consulting the study material and its contents as many times as necessary, among others.

In contrast to the positive aspect of the Internet and its benefits for the development of virtual education, there are also disadvantages of virtual education to be developed in cyberspace because the amount of information that circulates digitally, exceeds the ability of people to process it, in addition, other disadvantages such as: that students incur in practices such as copying and pasting information, that automated processes are carried out without internalizing and understanding the contents (answering an exam by intuition or guessing the answers), that students do not correctly manage artificial technology, tools and virtual platforms.

These disadvantages or adverse scenarios are the ones that should be reduced or diminished and strengthen everything that represents benefits for the technical, professional and human formation of the students. To achieve this goal, it is essential to recognize or identify and guide students' ICT knowledge, skills and abilities for the benefit of educational processes that form people capable of participating in the labor system of a society and, at the same time, recognize and manage the use of ICT for the benefit of educational and social development.

In relation to ICT competencies, Basantes-Andrade, Cabezas-González and Casillas-Martín (2020) in the published study "Competencias digitales en la formación de tutores virtuales en la Universidad Técnica del Norte, Ibarra-Ecuador" identify 5 types of basic competencies for virtual tutors: academic, organizational, guiding, technical and social.

These same basic competencies can also be developed by students; among the academic competencies are: researching and managing reference sources, analyzing content, developing practices and exercises, among others. Organizational skills include: planning and defining the study agenda, organizing subject information. The guiding competencies for students are a function of the skills to interact in a digital environment to complement their academic training. Technical competencies in relation to the use of digital devices, platforms, communication mechanisms and social competencies that are oriented to the ability of students to interact, socialize and moderate their interpersonal relationships in virtual educational environments.

Basantes-Andrade, Cabezas-González and Casillas-Martín (2020, p. 280) emphasize that the formation of ICT competencies in an oriented and strategic manner "is visible in the development of skills, knowledge, attitudes and strategies with the efficient and safe use of information and communication technologies in online education".

In this scenario, it is not only important for education to have the introduction of Information and Communication Technologies, but also for educational activities to be designed with relevance to these technologies and to the social, political and economic context of society and of the key actors in the teaching and learning process (teachers and students).

ICT competencies require that the actors in the teaching and learning process participate in a digital environment and its constant transformation that impacts on the strategies for the development of education. For societies, digital transformation and its impact on the areas of personal and professional life represent challenges in relation to ensuring digital societies that are sustainable, inclusive and secure. In this context, the XXVIII Ibero-American Summit of Heads of State and Government (including Guatemala) was held in 2023 and one of its main results was the Ibero-American Charter of Principles and Rights in Digital Environments. The purpose of this declaratory charter is to promote strategic and common principles for States to consider when adopting or adapting the domestic legal framework, public or private policies in relation to digital environments.

The Ibero-American Member States, through the Ibero-American Charter of Principles and Rights in Digital Environments, reached commitments on 10 issues, one of which is focused on digital inclusion, with the goal of promoting "inclusive policies that recognize and address the situations of vulnerability of different groups and social groups in digital environments and that protect fundamental rights". In addition, under the theme of Centrality of the individual, one of the principles is "Fostering structural conditions, practices, tools and regulatory frameworks that promote universal, equitable and affordable access to ICT infrastructure and services, without discrimination of any kind"

In this sense, education through virtual environments should apply these principles and strengthen pedagogical competencies impacting the teaching and learning processes, since these are the central axis of the teaching exercise and the mechanism for young people, especially in rural areas, to develop ICT competencies.

An exploratory/descriptive research was carried out at the Universidad Panamericana with students of the Secondary School Teacher Training Program in Pedagogy and Social Sciences, on ICT competencies in virtual education in rural contexts. Universidad Panamericana is a private university in Guatemala and has a complete higher education system. It contributes to the development of the country, since it is projected in twelve campuses and 106 branches, located in Guatemala City and in the interior of the country. It serves more than 17,000 students enrolled in more than 45 technical, teaching, bachelor's, master's and doctoral programs, in classroom, blended and virtual modalities.

It is important to note that one of the cross-cutting themes of Universidad Panamericana is Information and Communication Technology, which applies to all degree programs, with on-site and virtual courses in the different faculties. The ICT axis responds to the need to seek answers to improve the quality of virtual and face-to-face education in rural higher education contexts.

Method

Design

This is a cross-sectional research developed as part of the studies of the Doctorate in Education of the Universidad Internacional Iberoamericana (UNINI), which was applied with students of the Secondary School Teaching Program in Pedagogy and Social Sciences of the Faculty of Education Sciences of Universidad Panamericana in the rural area; the design was exploratory because it constitutes a first approach to the aspects related to ICT competencies and descriptive because it seeks to characterize the study population taking into account variables such as age, use of electronic devices, forms of connectivity, as well as to know their perception of ICT competencies and the limitations of virtual education in rural contexts.

Participants

The objective of the research was to describe the ICT competencies in the modality of virtual education in rural contexts of the students of the Secondary School Teacher Training Program in Pedagogy and Social Sciences of the Faculty of Education Sciences of Universidad Panamericana in the departments of Petén, Huehuetenango, Zacapa, Alta Verapaz, Baja Verapaz, Sololá, Quiché, Huehuetenango, Quetzaltenango and Guatemala. In October 2022, at the time of applying the research instrument, 120 students participated, of which 25% were from Petén, 23% from Huehuetenango, 16% from Zacapa, 15% from Alta Verapaz and Baja Verapaz, 11% from Sololá and Quiché, 8% from the department of Guatemala (municipality of San Raymundo) and 3% from Quetzaltenango.

Instrument

Corresponding to the survey as a research technique, a Google questionnaire with 21 multiple-choice questions was generated in order to record ICT data and information related to competencies, factors, rural context, access, age, gender and region of the students surveyed.

For the validation of the research instrument, a pilot test was carried out with a sample that met similar characteristics to the selected population. It was applied in the departments of Sololá and Quiché, which are rural areas where the High School Teacher Training program is offered. The sample for the pilot test consisted of 41 students, enrolled for the 2022 cycle. As a result, a validated instrument was obtained. The Board of Universidad Panamericana authorized the application of the instrument; a requirement that was requested by the Ethics Committee of Universidad Iberoamericana (UNINI) in order to carry out the fieldwork.

Procedure

For the collection of data, the population was located in the area where Universidad Panamericana had, in 2022, a secondary school teaching program in Pedagogy and Social Sciences of the School of Education Sciences, specifically in rural areas. For this reason, the metropolitan region was not taken into account because it does not have the same characteristics as rural contexts.

The inclusion criteria are male and female students enrolled in the first year of the Secondary School Teacher Training Program in Pedagogy and Social Sciences located in the rural area of Universidad Panamericana. A total of 120 students participated.

Since the population of students enrolled in the faculty is 150 people, the application of the research instrument to the total number of students enrolled was considered; however, due to circumstances such as technological access or permanence

of students in the faculty, the participation of 120 students (81% of the total number of students enrolled) was achieved.

Data analysis

The processing of the information involved two stages, the first refers to the capture of the information provided by the students through the application of a questionnaire of multiple answers through a Google form which generates databases in files compatible with .xlsx (Excel) and graphs in relation to the results to describe the ICT competencies in the modality of virtual education in rural contexts of the students of the Secondary School Teacher Training in Pedagogy and Social Sciences of the Faculty of Education Sciences of Universidad Panamericana.

In a second stage, we proceeded to generate databases and process information through the statistical package SPSS (Statistical Package for Social Sciences) with which we obtained descriptive statistics such as frequencies, percentages; in addition to processing cross tables and graphs in order to establish the behavior of the study variables related to ICT competencies.

Ethical considerations were taken into account in the research with students. Some of these considerations were: confidentiality of the information, anonymity of the students' responses, voluntary participation, technical and respectful language in the instruments, and no economic cost to the students.

Results

The results of the application of the questionnaire to students of the Pedagogy and Social Sciences High School Teacher Training Program of the Faculty of Education Sciences are presented. There was a participation of 120 students in the rural area, of which the group was mostly women, representing 75% compared to 25% men. Based on the enrollment of students from previous years, the trend of female enrollment is evident.

Summary of the number of students per site

Table 1 summarizes the frequency of students per Universidad Panamericana campus where the Secondary School Teacher's Degree in Pedagogy and Social Sciences is taught.

Table 1
Frequency and percentage of students per site

Region	Frequency	Percentage
Petén	*30*	*25.1*
Huehuetenango	*27*	*22.4*
Zacapa	*19*	*15.8*
Alta and Baja Verapaz	*18*	*14.9*
Sololá and Quiché	*13*	*10.7*
Guatemala (San Raymundo)	*9*	*7.6*
Quetzaltenango	*4*	*3.4*
Total	*120*	*100*

Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

Since the research was carried out in rural areas of the departments listed in Table 1, it is important to mention that the application of the instrument in the department of Guatemala was specifically carried out in the municipality of San Raymundo, which has rural characteristics.

Age and perceived ICT literacy level

The crossover between the variable age of first-year students in the Secondary School Teacher Training Program in Pedagogy and Social Sciences at Universidad Panamericana and the perception in relation to their level of knowledge of ICT is summarized.

Table 2
Crosstabulation with the opinion on the category of ICT knowledge and the age of the students.

Age	Beginner	Intermediate	Advanced	Total
From 18 to 20 years old	*5*	*21*	*4*	*30*
From 21 to 30 years old	*8*	*51*	*8*	*67*
From 31 to 40 years old	*2*	*15*	*1*	*18*
From 41 to 50 years old	*1*	*2*	*1*	*4*
From 51 to 55 years old	*0*	*1*	*0*	*1*
Total	*16*	*90*	*14*	*120*

Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

It compares the options in which students consider their knowledge in relation to ICT. The category of intermediate knowledge stands out, that is, they consider themselves competent in relation to ICT for the educational environment.

This study does not assess the quality with which the different ICT competencies are developed, but rather the presence of ICT skills, knowledge and abilities in the students of the faculty. The beginner category refers to the minimum knowledge, skills and abilities in the use of ICT. In the Intermediate level category, it refers to basic academic, technical, organizational, counseling and social competencies. The advanced category refers to the knowledge, skills and abilities developed in a technical manner in the use of ICT.

Communication, electronic devices and learning processes

Table 3

Electronic communication media frequently used in learning processes

Electronic communication	Frequency	Percentage	Percentage of cases
E-mail address	97	27.6	80.8
Text messaging	28	8.0	23.3
Digital social networks	59	16.8	49.2
WhatsApp	109	31.0	90.8
Telegram	6	1.7	5.0
Videoconferencing platforms	53	15.1	44.2
Total	352	100.0	293.3

Note. N=120. Fieldwork - SPSS (Statistical Package for Social Sciences) 2022 software.

The frequency of use of electronic communication systems in the learning process is presented. This question allowed the student to select 3 of what he/she uses the most. In general, the responses were centered on: WhatsApp (91%), email (81%) and digital social networks (49%). Telegram was one of the least used communication tools.

Table 4

Cross table in relation to the electronic devices from which academic tasks are performed and on which online classes are received.

		Electronic device on which you receive your classes online			
		Smartphone	Laptop computer	Desktop computer	Total
Electronic device on which it performs academic tasks	Smartphone	6	1	0	7
	Laptop computer	33	61	1	95
	Desktop computer	10	1	7	18
	Total	49	63	8	120

Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

It is important to mention that when asking the student about the devices from which they receive their online classes they were presented with the option of "Tablet" same that is absent from the frequency table because this device is not used by any of the 120 students surveyed.

Table 5
Summary of the technological resources provided by Universidad Panamericana to student teachers.

Resources provided by the University	Frequency	Percentage	Percentage of cases
Educational platforms	96	37.4	80.0
Laboratories	5	1.9	4.2
Internet	6	2.3	5.0
Tutorials	33	12.8	27.5
Web applications	26	10.1	21.7
Virtual library	89	34.6	74.2
None	2	0.8	1.7
Total	257	100.0	214.2

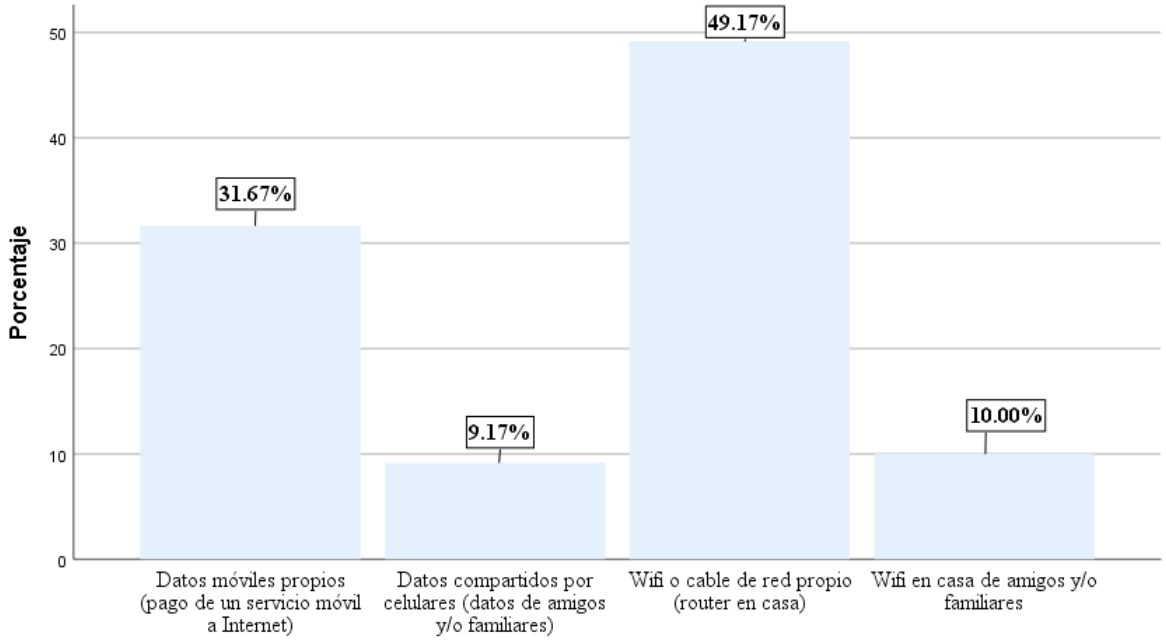
Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

In the case of the technological resources provided by the university for the virtual courses, it is observed that 80% of the students think that they are provided with access to an educational platform to receive their courses. 74.2% of respondents identify access to the virtual library as another resource provided. The least frequently used resources are Internet access (5%) and access to laboratories (4.2%).

Internet connectivity, advantages and disadvantages of virtual education

Figure 1

Percentages in relation to the form of Internet connectivity by the students



Note. N=120. Fieldwork - SPSS (Statistical Package for Social Sciences) 2022 software.

The ways in which students access the Internet are compared, the label in each bar is the total for each category and in relation to a sample of 120 students.

49% of respondents use internet connectivity via wifi or their own network cable through their own service from home. 32% do so through their own data. It is important to highlight that the results show a percentage of 9% of students who use data shared by cell phones (data from friends or relatives) and 10% use wifi at friends' or relatives' homes. These percentages, although lower in comparison with students who have their own resources for Internet connectivity, are significant categories from the perspective of guaranteeing student connectivity to virtual environments in rural areas.

Table 6

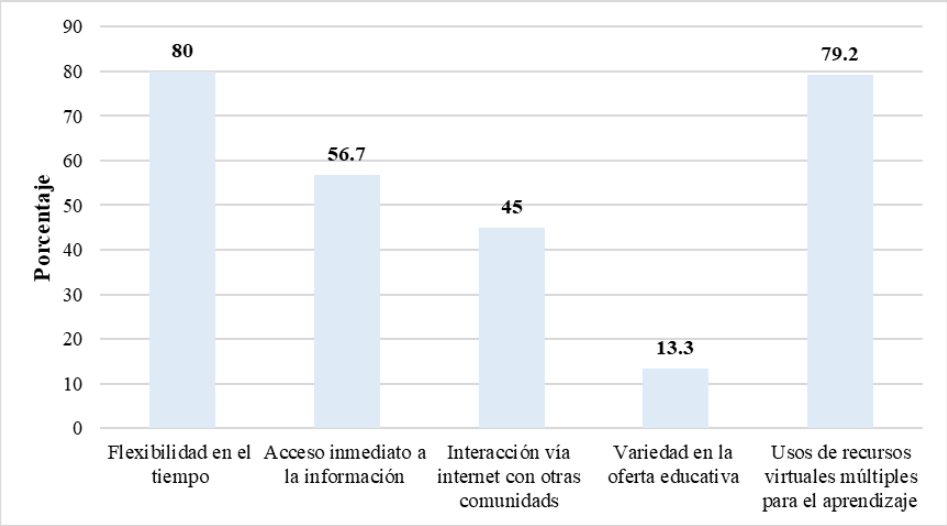
Student's opinion regarding the disadvantages of virtual education

		Technical limitations	Connectivity failures	Cost of equipment	Barriers to communication	Total
through what device do you receive your online classes?	Smartphone	18	43	19	16	49
	Laptop computer	16	61	20	20	63
	Desktop computer	3	7	5	1	8
Total		37	111	44	37	120

Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

It is evident that the devices most used by students to receive online classes is the telephone and laptop, however, 93% (111 students) highlight as a disadvantage for virtual education the aspect of Internet connectivity failures. Students also identified other disadvantages such as: cost of equipment, communication barriers and technical limitations.

Figure 2
Advantages of virtual education



Note. N=120. Field work - SPSS (Statistical Package for Social Sciences) 2022 software.

79% of the students surveyed see the variety of virtual resources that accompany them in the learning process as an advantage. Fifty-seven percent consider immediate access to information important in the development of their virtual courses and 80% identified flexibility in time as an advantage.

Discussion and conclusions

Based on the results, it is evident that students in rural areas, in the academic context, use Information and Communication Technologies (ICT) such as smartphones, laptops and desktop computers. The findings show that the perception of most students is that their category of knowledge in relation to ICT is Intermediate. On the other hand, it was identified that the students of the Secondary School Teacher Training Program in Pedagogy and Social Sciences are young and 75% are women.

In relation to the use of electronic devices, the findings show that 52.5% use the laptop computer and 6.66% use the desktop computer to receive their online classes. In addition, 79.16% use a laptop computer and 15% use a desktop computer to perform their academic tasks. However, it was identified that 5.8% of students use the smartphone for academic assignments and 40.8% use it to receive virtual classes. Regarding the use of electronic devices, the Inter-American Development Bank (IDB), (2022) citing (Arias Ortiz et al., 2020) in the publication with the title ¿Cómo reconstruir la educación

postpandemia? Solutions to fulfill the promise of a better future for youth, they mention that: lessons learned show that the delivery of educational content in a virtual environment involves working with accessibility, content curation focused through a strategy that allows interaction, enabling learning effectively through different devices such as cell phones and computers.

The use of a specific device suggests certain scenarios that can be inferred: as a first point that the phone is a multifunctional tool for students, because in addition to personal use, they also use it for their activities in the academic environment; it is inferred that virtual classes are accessed from the mobile device or laptop, not only because of the ease offered by the applications and platforms through these devices, but also because they represent an economical option.

As a second point, for each device that is used in virtual environment, it requires the formation of specific competencies. For example, to access online virtual classes, applications from different educational platforms are regularly used, while accessing them from a laptop or desktop computer does not necessarily require the installation of applications from these educational platforms. Another example is that the mobile device or phone is not ideal for performing tasks compared to the laptop or desktop computer.

The use of electronic devices for virtual environments represents a possibility of access to virtual education, but there are limitations for students in rural areas, specifically in relation to connectivity. In opposition to the disadvantages, the students of the faculty of the Universidad Panamericana and according to the geographical characteristics of each of the communities where the student belongs, see as an advantage the flexibility of time since the virtual courses are developed asynchronously, where the student must respond to their pace and time according to the schedule of activities to be developed in the course of the scheduled weeks. However, a geographical disadvantage of the region or rural communities are the constant failures of Internet connectivity, a triggering factor that often limits the monitoring and in some cases the abandonment of virtual courses. In Guatemala, and specifically in rural areas, the difficulties related to internet access and virtual resources for education stem from the low rural connectivity offered by the telephone companies that provide internet access services.

The smartphone is used in the rural area as a means of electronic communication, especially by the use of WhatsApp with 90.8%, email with 80.8% and social networks with 49.2%, because these mechanisms represent easy access. Regarding the use of WhatsApp in the academic environment, Melgarejo Noceda & Melgarejo Noceda (2022), mentioned that WhatsApp is one of the most used tools by students due to the practical functions such as making video calls, creating groups, sending multimedia file links that allow an immediate communicative and data transfer development.

The results linked to the use of devices and electronic media are congruent with the findings related to internet connectivity due to the fact that 31.67% connect to the internet with mobile data, 49.17% connect with wifi or their own network cable. However, there is a 20% that connects with data or wifi that correspond to third parties, this limits in some way the immediate connectivity and timely access for the development of their classes. In order to access the Internet, students need to have financial resources to purchase data packages or pay for Internet service.

Higher education in Guatemala is having a greater boom in the post-pandemic virtual environment due to the need to move from the face-to-face to the virtual modality, for which learning was required for teachers and students in the use of new educational platforms, technological tools, virtual media, so a curriculum was redesigned to correspond to ICT competencies and a methodology focused on virtual contexts. For this

reason, strategies aimed at strengthening ICT competencies, based on Tuning competencies, should be implemented, especially in rural regions of Guatemala.

ICT skills constitute a complex scenario in the education sector because they depend on several factors such as: socioeconomic level, technological development, quality of Internet service, age, among others. In relation to the age factor, this determines the development of competencies because young people are exposed to greater technological contact which strengthens skills such as: the use of mobile devices, digital tools, web browsing, use of applications for personal, work, leisure and entertainment. However, the training of technological skills is not necessarily related to an adequate and strategic use for the educational and training sector. Young people should be oriented towards the strategic use of ICT for the educational and professional environment. In this research, it was determined that it is the young people who, being students of the Secondary School Teacher Training in Pedagogy and Social Sciences of the Faculty of Education Sciences of the Universidad Panamericana, have intermediate skills that allow the development of the educational environment, but that these skills, abilities and knowledge can be strengthened, optimized and improved.

In this scenario, Universidad Panamericana provides different technological resources as tools for students. Among these supports that were recognized by the students (120) of the faculty are: 80% of cases identified educational platforms (Blackboard). In addition, Universidad Panamericana provides access to Teams since they use the institutional e-mail that enables them to use Microsoft licenses. In addition, 74.2% identified the Virtual Library, and Universidad Panamericana provides access to this service: eLibro, EBSCO and Digitalia.

