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Presentation of Content

In the first article we present, *The impact of research results on art education*, JUAN-CARVAJAL, Mara Lioba, JUAN-CARVAJAL, Dargen Tania, VDOVINA, María, with adscription in the Universidad Autónoma de Zacatecas and Universidad de las Artes, La Habana, Cuba, as the following article we present, *Interactive infographics as a digital tool for the appropriation of concepts*, by FLORES-GONZÁLEZ, Norma & FLORES-GONZÁLEZ, Efigenia, with adscription in the Benemérita Universidad Autónoma de Puebla, as the following article we present, *Mental health and school life in Durango Parents' perspective*, by LARA-ESQUEDA, Agustin, CEJAS-LEYVA, Luz María, HERRERA-VARGAS, Isela Vanessa and LARA-BASULTO, Agustin David, with adscription in the Facultad de Psicología y Terapia de la Comunicación Humana, UJED and Consultoría LARBAS SA de CV, as the following article we present, *Organizational knowledge based on ISO 9001: 2015 in a higher education institution*, by FORNÉS-RIVERA, René Daniel, CANO-CARRASCO, Adolfo, CHAN-GARCÍA, David Leobardo and VÁSQUEZ-TORRES, María Del Carmen, with adscription in the Instituto Tecnológico de Sonora.

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The impact of research results on art education**Impacto de los resultados de investigaciones en la enseñanza artística**

JUAN-CARVAJAL, Mara Lioba†, JUAN-CARVAJAL, Dargen Tania, VDOVINA, María

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Abstract

Music teaching today represents a greater effort compared to previous eras. Before, quality and rigor, combined with ideas, resources, techniques and emotions were shared, inside or outside of the school environment. Currently, the same process is accelerated: the considerable number of research in, about and in favor of art, joined with technological impact, and the existence of social networks, activates informational exchange, and causes contrasts that require higher creativity from the teacher in order to offer tools for the student to qualify the cumulus of information at their grasp. This is made possible by integrating teaching with research, a popular theme in education-related events; which constitutes the objective of this work: to popularize alternatives for the achievement of the possibilities the research process offers in music teaching. The analytic-synthetic method, the life history method, documental analysis method and interview were combined from a qualitative standpoint, which was conducive to a multilateral study of the composer and his creativity's development, and also to the activities' design, and the search for information. Ideas and experiences about the potential of research for art education, plus extracurricular activities designed and based on the research are therefore offered.

Research process, Art education, Research methods**Resumen**

La enseñanza artística en la actualidad conlleva un esfuerzo superior respecto a siglos anteriores. Antes, calidad y rigor, se conjugaban con ideas, recursos, técnicas y emociones dentro y fuera del contexto escolar. Actualmente el proceso se acelera por el número considerable de investigaciones en, sobre, y para el arte, unido al impacto tecnológico y a la existencia de redes sociales que activan el intercambio informativo, provocan contrastes, y exigen del profesor mayor creatividad para ofrecer al estudiante, herramientas que le permitan diferir el cúmulo de información a su alcance. Esto es posible al integrar docencia e investigación, tema recurrente en eventos sobre educación, lo que motiva el objetivo de este trabajo: generalizar alternativas para el aprovechamiento de las potencialidades que ofrece el proceso investigativo en la enseñanza de la música. Desde un enfoque cualitativo se combinaron los métodos analítico-sintético, historia de vida, análisis de documentos y entrevista, lo que propició el estudio multilateral del desarrollo del compositor y de su creación, el diseño de actividades y la búsqueda de información. Se brindan ideas y experiencias sobre el potencial de las investigaciones para la enseñanza artística y actividades extracurriculares diseñadas a partir de los resultados de la investigación.

Proceso investigativo, Enseñanza artística, Métodos de investigación

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† Researcher contributing as first author.

Introduction

The teaching profession in higher education is permeated by globalization and by the swift scientific, technical and social development, which in terms of communication impacts the educational system. Consequently, it is characterized by a dynamism that entails a greater effort than in previous centuries.