Based on the results it can be inferred that Universidad Panamericana provides rural students with digital resources that contribute to strengthen their ICT skills in the learning process. It is inferred that the way in which the university can strengthen and contribute to the development of ICT competencies in rural Guatemala is by providing the technological and virtual structure for its students, but at the same time, training them to be managers of the skills and knowledge acquired, so that they are able to transfer the knowledge to other people or groups, according to their economic, social, political or cultural realities.

The area of influence of the High School Teacher Training Program has a greater demand in the regions of Petén, Huehuetenango and Sololá-Quiché. In Guatemala these regions are recognized as having a larger number of inhabitants, multiethnic and multicultural, areas that are remote and with high levels of poverty, which represents a challenge for Higher Education in Guatemala, especially in access to ICTs.

The development of ICT competencies in rural Guatemala, at an optimal level, represents a challenge that must be solved by having a strategic approach for the formation of skills and knowledge related to new technologies and that this is congruent or compatible with the value system, culture, and economy of the students of the Secondary School Teacher Training in Pedagogy and Social Sciences. This approach contributes to the development of ICT competencies based on a scenario of respect, tolerance, inclusion and ethics for the different actors in the educational process.

The ICT competencies of the students are functional for educational environments that involve elementary activities in a face-to-face model (use of technological devices, use of computers, projectors or others) and elementary activities in virtual modality such as: receiving online classes through educational platforms, management of receiving and sending assignments electronically, use of virtual media for communication, among others. However, it is inferred that the knowledge and application of ICT competencies still needs to be strengthened.

The present study constitutes a first approach to describe the aspects related to ICT competencies in virtual education in rural contexts. However, due to the complexity involved in verifying the development of ICT competencies in students, it is suggested that the research be expanded to verify the situation of the problem in the teaching sector and the follow-up of students, in order to propose congruent (with the rural context) and holistic lines of action linked to the educational process of Universidad Panamericana.

References

Basantes-Andrade, A., Cabezas-González, M., & Casillas-Martín, S. (2020). Competencias digitales en la formación de tutores virtuales en la Universidad Técnica del Norte, Ibarra-Ecuador. *Formación Universitaria. 13*(5). http://dx.doi.org/10.4067/S0718-50062020000500269

El Banco Interamericano de Desarrollo. (2022). *¿Cómo reconstruir la educación postpandemia? Soluciones para cumplir con la promesa de un mejor futuro para la juventud.* https://www.ilo.org/sanjose/WCMS_755522/lang--es/index.htm

FONDETEL, (2019). *I Encuesta de brecha digital a nivel Nacional.* https://fondetel.gob.gt/encuesta-brecha-digital/

Godoy, M., & Calero, K. (2018). Pensamiento crítico y tecnología en la educación universitaria. Una aproximación teórica. *Revista Espacios*, *39*(25), 36.

González, J., Wagenaar, R., & Beneitone, P. (2004). Tuning-América Latina: un proyecto de las universidades. *Revista Iberoamericana de Educación 35,* 151-164. https://doi.org/10.35362/rie350881

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). Metodología de la investigación (6ª. Ed.). McGraw-Hill.

Islas, C. (2017). La implicación de las TIC en la educación: Alcances, Limitaciones y Prospectiva. *Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 8*(15), 861 - 876. https://doi.org/10.23913/ride.v8i15.324

Melgarejo Noceda, D., & Melgarejo Noceda I. (2022). El WhatsApp como herramienta educativa. *Revisión sistemática. Ciencia Latina Revista Científica Multidisciplinar, 6*(4), 339-360. https://doi.org/10.37811/cl_rcm.v6i4.2590

Pérez, R., Mena, E., & Elicerio, D. (2020). El nuevo enfoque de participación docente ante los retos y desafíos tecnológicos de la cuarta revolución industrial. *Revista Espacios, 41*(11), 24.

Pérez Valles, Carlos., y Reeves Huapaya, Emma. (2023). Educación inclusiva digital: Una revisión bibliográfica actualizada. Las brechas digitales en la educación inclusiva. *Revista Actualidades Investigativas en Educación*, *23*(3), 1-24. https://doi.org/10.15517/aie.v23i3.54680

Secretaría General Iberoamericana, (2023). *Carta Iberoamericana de Principios y Derechos en los Entornos Digitales.* https://www.segib.org/wp-content/uploads/Carta-Iberoamericana-de-Principios-y-Derechos-en-los-Entornos-Digitales_Es.pdf

UNESCO. (2016). *Competencias y estándares TIC, desde la dimensión pedagógica.* http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/Competencias-estandares-TIC.pdf

MLS - EDUCATIONAL RESEARCH (MLSER)
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IMPORTANCE OF LEARNING STYLES AS A TEACHING STRATEGY, IN A PRIVATE UNIVERSITY IN MEXICO

IMPORTANCIA DE LOS ESTILOS DE APRENDIZAJE COMO ESTRATEGIA EN LA ENSEÑANZA, EN UNA UNIVERSIDAD PRIVADA, EN MÉXICO

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ABSTRACT

This research seeks to identify the predominant learning styles to propose the best teaching strategies that promote meaningful learning and improve academic performance, by identifying the learning styles of a sample of first-semester university students, who were apply the Honey – Alonso Learning Styles Questionnaire (CHAEA). The sample consists of 24 participants. The focus of the study is quantitative and qualitative. The data obtained were analyzed using the statistical tools of Microsoft Excel. After processing the results, it was determined that the predominant learning style is reflective with 42%, with a moderate preference. In second place, the pragmatic style with 21%; in third place, the active style with 12.5% and lastly the theoretical style with 4%. With a percentage of 79%, the participants showed a unique learning style and 21% a combined style. All learning styles are present in the student sample. It was also identified that a student with less developed learning styles can obtain higher grade point averages than those students with more developed learning styles. With these results, some didactic strategies are proposed (concept maps, research work and case method, in the case of the reflective style), so that they are implemented according to the learning characteristics of the students and improve their academic performance. For future research, it is recommended to interview teachers, increase the size of the sample, and work with probabilistic sampling.

Palabras clave:

RESUMEN

Esta investigación busca identificar los estilos de aprendizaje predominantes para proponer las mejores estrategias de enseñanza que promuevan el aprendizaje significativo y mejore el rendimiento académico, mediante la identificación de los estilos de aprendizaje de una muestra de estudiantes universitarios de primer semestre, a los cuales se les aplica el Cuestionario Honey – Alonso de Estilos de

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estilos de aprendizaje, estrategias didácticas, rendimiento académico, educación superior.	Aprendizaje (CHAEA). La muestra consta de 24 participantes. El enfoque del estudio es cuantitativo y cualitativo. Los datos obtenidos fueron analizados utilizando las herramientas estadísticas de Microsoft Excel. Luego del procesamiento de los resultados, se determinó que el estilo de aprendizaje predominante es el reflexivo con 42%, con una preferencia moderada. En segundo lugar, el estilo pragmático con 21%; en tercer lugar, el estilo activo con 12.5% y en último lugar el estilo teórico con 4%. Con un porcentaje de 79%, los participantes mostraron un estilo de aprendizaje único y un 21% un estilo combinado. Todos los estilos de376prendízaje están presentes en la muestra de estudiantes. También se identificó que un estudiante con estilos de aprendizaje menos desarrollados puede obtener promedios de calificaciones más altos que aquellos estudiantes con estilos de aprendizaje más desarrollados. Con estos resultados, se proponen algunas estrategias didácticas (mapas conceptuales, trabajo de investigación y método de casos, para el caso del estilo reflexivo), para que sean implementadas según las características de aprendizaje de los estudiantes y se mejore su rendimiento académico. Para futuras investigaciones se recomienda entrevistar a docentes, incrementar el tamaño de la muestra y trabajar con muestreo probabilístico.

Introduction

As a result of the pandemic caused by the Covid-19 health crisis around the world, and Mexico was no exception, students and teachers at all educational levels had to move to online education. As mentioned in "Volvemos a clase, el impacto del confinamiento en la educación", research conducted in 2020 in Spain by Fundación SM and the Instituto de Evaluación y Asesoramiento Educativo, the pandemic and the confinement generated a new, unexpected, complex and difficult situation in the teaching-learning processes: learning at a distance without previous experience. None of the actors in the process were prepared for this new experience.

Today, despite more and better access to technology and a wide range of educational offerings, this is not reflected in improved student performance, which translates into academic failure. Failure to meet learning objectives is a consequence of the absence of appropriate teaching strategies.

According to Medina-Gual (2021) the most serious thing that happened in education as a result of the 2020 health crisis is that student learning was affected because few hours were dedicated to learning activities. From the main findings of the research that was conducted during the pandemic, it was identified that to interest students, broaden their knowledge and enable them to use the available information more effectively through the use of technology. These studies suggest that learning methodologies should combine the use of technology with active and collaborative learning strategies, in which students work together to solve problems.

Although much has been said that during the pandemic the level of learning was low, (Medina-Gual, 2021) and Arnove (2020) mention that what matters is not the greater or lesser amount of knowledge deposited in the minds of the students, but the value of what they learned for their lives.

This value is appreciated if the student improves his or her academic performance. In fact, Bustinza, Durán and Quintasi (2006) mention that, in order to improve academic performance, it is important to adapt the learning process to the personal characteristics of each student. For this reason, it was necessary to carry out this research, since it allows to know the different ways that students have to carry out their learning and from this, to be able to propose teaching strategies that add value to the academic and personal life of young students.

Nowadays it is common to find teachers who teach with strictly theoretical or expository teaching strategies, where for them the most important thing is a blackboard, a screen, a projector and a power point presentation to teach their students. This situation can be demotivating for a certain group of students, resulting in a marked lack of interest in learning.

Since students' learning processes are not the same, the strategies designed by teachers should not be the same for all students. (Aragón García and Jimenez Galán, 2009). Because of this, it is convenient for teachers to consider learning styles as a fundamental element in the design of teaching-learning strategies. Today it is essential to understand how the new generations learn. This will allow us to identify the best teaching methods and strategies that adapt to their profile and needs and to reinforce those aspects necessary to achieve meaningful learning, and at the same time, improve their academic performance.

The specialized literature promotes the idea that strategically aligning learning styles and didactic strategies could generate meaningful learning and maximize students' academic performance.

The concept of Learning Styles is reviewed and analyzed in specialized literature in this research. The Honey-Alonso Questionnaire of Learning Styles (CHAEA) is applied to a sample of 24 participants to identify their learning styles. The objective of this research is to identify the learning styles of first semester undergraduate students through the application of the CHAEA questionnaire in order to propose the best teaching strategies for each style.

The present research has a combined design of both approaches (quantitative and qualitative). The predominant learning style is identified as reflective with 42%, with a moderate preference. In second place, the pragmatic style with 21%; the active style with 12.5% in third place and in last place the theoretical style with 4%. Seventy-nine percent of the participants show a single style and 21% a combined style. All learning styles are present in the sample group. Based on the results obtained, some teaching-learning strategies are proposed, according to the predominant learning style of the students, to facilitate their learning.

Method

Design

Mixed approach research (quantitative and qualitative). A descriptive, quasi-experimental, correlational-causal methodology was chosen. Data were collected through the application of the Questionnaire of Learning Styles (CHAEA) to identify the predominant learning styles of the students. With a descriptive design, which aims to specify the characteristics and profiles of the people under analysis. For this specific research, the learning styles of a group of incoming university students are explored in a qualitative way, as well as a quantitative analysis was carried out.

According to Flick (2015), the goal of qualitative research is often to produce knowledge that is relevant to practice, meaning knowledge relevant to generating solutions to practical problems. For this research, the qualitative approach means proposing options aimed at strengthening the teaching-learning process, and above all, considering those teaching practices that do not take into account the importance of learning styles, this with the objective of favoring the learning and academic performance of higher education students.

Participants

The sample with which we worked was an intact group; that is, it was an already constituted group, which means that no random selection of the participating subjects was made. They were the same as those considered for this study because they were enrolled in the Introduction to Entrepreneurship course, in the period January-May 2022. The group of students has the following characteristics:

Table 1
Characteristics of the sample group

School Cycle	January - May 2022
Subject and Key	Introduction to Business - ADM1401
Semester	First
Group key (NRC)	90865
Total students enrolled	27

Note. Source: own elaboration with data from Banner System, UAQ, 2022

Considering the didactic and academic purposes associated with this group, the sample is considered significant. The distribution of the sample by gender is presented in table two.

Table 2
Distribution by gender

Genre	Frequency	Percentage
Female	15	56%
Male	12	44%
Total	27	100%

The distribution of the sample by race and gender is shown in Table 3.

Table 3
Distribution of the sample according to career

Career	Number of students	Percentage	Men	Women
Business Management and Administration	12	44	7	5
Management of Entertainment Companies	3	11	1	2
Finance and Public Accounting	2	7	2	0
Strategic Marketing	6	22	0	6
Information Technology and Digital Business (engineering)	4	15	2	2
Total students enrolled	27	100	12	15

Regarding the number of men and women in each professional career, there are notable differences in the case of Strategic Marketing (6 women and 0 men), this is due to the fact that in this professional career there is a greater number of women enrolled. As

can be seen in Table 3, the study subjects were of very diverse profiles, which favored the research, since they had different learning styles.

Sampling

In this research, the sample was not selected through a formal random procedure, as it followed a logic of sampling by accessibility and convenience. It was decided to work with a group of incoming students, enrolled in the Introduction to Business, in the period January-May 2022.

The CHAEA questionnaire was applied to 89% of the students (24 out of 27) -since 3 of them did not attend the session on the day of application- in order to know which learning style they use and predominates in them. This facilitates having group results to address the learning needs of this particular group without the intention of making generalizations.

Instruments

Designed by Catalina Alonso, Domingo Gallego and Peter Honey (1994), the instrument used to characterize the variable Learning Profiles, the Honey Alonso Questionnaire of Learning Styles (CHAEA), derived from Honey & Mumford's Learning Style Questionnaire, belongs to the family of questionnaires that consider learning styles as relatively stable and flexible learning preferences. (Coffield, Moseley, Hall, and Ecclestone, 2004)

This questionnaire adapted for Spanish-speaking university students is widely validated, both in Spanish-speaking countries in general (Rodríguez, 2006) and for being the most widely used in Spanish-speaking countries (Garcia Cué, Santizo Rincón and Alonso Garcia, 2009), in addition to allowing the statistical analysis and correlation of variables, with a limited number of variables, as an exploratory approach to the problem.

This questionnaire consists of 80 dichotomous response items, 20 of which correspond to each learning style and are randomly distributed in such a way that the maximum score that can be obtained is 20 points for each style. The dichotomous score described is: agree (+ sign), or disagree (- sign). The absolute score that each subject obtains in each group of 20 indicates the level reached in each of the four styles. The abbreviated general scale of learning style preferences developed by Alonso was used to classify style preference. This scale facilitates the meaning of each of the scores, since it makes it possible to know who is in the average, who is above and who is below.

Data collection

For data collection, authorization was requested from the corresponding authorities of the Universidad Anáhuac Querétaro to have access to the students, who participated on a voluntary basis.

An explanation was given to the students on ethical and confidentiality issues, explaining the purpose of the questionnaire that was applied, agreeing on a date and time with the University's directors. Thus, the CHAEA Questionnaire was applied to 24 students of the first semester group who took the subject Introduction to Business and who agreed to participate in the research, explaining to the students the professional and academic interests in order to identify the learning styles of each one of them. The questionnaire was administered in 25 minutes. It was not necessary to eliminate any of the questionnaires due to incomplete responses.

After the fieldwork, the general data of the participants (name and professional career) as well as the results obtained in the application of the CHAEA questionnaire were

captured using the Excel program version 2017, in which the data were tabulated and descriptive statistical techniques (averages, frequencies, variance, etc.) were performed

Data analysis

Table 4 shows the scores of each participant for each learning style, the predominant style and its intensity (cumulative total). There is a predominance of a single learning style for most of the participants; however, there are some cases that share 2 styles.

Table 4

Learning style scores and predominant learning style

#	Genre	Career	A	R	T	P	Predominant Style	Total Accumulated
1	F	DAE	10	9	6	7	A	32
2	F	TIND	12	16	13	16	R-P	57
3	M	DAE	11	13	11	12	R	47
4	M	DAE	19	12	12	15	A	58
5	F	DAE	11	13	15	15	T-P	54
6	M	TIND	8	19	15	11	R	53
7	F	DEE	14	13	14	15	P	56
8	F	ME	13	12	12	13	A-P	50
9	M	TIND	12	14	12	11	R	49
10	F	ME	18	15	14	11	A	58
11	F	ME	15	16	15	14	R	60
12	F	ME	12	16	15	12	R	55
13	F	TIND	13	15	16	17	P	61
14	F	ME	10	18	18	13	R-T	59
15	M	DAE	10	14	10	16	P	50
16	F	DEE	10	10	8	13	P	41
17	M	DAE	12	15	14	14	R	55
18	M	FICO	10	15	13	12	R	50
19	M	DAE	13	16	14	16	R-P	59
20	M	DAE	9	17	15	10	R	51
21	F	DAE	12	14	15	11	T	52
22	F	DAE	11	10	12	15	P	48
23	M	DAE	12	16	12	10	R	50
24	F	DAE	13	16	15	13	R	57

Note. DAE (Business Administration and Management); DEE (Entertainment Business Management); FICO (Finance and Public Accounting); ME (Strategic Marketing) and TIND (Information Technology and Digital Business); Active (A); Reflective (R); Theoretical (T); Pragmatic (P); Reflective-Pragmatic (R-P); Theoretical-Pragmatic (T-P); Active-Pragmatic (A-P); Reflective-Theoretical (R-T).

Cronbach's alpha coefficient was used to measure the internal consistency of the scale. The alpha coefficient obtained for the total number of records was 0.54, which is considered acceptable for this research. Cronbach's alpha offers the possibility of evaluating how much the reliability of the test would improve or worsen if a certain item were excluded.

Results

Once the scores of each of the participants were obtained, the predominant style of each student by professional career was determined. The criterion for determining the predominant learning style was: 1) higher score and 2) equal (higher) scores.

Table 5
Scores for learning styles by career path

Career	Learning Styles							
	A	R	T	P	R-P	T-P	A-P	R-T
DAE	2	5	1	2	1	1	0	0
DEE	0	0	0	2	0	0	0	0
FICO	0	1	0	0	0	0	0	0
ME	1	2	0	0	0	0	1	1
TIND	0	2	0	1	1	0	0	0
Total	3	10	1	5	2	1	1	1

Interpreting the data in Table 5, we obtain: 3 students with active style (12.5%); 10 students with reflective style (42%); 1 student with theoretical style (4%); 5 students with pragmatic style (21%); 2 with combined reflective-pragmatic style (8%); 1 with combined theoretical-pragmatic style (4%); 1 with combined active-pragmatic style (4%) and 1 with combined reflective-theoretical style (4%).

For Business Management and Administration students, the predominant style is Reflective, the same as for Finance and Accounting students, Strategic Marketing students and Information Technology and Digital Business students; while for Entertainment Management students the predominant learning style is Pragmatic.

Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style.

The predominant style of most students is reflective, followed by pragmatic and active. This information was taken into account when selecting didactic strategies to be implemented in the classroom according to the learning styles identified.

Table 6 shows the predominant learning style by gender:

Table 6
Learning style by gender

Genre	Learning Styles							
	A	R	T	P	R-P	T-P	A-P	R-T
Female	2	3	1	4	1	1	1	1
Male	1	7	0	1	1	0	0	0
Total	3	10	1	5	2	1	1	1

It can be observed that the predominant learning style in the female gender is pragmatic (28.5%), while the male gender has a greater preference for the reflective style (70%).

Regarding preferences, Alonso, Gallego and Honey (1994) propose the scores for each of the learning styles for each of them, as shown in Table 7:

Table 7
General scale of preference in learning styles

	10%	20%	40%	20%	10%
			Preference		
	Very Low	Download	Moderate	High	Very High
Active	0-6	7-8	9-12	13-14	15-20
Reflective	0-10	11-13	14-17	18-19	20
Theoretical	0-6	7-9	10-13	14-15	16-20
Pragmatic	0-8	9-10	11-13	14-15	16-20

Note. Source: Alonso, Gallego and Honey (1994).

According to the results of the questionnaire applied, the students who participated in the study have the following preferences in each of the learning styles, as shown in Table 8.

Table 8
Preference and learning styles

Learning styles	Media	Standard deviation	Preference
Active	12.08	2.55	Moderate
Reflective	14.33	2.49	Moderate
Theoretical	13.16	2.61	Moderate
Pragmatic	13	2.41	Moderate

According to the above, it is observed that, on average, the participants have mostly made use of the reflective style (14.33), with a moderate preference, according to the Baremo, with a dispersion with respect to its average value of 2.49. On the other hand, the active style (12.08) is the least used by the participants. It is important to note that the 4 learning styles are not mutually exclusive.

For this research it is also important to identify that a student with less developed learning styles can obtain higher grade point averages than those students with more developed learning styles. Also, the fact that a student has more developed learning styles does not directly imply better academic performance, expressed through grades.

In this sense, the degree of development of learning styles is not a determining factor in students' academic performance. The above is shown in Table 9, which considers only 13 of the 24 students in the group, to exemplify the situation.

Table 9
Learning style and academic performance

#	Genre	Career	Predominant learning style	Cumulative total	Intersemester Evaluation	Final Evaluation
1	F	DAE	Active	32	9.8	10
2	F	DEE	Pragmatic	41	9.0	9.4
3	M	DAE	Reflective	47	9.2	9.1
4	F	DAE	Pragmatic	48	9.5	9.4
5	M	TIND	Reflective	49	9.3	9.7
6	F	TIND	Reflective - Pragmatic	57	8.5	9.8
7	F	DAE	Reflective	57	9.8	9.4
8	M	DAE	Active	58	6.7	9.1
9	F	ME	Active	58	8.4	8.5
10	F	ME	Reflective - Theoretical	59	9.1	9.2
11	M	DAE	Reflective - Pragmatic	59	6.3	7.9
12	F	ME	Reflective	60	9.3	9.1
13	F	TIND	Pragmatic	61	9.5	9.4

During the January-May 2022 semester, 2 evaluations were applied (inter-semester and final). The student labeled #1 has the lowest cumulative total of the sample of participants, yet his average scores are the highest. On the other hand, the student labeled #11 has one of the highest figures in the cumulative total, however, his average grades are lower than the rest of the students presented in the table. Same situation with student #8.

In this research it was found that the predominant learning style in most of the participating students is reflective (42%), followed by pragmatic (21%), active (12.5%) and, finally, theoretical (4%). Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style. Similar to other research, all 4 learning styles are present in the entire participant sample. In addition, there are 4 combinations of two different styles.

The sample means allow placing the four learning styles in a moderate preference, which can be interpreted as the possibility of becoming high or low, depending on the teaching strategies implemented in the classroom by the teacher and the learning strategies used by the students.

In the research "Strengthening learning styles to learn to learn", prepared by Rodríguez Carracedo and Vázquez Carro (2013), the authors conclude that it is essential for teachers to know the predominant learning styles of their students and thus adapt, as far as possible, their teaching style to the learning style of each of their students and the group in general.

In his analysis of some pedagogical aspects that are key to optimize learning, González Peiteado (2013) argues that an efficient teaching action begins by reducing the differences between teaching styles and learning styles and therefore, it is imperative that teachers know the ways to approach their students' learning.

With the results obtained in this research, it is considered that students with a preference towards a specific learning style learn better when teaching strategies integrate activities appropriate to their predominant style.

Table 10 shows some examples of teaching strategies suitable for different styles.

Table 10

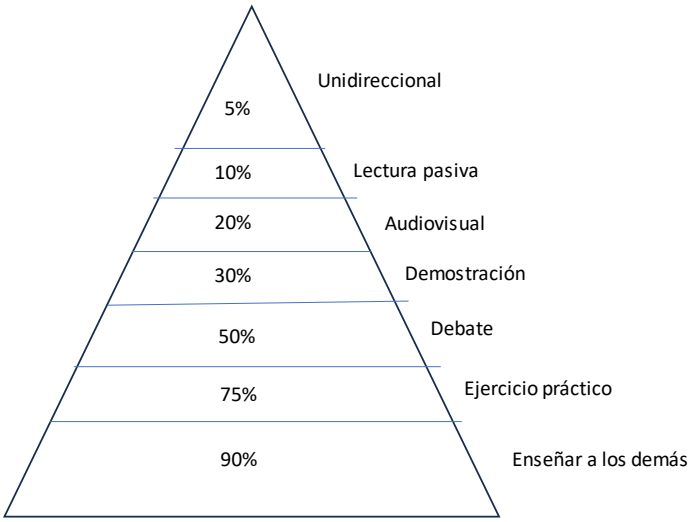
Teaching strategies and learning styles that favor

Teaching Strategy	Learning Style that favors
Brainstorming Allows the free presentation of ideas, without restrictions or limitations, in order to generate original ideas or new solutions	Active
Case Method Written description of an event that occurred in the life of a person, group or organization, which may be real or hypothetical, but constructed with characteristics analogous to those presented in reality	Active, Reflective and Theoretical
Problem-Based Learning The teacher presents to the group a situation taken from reality and related to the contents of the course that is expected to be addressed by the students or as a group. The key to this strategy is the way in which students can identify what they need to address the problem situation and the skills they develop to solve it	Pragmatic
Exhibition Presentation of a logically structured topic, where the main resource is oral language, although it can also be written text. It provides structure and organization to cluttered material and can extract the important points from a wide range of information.	Pragmatic, Active and Reflective
Research Work Personal or group work that helps to raise and seek solutions to problems that arise in real life. In this part, the student collects, analyzes and reports the following information	Active, Reflective, Theoretical and Pragmatic
Internet search Students find online sources of information through search engines	Active, Reflective, Theoretical and Pragmatic
Concept Mapping As a means of representation that allows visualizing the concepts and propositions of a text, as well as the relationship between them	Active, Reflective, Theoretical and Pragmatic
Use of Educational Platforms Students, in different geographic locations, can access all course materials in any modality and interact with their teachers and classmates	Active, Reflective, Theoretical and Pragmatic

Note. Source: own elaboration with information taken from Garcia Cué, Sánchez, Jiménez and Gutierrez (2012, p. 8-9).

To reinforce the above, Figure 1 shows the learning pyramid, which represents the learning rate as a function of the teaching method.

Figure 1
The learning pyramid



Note. Source: National Training Laboratories of Bethel (year not available)

Reflecting on what the learning pyramid shows, we can comment that the more a didactic strategy helps to improve learning, the more effective it is considered to be. In other words, one teaching strategy is considered more effective than another if it results in better assimilation of the material presented.

Discussion and conclusions

In this research, the learning styles of a sample of incoming higher education students were identified. The predominant learning style is reflective, secondly, pragmatic, followed by active, and in last place of preference, the theoretical style. All learning styles are present in the group of participating students. Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style.

Individuals have a preference for certain learning styles and for learning to be effective, they require a teaching style that is appropriate to their way of learning. Knowing students' learning styles can improve teaching effectiveness.

With the results obtained, we have that students with a tendency towards a learning style, if appropriate didactic strategies are implemented, their learning is better. Identifying students' learning styles serves as a starting point towards a contextualized didactic planning adapted to the different learning styles of the students, which consists of identifying the learning styles of the students from the beginning of the course, since it allows the teacher to know how they learn. This is fundamental in order not to design didactic strategies focused only on the teacher's interest and style.

Likewise, the educational level, the duration of the cycle, the learning objectives, the thematic contents, the evaluation criteria, as well as the educational model of the institution must be considered, so that all these elements can be strategically aligned in order to integrate a set of effective and adequate didactic activities for each learning style.

Higher education institutions should promote active pedagogies that foster meaning-directed learning styles, based on critical thinking and student autonomy, which in turn will enhance academic achievement. The university professor must foster learning environments that encourage dialogue, interaction among students, and timely feedback, so that the student is responsible for and actively participates in his or her learning.

The reports found in the specialized literature support the idea that a teaching-learning strategy adapted to the predominant learning style of the students is more likely to promote meaningful learning than a task or activity irrelevant to the cognitive structure of the students.

The teaching strategies and styles employed influence learning, therefore it is recommended that teaching styles be modified to benefit all students. Active learning techniques, oriented to learning styles, allow the learner to develop better interaction and cooperation.

In the teaching-learning process, the teacher is fundamental, the cornerstone, but the student is the protagonist. Understanding that the classroom is a system of interaction and communication implies understanding that the teacher is not there to perform monologues, expecting respect and silence from his students; but, on the contrary, to understand that, as teachers, we enter the classroom expecting answers and questions from our students.

The class is a worthwhile experience. The university is a place of knowledge construction. What we do in class is worthwhile when it connects us with others who put into action an expression of the practice of their professional work. The classroom experience is fulfilled when real-time interactions take place in creative contexts, both in and out of the classroom. The moral decision to educate and build knowledge is a mark that must sustain the teacher's life. And that every time you enter the classroom you start that experience that both teachers and students want to live. Contemporary didactics that addresses the construction of knowledge through teaching practices in the complex world in which we live, is the path to follow that will lead us to reinvent the university classroom.

The students of the "future" will be students from much more diverse backgrounds than today's students. The number of foreign students will increase. International exchange programs will be growing and students will face increasing globalization. This evolution towards greater diversity and mobility will mean many challenges for the teacher, so adapting pedagogical methods to the different learning styles of students will be crucial in the teaching job.

If as teachers we are able to dream, imagine, design, think, anticipate, co-create and invent, we will understand that true learning is possible. When all young people can access and complete university and receive a quality education that allows them to create a more just world, we will know that the effort will have been worthwhile.

References

Alonso, C.M, Gallego, D. J., & Honey, P. (1994). *Los Estilos de Aprendizaje. Procedimientos de diagnóstico y mejora.* Ediciones Mensajero.

Altamirano-Droguett, J. E., Araya-Crisóstomo, S. P., & Contreras, M. P (2019). Estilos de aprendizaje y rendimiento académico de estudiantes de la carrera de obstetricia. *Revista Ciencias de la Salud, 17* (2), 276-292. https://doi.org/10.12804/revistas.urosario.edu.co/revsalud/a.7937

Aragón García, M. & Jiménez Galán, Y. (2009). Diagnóstico de los estilos de aprendizaje en los estudiantes: estrategia docente para elevear la calidad educativa. *Revista de Investigación Educativa*, (9), 1-21. http://www.uv.mx/cpue/num8/opinion/aragon_estilos_aprendizaje.html

Arnove, R.F. (2020). Imagining what education can be post covid 19. *Prospects, 49*, 43-46. https://doi.org/10.1007/s11125-020-09474-1

Bahamón Muñetón, M.J, Vianchá Pinzón, M.A., Alarcón Alarcón, L.L., & Bohórquez Olaya, C.I. (2012). Estilos y estrategias de aprendizaje: una revisión empírica y conceptual de los últimos 10 años. *Pensamiento Psicológico*, *10,* (1), 129-143. https://www.redalyc.org/articulo.oa?id=80124028009

Bustinza Araujo, C., Durán Aguilar, D., & Quintasi Quillas, J. (2006). Diagnóstico de los Estilos de Aprendizaje de Estudiantes de IV ciclo de la Especialidad de Educación Inicial. Tarea

Cándido Genovar, R. & Beltrán Llera, J. (1999). *Psicología de la instrucción. Variable y procesos básicos.* Síntesis.

Casasola Rivera, W. (2020). El papel de la didáctica en los procesos de enseñanza-aprendizaje. *Comunicación, 29*(1), 38-51. https://dx.doi.org/10.18845/rc.v29i1-2020.5258

Cervantes López, M.J., Llanes Castillo, A., Peña Maldonado, A.A., & Cruz Casados, J. (2020). Estrategias para potenciar el aprendizaje y el rendimienrto académico en estudiantes universitarios. *Revista Venezolana de Gerencia, 25*(90), 578-591. https://www.redalyc.org/articulo.oa?id=29063559011

Chiang Salgado, M.T., Díaz Larenas, C., & Arriagada Pizarro, P. (2016). Estilos de enseñanza y aprendizaje: ¿cómo dialogan en la práctica? *Revista de estilos de aprendizaje. 9*(17), 2-24. https://doi.org/10.55777/rea.v9i17.1045

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Learning Styles and Pedagogy in post-16 learning: A systematic and critical review.* The Learning and Skills Research Centre.

Diccionario de Ciencias de la Educación*.* (1983). Santillana.

Escurra, Mayaute, L.M. (2011). Análisis psicométrico del Cuestionario de Honey y Alonso de Estilos de Aprendizaje (CHAEA) con los modelos de la teoría clásica de los test y de Rasch. *Persona*, (14), 71-109. https://www.redalyc.org/articulo.oa?id=147122650003

Espinoza, Poves, J.L., Miranda Vílchez, W.A., & Chafloque Céspedes, R. (2019). Los estilos de aprendizaje VARK en estudiantes universitarios de las escuelas de negocios.

Propósitos y Representaciones, 7(2), 384-414. https://dx.doi.org/10.20511/pyr2019.v7n2.254

Flick, U. (2007). *Introducción a la investigación cualitativa.* Morata Paideia.

Flick, U. (2015). *El Diseño de Investigación Cualitativa.*Ediciones Morata.

Gaeta González, M.L., Reyes Vergada, M de L., González Rabino, M., Espinosa Jiménez, M., Gutiérrez Niebla, M. I., & Benitez Ríos, Y.T. (2020). Perspectiva de futuro, patrones de aprendizaje y rendimiento académico en estudiantes universitarios mexicanos. *Estudios sobre Educación, 39*, 9-31. https://doi.org/10.15581/004.39.9-31

García Cué, J.L, Sánchez Quintanar, C., Jiménez Velázquez, M.A., & Gutiérrez Tapias, M. (2012). Estilos de aprendizaje y estrategias de aprendizaje: un estudio en discentes de postgrado. *Revista de estilos de aprendizaje*, *5*(10), 1-17.

Garcia Cué, J.L, Santizo Rincón, J.A., & Alonso Garcia, C.M. (2009). Instrumentos de medición de estilos de aprendizaje. *Revista de Estilos de Aprendizaje, 2*(4), 3-12. https://doi.org/10.55777/rea.v2i4.886

Garger, S. & Guild, P. (1984). Learning Styles: The Crucial Differences. *Curriculum Review Journal*, *23*(1)*,* 9-12.

González Peiteado, M. (2013). Los estilos de enseñanza y aprendizaje como soporte de la actividad docente. *Revista De Estilos De Aprendizaje*, *6*(11). https://doi.org/10.55777/rea.v6i11.971

Honey, P. & Mumford, A. (1986). *The manual of learning styles.*Peter Honey Publications.

Honey, P. & Mumford, A. (1986). *Using our learning styles.* Peter Honey Publications.

León, O. & Monetti, J. (2014). Estilos de aprendizaje y enseñanza de la matemática en ingeniería. In *Memorias del Congreso Iberoamericano de Ciencia, Tecnología, Innovación y Educación*.

López Trujillo, A., Nava Monroy, M.E., & Moreno Colín, R. (2013). Exploración de los estilos de aprendizaje en estudiantes de la carrera de Biología. *Revista de Estilos de Aprendizaje*, *6*(11),118-138.

Matienzo, R. (2020). Evolución de la teoría del aprendizaje significativo y su aplicación en la educación superior. *Dialektika. Revista de Investigación Filosófica y Teoria Social, 2* (3*)* , 17-26. https://journal.dialektika.org/ojs/index.php/logos/article/view/15

McKenna, L., Copnell, B., Butler, A., &Lau, R. (2018). Learning style preferences of Australian accelerated postgraduate nursing students. *Nurse Education in Practice*, *28,* 280-284.

Medina-Gual, L. (2021). *Educar en contingencia durante la covid 19 en México. Un análisis desde las dimensiones pedagógica, tecnológica y socioemocional.* Fundación SM , A.C. 2021.

Prieto Navarro, L. (2017). *Autoeficacia del profesor universitario: eficacia percibida y práctica docente.* Narcea Ediciones.

Revilla, D. (1998). *Segundo Seminario Virtual del Departamento de Educación de la Pontificia Universidad Católica de Perú.* Obtenido de http://www.pucp.edu.pe/~temas/estilos.html

Rodríguez Carracedo, M del C. & Vázquez Carro, E. (2013). Fortalecer estilos de aprendizaje para aprender a aprender. *Revista de Estilos de Aprendizaje*, *6*(11), 19-37. https://doi.org/10.55777/rea.v6i11.969

Rodríguez Gómez, J. (2006). Validación del CHAEA en estudiantes universitarios. *Memorias*, *7*(1),116-136. http://memorias.um.edu.mx/ojs/index.php/rev/article/view/26

Solórzano Mendoza, Y.D. (2017). Aprendizaje autónomo y competencias. *Revista Científica Dominio de las Ciencias*, *3*, 241-253. https://dialnet.unirioja.es/descarga/articulo/5907382.pdf

Valdivia, F. (2002). *Estilos de aprendizaje en educación primaria.* Dykinson.

Vera Sagredo, A., Poblete Correa, S., & Días Larenas, C. (2019). Percepción de estrategias y estilos de aprendizaje en estudiantes universitarios de primer año. *Revista Cubana de Educación Superior, 38 (1)*. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0257-43142019000100006&lng=es&tlng=es

Villarroel, V. & Bruna, D. (2017). Competencias Pedagógicas que Caracterizan a un Docente Universitario de Excelencia: Un Estudio de Caso que Incorpora la Perspectiva de Docentes y Estudiantes. Concepción, Chile: Universidad del Desarrollo, Facultad de Psicología, Centro de Investigación y Mejoramiento de la Educación.

Vivas Vivas, R., Cabanilla Vásconez, E., & Vivas Vivas, W.H. (2019). Relación entre los estilos de aprendizaje y el rendimiento académico del estudiante de la carrera de ingeniría agronómica de la Universidad Central del Ecuador. *Revista Educación, 43*(1), 468-482. https://doi.org/10.15517/revedu.v43i1.28439

Woolfolk, A. (2014). *Psicología Educativa.* Pearson Educación.

MLS - EDUCATIONAL RESEARCH (MLSER)
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CURRICULUM IN THE SCHOOL CONTEXT: REFLECTIONS ON CONTEMPORARY PRACTICE

CURRÍCULO NO CONTEXTO ESCOLAR: REFLEXÕES SOBRE A PRÁTICA CONTEMPORÂNEA

CURRÍCULO EN EL CONTEXTO ESCOLAR: REFLEXIONES SOBRE LA PRÁCTICA CONTEMPORÁNEA

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ABSTRACT

There are countless motivations that lead to the path of research. In this case, the motivational reason was the desire to investigate the selection of content, by teachers who work in a specific school in the municipal education network of Salvador-Ba, with the aim of reflecting - and bringing into the field of discussion - the curricular proposals implemented in this teaching unit, seeking to understand how they determine the teaching praxis developed in everyday school life. To this end, the collected data analysis device was used, through the application of questionnaires to teachers and staff, whose analysis revealed that the majority believe that the school develops a curriculum that breaks with the idea of an institution reproducing the determined rules by society. However, it was observed that there is a gap between what is said and what is done, impacting - in a decisive way - on teaching practice and, consequently, on student learning. Therefore, we believe that it is necessary to break with all types of standardizing curriculum, seeking to promote new ways of teaching and learning, based on a curricular structure that guarantees students effective and meaningful learning, taking into account their sociocultural context, life experiences, needs, particularities and specificities.

Keywords:
Curriculum, education, teaching practice.

RESUMO

são incontáveis as motivações que levam ao caminho da pesquisa. No caso dessa, a razão motivacional foi o desejo de investigar sobre a seleção dos conteúdos, por professores que atuam em uma determinada escola da rede municipal de ensino de Salvador-Ba, no intuito de refletir - e trazer para o campo da discussão - as propostas curriculares implementadas nesta unidade de ensino, buscando compreender como elas determinam a práxis docente desenvolvida no cotidiano escolar. Para tanto, utilizou-se o

Palavras-chave:
currículo, educação, práxis docente.

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dispositivo de análise de dados coletados, por meio da aplicação de questionários a docentes e funcionários, cuja análise revelou que a maioria acredita que a escola desenvolve um currículo que rompe com a ideia de uma instituição reprodutora das regras determinadas pela sociedade. Contudo, observou-se existir um distanciamento entre o que se diz e o que se faz, impactando - de modo decisivo - na prática docente e, consequentemente, na aprendizagem dos alunos. Dessa forma, acreditamos que é preciso romper com todo tipo de currículo uniformizante, buscando promover novas formas de ensinar e aprender, pautadas numa estrutura curricular que garanta ao aluno uma aprendizagem efetiva e significativa, levando em conta seu contexto sociocultural, experiências de vida, necessidades, particularidades e especificidades.

RESUMEN

Palabras clave:
currículo, educación, práctica docente.

Existen innumerables motivaciones que conducen al camino de la investigación. En este caso, el motivo motivacional fue el deseo de investigar la selección de contenidos, por parte de docentes que actúan en una escuela específica de la red educativa municipal de Salvador-Ba, con el objetivo de reflejar - y traer al campo de discusión - las propuestas curriculares implementadas en esta unidad didáctica, buscando comprender cómo determinan la praxis docente desarrollada en el cotidiano escolar. Para ello se utilizó el dispositivo de análisis de los datos recolectados, mediante la aplicación de cuestionarios a docentes y personal, cuyo análisis reveló que la mayoría cree que la escuela desarrolla un currículo que rompe con la idea de una institución que reproduce las reglas determinadas por sociedad. Sin embargo, se observó que existe un desfase entre lo que se dice y lo que se hace, impactando - de manera decisiva - en la práctica docente y, en consecuencia, en el aprendizaje de los estudiantes. Por lo tanto, creemos que es necesario romper con todo tipo de estandarización curricular, buscando promover nuevas formas de enseñar y aprender, basadas en una estructura curricular que garantice a los estudiantes un aprendizaje efectivo y significativo, teniendo en cuenta su contexto sociocultural, experiencias de vida, necesidades, particularidades y especificidades.

Introduction

There are countless discussions about curriculum around the world, but there is no consensus on such a polysemic and complex subject, especially if we consider that its definition can vary according to the political-geographical location in which it is inserted, as well as its historical context. Likewise, we need to take into account the various types of pedagogical approaches that influence it, as well as the objectives for which it is proposed. Thus, any definition of a curriculum could be correct or incorrect, depending on whether it meets any of the above "requirements". Thus, initially, among the vast conceptual range on curriculum, we followed the guidelines of current studies and conceived the notion of curriculum as a field of struggle for meanings and re-significations which, expressing itself in the midst of tensions and power relations, contributes to the construction of identities. Therefore, we rely on the concept defended by Moreira and Candau (2007, p. 18), who define curriculum as "the school experiences that unfold around knowledge, in the midst of social relations, and that contribute to the construction of our students' identities".

There are many reasons why research is carried out: the search for answers to questions or hypotheses that arise in everyday life; the search for explanations when there are not enough elements to answer these questions, hypotheses and/or even solve problems; restlessness in the face of challenging situations that need to be overcome; the desire to get to know the object of research better, in order to plan actions that will help with new discoveries. In short, there are countless motivations that lead to research and Demo (2001, p. 12) gives us a very pertinent definition of what research could be: "intelligent dialog with reality, taking it as a process and attitude, and as an integral part of everyday life". It is from this perspective that we wanted to investigate the selection of content by teachers working in a particular school in the municipal education network of Salvador - state of Bahia (Ba), in order to reflect on the curricular proposals implemented in this teaching unit, seeking to understand how they determine the teaching praxis developed in everyday school life. To this end, we relied on the participation of the different social actors involved in the process of drawing up and implementing the school's curriculum proposal. We emphasize that the researcher is part of the context of the institution where the research took place.

The school is a small educational establishment and its administrative staff consists of a principal, two vice-principals, a secretary and a pedagogical coordinator. The teaching staff is made up of seven civil service teachers and one teacher under the Special Administrative Law Regime - REDA, distributed over two shifts. At the moment, there are only three general service assistants on staff, taking turns as lunch ladies; two Early Childhood Development Assistants (ADIS), one for each Early Childhood Education class, and two porters.

The school serves 284 students, distributed in the morning and afternoon shifts, in a total of ten classes, two in early childhood education and eight in primary education, grades 1 to 5. The community served by the school is populous and quite deprived, although it does have a few financially well-structured families. Most families survive on less than one minimum wage, income obtained through the Bolsa Familia program, small and precarious businesses, informal services and domestic labor.