The organization by disciplines or modules of the framework that disclosed the features of the profession, and the resources that ensured the development of a curriculum, along with the specialization of the teacher, certified the quality and rigor of the professional's training. At present, the process is accelerating and the technological impact causes discrepancies that demand from the teacher familiarity with tools that foster creativity and promote guided motivation towards study in the pupil, at the same time as these references are examined, in order to compare and make the most appropriate decisions, taking into account the befitting context.

The use of technologies in education is abundant and rigorous; the trend is progressing towards technological availability in any of its variants: consumer technology (tools created for recreational or professional purposes); digital strategies (to improve the teaching-learning process); internet technologies (a potential available to all, online tools that complement the process); educational technologies (specifically designed for teaching); or technologies in social networks (Johnson, Estrada and Freeman, 2014). Its use, increasingly widespread in society, greatly impacts teaching.

Art education in general, like any educational process, also absorbs the infinite possibilities provided by the benefits offered by information technology and communications. Among the benefits this supplies higher education with, there could be mentioned: an easy access to information, available variability, high speed parameters during its processing, elimination of local space and time barriers, possibility of feedback and interactivity, creation of flexible learning spaces, optimization of educational-research activities, and speed in process management (Gómez, Contreras, & Gutiérrez, 2016).

The ease of traveling through time through artistic, architectural, and visual representations, or for example, in the case of music, recordings, favors the characterization of the moment that is recreated and offers observation, listening, comparison and development in imagination to art education; all of these being motivating elements to create which, accompanied by theoretical support, streamline the teaching process and take advantage of the wide spectrum of information available to the student.

Undoubtedly, the exploitation of the existing informational potential depends to a great extent on the preparedness of the teacher. The multidisciplinary in knowledge management, coupled with stimulation of the student's motivation, requires a pedagogical mastery from the teacher or tutor; in other words, it is necessary to acquire a cultural background that allows them to make comparisons based on indicators that refer to aspects of territoriality, tradition, time, forms or methods, so that the necessary competencies for professional practice are developed. Likewise, when managing their lesson, the teacher must explore professional problems, solutions, experiences and good practices, in accordance with the particularities of the branch of art to which they belong.

This course of action is informed by the benevolent intention of cultivating the benefits of research to impact the quality of the lessons. The modeling of the content stated in the programs of the disciplines or subjects, along with the knowledge of the socio-economic particularities, of the historical, cultural, the traditional, the classical and the popular angles, confers a vision of the old and how it has evolved towards the present. It is there where there is a wealth of information available for the teacher to integrate the teaching and research processes through which, consequently, a positive impact is achieved in artistic teaching.

Research in art changes the sense of perception, transforms the researcher in such a way that it is impossible for him to listen to, criticize or perform an artistic work again, without a study that encompasses the universality of what can be appreciated in it. (Sánchez, Juan-Carvajal, Vdovina, and Juan-Carvajal, 2016, p. 102)

It is precisely this universality that is the greatest potential the teacher has for the lessons, its exploitation helps the student's motivation to seek information and investigate, which are aspects that contribute to the benefit of the disciple and the teacher himself as a feedback system in their academic labor.

Motivation is based on the needs of the individual. If we could have a good characterization of the student and could take advantage of the potentialities of the context, emotional and cognitive processes that fuel curiosity towards the unknown can be developed. In art, particularly in teaching a musical instrument, differentiated work with students has greater advantages; in this profession, the teacher becomes a tutor who accompanies his students in most of his career if not in all of it, which enables the generation of new needs in his disciples.

The teacher is a permanent supplier of knowledge, discoveries and affirmations that contribute to the fact that, when the artists reveal themselves to the public, they manifest their innate talent, revealing their capacity and expressive nature. Experience has shown that characterizing the student is not an easy task, since it involves inquiring into his personality traits. Consequently, pedagogical observation will be present in all educational activity so as not to lose sight of the details that point to what to work on with each of the applicants so that they gain confidence and guide them towards success.