In order to achieve the proposed research objective, we opted to analyze the data collected through questionnaires (open and closed questions). Between teachers and staff, we decided to administer the questionnaire to 100% of teachers and ADIs. As for

the other employees, we administered the questionnaire to 50% of them. The survey data was collected during the months of February, March and April two thousand and nineteen.

Curriculum: a social, political, educational and cultural tool

Our studies show that by the end of the 20th century, the number of people in the world had risen. In the 19th century, the curriculum was still divided into two paradigms: the trivium, which consisted of subjects such as grammar, rhetoric and dialectic, and the quadrivium, which consisted of music, arithmetic, geometry and astronomy. Already in the sec. In the 20th century, the curriculum focused on immigration, urbanization and industrialization. Then, in 1918, Bobbitt launched "The Curriculum", which assumed that the curriculum should be geared towards preparing children and young people to achieve the goals of the society in force, with ideas of standardization and efficiency.

Another important milestone for curriculum design, according to some research, occurred during the Chicago Conference in 1947. At this conference, Ralph Tyler set out the tasks of a curriculum theory, and in 1949 he presented the rationale for his principles in *Basic Principles of Curriculum and Instruction,* which became known as the Tyler *rationale*: 1. What educational objectives should the school strive to achieve? 2. What educational experiences can be offered that are likely to achieve these goals? 3. How can these educational experiences be organized efficiently? 4. How can we be sure that these objectives are being achieved?

According to Roldão (1999, p. 18), the curriculum approach changed again at the end of the 60s and beginning of the 70s. Also, according to the author, as a result of student demonstrations and oppositions that strengthened libertarian values, as well as the emancipation of the human person, teaching began to focus on the needs and interests of the student, emphasizing the contemporary significance of social issues, in an integrative approach to knowledge.

We are thus moving towards a conception of curriculum that aims to encompass the most significant contributions of the various theoretical perspectives, even if they are sometimes difficult to reconcile. From this perspective, the school curriculum seeks its sources of inspiration in the knowledge and needs of the social context, as Moreira and Candau (2007, p. 32) point out when they suggest that "the curriculum should seek to rewrite the usual school knowledge, bearing in mind the different ethnic roots and the different points of view involved in its production".

Thus, given all the context presented, this paper aims to promote reflection and discussion on the curricular practices developed in the daily life of the school where the research took place. The construction of this text is the result of a process of systematization, involving the participation of various actors who play a leading role in the day-to-day life of the school community. For this construction, we sought to discover and analyze important considerations about pedagogical thinking and doing at the institution, using the records produced and systematized in the period from February to April two thousand and nineteen, considering qualitative and quantitative data.

In this context, we also set out the concepts that guided our work, the advances and difficulties experienced, as well as the challenges and obstacles during the data collection process. The first step in obtaining the participation of the subjects involved in the research was to create a comfortable and trusting environment where everyone could feel comfortable expressing their ideas and points of view in a sincere manner. To do this, we needed to win their trust so that they could share the information we needed

to carry out the research. Therefore, in addition to authorizing us to carry out the research, we asked the management for a moment during the first Complementary Activity, the school's collective CA, held in February of that year, so that we could explain the purpose to the group, as well as the objectives of the research and how it would take place during the first three months of the 2019 school year.

We did so, and were able to count on the participation of almost all the teachers and staff at the school, without too many obstacles. Only two teachers refused to take part, claiming that they were uncomfortable with the situation. They showed a sense of displeasure at feeling supervised, even though the researcher had explained the purpose of the survey.

Methodology

In order to define the type of research intended, we used the theoretical contributions of authors such as Demo (2001) and Gil (2002), who understand research as a mechanism for adjusting, organizing and enabling understanding of a problem, which is proposed to be studied. Gil defines research as:

> A rational and systematic procedure that aims to provide answers to the problems posed. Research is required when not enough information is available to answer the problem, or when the available information is in such disarray that it cannot be adequately related to the problem. [...] research develops through a process that involves numerous phases, from the appropriate formulation of the problem to the satisfactory presentation of the results (GIL, 2002, p. 17).

In this case, it is essential to think/reflect on the path to be followed, as well as the strategies that should be developed, in order to create and implement an intervention proposal, if necessary, once the results have been obtained. In addition, the methodological path must be planned carefully, with a close relationship between the type of research and the object to be researched. Thus, this research is a case study and uses data collection, which points out possible ways to reach answers and/or solutions to the problem raised.

According to Gil (2008), quoting Yin (2005, p. 32), a case study can be defined as follows:

> A case study is an empirical study that investigates a current phenomenon within its context of reality, when the boundaries between the phenomenon and the context are not clearly defined and in which several sources of evidence are used (GIL, 2008, p. 58).

In this context, Thiollent (2002, p. 25) warns of the importance of understanding the role of methodology in research. For the author, methodology "consists of analyzing the characteristics of the various methods available, evaluating their capabilities, potential, limitations or distortions and criticizing the assumptions or implications of their use."

Thiollent also teaches us about the importance of studying and understanding the methodology, alerting us to the fact that this stage of the research guides the researcher in conducting the research, developing the problem, selecting definitions/concepts, hypotheses and the set of appropriate techniques for collecting information. As it is a case study, this type of research can be mixed. So, in order to obtain answers to the

problem proposed as the object of study, we opted to combine qualitative and quantitative methods.

From this perspective, we believe that the methodological route to understanding the proposed object of study is not a description of procedures that are simply followed, but rather strategies that are thought out and planned with a view to achieving the defined objectives. We spent three months interacting with the school community and the local community around the school, trying to gain their trust, their understanding of the work we were going to do and their permission to do it. These are all necessary elements for consolidating the research we set out to carry out, especially since violence and drug trafficking prevail in certain neighborhoods close to the school without any police intervention.

The field research data was collected during more than ten visits to the community between February and April of the year two thousand and nineteen. Initially, we collected the information needed to determine the research sample, taking into account the age range, length of time working in the profession and in that school, as well as the generational issues of the subjects taking part in the research. We checked and analyzed planning instruments, the school's political-pedagogical project (PPP), the curriculum guidelines that guide the teachers' pedagogical practice and actions, the school management and pedagogical coordination action plan, as well as other didactic-pedagogical materials.

Therefore, following the guidelines of Gil (2002), we chose to carry out the research with a sample corresponding to 100% of the school's teaching staff and 50% of the other employees. Based on Thiollent's (2002) conceptions, we took the position of researcher-observer, as we understood that this method involves observation in the field, document analysis, written records and the application of questionnaires.

Results

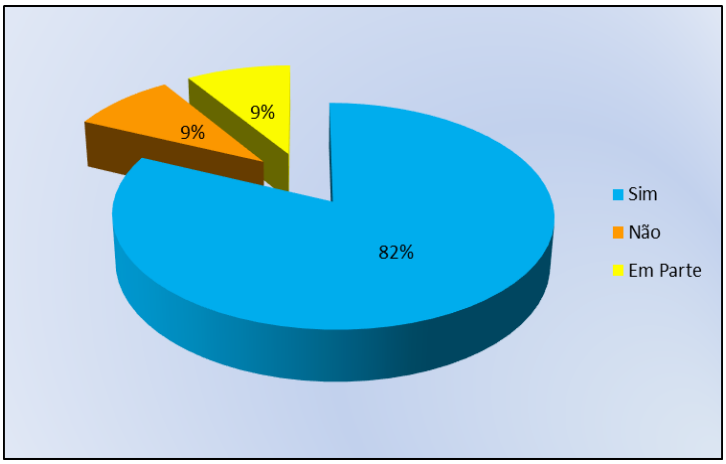
We used open and closed questions in the questionnaires, with the aim of understanding the universe surveyed. The open questions served as a basis for identifying the research subjects' impressions of the concept and importance of the curriculum, as well as its applicability in everyday school life. The closed questions, on the other hand, included personal data such as gender, age, length of professional career, time working in the school unit, as well as questions about the organization and articulation of the curriculum.

Closed questions

In this first moment, we present the results obtained through the closed questions of the questionnaires applied, when from the data collected it was possible to see that there is, in the school, a favorable environment for reflections on the curriculum, as well as rethinking its contents and practices.

Most of the teachers and staff have been working at the school for more than three years, meaning they know the reality of the students and the local community well. Of these, 66% work as a teacher, and 100% of them declared that they enjoyed the profession, without making any reservations. For 82% of those surveyed, including teachers and staff, the school makes its mission, vision and values clear to the community, as can be seen in the figure below.

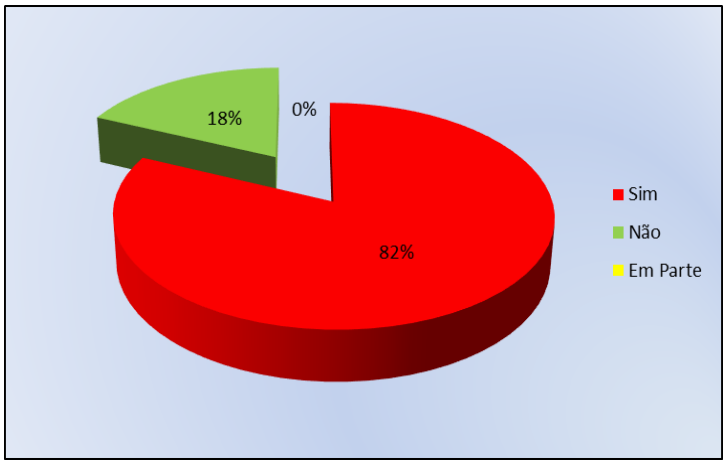
Figure 1
In your opinion, does the school make its mission, vision and values clear to the community?



According to the school's political-pedagogical project, the mission, vision and values of the educational unit where the research took place are as follows:

> To provide its students with teaching of quality and excellence, focused on learning in an effective and meaningful way, favoring the formation of ethical, creative, reflective, participatory and inquisitive subjects, respecting individualities within diversity. The school's mission is to form citizens who are critical, interactive, questioning and active in the society of which they are a part. Subjects who assimilate information and transform it into knowledge, and then use that knowledge for their own benefit and for the benefit of the community in which they live [...]. The school's vision is to prepare students to intervene in a critical and transformative way in the society in which they live, because we believe that knowledge is only meaningful to students when they understand its applicability, i.e. knowing how to manage the information acquired in order to extract and build new knowledge, giving new meaning to many others (PPP, 2014, p. 26-27).

Figure 2
Does the school's management and pedagogical coordination team meet with you to discuss compliance with the curriculum and alternatives to make it more dynamic in order to improve student learning?

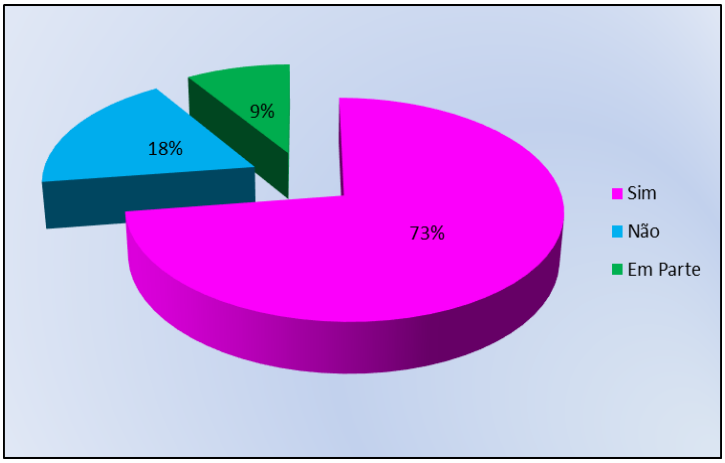


When analyzing figure 2, on the practice of meetings with the pedagogical coordination and school management to discuss and evaluate the actions developed from the educational curriculum, as well as to seek strategies and alternatives to improve student learning, 82% of the subjects surveyed stated that yes, these moments exist; however, 18% said that no, these moments do not exist. In other words, a small but significant portion of them believe that there is no time to discuss and evaluate the curriculum. What actually takes place are merely collective meetings that deal with various subjects, less so with the applicability of the curriculum and its results.

Reading and analyzing Figures 3 and 4 reveals that 73% of the teachers and staff at the educational establishment surveyed believe that the programs and pedagogical projects that exist at the school are developed in conjunction with the school curriculum, in the same way that the collective planning agendas include the school curriculum.

Figure 3

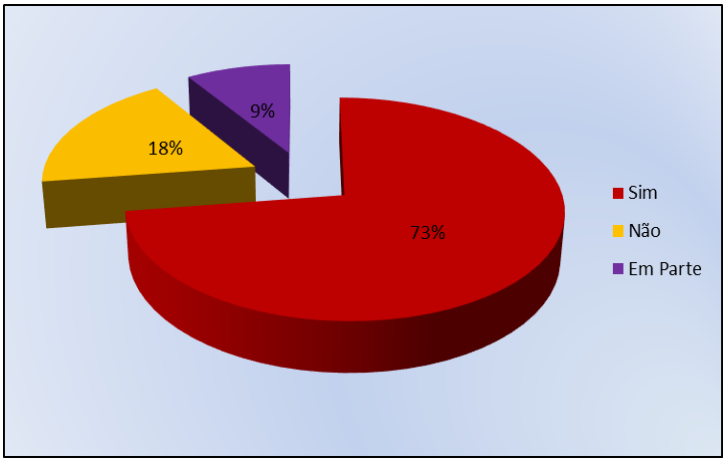
Are the school's existing programs and projects developed in conjunction with the school curriculum?



Note: Figure created by the authors based on research data.

Figure 4

Do the collective planning agendas (fortnightly and/or monthly) take into account the school's curriculum?



Thus, we can see that a large part of the subjects surveyed (18%) do not agree that there is a link between the programs and projects developed at the school and the curriculum adopted. In conversation with these professionals, we heard their criticisms of the concepts that guide the school's curriculum. This attitude leads us to conclude that only a minority of the professionals who work in the school where the research took place have a broader, more critical and questioning view of the school curriculum, since they are the only ones who realize, or at least admit, that the organization of the curriculum affects the organization of teaching practice, as well as strongly influencing the education of our students, often determining how these subjects will act in society when they are adults.

Figure 5

Is there a guiding document on which the pedagogical plans drawn up by the teachers are based?

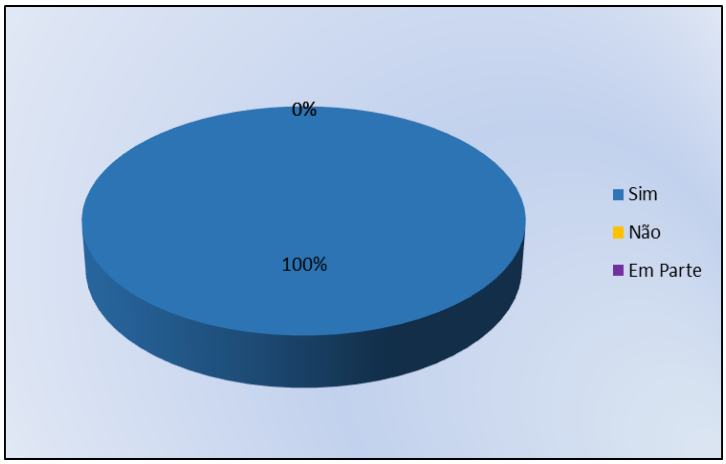


Figure 5, which refers to the existence of a guiding document on which the pedagogical plans drawn up by the teachers are based, shows that 100% of the subjects surveyed declared the existence of a political-pedagogical project for the school, which was built by many hands with the participation of members of all segments of the school community.

We consider this item to be positive, as we believe that the political-pedagogical project is an important instrument in education, through which the actions carried out in the school can be reconfigured, signifying goals and objectives. Complementing our thinking, Vasconcellos (1995, p. 143) defends the idea that the PPP "is a theoretical-methodological tool that aims to overcome the difficulties and obstacles that arise in the day-to-day running of the school in an organized, conscious and cooperative manner".

Finally, reading figures 6 and 7, on the importance of evaluating the curriculum proposal process in order to improve the quality of teaching offered by the school, as well as taking into account the experiences of the students and their families when selecting the content that makes up the school curriculum, we see that 82% consider this action to be important. On the other hand, only 55% of those surveyed believe that the knowledge students bring to school is taken into account when selecting what should be worked on/taught during the school year.

Figure 6
Is the evaluation of the process and the application of the curriculum proposal an important action in the search for the quality of teaching offered by the school?

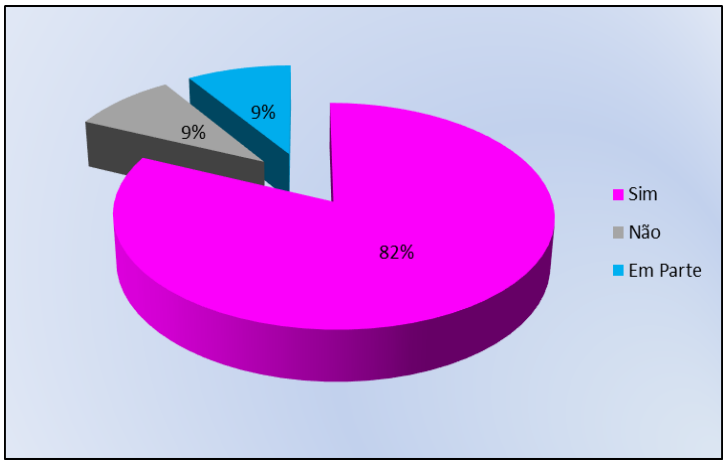
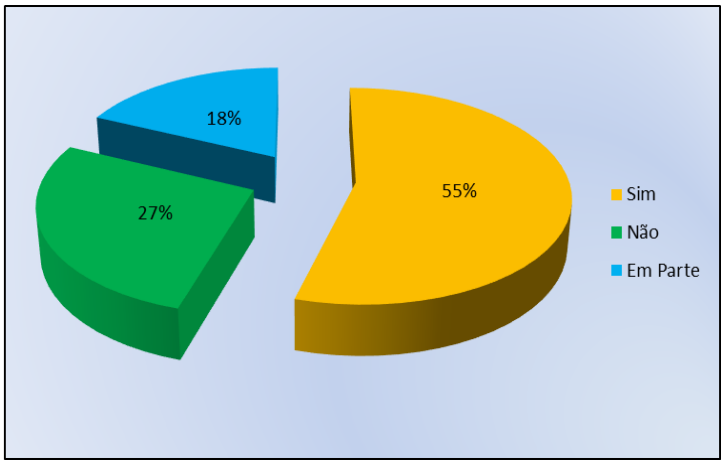


Figure 7
Are the experiences of students and their families taken into account when selecting content?



Looking at the figure above, we see that 27% of the teachers and staff who work at the school surveyed believe that the students' life experiences, which are so important for building new knowledge, are not taken into account in the teaching and learning process developed at the school. Based on our studies, we concluded that even though we are living in the 21st century, many schools still use the same practices as before. One of them is not valuing what the student brings as experience to the classroom, which could enrich and favor their learning process.

Open questions

In this second moment, the data presented deals with the open questions and, as these are subjective questions, we have selected only a few answers and transcribed them as the subjects wrote them.

How, when and with whom are the curricular contents to be taught and learned during the school year selected?

> The selection is made before the start of the school year, collectively and articulately, according to the learning milestones, the needs of the students, focusing on the central theme of the Department of Education (Interviewee A).
>
> With the management team, the pedagogical coordinator and the teachers, at the pedagogical week and meetings at the end of the two-month period (Deponent B).
>
> It's usually done at the beginning of each school year, with reviews every two months (Interviewee C).
>
> No selection of content is made in an organized and planned way (Interviewee D).

In the statements above, it was possible to perceive controversial information, as already reported in the previous section, in the analysis of figure 7, when 55% of those surveyed believe that the life experiences of students and family members are taken into account in the selection of content and 27% declare that they do not, that this information does not proceed. This situation could mean that many education professionals still confuse listing content with the action of selecting, which is quite different.

We also believe that, in fact, what happens in the school where the research was carried out is a list of contents; since we can't select contents at the beginning of the year if we don't yet know the students we're going to work with, if we don't yet know their needs and particularities.

What should a curriculum prioritize, considering that we educate citizens for life?

> A curriculum should prioritize reading and writing, environmental preservation, citizenship (rights and duties), family and interpersonal relationships (Interviewee A).
>
> Current issues from the student's daily life, their experiences and their view of the world, thus contributing to their human development (Interviewee B).
>
> It should prioritize not only basic content and cross-cutting themes, but also emphasize the experiences that students have built up throughout their lives, taking into account their reality (Interviewee C).
>
> Each student's baggage of experience (Interviewee D).

The curriculum is a political instrument that is linked to ideology, social structure, culture and power. Thus, the composition and elaboration of a school's curriculum proposal implies an understanding that the curriculum is more than just the contents of school subjects. That said, it is possible to see that most of the subjects surveyed understand that students' experiences and their conceptions of the world should be taken into account in the school curriculum, but there are still those who believe that the priority should still be formal content.

How do teachers need to be prepared to deal with changes in society and how do these changes affect the curriculum?

> Through continuing education courses. The curriculum can't remain static, it has to keep up with the transformations taking place in society (Interviewee A).
>
> Teachers need to be constantly training, seeking out new knowledge, improving themselves in order to face the many changes that are taking place in society very quickly (Interviewee B).
>
> Through professional development, in other words, by continuing their initial training (Interviewee C).

> They must always prepare themselves by dialoguing and interacting with the sciences, culture and diversity that are out there (Interviewee D).

All the issues surrounding pedagogical practice and its relationship with the curriculum, knowledge and the school's social function require continuous thought and reflection on this process. From the above statements, it is possible to see that the research participants understand the importance of constantly seeking professional improvement through continuing education; however, they were unable to express how the constant changes in society can influence the configuration of the school curriculum.

Is there a political-pedagogical project at the institution? How was it built? Collectively or by experts?

> Yes, there is, and it was built collectively, with contributions from the teaching staff, as well as joint discussions, observing the reality of the community where the school is located (Interviewee A).
>
> Yes, when I arrived at the institution the PPP had already been built. As far as I know, collectively (Interviewee B).
>
> Yes. With the whole school community and members of the council (Interviewee C).
>
> Yes, collectively, and then a review was carried out by a specialist from the Department of Education of the municipality of Salvador (Interviewee D).

The political-pedagogical project must be a process of permanent reflection, discussion and participation on the school's problems. The above statements lead us to understand that the PPP of the school where the research was carried out is the result of the collaboration and participation of all the segments that make up the school community, which is something very positive; because we believe that in order to guarantee the success of the actions implemented by this important pedagogical instrument, the subjects need to recognize themselves in it in order to endorse it.

What aspects are considered to facilitate and inhibit the involvement and participation of the school community in the construction and implementation of the school's political-pedagogical project?

> The lack of awareness on the part of the students' families is an inhibiting aspect of participation in this construction and democratic management is a facilitating aspect (Interviewee A).
>
> Currently, the facilitating aspect is the school transport that brings parents to school and the inhibiting aspect is their lack of will (Speaker B).
>
> Facilitators: transportation and meetings. Inhibitors: lack of awareness about the role of the school (Interviewee C).

In the accounts above, we understand that not all parents and students were as active as they should have been in the construction of the school's political-pedagogical project. We noticed in the statements made by the interviewees that the lack of awareness on the part of the students' families and guardians of the importance of the political-pedagogical project, as a guiding document for actions that facilitate the process of building knowledge, is an inhibiting aspect for the involvement and participation of the community in drawing up and implementing it. On the other hand, there was also a lack of awareness and understanding on the part of the subjects surveyed with regard to the facilitating aspects, since most of them naively stated that school transportation was a facilitating aspect for community participation in the construction of the political-pedagogical project.

How do you describe the participation of parents, family members, staff and teachers in the construction and implementation of the school's political-pedagogical project?

> The vast majority of family members take part in the activities developed by the school, but they don't bother to demand or monitor the actions of the project, nor do they follow the decisions of the school council (Interviewee A).
>
> The participation of the school community in the implementation of the PPP is active, but the participation of parents still leaves something to be desired (Interviewee B).
>
> Parents and family members are involved in the daily life of the school, but most of them don't come to the school, not even to the bimonthly meetings (interviewee CJ).

The statements listed above lead us to reflect on how the school's actions are being perceived by the school community and on how the school is establishing relations with the surrounding community; from the above-mentioned statements, it is possible to see that the students' parents and relatives hardly participate in the pedagogical actions developed at the school. It is therefore necessary to develop actions that bring the local community closer to the school community, with a view to motivating the family to participate more in the activities developed by the school, as well as in the students' school life.

What is included in the school's pedagogical policy? For example, are popular culture, diversity (sexual orientation, religion, culture, etc.), inclusion (of people with disabilities), evaluation, family-school partnership, sports practices, etc. included in this project?

> Popular culture, diversity, evaluation, family-school partnership, among others (Interviewee A).
>
> All the items mentioned in the question, taking into account the student's reality and social context (Interviewee B).
>
> All the items mentioned above, among other current issues (Interviewee C).
>
> Yes, they are. Also included in the PPP proposal is the issue of identity, values, environmental issues, among others (Interviewee D).

When analyzing the speeches regarding what is included in the school's political-pedagogical project, we found that the vast majority of those surveyed believe that the school's PPP proposal addresses its clientele in the most varied social aspects, such as: identity, values, culture, diversity, inclusion, as well as themes relating to social relations and current knowledge, which are indispensable for the formation of a critical, participative and active subject.

Therefore, in view of the above, we believe that it is necessary to think about breaking with any type of curriculum that is standardizing, breaking paradigms, seeking to promote new ways of teaching and learning, based on a curricular structure that guarantees students effective, efficient and meaningful learning, taking into account their socio-cultural context, their life experiences, their needs, specificities and particularities. To this end, these social subjects must participate in the construction and elaboration of the curriculum proposal implemented in their school.

Discussions and conclusions

The aim of this research was to investigate how content is selected by the teachers who work in a particular school in Salvador's municipal education network, in order to reflect on the curricular proposals implemented in this teaching unit, seeking to understand how they determine the teaching praxis developed in everyday school life.

At the end of our research, we concluded that most of the teachers who work in the school unit where the research took place believe that they develop a curriculum that breaks with the idea of an isolated institution that only reproduces the rules determined by society.

Based on the analysis of the information gathered, we also concluded that there is a favorable environment in the school for reflecting on the curriculum, as well as rethinking its contents and practices; however, it was observed that only a minority of the professionals who work in this teaching unit, where the research took place, have a critical and inquiring view of the curriculum, understanding that its organization influences both teaching practice and student education.

From the perspective adopted by the school, a large part of the education professionals who work there defend the idea that this institution is not isolated, disconnected from current reality, but inserted in a social context that is dynamic and inconstant, and because of this the school needs to constantly reinvent itself, seeking to keep up with the changes taking place in society, as well as meeting the expectations, desires and needs of the community it serves.

In fact, in the construction of the political-pedagogical project, we could see that the school sought to define a curriculum proposal that meets the needs of its clientele, providing opportunities to develop actions related to social relations, the construction of knowledge, in order to favor the autonomy of the student and the expansion of important and indispensable knowledge for the formation of an active, creative and transforming subject, active in the society of which he is a part.

We also see in the school's PPP a concern to help build and strengthen identities and teach values - so important and necessary for life in society, especially nowadays, without forgetting to consider the context and experiences of the learner. However, even though most of the subjects surveyed understand that students' experiences and their conceptions of the world should be taken into account in the school curriculum, we also observed that a significant proportion still believe that the priority should be formal content.

The school is not a serene space where absolute truths are taught and shared; on the contrary, doubts, uncertainties and questions permeate its daily life. Issues arising from the fickleness of society and culture itself, social, political and religious relations, people's way of being and living. And it is these doubts, uncertainties and questions that support the inquiries we make about the curriculum paradigm we develop in our schools.

Having said that, we conclude that, although the school is open to reflection and to rethinking pedagogical practice based on the curriculum, there is still a great distance between what we say and what we do, and this has a decisive impact on teaching practice and, consequently, on student learning.

References

Barbosa Moreira, A. F. (2001). A recente produção científica sobre currículo e multiculturalismo no Brasil (1995-2000): avanços, desafios e tensões. *Revista Brasileira de Educação, 18*, 65-81. https://www.redalyc.org/articulo.oa?id=27501807

Brasil. (2014). *Projeto Político-Pedagógico da Escola.* Secretaria Municipal de educação do município de Salvador - Bahia.

http://smec.salvador.ba.gov.br/documentos/Instru%C3%A7%C3%A3oNormativa-Lei10639.pdf

Demo, P. (2001) *Pesquisa: princípio científico e educativo.* Cortez Editora.

Gil, A. C. (2002). *Como elaborar projetos de pesquisa.* (3ª Ed.). Atlas.

Gil, A. C. (2008). *Métodos e técnicas de pesquisa social.* (6ª Ed.). Atlas.

Moreira, A. F. B.; Candau, V. M. (2007). *Indagações sobre currículo: currículo, conhecimento e cultura.* Ministério da Educação, Secretaria de Educação Básica.

Roldão, M. do C. (2009). *Currículo e cidadania: Inovação*.

Silva, T. T. da (2010). *Documentos de Identidade: uma introdução às teorias do currículo.* (3ª Ed.) Belo Horizonte.

Thiollent, M. (2002). *Metodologia da pesquisa-ação.* Coleção temas básicos de pesquisa-ação. (14ª Ed.). Cortez.

Vasconcellos, C. S. (1995). *Planejamento: plano de ensino-aprendizagem e projeto educativo.* Libertat.

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TRAINING PROJECT FOR THE DEVELOPMENT OF RESEARCH SKILLS IN NATURAL SCIENCES IN ECUADORIAN HIGH SCHOOL STUDENTS

PROYECTO FORMATIVO PARA EL DESARROLLO DE HABILIDADES INVESTIGATIVAS EN CIENCIAS NATURALES EN ESTUDIANTES DEL BACHILLERATO ECUATORIANO

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ABSTRACT

The scientific formation of students, regardless of their particular educational level, is a requirement in most countries. Educational systems declare the need to work on research, some as a curricular requirement and others as a need within comprehensive training, but worked extracurricularly. In the case of Ecuador, the regulatory documents of the unified general baccalaureate declare the scientific and integral formation of students in different spaces, despite the fact that educational practices are not always prosecuted towards these claims. In this article, the result of a research that proposes the treatment of formative research from the structuring of a project in the area of natural sciences, is exposed at the baccalaureate level of an educational unit; where the integration of materials, spaces and relationships with the socioeconomic and natural environment are essential. The research carried out is interesting, as it bets on the reflective and self-reflexive character, both individual and group, typical of qualitative research; despite the quantitative logic that prevails in the structure of the proposed project. The consensus criteria of experts and participants in the structuring, allow to assert the significance and sufficiency of the project for the development of

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investigative skills in students, and the required scientific and technological learning.

RESUMEN

Palabras clave:
investigación formativa, proyecto, Ciencias Naturales, Bachillerato

La formación científica de los estudiantes, independientemente del nivel educativo particular, constituye una exigencia en la mayoría de los países. Los sistemas educacionales declaran la necesidad de trabajar la investigación, algunos como exigencia curricular y otros como necesidad dentro de la formación integral, pero trabajada extracurricularmente. En el caso de Ecuador, los documentos reglamentarios del Bachillerato General Unificado, declaran la formación científica e integral de los estudiantes en diferentes espacios, a pesar de que las prácticas educativas no siempre se encausan hacia esas pretensiones. En el presente artículo, se expone el resultado de una investigación que propone el tratamiento a la investigación formativa desde la estructuración de un proyecto en el área de las Ciencias Naturales, en el nivel de Bachillerato de una Unidad Educativa; donde la integración de materias, de espacios y las relaciones con el entorno socioeconómico y natural resultan esenciales. La investigación desarrollada resulta interesante, al apostar por el carácter reflexivo y autorreflexivo, tanto individual como grupal, propio de la investigación cualitativa; a pesar de la lógica cuantitativa que prevalece en la estructura del proyecto que se propone. El criterio consensuado de expertos y participantes en la estructuración, permiten aseverar la significatividad y suficiencia de proyecto para el desarrollo de habilidades investigativas en los estudiantes, y el aprendizaje científico y tecnológico exigido.

Introduction

In the current educational context, it is of vital importance that Ecuadorian high school students acquire research skills in the natural sciences. These skills will enable them to develop critical and reflective thinking, as well as to successfully face the academic and work challenges of high school. In addition, research training has become an imperative need due to the rapid technological advancement and innovation that characterizes our world today.

The term "ability" is closely linked to the development of habits, skills and mental processes that enable individuals to be competent in the challenges that society presents to them in their lives. Current education seeks to promote the development of research skills through both dependent and independent exploration of knowledge. This allows to promote the capabilities and improve the performance of people in their environment.

Considering the current demands of the labor market and the preparation of high school graduates to face the upper secondary level, it is essential that they possess knowledge and attitudes related to research training. This will allow them to access better job opportunities and succeed in their university career according to the accelerated process of innovation and technology that we are experiencing today.

Through a training project, we seek to foster the development of critical and reflective thinking in students by providing them with practical experiences where they can apply their theoretical knowledge in real situations. In addition, it is intended to promote the analysis, synthesis and generalization of data and results obtained during the research. This project not only strengthens experimental competencies within the educational environment, but also establishes links between formal education and society. In this way, it is possible to contextualize the issues addressed by the students with the current needs of our society.

It is important to emphasize that the formation of habits, skills and abilities during general education and high school studies is a fundamental basis for enhancing academic performance in more demanding university environments. In these environments, research plays a crucial role in developing the competencies needed to work in various professional areas. The development of critical thinking and research practice in high school students provides a systematic structure to efficiently develop the required research skills.

The high school level in Ecuador, as the third level of school education, is characterized by the complementarity and interdisciplinary integration of the education received, preparing students for their continuation in higher education. In this sense, the importance of promoting innovation, understanding development and its limitations, working with chemical, physical and biological processes, as well as incorporating scientific and technological advances is recognized.

Emphasis is placed on the need to train students to make decisions in the face of complex environmental and cultural problems. As established in the programmatic documents, it is necessary for students to develop research skills through field work and experimentation as a basis for logical and critical arguments. Therefore, an education that fosters the integration of knowledge and applies scientific research methods to transform reality is increasingly crucial.

In relation to the latter, it is argued that the use of projects based on real local problems should be the main training mechanism in research for high school students. These problems may be identified by the students or teachers themselves during field work or presented by the latter based on previous exploratory research. The investigative

capacity is a personal process that allows reaching advanced levels coinciding with the acquired knowledge. It is important to determine specific areas in which to design strategies that help strengthen the students' research skills as a support for their self-training.

This issue is closely related to subjects in the area of Natural Sciences, which raises the opportunity to involve students and teachers in research on soil composition and the use of nanomaterials to improve local agriculture. The question then arises as to how to achieve active participation by students in these investigations.

The main objective of this article is to present a training project specifically designed to enhance research skills in Natural Sciences among Ecuadorian high school students. This project seeks to connect students with their environment and community, giving them the opportunity to address real problems related to this scientific discipline. The specific objectives are to describe a formative research project involving both students and teachers in the area of Natural Sciences at the Alfonso Laso Bermeo Educational Unit, located in Quito, Ecuador, and to structure the project in order to promote student protagonism and achieve an integral education.

Thus, this article aims to contribute to the educational field by presenting an innovative educational project that promotes the development of research skills in Natural Sciences among Ecuadorian high school students. It is hoped that the results obtained will serve as a solid basis for implementing similar strategies to promote academic success and comprehensive training in this relevant scientific area.

Research training is understood as a process that involves diverse actors and practices. Trainers, as human mediators, have the role of promoting and facilitating access to knowledge, the development of skills, habits and attitudes, as well as the internalization of values necessary to carry out research practice.

It is important to note that this training is not limited to a defined period of time. It is not simply a matter of completing training before conducting research. Research training also occurs during the research process itself and throughout the time an individual is a learner both inside and outside the school system.

Research training may have different emphases and use various procedures depending on the fundamental objective guiding such training. It is different to provide training oriented towards those who will dedicate their professional life to research (researcher training) than to offer it to those who need to improve their professional performance or apply research results in their field of work. There is also a form of training focused on developing mental structures and general skills to solve problems and achieve better results in everyday aspects. In other words, research training is a continuous and intentional process that involves different phases and objectives according to the specific needs of the subjects involved.

The training of researchers is a broad process that focuses on preparing individuals to perform professionally in the generation of knowledge in a specific field. This process has both a personal and institutional dimension, and is not limited only to formal educational programs. In addition, it is not subject to a specific time frame or unique modalities.

In the strictest sense, research training involves the preparation of people who seek to engage professionally in research. Several authors recognize the formative value of research for university students. For example, Vallejo et al. (2020), López et al. (2021), Sánchez y Murillo (2021), Pensado et al. (2022) y Espinoza (2022) have highlighted the difficulties students face when entering university and how research can provide them with scientific methods to construct knowledge for themselves, beyond just appropriating research results conducted by others.

Casanova (2020) argues that, before developing research skills in students, it is essential to form a system of attitudes based on affectivity and love for inquiry. This training should begin at the basic levels of education and continue through higher education. It also emphasizes that this comprehensive training must adopt a systemic approach. In this sense, Casanova (2020) states that the skills to be enhanced are: obtaining, processing and communicating information through research actions as a means to achieve academic objectives.

Blanco et al. (2019) point out that students' formative processes should be approached from a reflective and updated didactic perspective. It is necessary to prepare students to search for relevant information, process it properly and communicate results and conclusions using the scientific method. To achieve this, aspects related to health, family, environment and the community surrounding the students must be considered. The didactic processes for developing research skills must include both the planning and execution of such processes. In addition, Zambrano et al. (2022) suggest exploring new ways to enhance research skills so that students can become actively involved by searching for information on topics that are relevant and interesting to them.

Based on the premise that technological support is important nowadays, since it fascinates students and immerses them in a world of triple coding (sound, color and movement), it can be stated that these technological resources are motivating and attractive to students, which facilitates better academic performance and allows them to develop their capabilities (Miranda et al., 2020).

In relation to the development of research skills, Miranda et al. (2020) explain that students often face difficulties due to the need not only to understand the problem, but also to intervene to enhance skills related to information search, processing and communication.

At the baccalaureate level of education, research is considered to be a completely didactic and interactive process. During its application, students actively participate by appropriating and constructing their own knowledge through individual practice, group learning and discovery. It is in this context that innovative attitudes towards science and technology are fostered (Castro et al., 2019).

It is evident that both students and teachers face problems, since they do not always address real issues that can be converted into needs felt by society and, as a consequence, by the students themselves. These inconsistencies become more noticeable upon entering college.

Several studies confirm the problem that students experience when they move from high school to college in terms of their research habits. The teaching provided by high school teachers is deficient and most students lack the motivation to research and develop projects. There is a tendency toward passively receiving information from the teacher rather than being actively involved in carrying out projects (Castro et al., 2019).

According to Zúñiga et al. (2023), "an effective strategy to foster research skills in high school students is the realization of formative projects, which allow them to engage with their communities in real scenarios" (p. 1218). These projects facilitate the development of cognitive skills, such as critical and reflective thinking, as they are directly related to the project being developed. Students have the opportunity to perform analysis, synthesis and generalizations from data and results, as well as explore different literatures and phenomena to draw a line of inquiry focused on their research objectives.

In this sense, formative research involves acquiring a set of knowledge, skills, abilities and attitudes necessary to carry out research processes (García et al., 2018). It is essential that these qualities be cultivated from high school to promote a general culture among students that can be efficiently applied in higher education. As students are

confronted with increasingly complex research tasks during their academic training, they will be better prepared to develop the skills necessary for future research projects.

The participation of students in formative projects provides them with the opportunity to directly explore specific topics, such as monographs, which allows them to construct their own learning and develop a progressive research culture. According to Díaz et al. (2021)the use of the classroom project as a formative research strategy has made it possible to recreate cases within the educational environment and to achieve an integral concreteness of the teaching-learning process" (p. 11). This practice not only fosters an investigative culture among students, but also contributes to their integral formation as they face diverse educational processes.

In a scientific study conducted by Martínez (2019)a problem related to soil composition and its possible influence on local agriculture was identified. It became evident that indiscriminate agricultural practices can cause significant wear and tear on soils, especially in the midst of the global climate crisis. For this reason, there has been increasing interest in using smart materials produced from sustainable and inexhaustible reservoirs, such as naturally degradable carbon, that are less toxic and do not rely on fossil resources. In this context, the feasibility of biomaterials derived from naturally available raw materials has been studied, with emphasis on biopolymers obtained from biomass (Martinez, 2019).

Project-based learning, working with formative research in different contexts and Natural Science studies related to Chemistry and agriculture have been addressed by several authors. Among them are Castro et al. (2019), Espinoza (2020), Guerra et al. (2021), Carrillo et al. (2021), Yera et al. (2021), Zúñiga et al. (2023) y García (2023). These authors justify and suggest the importance of conducting research and developing projects for training purposes.

Method

The research conducted is based on the dialectical and socio-critical paradigm, which recognizes the development and self-development of the objects of reality through the contradictions that generate them. In addition, it is argued that the construction of knowledge is a self-reflective process that arises from the socio-individual needs of the groups, which drives the development of its members' capabilities. In this sense, the predominant approach used in this research is qualitative.

Theoretical methods such as analysis and synthesis were used to address the problem and determine the theoretical foundations, as well as to process the information presented. Inductive and deductive methods were used to study particular cases and generalizations derived from the study of soils and proposals related to agricultural problems and the use of nanomaterials.

The content analysis method was used to identify the essential categories and subcategories related to the conception of formative projects and research skills. This identification was carried out by reviewing scientific articles published in indexed journals, theses and books in recognized databases.

The Expert Criteria method was used to evaluate the feasibility, adequacy and relevance of the proposed training project. In this process, 10 experts were selected after calculating the competence coefficients on knowledge in educational projects and research skills, using a potential sample of 16 experts.

Once the experts were selected, the training project proposal was sent to them by email and WhatsApp, accompanied by a survey containing dichotomous questions. The

reliability of this instrument was evaluated by calculating Cronbach's Alpha coefficient using SPSS version 25 software. A value of 0.93 was obtained, which indicates a high internal consistency of the responses obtained from the experts.

In addition, SPSS version 25 was used as a statistical tool for the analysis of the instruments used in the survey. This tool made it possible to evaluate the reliability and validity of the data collected, as well as to identify possible patterns or trends in the experts' responses.

Thus, the Expert Criteria method, together with the calculation of Cronbach's Alpha coefficient using SPSS version 25 and the use of statistical tools for the analysis of the instruments, allowed a rigorous and reliable evaluation of the viability and relevance of the proposed training project.

The selection initially considered professional and ethical qualities, as well as academic or scientific level, in addition to their willingness to participate in the process. The target population included specialists involved in executive studies or formative and research processes within the educational field.

A coefficient of expertise was calculated based on their knowledge and the sources available to obtain it. Finally, 10 experts were selected: six with a medium-high coefficient and four with a high coefficient.

In order to determine the criteria for assessing the relevance, adequacy and potential viability of the structured project, the experts were provided with a detailed summary of the project components along with an explanation of how the project was constructed. A permanent exchange was maintained with the experts and the individual assessments were summarized until a consensus or favorable majority was reached.

Results

As an initial result, a formative project proposal has been developed to foster the research skills of high school students. This proposal seeks to promote learning through research. Although this educational approach has been conceived mainly in Higher Education institutions, the idea is defended that it is also possible to implement it at different educational levels.

Projects are considered to be mechanisms both for managing research in general and for promoting research training specifically. A research project is a structured and feasible objective that arises from an individual or common need among a group of people. Their resolution requires a scientific process to be carried out within the established time frame and with the appropriate human, material and financial resources.

If the project has a formative intention, then it must integrate two objectives: the formative and the investigative. These may coincide when the problem to be investigated is related to a specific formative aspect. In this proposal structured in this article, the formative intention directed to students of the third year of the General Unified High School in the Alfonso Laso Bermeo Educational Unit located in Quito, Ecuador, is integrated. The basic problem addressed is related to local agricultural development.

It is essential to involve students, teachers in charge of subjects related to Natural Sciences and community agricultural actors to jointly build this research-training project. In this way, learning in the classroom is combined with outdoor educational activities, as established by Ecuadorian regulations.

The training of the students must be in line with the methodology used in the structuring of the training project presented. This methodology consists of several steps:

Identification and argumentation of the basic problem: Identification should preferably take place in the natural context, where there are real perceived needs. Argumentation, on the other hand, can be developed from both theory and practice, covering different contexts or spaces. This involves time and dedication, but it also requires the participation of everyone involved. In this specific case, we consider those who feel the need and those who have the desire and capacity to satisfy it. Students and teachers related to the areas of knowledge of Natural Sciences are also directly involved.