An alternative in this sense is attention and transmission of previous positive experiences, both one's own and those of other people: moral support on the basis of narration of anecdotes, stimulation by taking advantage of the acquired knowledge, or sharing of a vision based on the possibility of carrying out the projected target until the goals are achieved, make a frustrating situation feasible for redesign and for greater effort be put forth to achieve the intended purpose. A teacher who is able to integrate both the teaching and research processes and take advantage of the impact of the latter in teaching, has a greater chance of achieving success with his students.

Determining the impact of the research process in the classroom is discerned from different points of view; in general, the so-called "impact measurement" goes through the comparison of moments based on specific indicators such as, the fulfillment of objectives, judgment of the value of the process, or the issuance of a value judgment that facilitates decision-making. However, the impact is not always related to a result, its action will be latent throughout the investigative process:

Impact appraisal is a type of evaluation that can be carried out in the final phase of the intervention of a policy, program or project, or in its intermediate phase, in order to make decisions about its continuation, and possible adjustments which would be necessary. There is a certain consensus in which an impact evaluation is defined as the measurement of the changes in the well-being of the individuals participating in the program, and which could be attributed to it.

... An impact evaluation aims to measure the effect that any program may have on some variable associated with the well-being of its beneficiaries. (Estacio, Millán, Olivera, Parra and Santa María, 2010, p.6)

On the other hand, the impact is observed in different ways, despite the recurring criteria of change and its influence when making decisions. In its evaluation, four potential advantages are perceived: *the demonstration*, given by the possibility of presenting evidence of a result or, of the acting guidelines during a process; *orientation*, since it favors the cosmopolitan vision of context, characterization of an object, projection and prevention; *motivation*, which is related to the first two and encourages action and innovation; and the *integrative* element, which offers tools to bring together or unite processes, results, modes, etc., which favors decision-making and proactive positions in the pedagogical process.

Evaluating the impact is not precisely the objective proposed in this work, but instead it is the usefulness of its results, fundamentally those of the application of research methods, to complement the work of the music teacher. Consequently, alternatives are provided here for taking advantage of the potential offered by this process in artistic teaching, particularly in music, in the teaching (and learning) of an instrument.

Development of an idea

According to the various bibliographic sources consulted, the first moment of the investigative process is the generation of the "idea"; an idea that, without any precision, allows you to visualize a goal and identify a number of problems that affect the proper functioning of a process or object. In artistic education, particularly in music, there is a number of works with several centuries of existence in the catalog, composed, for example, for bowed string instruments. In this way, there is a wide spectrum of works accumulated by humanity.

However, despite the efforts of educational centers and technological advances and library exchanges, it is impossible for each educational institution to find all this wealth. However, concerned about the absence of scores, specialized articles, recordings, videos, or references about composers with less dissemination, recent musicological research and contemporary creation in numerous territorial areas keeps the processes of musical research active, which could be the object of motivation for the study, approach and a local, national and international dissemination of new repertoires for chordophones. So, why not take advantage during instrument lessons, and learn the repertoire to interpret, of the results of those investigative processes that compile such information?

There is research that promotes, -to mention a daily practice-, the study of cases or life history as scientific methods to reveal the characteristics of a time, a work or a certain author. Traits such as knowledge of the context, historical moment, personality, social importance, influence of other regions or times, or existing technological resources, among others, have been generated from its contributions. In the case of teaching an instrument, all this allows the student to understand why a specific approach to a work should be different from another, not only from a technical point of view but also from an interpretive point of view (final objective); for this reason, it is necessary to know why a musical composition differs from another even if it is by the same author and shares certain stylistic features; or why in harmony dissimilar structures are drawn and that according to their links or chord arrangement, particularities of an artistic movement, trend or epoch are manifested.

Also, its important to consider the character, and the melodic sense and phrasing in the performance, to understand why the interpreters put a personal.