On this particular occasion, a problem previously identified by the main author in previous research is used to proceed to find the necessary and sufficient arguments. It is important to bear in mind that students do not always have the knowledge required to address these issues, and often these topics are not even included in the programs or curricula of the corresponding subjects. Therefore, it is necessary to generate additional training to broaden the existing curricular contents, always relating them to the problems raised.

To carry out this identification of specific problems, a real case is used, located in Agrícola Jiménez in the canton of La Maná in the province of Cotopaxi. In this particular case, there is a problematic situation related to the soil in the area. La Maná is located on a plain in the western Andes Mountain range, about 150 km from the provincial capital, Latacunga. The canton's name is associated with the fertility of its soils, which are suitable for any type of crop.

The research seeks to investigate soil composition and how it influences agricultural performance, not only from a quantitative point of view but also from an environmentally sustainable perspective. To achieve this, it is necessary to systematize information related to soils, their composition and their influence on agriculture.

The search for and systematization of information for the theoretical argumentation: is carried out by the participants involved, especially the students and teachers of the Natural Sciences area. A guide with the thematic contents is provided and the necessary time is allocated to search and summarize the information. In addition, the form in which it will be presented is determined.

Among the topics to be addressed are: definition and classification of soils, characterization of agro-productive soils, identification of microflora and fauna existing in the soil, implementation of new technologies for soil conservation and improvement of soil quality. It is essential to promote the active participation of all those involved, especially students and teachers related to the subjects of the Natural Sciences area.

Table 1 shows a structured example of how to search for information on the specific topic "soils and soil improvement". This table serves as a reference within the proposed training project, providing support to high school students to develop research skills such as search and adequate systematization of information necessary to support their theoretical arguments.

Table 1
Structuring the search for information on soils and their improvement

Problem investigated.	Topics of study for its foundation.	Author's references (proposed by Martinez (2019))	Study participants.
Possible influence of soil composition on agricultural performance.	Soil definition and classification. Characterization of soils and agro-productive soils. Possible existing microflora and fauna depending on the soil. Implementation of new technologies for soil conservation. Improving soil quality.	Maurya et al. (2020), De Deyn and Kooistra (2021), Bernal et al. (2015), Basak et al. (2021), De Deyn and Kooistra (2021), Javed et al. (2021), Saeed et al. (2021), Sharma et al. (2021)	Students of the three years of high school and teachers of Natural Sciences.
Presentation of systematized information.			

From the systematization, it is concluded that there are carbonaceous nanomaterials in the soils of the area that could be affecting agricultural yields. Therefore, it is necessary to conduct a search to collect and organize information related to this issue. Based on this, a research question is posed: what evidence supports the improvement of agro-productive soil yields through the inclusion of carbonaceous nanomaterials obtained by hydrothermal synthesis of biomass?

In order to carry out this informative search and obtain a theoretical basis to answer this question, it is necessary to delve into new topics within different areas of knowledge, involving both students and professors.

Table 2 below shows how to structure and organize the specific search on the new topics addressed, such as nanomaterials and carbonaceous nanoparticles. This will help in the development of research skills in students, especially in terms of the ability to search for relevant information.

Table 2

Structuring the search for information on carbonaceous nanomaterials and nanoparticles

Problem investigated.	Topics of study for its foundation.	Author's references (proposed by Martinez, E. N. (2019))	Study participants.
Possible enhancement of the performance of agro-productive soils with the inclusion of carbonaceous nanomaterials obtained by hydrothermal synthesis of biomass	Superabsorbent materials. Natural sources of production. Artificial procurement methods. Physicochemical properties of superabsorbent materials. Regulations for the use of superabsorbent materials. Nanoparticles. Natural sources of nanoparticles. Physicochemical properties of nanoparticles. Nanoparticle characterization techniques. Methods of nanoparticle preservation. Carbonaceous nanomaterials. Chemical Structure. Physical-chemical properties. Applicable concentrations of carbonaceous nanomaterials to soil.	Cuadri et al. (2017), Llanes et al. (2020), Ucar (2020), Ucar (2020), Cordobés et al. (2016), Vasconcelos (2016), Yea et al. (2016), Ostrand et al. (2020), Dutkiewicz (2002), Gao et al. (2018), Olad et al. (2020), Zhang et al. (2021), Mignon et al. (2019), Zohuriaan-mehr and Kabiri (2008), Meshram et al. (2020), Behera and Mahanwar (2020), Rupert (2018), Kumar and Kumar (2017), Maduraiveeran and Jin (2021)	Students of the three years of high school and teachers of Natural Sciences.
Presentation of systematized information.			

In order to carry out the practical argument, it is identified that an experimental type of research is required. This type of research involves the manipulation of variables in order to observe, determine or measure responses or effects on other variables. In terms of approach, the quantitative approach will predominate, involving measurements and analysis of data crucial to answering the defined question.

Based on the above, the following questions arise:

- where can the data be obtained from?
- where are the relevant sources located?
- what methods, procedures and techniques can be used to collect the necessary data?
- Once the data have been collected, how should they be prepared for further analysis?

Based on the theoretical and practical analysis carried out up to this point, it is possible to determine the main activities to be carried out together with their respective indicators. In addition, the time needed to execute these activities and the resources required must be established.

The activities are determined according to each objective, taking into account the participants involved, the time required and the indicators to measure compliance. A Gantt chart and a logical framework matrix can be used to facilitate this step.

The following are some of the proposed activities:

Identification of laboratories for the study: It is suggested that soil investigation be carried out in specialized laboratories, such as the Laboratory of the Engineering and Applied Sciences Group (GICAS) located at the Universidad San Francisco de Quito, Quito canton, Pichincha province.

Determination of reagents and other resources: Participants will identify the following reagents required: raw material (banana peel dehydrated for 72 hours), distilled water and citric acid. In addition, equipment such as a hydrothermal reactor, precision furnace and filtration equipment (suction pump, filtration funnel and filter paper) will be required.

- Establishment of the appropriate sequence to perform the measurements.
- Systematic and accurate collection of data related to the study.
- Careful and comprehensive processing of the complete set of information collected.
- Comprehensive assessment and interpretation based on the information gathered together with clear and coherent presentation of the results obtained.
- Prepare detailed reports that allow sharing the findings with others interested or involved in the research topic
- Critically evaluate the entire structured project considering the objectives set, the activities carried out and the results obtained.

It should be noted that these are only some of the possible activities to be considered.

Regarding the evaluation of the training project proposal to develop research skills in high school students, an evaluation was carried out by experts using the Delphi method. The results obtained indicate that the experts considered the project to be relevant, sufficient and feasible in its dual function: to address the basic research problem and to foster the development of research skills in students.

In addition, the experts emphasized that the project has a methodological structure with a logical sequence. This structure facilitates students to acquire the necessary skills to face real problem situations in diverse contexts. It was also noted that the project prepares high school students to solve problems related to the natural sciences through scientific research. This aspect positively influences the integral formation of the students.

It is important to emphasize that these comments highlight some key aspects identified by the experts during their evaluation. Their opinions support both the relevance and feasibility of the proposed training project, as well as its potential impact on the development of research skills and general educational enrichment of the students involved.

In the study on the formative project for the development of research skills in Natural Sciences in Ecuadorian high school students, an evaluation was carried out both before and after the acquisition of these skills. The main objective of this evaluation was to measure the impact of the project on the development of students' research skills.

Prior to the implementation of the project, an initial assessment was conducted to establish the level of research skills of the students. This was done through tests and activities that assessed their ability to formulate research questions, design experiments, collect and analyze data, and communicate results effectively. These initial evaluations provided a baseline to compare results after project implementation.

Once the formative project was carried out, a second evaluation was conducted to measure the students' progress in the development of their research skills. Tests and activities similar to those used in the initial evaluation were applied, which made it

possible to compare the results and determine if there were significant improvements in the students' research skills.

In addition to individual evaluations, qualitative data were also collected through observations and interviews with participating students and teachers. These observations and interviews provided additional information on the degree of active participation of the students in the research, their level of commitment and their perception of the impact of the project on their integral formation.

Based on the results of these evaluations, it was possible to determine the positive impact of the training project on the development of students' research skills. Significant improvements were observed in areas such as formulation of research questions, design of experiments and communication of results. These results supported the effectiveness of the project and its contribution to the academic and formative development of students in Natural Sciences.

Thus, the evaluation before and after the acquisition of research skills in the students made it possible to measure the impact of the training project and determine its effectiveness in the development of these skills. The results obtained supported the importance of involving students in real research and provided a solid basis for the implementation of similar strategies in the educational setting.

Discussion and Conclusions

Although formative research is fundamental for the integral formation of students, the focus on the development of research skills must be adapted to the pedagogical and contextual conditions of the country. Several authors have pointed out the importance of taking into account the available resources, both technical and human, as well as the needs and characteristics of the educational community.

For example, Núñez y Mora (2019) they point out that it is essential for teachers to be trained and updated in terms of teaching methodologies and technological tools that promote the development of research skills. In addition, Parra-Bernal et al. (2021) they emphasize the importance of considering students' interests and motivations when designing training projects, as this will guarantee their active participation and greater commitment to the research process.

On the other hand, it is necessary to bear in mind that the development of research skills implies overcoming cultural and social barriers that may limit access to sources of information and the exchange of knowledge. Authors such as Pérez (2020) emphasize the need to promote inclusion and equity in the formation of research skills, ensuring that all students have equal opportunities to participate in training projects.

Thus, the formative project for the development of research skills in high school students is an important strategy that allows students to develop their capacity for inquiry and critical thinking. However, it is necessary to adapt this proposal to the pedagogical and contextual conditions of the country, taking into account both the available resources and the needs and characteristics of the educational community. To this end, it is essential to have trained teachers, to consider the interests of students and to promote inclusion and equity in the training process. (Núñez y Mora, 2019perez, 2020; Parra-Bernal et al., 2021)

Using formative research strategies guarantees, to a large extent, positive effects on baccalaureate students in terms of the development of research skills. These skills are strengthened through training in observation, abstraction and synthesis, as students can link these skills to the analysis and interpretation of reality. According to Posligua y Ávila

(2022) it is necessary to propose new strategies within this approach with the objective of strengthening and/or developing methodological construction and teamwork skills in students.

As students master and engage in formative research skills, they deepen their acquisition of new knowledge, foster autonomous learning and the creation of more advanced and organized mental strategies. In addition, they develop critical and reflective thinking, cognitive independence, analytical and interpretive skills at a more advanced level.

The opinion of Oña (2019) agrees with the need to implement didactic strategies that allow for the development of school projects between teachers and students. To achieve this, it is essential to identify the main strategies according to the students' learning needs and the research process they are carrying out. These strategies should actively involve all participants, so that they generate results based on real situations and have a greater degree of significance and conceptual grounding in addressing real problems in the students' environment.

According to Álvarez et al. (2022)the development of formative projects in high school students is an effective strategy to promote research skills. This type of project, which integrates content from different areas of knowledge, allows students to mobilize their knowledge and seek solutions to society's problems. The results obtained in this study support the previous findings of the aforementioned authors, since it is evident that formative research has a positive impact on students.

In addition, it is important that the teachers who guide these projects have a solid research profile. According to Álvarez et al. (2022), teachers with research skills can more professionally guide the development of these skills in students. Therefore, it is necessary to provide ongoing training to teachers to enable them to successfully face this process of developing research skills in high school students.

Therefore, the present study supports the idea that formative projects are an effective strategy to promote research skills in high school students. These projects, structured in a collaborative manner and guided by professors with research skills, allow students to face current challenges and look for alternatives to solve society's problems. It is essential to promote ongoing teacher training to ensure adequate development of research skills in high school students, as suggested by Álvarez et al. (2022).

This need requires a transformation in the training models of educators, establishing a close link between teaching and research. According to Fernández et al. (2021)the convenience and possibility of early training for research. It has been shown that many research skills can begin to be developed as early as basic education, and successful programs have been mentioned that aim to facilitate the development of specific skills, such as those related to metacognitive reflection.

It has also been pointed out that it is not necessary to introduce new curricular spaces or topics in school programs to foster the development of research skills. The most important thing is to guide the learning experiences generated by teachers, the activities proposed in complementary materials such as textbooks, as well as to use appropriate work methods and promote participatory ways to involve students.

These findings are consistent with those found in this study, where the importance of the formative project for the development of research skills in high school students was evidenced. Through the training provided in this project, it was possible to observe how students acquired relevant skills to carry out effective research.

In summary, both Fernández et al. (2021) and our results support the idea that it is possible to train and promote research skills from early stages through appropriate

strategies implemented by educators. This coincidence further strengthens our training proposal and its potential positive impact on the educational environment.

The study reflects a lack of awareness on the part of teachers regarding the scenario and the importance of involving high school students in scientific research activities. This gap is still insufficient and needs to be addressed urgently. It is essential to strengthen the solution to current problems through research in different branches, especially in the Natural Sciences, since current studies in this field are insufficient to face current challenges.

The results of the study indicate that the preparation of teachers in scientific research should be a constant training task, in order to efficiently develop formative research in students.

The project presented, which addresses the problem of soil composition and the influence of nanoparticles in agriculture in the context of Natural Sciences, was evaluated by experts and stakeholders. The evaluation was remarkably pertinent, sufficient and feasible, both to solve the basic problem and to favor the development of the research skills of the high school students at the Alfonso Laso Bermeo Educational Unit in Quito, Ecuador.

Although there are several factors that affect the development of research skills in Ecuadorian high school students, in this study a project linked to Natural Sciences was implemented. The response from both teachers and students was favorable, which confirms the viability of the project to increase these skills. It also served as a guide for rethinking future actions in the planning and execution of training projects.

The results obtained provided adequately structured scientific information to diagnose the problems related to research skills in students. These findings also provide guidelines to propose a redesign of the curricula and a conscious introduction of these contents.

However, despite the positive assessment by experts and stakeholders, it is necessary to identify and execute specific activities by each project member or designated team within the established time frame and with the necessary resources. This must be aligned with the general objectives and activities defined for each research training area, whether specific subjects, extracurricular work or outdoor practices.

In summary, this study demonstrates that the training project implemented has been effective in developing research skills in Ecuadorian high school students. The results obtained support the importance and the continued need to promote this type of educational projects aimed at strengthening research from the early stages.

It should be noted that the development of research skills allows students to acquire the necessary competencies to perform in the scientific field, such as critical thinking, information search and analysis, and the ability to design and carry out experiments, among other aspects. Therefore, it is necessary to promote a formative approach that takes into account not only the natural sciences, but also the social sciences, since both fields can contribute to the development of research skills in high school students.

In relation to this, Martinez (2019) points out that the reductionist approach to teaching science in the natural sciences limits students' critical thinking and distances them from the possibility of understanding the complexity of social and scientific phenomena. Therefore, it is necessary to broaden the view and promote research training that allows students to develop research skills in both the natural and social sciences.

In accordance with the above, Fuentes et al. (2019) argues that research training at the baccalaureate level should focus on the development of skills such as observation, data recording, analysis of results, hypothesis generation and critical reflection. These

skills are not only relevant in the natural sciences, but also in the social sciences, as they allow students to understand and analyze complex phenomena.

In summary, it is essential to recognize the importance of promoting research training in high school students, with an approach that goes beyond the natural sciences and also includes aspects related to the social sciences. This will allow the development of research skills in students and will contribute to the development of a global and critical vision of science. It is therefore necessary to review current educational approaches and work on the construction of strategies that promote comprehensive training and prepare students and teachers to face the challenges of today's scientific world.

References

Álvarez, L. K., Ponce, D. V., Reyes, V. M. y Campuzano, C. J. (2022). La formación de habilidades investigativas en estudiantes de bachillerato. *Revista Conrado*, *18*(85), 100-108.

Blanco, N., Ugarte, Y., Betancourt, Y., Domínguez, I. C. y Bassas, D. (2019). Momentos didácticos para el desarrollo de habilidades investigativas desde la educación en el trabajo. *Revista Cubana Educación Médica Superior*, *33*(3).

Carrillo, H., Cruz, M. y Cárdenas, J. R. (2021). Los contenidos integradores de la práctica de campo, una vía para desarrollar la educación ambiental: La integración de contenidos y la educación ambiental. *Revista Didasc@lia: Didáctica y Educación*, *12*(2), 146-156.

Casanova, T. (2020). Acciones para formar habilidades investigativas en estudiantes de la carrera de educación infantil en el contexto ecuatoriano. *Revista de Pedagogía Universitaria*, *24*(3).

Castro, G., Burgos, D., González, L. y Mendoza, J. (2019). La investigación; una necesidad de aprendizaje en el bachillerato. *Revista Universidad, Ciencia y Tecnología*, *19*(2), 68-74.

Díaz, P. A., Andrade, Y., Hincapié, A. M. y Uribe, A. P. (2021). Análisis del proceso metodológico en programas de educación superior en modalidad virtual. *Revista de Educación a Distancia (RED)*, *21*(65), 1-41. https://doi.org/10.6018/red.450711

Espinoza, E. E. (2022). El problema, el objetivo, la hipótesis y las variables de la investigación. *Portal De La Ciencia*, *1*(2), 1-71. https://doi.org/10.51247/pdlc.v1i2.320

Espinoza, E. E. (2020). La investigación formativa. Una reflexión teórica. *Revista Conrado*, *16*(74), 45-53.

Fernández, V. de J., García, F. J. y Gadea, W. F. (2021). Universidad y sostenibilidad. Límites y posibilidades de cambio social. *Revista de la educación superior*, *50*(199), 1-26. https://doi.org/10.36857/resu.2021.199.1797

Fuentes, D. M., Puentes, A. y Flórez, G. A. (2019). Estado Actual de las Competencias Científico Naturales desde el Aprendizaje por Indagación. *Educación y Ciencia*, *23*, 569-587. https://doi.org/10.19053/0120-7105.eyc.2019.23.e10272

García, N. M., Paca, N. K., Arista, S. M., Valdez, B. B. y Gómez, I. I. (2018). Investigación formativa en el desarrollo de habilidades comunicativas e investigativas. *Revista de Investigaciones Altoandinas*, *20*(1), 125-136. https://doi.org/10.18271/ria.2018.336

García, O. (2023). Experiencias didácticas en el estudio de la biodiversidad local a través de la investigación escolar. *ROCA. Revista Científico-educacional de la provincia Granma*, *19*(1), 342-360.

Guerra, L. de los Á., Fajardo, M. y Tamayo, Y. (2021). Actividades encaminadas al trabajo con el medio ambiente en Ciencias Naturales. *ROCA. Revista Científico-educacional de la provincia Granma*, *17*(1), 406-420.

López, A. B. V., Guzmán, J. K., Amaya, J. E. R., Aguagallo, F. V. y Moran, L. D. R. (2021). El acceso a la Educación Superior por una educación equitativa, ética y humanista. *RECIMUNDO: Revista Científica de la Investigación y el Conocimiento*, *5*(4), 74-83.

Martinez, E. N. (2019). *Materiales superabsorentes basados en carbono como mejoradores de la calidad de suelos agro producctivos* [Tesis de Grado, Universidad Técnica de Ambato].

Miranda, C. J. L., Herrera, D. G. G., Salazar, A. Z. C. y Álvarez, J. C. E. (2020). Uso alternativo de las TIC en Educación Básica Elemental para desarrollar la lectoescritura. *Revista Arbitrada Interdisciplinaria Koinonía*, *5*(1), 711-730.

Núñez, A. F. y Mora, F. E. (2019). *Guía metodológica para el desarrollo de habilidades investigativas en el diseño de proyectos escolares en la Unidad Educativa Chillanes* [Tesis de Maestría, Universidad Tecnológica Indoamérica]. https://repositorio.uti.edu.ec/bitstream/123456789/1090/1/PROYECTO%20DE%20TESIS%20FELTON%20MORA.pdf

Oña, C. M. (2019). *Desarrollo de habilidades investigativas en proyectos escolares de Educación Basíca Superior en la Unidad Educativa Nacional Sanquisilí* [Tesis de Maestría, Universidad Tecnológica Indoamérica].

Parra-Bernal, L. R., Menjura-Escobar, M. I., Pulgarín-Puerta, L. E. y Gutiérrez, M. M. (2021). Las prácticas pedagógicas. Una oportunidad para innovar en la educación. *Revista Latinoamericana de Estudios Educativos (Colombia)*, *17*(1), 70-94. https://doi.org/10.17151/rlee.2021.17.1.5

Pensado, M. E., Ramírez, Y. y Gómez, L. E. (2022). Formación investigativa en educación superior, un desafío vigente. *Revista Ciencia Administrativa*, *1*. https://www.uv.mx/iiesca/files/2022/10/07CA2022-1.pdf

Posligua, E. y Ávila, J. (2022). Estrategia metodológica para fortalecer el aprendizaje significativo de lectura en los estudiantes. *Polo del Conocimiento*, *7*(9), 222-263. http://dx.doi.org/10.23857/pc.v7i9.4575

Sánchez, A. A. y Murillo, A. (2021). Enfoques metodológicos en la investigación histórica: Cuantitativa, cualitativa y comparativa. *Debates por la historia*, *9*(2), 147-181. https://doi.org/10.54167/debates-por-la-historia.v9i2.792

Vallejo, L. A. B., Daher, N. J. y Rincón, R. T. (2020). Investigación y creatividad para el desarrollo de competencias científicas en estudiantes universitarios de la salud. *Revista Cubana de Educación Médica Superior*, *34*(3). https://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=100522

Yera, A. I., Zardón, O. y Broughton, C. E. (2021). Sustancias orgánicas y medio ambiente. Una necesidad en el estudio de la Química Orgánica. *ROCA. Revista Científico-educacional de la provincia Granma*, *17*(2), 151-169.

Zambrano, M. A., Hernández, A. y Mendoza, K. L. (2022). El aprendizaje basado en proyectos como estrategia didáctica. *Conrado*, *18*(84), 172-182.

Zúñiga, L. M., Cruz, M. A. y Dotres, S. (2023). El aprendizaje basado en proyecto con enfoque histórico-cultural y complejo: Aporte para la pedagogía profesional. *ROCA. Revista Científico-educacional de la provincia Granma*, *19*(1), 378-396.