Although these would not be the scientific questions to be asked during an investigation whose purpose is the achievement of an academic degree, the results obtain are justified to be presented to the students in order to stimulate the search for information oriented towards the corresponding program to your resume. This will provide, in addition to culture, a coherent and convincing sense of the musical interpretation that is made, *i.e.*, a personal codification of the expressive language that is transmitted to the listener.

It is necessary to mean that the selection of works or composers that students must work on will correspond to the curriculum for the training of the musician, the level at which they are and the discipline or subject they are studying. However, greater effect will be achieved if this is complemented with a previous or parallel characterization of the work, carried out by the students themselves.

Methodology**From research to performance, and viceversa**

The line of study of various contemporary works pursued with academic, investigative and / or interpretive purposes, led at a certain stage, -with a greater or lesser degree of involvement - the authors of this work to results that focused on the musical production for bowed string instruments in Cuba, which entailed the study of diverse compositions written in a specific period and the characteristics of the composers who were formed or grew up in said period; this simplified the process they had to exercise during they performance as teachers.

At a certain point, once this process was completed, which included publishing a book and the recording of two compact discs¹, some students became interested in interpreting certain works collected for the first time in these compilations; So it was time to reveal to the students that:

(...) Musical language does not pretend anything but communication through a varied proposal, an opening of codes through which the composer rejoices in showing his own personality and telling what is given to him in an authentic way. This is how the understanding of the musical work can only occur through a socio-historical and cultural analysis of the individual, his environment and his field of action. (Juan-Carvajal and Juan-Carvajal, 2014)

This position implies the positive presence of a complicity between the music teacher and the student since, in the training process, not only the instrumental or technical aspects are affected, but the spiritual one is awakened. An aesthetic sense is developed from which judgments, tendencies, techniques, characteristics, identity traits, analysis and evaluations of the positioning in the face of certain constituent structural elements of a composition emerge and are evaluated, or it might be that emotional states are identified that denote feelings, sensations and expressions present in the (supposedly spontaneous) interpretation of the signs in a score, during the performance of a musical work.

(...) The sensation that is produced when contemplating, listening or transmitting a performance creates an inexplicable state due to the lack of communication between the evoking language (signic) and the spoken language with which we communicate.

This is how consciously or unconsciously we are looking for the explanation of the sensations. (Vdovina, 2010, p. 65).

Another idea is to ensure access to information with an orienting guideline that favors the search and the design of spaces for meditations on the characterization and execution of the works (or parts of them).

A positive experience has been fostering debate about the results achieved by students of the same level; a debate that could be particularly intentional towards the aspects in which some kind of difficulty could be considered to have existed. This activity would be divided by themes, which would be specified from the outset of preparing the activity, considering the characteristics of the student body or the selected composer (figure 1).

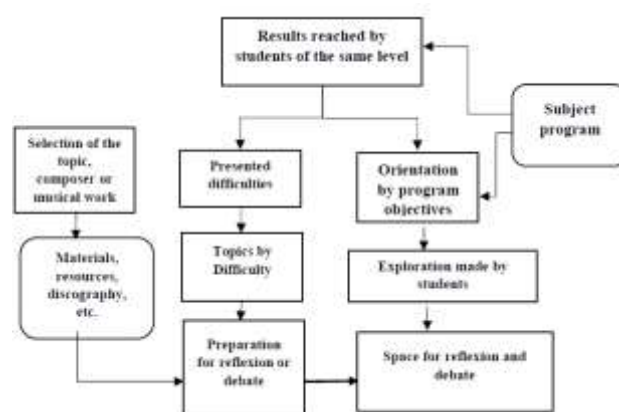


Figure 1 Flowchart exemplifying the preparation process of a debate

Source: Author's own elaboration

In the aforementioned research on bowed string instruments in Cuba, five composers who have passed through the Cuban reality during the last half century and who continue to compose were studied. All of them have a generational coincidence that makes it interesting to recognize the particularities of their ways of composing, their techniques, styles, periods, sources of inspiration, and expressive languages. Among their extensive and varied creations are recognized musical works for stringed instruments in different formats. A distinctive characteristic is that, alongside with composition, all of them perform (or they have done so at some stage of their lives) in other areas of artistic-musical knowledge such as orchestral conducting and / or teaching.

¹The book *Bowed Strings in Cuba. Half a century of creation* written by Dr.C. Mara Lioba Juan-Carvajal and Dr.C. Dargen Tania Juan-Carvajal with the collaboration of Dr.C. María Vdovina in 2014, published by the CIDMUC publishing house of Cuba and CDs I and II *Contemporary Music for Viola*, production made with PRODEP resources, produced at the Autonomous University of Zacatecas, Mexico, 2017, and recorded by the teaching violists Mara Lioba Juan-Carvajal and María Vdovina, having as guests the Russian-American violist Viera Borisova, and the violinist and violist Alexander Vdovin.

An example of this particularity is evidenced in the professor, conductor and composer Jorge López Marín (Havana, 1949). He graduated from the Kiev Conservatory and, subsequently, conducted postgraduate studies in Moscow during the geopolitical period of the USSR. Marín is a Doctor of Arts in Sciences from the University of the Arts of Cuba (ISA) and works as a professor of orchestration, composition and orchestral conducting at the aforementioned university. His characterization made it possible for our students, who have known or performed his works, to observe the impact of foreign schools on his training and to verify the most genuine Cuban music in his creations.

Benefits of research results for art education

Chiefly, in order to characterize the studied composer, his creation and the influence the context and the historical period had on his work, the *analytic-synthetical* and *life history* methods were used. Given the peculiarities of his profession, the correlation between the technological, instrumental, historical and affective aspects necessary for the formation of the artist, has a greater likelihood of a bigger scope when the results of different research methods and techniques are combined and contrasted. The use of these methods provided a more thorough vision of the quirks of the composer and an increase, dosage and variance of the activities with the students.

The *analytic-synthetical* method has as a function the study, independently, of the various parts of the object (considered as a whole) to get to the knowledge of its regularities, developmental rules, relationships, and to later integrate that information, in order to generate new points of view or theories.

The possibility offered by this method, of breaking down the research into different parts, favored the design of a methodological strategy that fostered the multilateral analysis of the composer's development and his creation, and simplified the examination of aspects related to the objectives of the training of the bowed string instrumentalist.

In this case, the following aspects were examined: the formation of the composer, the stylistic tendencies according to the stages studied, as well as the local and universal contexts, and additionally, the peculiarities in the musical morphological structure, that is, attention was paid through observation, reflection and analysis of various elements among which melody, harmony, rhythm, instrumentation, etc. were assorted, in other words, everything that is perceived and expressed in contact with the audience when executing a musical performance.

Another proposal is to stimulate the development of values in the education of the student. This is done through a multidisciplinary analysis of the contexts of formation and development of the composer, of the particularities of their time and of how much and of how much and in which way this impacted on their creation. As a result, the art student is favored with an aesthetic and cultural recognition of a given era; in turn, they situate themselves with greater responsibility towards their formation and stimulate a sense of belonging, which allows them to transform knowledge into an idea or artistic expression: musical performance in the broadest sense of the concept.

Life history, like all qualitative research, has a strong interpretive component; its function is aimed at the elaboration of "(...) memories based on the collection of particularities in cultural practices rooted in traditions that can be erased over time; in other words, prepare documents that in one way or another preserve cultural identity" (Juan-Carvajal and Juan-Carvajal, 2019, p.130).

Compliance with a methodological strategy for its application depends largely on the situation and the possibility of data collection. As a research method, it reveals the information mostly on account of individual or collective discourses, although bibliographic and documentary exploration and observation are not to be ruled out.

Memories and experiential impressions are fundamental axes of a method that focuses on personal or collective experience and "(...) takes into consideration the affective meaning of things, situations, experiences, and relationships that affect people (...)" (Charries, 2012, p. 51).