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EVALUATION OF THE PERCEPTION OF UNIVERSITY TEACHERS AFTER THE IMPLEMENTATION OF A PENSION FUND TO GUARANTEE THE STABILITY OF THE PENSION SYSTEM AT A PUBLIC UNIVERSITY IN MEXICO

EVALUACIÓN DE LA PERCEPCIÓN DE DOCENTES UNIVERSITARIOS TRAS LA IMPLEMENTACIÓN DE UN FONDO DE PENSIONES PARA GARANTIZAR LA ESTABILIDAD DEL SISTEMA DE PENSIONES EN UNA UNIVERSIDAD PÚBLICA DE MÉXICO

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ABSTRACT

The University of Guanajuato (UG) faced a significant financial challenge related to pension payments, as 40.61% of its annual payroll, equivalent to 500 million pesos, was allocated for this purpose. In response to this situation, a crucial reform called the "Solidarity Auxiliary Fund for the Support of Supplementary Pension Payments at the University of Guanajuato" (FAS) was implemented. This study aimed to assess the level of satisfaction in terms of job stability after the implementation of this reform. The obtained results reveal that over 40% of the surveyed individuals expressed their complete agreement with specific improvements, such as the assurance of receiving their pensions, the prevention of financial crises in the institution, and satisfaction in contributing to the pension fund. In this context, it is concluded that the auxiliary fund not only fulfills its economic purpose but also contributes to the financial strength of the institution. The

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active involvement of academic staff in contributing to the pension fund indicates substantial support for this measure, ultimately strengthening job stability and fostering overall satisfaction among the academic community. The creation and effective operation of the FAS, therefore, emerge as fundamental elements for the well-being and stability of the University of Guanajuato in the labor sphere.

RESUMEN

Palabras clave:
reforma a pensiones, Administración, cambio social, económico y laboral.

La Universidad de Guanajuato (UG) enfrentaba un desafío financiero significativo destinado al pago de pensiones, ya que se destinaba el 40.61% de su nómina anual, equivalente a 500 millones de pesos. En respuesta a esta situación, se implementó una reforma crucial denominada "Fondo Auxiliar Solidario para el Apoyo al Pago de Complemento de Pensiones de la Universidad de Guanajuato" (FAS). Este estudio se propuso evaluar el nivel de satisfacción en términos de estabilidad laboral después de la instauración de esta reforma. Los resultados obtenidos revelan que más del 40% de los encuestados expresaron su total acuerdo con mejoras específicas, tales como la seguridad en la recepción de sus pensiones, la prevención de crisis financieras en la institución, y la satisfacción al contribuir al fondo de pensiones. En este sentido, se concluye que el fondo auxiliar no solo cumple con su propósito económico, sino que también contribuye a la solidez financiera de la institución. La participación del personal académico en la aportación al fondo de pensiones indica un respaldo sustancial a esta medida, lo que, en última instancia, fortalece la estabilidad laboral y fomenta la satisfacción general del cuerpo académico. La creación y funcionamiento eficaz del FAS, por ende, se erigen como elementos fundamentales para el bienestar y la estabilidad de la Universidad de Guanajuato en el ámbito laboral.

Introduction

It is known that the world's population is aging. This same case is occurring among the academic staff of Mexico's public universities. As a result of this aging process, the proportion of people over 59 years of age is around 17% of the total and, in some cases, reaches more than 30%, as reported by the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS). Faced with this situation, some scholars comment that a paradox arises: on the one hand, they question why academics do not retire and make way for young talent, given the scarcity of jobs for them, and on the other hand, if they retire, they increase the liabilities of several public universities (Bensusán & Ahumada Lobo, 2006).

The average age of most universities is around 50 years old, while those over 65 years old correspond to 6% of the academic population. Also, in some institutions, more than 20% of active personnel meet the requirements for retirement, and in others, close to 10%. The average age of retirement is around 60 years old (Oliva, 2013).

Pension systems, in any of their variants, are an important element of social security systems. Its status needs to be checked periodically, as it gives important signals as to the state of social protection in the country. In general, the performance of pension systems can be evaluated by considering three aspects: coverage, adequacy and sustainability (Hernández, 2019).

In Mexico there are several federal and state contributory pension systems, administered by various institutions. According to data from INEGI (2010), of the total number of people over 60 years of age, only 24% had a retirement or pension and only 32.7% of men and 17% of women in this age range received a pension (Montoya, Roman, & Gaxiola, 2016).

The purpose of pension systems is to ensure that workers have, at the time of retirement due to old age or disability, the necessary resources to live a good life (Castañeda Ortiz & Jiménez Bustos, 2019).

Teachers are getting older every day and the pension and retirement systems are not entirely satisfactory. Retirement from work is significantly determined by the level of income and the social security system to which one belongs. Thus, if the current retirement schemes, together with the restrictions on the hiring of young academics, are not modified, in the near future Mexico's higher education institutions could be populated preferably by veteran academics. Even though there is no certainty to fix an age at which the capabilities of academics decrease, based on the literature it is feasible to assume that higher education institutions with academic staff preferably composed of personnel aged 60 or older will tend to decrease their production, especially in research activities and to a lesser extent in the transmission of knowledge (Rodríguez Jiménez, Urquidi Treviño, & Mendoza Grijalva, 2009).

In the case of the University of Guanajuato, where there was concern about indebtedness for pension and retirement systems according to data from the Center for Economic and Budgetary Research (CIEP), it was financially unviable since 2013, a situation it shared during 2017 with the Autonomous University of Zacatecas and the Autonomous University of Guerrero (Redacción AM, 2017).

At the beginning of 2017, the Solidarity Auxiliary Fund for the Support of Pension Complement Payment of the University of Guanajuato (FAS) began operating, after an arduous year (2016) of analysis to select the most viable reform and vote on it by the

academic union of the Academic and Administrative Staff Union Association of the University of Guanajuato (ASPAAUG). Three years after the fund began operations, this research explores the issue of pensions and retirement for workers at the University of Guanajuato.

Pension and retirement system in Mexican public universities

The pension scheme has relied primarily on two autonomous social security institutions, the Mexican Social Security Institute (IMSS) and the Institute of Security and Social Services for State Workers (ISSSTE), since they have the largest number of beneficiaries (Hori, 2000)[2]

The pensions of public universities, in particular, have a diversity of retirement systems, and this is due to their autonomous nature, as well as to the union association that represents the holder of the collective bargaining agreement (CBA) therefore, there is heterogeneity, since some contribute to the IMSS, ISSSTE, state security institution or to their own retirement system, with very different conditions and amounts granted that are stipulated within each collective labor contract, which currently causes financial instability in higher education institutions.

The liabilities generated by the retirement and pension systems of 32 public universities, considering both present and future generations, were in the order of 250 billion pesos. There are, on average, eleven active workers for every pensioner (in some cases the ratio is lower); but in a few years there will be five active workers for every pensioner and, in some cases, one worker for every pensioner (Soto, 2000).

The deficit generated by the pensions of 34 state public universities is equivalent to 2.0% of GDP and represents three times more than the budget allocated for higher education in 2017. As of 2001, the federal government was forced to allocate extraordinary resources to these institutions to solve the structural financial problems, currently known as Support for financial reorganization and attention to structural problems of the State Public Universities (UPES), which transfers resources to the institutions so that they can pay their labor liabilities (i.e., social security) and reduce the deficit generated by pensions. This means that a certain percentage of the education budget is used to pay pensions and retirements of UPES workers and not for education itself (Oliva, 2013).

To dimension the size of the deficit in 2014, which is equal to 357 thousand 944 million pesos, the budget allocated for the higher education function, in that year, was 120 thousand 148.2 million pesos. In other words, the universities' deficit represented three times more than the total budget allocated to finance higher education during that year, 1.7% of GDP in 2010 and 2% in 2014. The program *Support for Financial Reorganization and Attention to Structural Problems of the UPES (U081)* belongs to the *Education Function* in the *Higher Education Sub-function* within the PEF. Its budgetary resources are labeled under item 4300*, Grants and subsidies*, and not under items 4550 and 4700, which refer to pensions. According to data from the Ministry of Finance and Public Credit (SHCP), between 2007 and 2017, 2,550.5 million pesos, at current prices, were approved for program U081. Such amount, at 2017 prices, amounted to Ps. 25,936.1 million. (García Miramón, 2017). Currently, the U081 program was eliminated by the federal government, so there is no longer a budget for university workers' pensions.

However, it is important to mention that there are other systems, such as those of the Armed Forces, Petróleos Mexicanos (PEMEX), the Federal Electricity Commission (CFE), the 31 states of the country and the public universities (Hori, 2000).

2017 was a year in which the crisis affected the following universities: the University of Guanajuato, the University of Baja California, Chiapas, Coahuila, Del Carmen, Guerrero, Michoacana de San Nicolás de Hidalgo, Morelos, Nayarit, Yucatán and Zacatecas as well as the Technological Institute of Sonora. As of 2014, the deficit generated by the pensions of 34 public universities was equivalent to 2 percent of the Gross Domestic Product (GDP) and represented three times more than the budget allocated for higher education in 2017 (Reyes, 2017).

The University of Guanajuato, in particular, given its indebtedness for the pension and retirement systems, was financially unviable since 2013 (Redacción AM, 2017). At the end of 2016, the University of Guanajuato (UG) proposed a reform for the pension system of this institution. The importance of reform was based on the logic that, as time went by and no measures were taken, everything would be to the detriment of the institution and would constitute a structural problem for it. Some of the proposals analyzed by the institution were to increase the number of years of professional service; increase the regulatory salary; and increase the contributions of university workers.

which institution guarantees the pensions of UG academics? The Institute of Social Security of the State of Guanajuato (ISSEG)

The ISSEG is a decentralized public agency with its own legal personality and assets, which is responsible for the administration of the insurance and benefits set forth in its Law. The pension fund is comprised of employee contributions and contributions from obligated parties (employers), as well as income generated from ISSEG's financial investments, loans and commercial and real estate investments (Instituto de Seguridad Social del Estado de Guanajuato, 2021).

The pensions of the state of Guanajuato are guaranteed until 2081, due to the emphasis placed on regulations, profitability and institutional strengthening. The ISSEG has reformed the pension laws on several occasions, in terms of the contribution quota paid by both the worker and the employer; for example, in 2002 the contribution quota was increased from 18% to 27% and a minimum retirement age of 65 years was established; it was also determined that the law would be revised every four years by the local Congress. In 2008, pension adequacy was planned to 2067 and it was decided to increase the contribution rate from 27% to 35%. Again in 2013, the contribution rate was increased from 35% to 40% and it was agreed that each year there would be an increase, and retirement would be based on the salary of the last five years. ISSEG's assets went from 13,596 million pesos in 2012, to 23,008 million in 2018, a growth of 69 percent (Flores, 2019).

In Chapter Six, on retirement insurance, Article 45 of the ISSEG Law establishes that insured persons who are at least sixty years of age and have contributed for a minimum of thirty years if they are men or twenty-eight if they are women, shall be entitled to a retirement pension, equivalent to one hundred percent of the average of the base salary received in the five years immediately prior to the date of retirement, updated to present value according to the annual increase in the base salary of contribution in the five years immediately preceding the date of retirement (Ley de Seguridad Social del Estado de Guanajuato, 2016).

All University workers contribute 16.5% of their nominal salary to ISSEG, which pays the pension up to a maximum of 10 minimum salaries. Although workers are

guaranteed their pension (base salary) with the Social Security Institute of the State of Guanajuato (ISSEG), the same is not true for the retirement supplement. This refers to the payment of benefits, which has financial complications since no contributions and pensions are received for more than 30 years, which evidences a problem of imbalance between the income and expenses of its pension system. In order to enjoy this benefit without affecting the finances of the institution, the worker would have to have contributed during 30 years of his working life; otherwise, the institution will not have sufficient resources to pay this benefit (ASPAAUG, 2016).

The new reform to the pension system among UG teachers in the collective labor agreement (CCT)

In December 2016, the University of Guanajuato made a proposal to reform the pension system to both unions, Asociación Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato (ASPAAUG) and Asociacion Sindical de Trabajadores Administrativos de la Universidad de Guanajuato (ASTAUG). In this proposal, the changes were foreseen in relation to the current generations; that is, those who are not yet in a position to retire would have to start contributing 0.5 percent of the integrated salary, until reaching 6.5 percent of the integrated salary in the year 2029. In addition, with a differentiated treatment for management personnel who will obtain the pension supplement with a regulatory salary of 5 years and 93.5 % as maximum of the pension supplement, without bonus, and the ceiling would be the tabular category of a Full C professor (ASPAAUG, 2016). The labor community did not receive this reform well, as they felt that their rights were being violated and not taken into account. For this reason, ASPAAUG, through the participation of the university community, formulated a counterproposal to reform its pension system. (Ortiz Gil, Reyes Montúfar, & Maravert Alba, 2020)

ASPAAUG has a union base of 2,300 affiliates, with which it has the ownership of the collective labor contract (CCT) 2019-2021, whose chapter on social security and medical services, in its clauses 29 and 30, mentions the following:

Pension for retirement and old age insurance (clause 29 of the CCT): The University is obligated to cover the difference between the amount established by the Social Security Institute of the State of Guanajuato for retirement insurance and the salary plus benefits earned at the time of retirement insurance, or that of the highest position or category occupied in the last three (3) years, as appropriate for the employee. Upon retirement through old age insurance, the University will cover this difference in the percentage established by the ISSEG Law for such incidents. In both cases, these differences will be covered by the aforementioned bases, each time salaries and benefits are increased for active workers.

These benefits will also be granted to employees who are currently receiving a retirement or old age pension, and the university will be obligated to compensate them with the salary plus current benefits that correspond to the position and category they held at the time of retirement or old age pension, or a similar or equivalent one, if the one they held no longer exists. When there are workers who have rendered services in the University of Guanajuato and in some agencies of the State Government, the University will pay for this concept exclusively the percentage that, in accordance with the table of the Social Security Law for the Workers of the State of Guanajuato, corresponds to them for the years of service worked only for the Institution, regardless of the opinion issued by the Institute.

Death pension (clause 30 of the CCT):

The University of Guanajuato is obligated to pay to the family members or economic dependents of the deceased employee the difference between the amount established by ISSEG as death pension and 80% of the salary plus benefits assigned to the position held by the employee at the time of death, and to cover the difference, calculated on the same basis, each time salaries and benefits are increased for active employees. This benefit will be extended to widows, widowers or economic dependents of retirees or pensioners. The process for the payment of this benefit shall be carried out before the Human Resources Department of the University, upon presentation of the document containing the ISSEG's determination of the person or persons entitled to the pension and the amount thereof (ASPAAUG, 2016).

As can be seen, the collective bargaining agreement clearly establishes that the economic difference not covered by ISSEG will be paid by the University of Guanajuato. This is what we call the pension supplement and is the cause of a severe economic deficit in the institution, since there is no fund created to cover this supplement for each employee. Therefore, an agreement was established between ASPAAUG, Administrative Workers Union Association of the University of Guanajuato (ASTAUG) and University of Guanajuato to create the Solidarity Auxiliary Fund to Support the Payment of Pension Complement of the University of Guanajuato (FAS), which was signed on December 6, 2017 and deposited with the Local Conciliation and Arbitration Board for University Affairs of the State of Guanajuato.

With the signing of the agreement that gave rise to the FAS, a joint effort was established between ASPAAUG, ASTAUG and the university administration to generate a reform of the social security model, specifically the pension supplement (payment of benefits tied to salary) established in the CCT; this occurs independently of the pension that the worker could obtain from the ISSEG (Universidad de Guanajuato, 2017). Consequently, the agreement recognizes three generations for the application of this reform, with characteristics for each of them, and with respect to the application of the pension supplement, which is presented in Table 1, which shows the groups of generations into which the auxiliary solidarity fund is classified to support the payment of the UG pension supplement (Asociación Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato, 2018).

Table 1
Groups of generations into which the solidarity auxiliary fund for the support of the UG pension supplement payment is classified

Generation group	Conditions
Retirees and those who already have the right to retire, whether or not they are in the permanence plan (it consists of the granting of benefits that improve the economic conditions of the worker who has the right to retire and does not exercise it).	- Your nominal salary will not be affected - It shall retain its conditions, as established in the collective bargaining agreement in effect at the time of hiring the personnel. - Dynamic pension: it is updated based on the salary increase. - Those who are already entitled, retire with the highest salary of the last 3 years.
Current generation not yet eligible to retire.	- Contribution equivalent to 8% of your benefits only. - Average salary of the last 3 years of service, maintaining 100% of the integrated salary at the time of retirement. - Dynamic pension, i.e., it is updated in accordance with salary increases. - The length of service to access a death pension is reduced from 15 to 5 years for the benefit of the worker's family. - Cap on the amount of the pension equivalent to the salary of a full-time professor, tenured category C.
Future generation from the reform.	- Contribution of an amount equivalent, only, to 8% of their benefits. - Average salary of the last 5 years of service, maintaining 93.5% of the integrated salary at the time of retirement. - Pension update based on the National Consumer Price Index (NCPI). - The length of service to access a death pension is reduced from 15 to 5 years for the benefit of the worker's family. - Cap on pension amount equivalent to the salary of a full-time, tenured Professor C.

This agreement is a covenant whereby all university employees pay 8% of benefits to the fund, excluding Christmas bonus and vacation bonus, as shown below (table 2):

Table 2

Benefits of which each worker contributes 8% to the FAS

Benefits considered for ASPAAUG employees	Benefits considered for ASTAUG employees
• Seniority premium; • Additional Benefit; • Academic Improvement and Development; • Pantry and • Help for Publications.	• Seniority premium; • Additional Benefit; • Pantry; • Family Support; • Fixtures and • Calendar setting.

The same applies to the resources accumulated in the trust fund already established by the University, in order to capture the support granted by the Federation to strengthen the structural reforms in the pension systems, in addition to the balances of the loans granted and the interest they generate, derived from the amounts available from the same Fund for the granting of this benefit (Universidad de Guanajuato, 2018).

Another of the financial adjustments established in the FAS agreement is that UG management personnel will obtain the pension supplement with a regulatory salary of five years and 93.5% as a maximum of the pension supplement, and this amount will never include the temporary bonus received in these positions. This action will prevent the pensioning off of executives with excessive salaries. The form of capitalizing the pension fund will be subject to the following mechanism, and its use in the supplementary payment is established as follows (tables 3 A and B):

Table 3

Percentage used from the FAS for the payment of the supplement and percentage to capitalize the pension fund, respectively

a) For the payment of the pension supplement, in the following manner:

Year	Of the 8 percentage points
2018	2
2019	4
2020	6
2021 and thereafter	8

b) For the creation of the Auxiliary Fund, as follows:

Year	Of the 8 percentage points
2018	6
2019	4
2020	2

2021 onwards	0

The accumulated in the Auxiliary Fund, in terms of paragraph 3b, cannot be used for the payment of pensions and supplementary pensions until the year 2022. After that date, only the equivalent of a percentage of the benefits may be taken, in accordance with the following table 4:

Table 4

From the accumulated fund until 2021, the annual percentage will be taken for the payment of the supplementary allowance

Year	Percentage of benefits applied
2022	2
2023	4
2024	6
2025	8
2026	10
2027	12
2028 onwards	14

Method

This research analyzes the pension reform at the UG (FAS) after three years of its implementation. To this end, a survey was developed for the ASPAAUG community, which would provide information on the social situation within the organization. The population was stratified by ASPAAUG-affiliated academics, which are N: 2300 affiliates, a simple random sampling formula was applied in order to identify how many people should be surveyed (n: 264 people). Data collection was done with a digitally elaborated questionnaire sent by e-mail. The study period was from June 12 to September 30, 2020. The digital survey was anonymous, sent by e-mail to the 2,300 academics who are members of ASPAAUG. Each participant was sent a digital informed consent form to participate in the research. The objective of the study and the guarantee of confidentiality were explained to them. This instrument was developed on the *Microsoft Forms*platform. Workers respond to each item using a *Likert-type*response format. All the information collected was captured in a database and processed using the STATA program.

Results

All participants were male (53%) and female (47%). Given that the population of this study is large and it is possible to find scholars of very different ages in it. Sixty-six

percent of the respondents ranged between 37 and 55 years of age, followed by 20% of the population under 36 years of age and only 14% were over 56 years of age. Regarding the employment characteristics of the participants in terms of length of service, type of appointment, branch of knowledge and number of categories (positions) held within the UG, the results obtained are shown in Table 5 below.

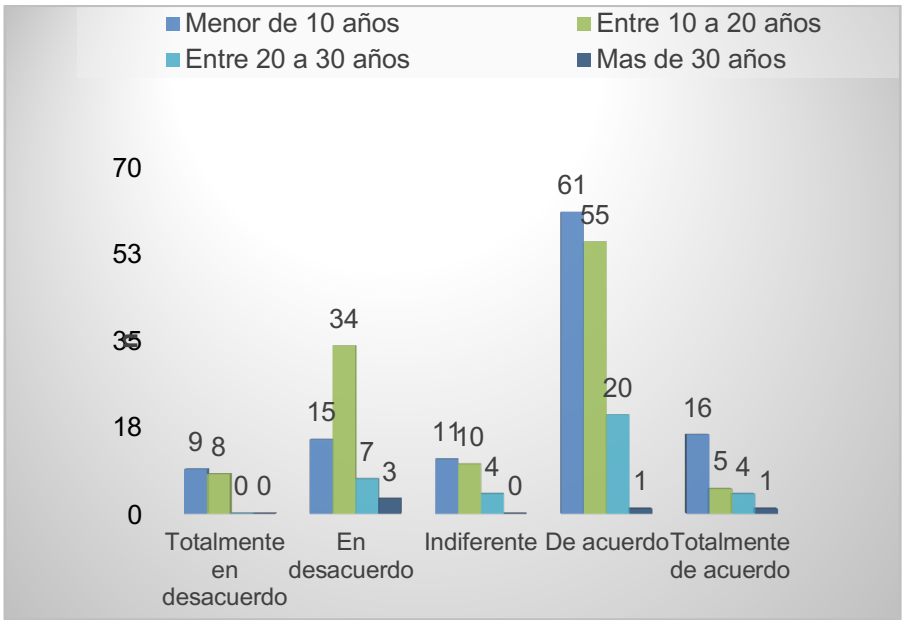
Table 5

Work characteristics of the study sample

Variable	Range	Percentage
Seniority in the UG:	Less than 10 years	42 %
	Between 10 and 20 years	42 %
	Between 21 and 30 years old	13 %
	More than 3 years	2 %
Type of appointment:	Part-time Professor	50 %
	Full Professor	24.5%
	Associate Professor	14.7%
	Academic technician	5.8 %
	Professional academic technician	3.9 %
	Academic Assistant	1 %
Branch of knowledge:	Arts and humanities	21.5 %
	Engineering and architecture	20.5 %
	Health sciences	18.6 %
	Chemical biological sciences	16.6 %
	Social and legal sciences	12.7 %
	Economic and administrative	9.8 %
Number of categories (positions) held within the UG:	Less than 2	63 %
	Between 3 to 5	28 %
	More than 6	9 %

The University of Guanajuato has a pension and retirement supported by the ISSEG; however, this institution has reached the limit of pension payment feasibility, which may not exceed the upper limit of the contribution base salary. Therefore, the excess pension payment (salary benefits) is paid by the UG, which is known as pension supplement, so that the employee retires with 100% of his or her full salary. Figure 1 shows that the population with less than 10 years of service (54.4%) agrees that they have good working conditions within the institution.