Its flexibility and possibility of representing the object as it is described gives it a certain degree of complexity when recounting the phenomena according to the memories of the protagonists or experts, which are sometimes divergent. In the research carried out, the methodological strategy integrated the *documentary analysis* and the *interview*.

The *documentary analysis* consists of the exploration of any object that registers some phenomenon - either in printed or digital format. The impact of the results of the research process offers the teacher information about the peculiarities of the object under study, which makes it possible to design and carry out various activities alongside the students based on the results obtained.

Results

The research process' results gave birth to the idea of designing activities where students fulfilling the objectives of the class was promoted, taking advantage of the impact the results of the application of the method brought, in order to promote motivation for study and creativity. Returning to the aforementioned composer, table 1 shows some of the works written by Jorge López Marín for different combinations of strings, strings with piano, or with other instruments (as a result of the application of the documentary analysis) with design ideas for activities made to work with students in different non-teaching spaces.

Work	Format	Activity design
Variaciones en ritmos cubanos (1973)	String quartet	Aesthetical and stylistic analysis in the context of postmodernity in music.
Música para viola y cuerdas "Federico Smith in memoriam" (1977)	Soloist viola and string orchestra (also written for viola and piano)	Melodic and harmonic analysis from different performances taking into account the educational environment and the characteristics of the performer.
Musipaz (1988)	String orchestra	Reading with a debate about the features of the work y and the impact of the context on which it was inspired (a sculpture). The great expressiveness of a neoclassical-style-language.
Noche de tango (1999)	Pianoforte and string orchestra	Listening and recognition of the usual features of the genre, mixed with contemporary composition techniques as well as poetry, tango and afro-cuban miscegenation.

Sweet Ceci Mar (2002)	Clarinet, viola and pianoforte	Debate about the used format, which includes a wind instrument, -the clarinet- and this instruments' closeness with the viola, the structure of the work employed by Mozart, and the influence on the context of chamber music and the development of the viola on this genre.
Tanguendo con tumbao (2005)	Pianoforte and string orchestra	Reflexion about the use of the chordophones, and the perception of rhythmic and melodic motives of popular music.
Rumor de Fantasmas (2005)	String orchestra	Analysis of the postmodern aesthetics that generally characterize the composer's music.
La danza implacable (2007)	Viola trio	Concert-debate, with the presence of specialists, about the sound and possibilities of the instrument in a <i>sui generis</i> organization: the viola trio.
Suite alegórica, para piano y violín (2009) también en versión para violín y orquesta de cuerdas.	Violin and pianoforte, or soloist violin and string orchestra	Appreciation of the characteristics of the composer concerning the treatment of the violin as a solo instrument, which influenced the creation of subsequent violin and orchestra concertos.

Table 1 A simple of works written by Jorge López Marín for strings and/or combined with other instruments
Source: Author's own elaboration

The possibility of open and intentional communication in the activities carried out based on the debate proposals, increased the students' motivation towards searching for comparing new sources, especially for moments of exchange with specialists and composers.

The compilation that resulted, enabled the students to become acquainted with the composer's works written for the formats where the bowed string instruments stand out, helped pinpointing the location and offered a possibility of reading and analyzing some scores.

López Marín's discography includes works for symphony orchestra, chamber ensembles or small formats. Regarding the bowed strings instruments, he wanders through different genres and styles, a fact which motivated listening and debate about the performances and a characterization of the different ways of approaching the work and performing it.

The *interview*, as a recurring complementary method in life history research, enriches theoretical evaluations and motivates the search for new notions that support interpretive practice. Given the peculiarity of being in direct dialogue with the interlocutor, attention to verbal and extraverbal language is made easier. Its execution logic starts from the definition of the objectives and the identification of the aspects on which information is needed. Its arrangement requires the determination of the ideas or topics to be discussed – a guidance that is provided in advance - and a prior study to conduct it with dynamism and not lose the interest of the interviewee.