Figure 1
Working conditions are satisfactory in relation to seniority



Until 2016, the institution allocated 495 (four hundred ninety-five) million pesos of its ordinary expenditure for the payment of obligations arising from retirements and pensions; consequently, the UG and the ASPAAUG signed on December 6, 2017 the creation of the FAS, which seeks a balance of university finances, and would impact the development of its substantive functions.

As can be seen in Table 6, most of the respondents agree that they are aware of the financial problems suffered by Mexican public universities due to pensions. For example, 79.4 % of the teachers affirm that they totally agree with knowing about this problem, as shown in the following table.

Table 6

Knowledge about Mexican public university institutions with financial problems due to the failure to reform their pension systems

Variable	Strongly disagree	Disagree	Indifferent	Agreed	Totally agree
Academic Assistant					
n	2	0	0	1	1
%	14.2	0	0	0.75	2.3
Academic technician					
n	1	0	3	11	3
%	7.1	0	6.1	8.2	6.8
Professional academic technician					
n	1	3	5	6	4
%	7.1	12.5	10.2	4.5	9
Associate Professor					
n	3	3	4	22	12
%	21.4	12.5	8.1	16.5	27.2
Part-time Professor					
n	7	16	31	56	9
%	50	66.6	63.2	42.1	20.4
Full Professor					
n	0	2	5	32	14
%	0	8.3	10.2	24	31.8
None of the above					
n	0	0	1	5	1
%	0	0	2	3.7	2.3
Total	14	24	49	133	44

Table 7
Assessment by gender regarding whether a financial crisis at the UG was foreseen when the FAS was created

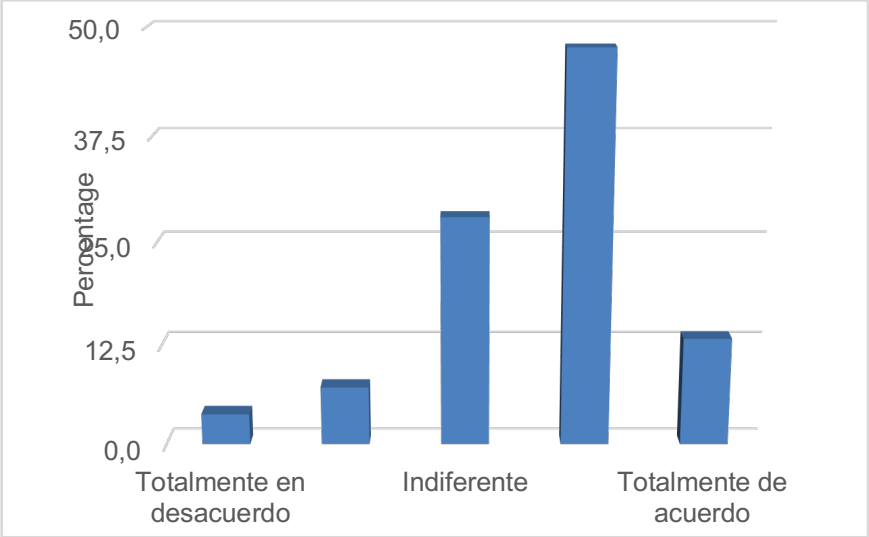
Variable	Man	Woman
Strongly disagree		
n	9	0
%	6.5	0
Disagree		
n	9	9
%	6.5	0.7
Indifferent		
n	46	32
%	33.5	25.1
Agreed		
n	56	62
%	40.8	48.8
Totally agree		
n	17	24
%	12.4	18.8
Total	137	127

By gender, 48.8% (women) and men (40.8%) agree that the formation and implementation of this reform prevented a financial crisis for the institution, as shown in Table 7 below.

On the other hand, 47.7% of the surveyed population considers that they are satisfied with contributing 8% of their benefits for the creation and strengthening of the FAS (Figure 2), while only 3.8% totally disagree, as shown in the following figure:

Figure 2

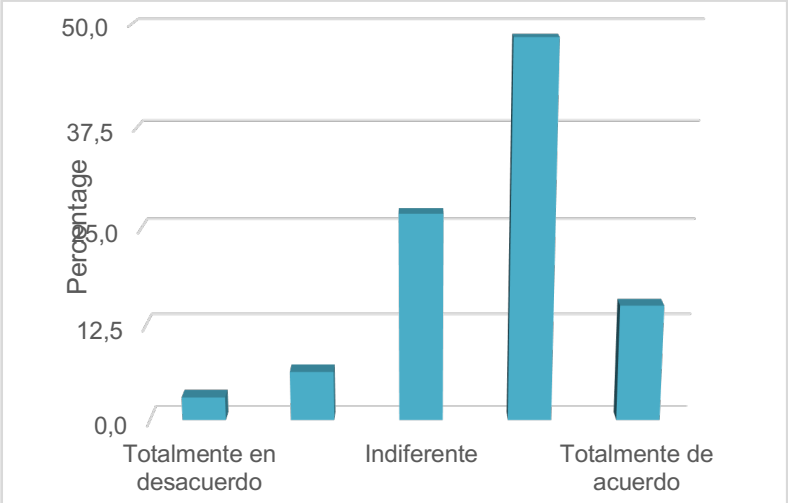
You are satisfied with your participation in FASAPCPUG



Finally, the point of view of the population analyzed regarding the creation and operation of the FAS (Figure 3), is that 48.5% agree with having greater security of receiving their pension upon retirement from the UG by creating the pension fund, while only 3% disagree.

Figure 3

Appreciation of the operation of FASAPCPUG, in terms of having greater security of receiving the pension at the time of retirement from the UG.



Discussion and conclusions

The above information indicates that the ASPAAUG population maintains a balance between mature and young academics, with only 14% of the total exceeding the age of 56. However, in order to have more elements for analysis, this reading should be complemented with information on the seniority of academics. In the study sample, only 15% (seniority of more than 21 years) are in a position to access retirement, because they meet the criteria of the previous ISSEG law (2002), which establishes 15 years of seniority and 55 years of age to access this benefit.

The data presented show that the population is composed of two sets of academics: one is made up of academics who are in their fifth decade of life and have worked around 21 years at the institution; the other is made up of young people who have joined the UG in the last ten years (42%), who will contribute 8% of their benefits for more years to strengthen the FAS.

The UG distributes its academic positions in six types of positions. The first type of position is occupied, as shown in Table 5, by part-time teachers (50%), which in theory is a population with a lower salary and their contribution to the FAS is proportional to their benefits received, so it can be inferred that this group of colleagues is the most vulnerable population at the time of retirement, since they have a high probability of having a low pension, since they do not have another social security system.

The perception of improvement that the UG has had in its substantive functions is heterogeneous, since more than 54.4% of the surveyed population agrees that there are good working conditions, while 30.3% disagrees (graph 1). Although these variables are related, there is a possibility of bias due to the fact that our largest number of participants in this research were part-time professors (n=119), most of whom do not have access to the economic support granted for research through the UG itself (program of incentives for the performance of teaching staff). Data from the university itself, as of May 31, 2020, has 559 full-time professors registered in the academic performance scholarship system and a total of 626 professors in the National System of Researchers attached to the University of Guanajuato, so the financial support also depends on an external institution such as *Conacyt* (Universidad de Guanajuato, 2020).

Table 6 shows that the majority of the population studied (79.4%) agrees with knowing the problems of the institutions that have financial difficulties due to pension issues; however, it is clear that 63.2% of part-time professors are indifferent to knowing the current situation of the public universities in our country that face this situation. This is probably due to an excessive workload that prevents them from empirically getting to know these facts.

The fact that most of the participants surveyed were aware of the uncertain payroll situation of other public universities makes it possible to obtain results that refer to the appreciation regarding the FAS, as it is by gender. Table 7 shows that 89.6% totally agree that a financial crisis in the institution was prevented, and that the federal government has sent the subsidy resources owed and with these resources it was possible to pay the workers of four of the five state universities that were at risk of not being paid the second fortnight of November. Even so, uncertainty prevails regarding the December payroll and the commitment to Christmas bonus and other benefits at public universities (Román, 2020).

Finally, percentages of 47.7% and 48.5% are satisfied with aspects such as: *satisfaction in participating in the pension fund contribution* and *greater security in*

receiving their pension, respectively. This attitude is probably due to the fact that the academic community of ASPAAUG is aware of the position of the Ministry of Public Education (SEP) that there will be no resources for universities in crisis as long as they do not carry out the financial reorganization actions required by the federal government (Moreno, 2020).

This shows that after 3 years of creation of the pension fund it is in a process of capitalization, and a low percentage of the fund is being taken to decrease liabilities which until 2016 was four hundred and ninety five million pesos of ordinary expense for the payment of retirements and pensions. It is revealed that this expense is increasing day by day with new personnel accessing the right to retirement, based on the fact that this benefit has never been funded since its creation. The existence of this fund will make it possible to reduce the subsidy currently covered by the institution, thus strengthening the institution (Universidad de Guanajuato, 2020).

The financial crisis of the international pension systems and that of the University of Guanajuato allows us to distinguish its two causes: the increase in life expectancy and insufficient contributions. In the mid-20th century, life expectancy barely reached 50 years, so it was logical to think of granting pensions after 30 years of service, since the few workers who would retire would have a short life expectancy from the date of retirement. In addition, the quality of life at the age of 50, in general terms, did not allow to be fit to work. Currently, life expectancy exceeds 75 years and to this we add that the pension is transferable after the death of the worker to his or her economic dependents, as is the case of the widow.

Although workers are guaranteed their pension to the extent of their base salary, with the Social Security Institute of the State of Guanajuato, the same is not true for the retirement supplement.

After the implementation of this reform to the pension system, it was important to evaluate the degree of satisfaction of the academics with its entry into force and its 3 years of operation, since its implementation required a broad debate and a democratization process, where the acceptance of these new policies was approved.

After conducting the research, it is concluded that the implementation of this reform in the University of Guanajuato will allow a readjustment in its finances, which, in theory, should allow a better distribution of these to optimize its labor system and the educational environment. Therefore, the results also show that the academic union's appreciation is that it was able to consolidate significant levels of good stability in terms of greater security in receiving their pension, that a financial crisis in the institution was prevented, as well as being satisfied in participating in the contribution (8% of their benefits) to the pension fund.

This experience proves that it is possible to modify this projection, which now leaves at least 14 of the 34 public state universities without funds to pay the pensions of their former employees. The institutions that have implemented reforms to their pension systems are the Autonomous University of Aguascalientes (UAA), which has financial sufficiency for the next 20 years with its pension and retirement fund and guaranteed labor prerogatives. The viability of the fund allows the institution sufficient time to seek mechanisms to help strengthen it and thus avoid a deficit as of the year 2037. Employees contribute 10 percent of their base salary to the pension and retirement fund (Henández, 2017).

For its part, the Universidad Juárez Autónoma de Tabasco (UJAT) emphasizes that, with the implementation of a new pension and retirement system, the institution has

given guarantees to its academic and administrative staff. The public universities should make it a priority to propose structural reforms to address pension and retirement liabilities (Oliva, 2013).

Since the reform of the pension and retirement law is not retroactive to the date of its approval, the bulk of ASPAAUG academics will be able to access retirement under the criteria set in advance, they will only have to contribute 8% of their benefits during their active working life. Although here it is worth mentioning that the new generations (with definitive effect as of 2018) will have new conditions and amounts at the time of retirement.

Currently, the SEP announced that it had negotiated extraordinary support for 6 public universities that are in financial crisis. The universities that received extraordinary support are the autonomous universities of Coahuila, Morelos, Sinaloa, Michoacán, Chiapas and Zacatecas. However, Oaxaca, Chihuahua, Nayarit and Durango also declared a crisis (Moreno, 2020). It is important for each public university to carry out a situational diagnosis of its pension system and to analyze its strategy jointly with the unions, in order to seek financial solutions that allow labor stability and respect for collective bargaining agreements, giving priority to dialogue and collective bargaining for the benefit of the institution and the workers.

References

Alonso Meseguer, J. & Conde Ruiz, J. I. (2007). Reforma De Las Pensiones: La Experiencia Internacional. *Revista de Economía: Información Comercial Española (ICE*), *1* (837), 179 - 193.

Asociación Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato. ASPAAUG. http://www.aspaaug2015.com/index.php?seccion=actuarial#conGen1

ASPAAUG. (2016). Asociación Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato. Contrato Colectivo de Trabajo 2016 - 2018. http://www.aspaaug2015.com/pdfs/contratocolectivo.pdf

Bensusán, G., & Ahumada Lobo, Í. (2006). Sistemas de Pensiones y Jubilaciones en las Instituciones Públicas de educación superior y composición por edad del personal académico. *Revista de Educación superior*, *2* (138), 7-35. http://redalyc.uaemex.mx/redalyc/pdf/604/60413801.pdf

Castañeda Ortiz, E., & Jiménez Bustos, G. (2019). Los sistemas de pensiones entre los docentes universitarios. *Centro de Estudios Sociales y de Opinión Pública*, 1-13.

Consejo Nacional de población. (2012, January 1). Proyecciones de la población en México (2010–2050). CONAPO. http://www.portal.conapo.gob.mx/00cifras/proy/municipales.xls

Cruz L. Y. & Cruz L., A. (2008). La educación superior en México tendencias y desafíos. *Revista da Avaliação da Educação Superior (Campinas)*, *13* (2), 293-311. https://dx.doi.org/10.1590/S1414-40772008000200004

Farfán Mendoza, G. (2017). México. La constitución de 1917 y las reformas a los sistemas de pensiones*. Revista Latinoamericana de Derecho Social*, *1*(24), 3-37.

Flores, L. (2019, August 11). Aumento de pensionados, foco rojo en Guanajuato. *El Economista*. https://www.eleconomista.com.mx/estados/Aumento-de-pensionados-foco-rojo-en-Guanajuato-20190811-0093.html

García Miramón, F. (2017). *Pensiones en México 100 años de desigualdad*. CIEP.

García Nieto, H. U., Pacheco Espejel, A. A., Ruiz Hernández, B., Sánchez López, L. F., & Vargas Alencaster, L. D. (2006). Situación actual y perspectivas de los sistemas de pensiones y jubilaciones en México. En *La situación del trabajo en México*, (pp. 205-232).

Universidad Autónoma de Aguascalientes. (2022). Amplía UAA Fondo de pensiones y jubilaciones a 1,300 mdp tras inyectar recursos adicionales. *Universidad Autónoma de Aguascalientes*. https://www.uaa.mx/portal/noticias/amplia-uaa-fondo-de-pensiones-y-jubilaciones-a-1300-mdp-tras-inyectar-recursos-adicionales/

Hernández, H. C. (2019). Some Notes about Retirement Pension Systems of Social Security and the Experience of its Reform in Latin America. *Revista Economía y Desarrollo*, *160*(2). https://www.redalyc.org/articulo.oa?id=425558003017

Hori, G. (2000). Breves notas sobre la seguridad social en México. *Revista mexicana de la seguridad social en México*, *1*, 71-100.

Instituto de Seguridad Social del Estado de Guanajuato. (2021). Instituto de Seguridad Social del Estado de Guanajuato. *ISSEG.* https://isseg.gob.mx/quienes-somos/

Ley de Seguridad Social del Estado de Guanajuato. (2016). In Congreso del Estado de Guanajuato. Instituto de Investigaciones Legislativa. http://imug.guanajuato.gob.mx/wp-content/uploads/2017/05/Ley-de-Seguridad-Social-del-Estado-de-Guanajuato.pdf

López S., A., & Morales H., I. (2005). El sostenimiento de la educación en México. *Papeles de Población*, 239-254. http://www.redalyc.org/comocitar.oa?id=11204410

Márquez J., A. (2012). El financiamiento de la educación en México: Problemas y alternativas. *Perfiles educativos*, 34(spe), 107-117. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982012000500010&lng=es&tlng=es

Milenio. (n.d.). Campus Milenio Suplemento Universitario. Jubilaciones y pensiones: el lado frágil de la negociación presupuestal.

Montoya, B., Roman, Y., & Gaxiola, S. (2016). Envejecimiento y vulnerabilidad social en el Estado de México.

Moreno, T. (2020). No habrá más recursos para 4 universidades en crisis: SEP. *El Universal, 29*. https://www.eluniversal.com.mx/nacion/no-habra-mas-recursos-para-4-universidades-en-crisis-sep

Muñoz G., H. (2012). La educación y el futuro de México. Plan de diez años para desarrollar el sistema educativo nacional. http://www.planeducativonacional.unam.mx/PDF/CAP_02.pdf.

Oliva, M. (2013). *Una reflexión acerca de la jubilación de los académicos en las universidades públicas estatales de México.* Universidad Veracruzana: https://www.uv.mx/iiesca/files/2013/04/12CA201201.pdf

Ortiz Gil, M. A., Reyes Montúfar, C. L., & Maravert Alba, M. I. (2020). Participación activa de la Asociación Sindical de Personal Académico y Administrativo De La Universidad de Guanajuato (ASPAAUG) en la creación del fondo auxiliar solidario para el apoyo al pago de complemento de pensiones de los trabajadores de la Universidad de Guanajuato. *Ciencia Administrativa*, *1*, 45-55. https://www.uv.mx/iiesca/files/2021/05/04CA2020-02N.pdf

Pérez, S. M., & Castro, C. (2016). Población de adultos mayores, desafío económico y social para el sistema de pensiones en México. *Población y desarrollo sostenible, 92*.

Ramírez, L., & Chande, B. (2012). *Seguridad económica en la vejez: El reto del envejecimiento en México*. Academia Mexicana de Medicina e Instituto Nacional de Geriatría Solís Soberón.

Redacción A. M. (2017). Quiebran pensiones a 14 universidades. *Periódico AM*. https://www.am.com.mx/noticias/Quiebran-pensiones-a-14-universidades-20170621-0005.html

Reyes, C. (2017). *Jubilaciones y pensiones: el lado frágil de la negociación presupuestal*. Campus Milenio suplemento Universitario. http://campusmilenio.mx/index.php?option=com_k2&view=item&id=8063:jubilaciones-y-pensiones-el-lado-fragil-de-la-negociacion-presupuestal&Itemid=114

Rodríguez Jiménez, J. R., Urquidi Treviño, L. E., & Mendoza Grijalva, G. (2009). Edad, producción académica y jubilación en la universidad de sonora. *Revista Mexicana de Investigación Educativa*, 593-617.

Román, J. A. (2020). Logran pagar a trabajadores de cuatro universidades estatales. *La Jornada.* https://www.jornada.com.mx/ultimas/sociedad/2020/12/02/logran-pago-a-trabajadores-de-cuatro-universidades-estatales-2233.html

Rosas, T. & Alemán, V. (2018). Sin recursos para apoyar a 10 universidades en crisis. *Excelsior*. https://www.excelsior.com.mx/nacional/sin-recursos-para-apoyar-a-10-universidades-en-crisis/1283248#view-2

Santibáñez, L. & Campos, M. (2011). El gasto educativo en México: Consideraciones sobre su eficiencia. *México Evalúa*, 4-18.

SEP-ANUIES, XXIII. (n.d.). Informe del programa de fomento a reformas estructurales en las universidades. In *XXIII Sesión Ordinaria del Consejo de Universidades Públicas e Instituciones Afines* (p. 3). SEP-ANUIES.

Soto, C. (2000). *Valuación Actuarial Estandarizada de las Universidades e Instituciones Públicas de Educación Superior*. Actuario.

Universidad de Guanajuato. (2021). Instituto de Seguridad Social del Estado de Guanajuato. ISSEG: https://isseg.gob.mx/quienes-somos/

Universidad de Guanajuato. (2016). Ley de Seguridad Social del Estado de Guanajuato. H. Congreso del Estado de Guanajuato. Instituto de Investigaciones Legislativa: http://imug.guanajuato.gob.mx/wp-content/uploads/2017/05/Ley-de-Seguridad-Social-del-Estado-de-Guanajuato.pdf

Flores, L. (2019). Aumento de pensionados, foco rojo en Guanajuato. *El Economista*. https://www.eleconomista.com.mx/estados/Aumento-de-pensionados-foco-rojo-en-Guanajuato-20190811-0093.html

Universidad de Guanajuato. (2018). Asociación Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato. *ASPAAUG*. http://www.aspaaug2015.com/index.php?seccion=actuarial#conGen1

Universidad de Guanajuato. (2016). Asociacion Sindical de Personal Académico y Administrativo de la Universidad de Guanajuato. Contrato Colectivo de Trabajo 2016 – 2018. *ASPAAUG*. http://www.aspaaug2015.com/pdfs/contratocolectivo.pdf

Universidad de Guanajuato. (2017). Sistema de pensión UG. Convenio para el financiamiento del complemento de pensión. http://www.ugto.mx/fortalecimientopensiones/images/pdf/convenio-plan-fortalecimiento.pdf

Universidad de Guanajuato. (2018). Gaceta Universitaria. Reglamento del Fondo Auxiliar Solidario para el Apoyo al Pago del Complemento de Pensión.

http://www.ugto.mx/gacetauniversitaria/component/jdownloads/send/272-acuerdos-de-rectoria-general/59-reglamento-del-fondo-auxiliar-solidario-para-el-apoyo-al-pago-del-complemento-de-pension-de-la-universidad-de-guanajuato?option=com_jdownloads

Universidad de Guanajuato. (2020). Dirección de Apoyo a la Investigación y al Posgrado. Investigación. https://www.ugto.mx/investigacionyposgrado/investigacion/sni/total#:~:text=Al%2031%20mayo%20de%202020,de%20Guanajuato%20con%20reconocimiento%20S.N.I.

Universidad de Guanajuato. (2020). Pensiones. Preguntas frecuentes: https://www.ugto.mx/quienes-somos/objetivos/196-pensiones/854-preguntas-frecuentes

Universidad de Guanajuato. (2016). Valuaciones Actuariales Del Norte. http://www.ugto.mx/images/pdf/para-saber-mas-sobre-el-sistema-de-pensiones-universitario.pdf