An essential element in the *interview* is the selection of the informants. In this sense, those who have knowledge and experience, possess the ability to reflect, can express themselves clearly, and are willing to provide information are recommended.

In general, the results of the exercise of combining the *analytic-synthetic* and *life history* methods, along with the sources' potential used by students for exploration, allow the design of activities such as round tables, panels or workshops, where the exchange between the protagonists of the events, the specialists or experts and the students is encouraged, which, in turn, arouses their interest to improve themselves to enhance their performance, either in classes in front of the teacher or tutor, or in front of the public.

The results of the application of research methods constitute a wealth of sources for the music teacher's work such as: knowledge of the subject, prestige and social impact of a composer; the characterization of compositions, especially in the case of contemporary and last century music, that can be exploited in order to raise the motivation of students towards the study and search of audiovisual products, musical performances, or production where the distinctive features of the works and their composers are highlighted, as well as the particularities of the region and the educational institution where the studies are carried out.

Conclusions

The technological development achieved by society has an impact on higher education with benefits such as the wide access and variability of information that, in turn, generate contradictions in the student. As a consequence, the teacher is required to improve their pedagogical mastery in order to develop a quality teaching process and the promotion of creativity and motivation towards study. An alternative for these demands is manifested in the integration of the research and teaching processes.

To obtain positive results during the use of the investigative potential in the artist's training, the teacher must profile the student and promote exploration and research on topics that develop their interest and are in correspondence with the objectives of the study plan of the career.

The use of the results of the research process in the artist's training derives in the search for technical information and a multidisciplinary vision of the evolution of art and, consequently, of individual and collective cultural development, as well as responsibility in their formative process, and their identity with the school and the territory.

The combination of methods and the comparison of the results obtained in the different stages of the investigation, complements the technological, instrumental and emotional aspects, and favors the design of educational tasks that promote in music students sensitivity, creativity and motivation towards study.

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Interactive infographics as a digital tool for the appropriation of concepts**La infografía interactiva como herramienta digital para la apropiación de conceptos**

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Abstract

The educational process has changed substantially, migrating to a digital format, where traditional practices and digital resources coincide for the construction and deconstruction of knowledge. According to the previous background, the research focuses on identifying whether interactive infographics as a digital resource allow the appropriation of concepts in different contexts. For this purpose, the study was analyzed quantitatively with 20 undergraduate students and 20 from High School during spring 2021, finding these results: infographics do promote the appropriation of concepts in English and Spanish, thanks to the existing association between such an appropriation and the use of the fundamental characteristics in the design of infographics as visual representations, keywords, and information, which show coherence, cohesion, logical sequence and a relationship between its elements: images, text, hypertext, and hyperlinks. In conclusion, interactive infographics are an adequate resource for conceptual changes in virtual environments.

Infographics, Appropriation of concepts, Virtual environments**Resumen**

En esta nueva normalidad, el proceso educativo ha cambiado sustancialmente migrando a un formato digital, donde las prácticas tradicionales y recursos digitales coinciden para la construcción y deconstrucción del conocimiento. Tomando en cuenta estos antecedentes, la investigación se centra en identificar si la infografía interactiva como recurso digital permite la apropiación de conceptos en contextos distintos. Para tal objetivo, el estudio se analizó cuantitativamente con la participación de 20 alumnos de licenciatura y 20 de Media Superior, durante primavera 2021, encontrándose como resultados, que la infografía si promueve la apropiación de conceptos en inglés y español, gracias a la asociación existente entre la apropiación de conceptos y el uso de las características fundamentales en el diseño de la infografía tales como representaciones visuales, palabras clave e información, las cuales muestran coherencia, cohesión, secuencia lógica y una relación entre sus elementos: imágenes, texto, hipertexto e hipervínculos. Se concluye que la infografía interactiva es un recurso adecuado para el cambio conceptual en ambientes virtuales.

Infografía, Apropiación de conceptos, Ambientes virtuales

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Introduction

The disruption caused by the migration of education to the virtual mode has different implications, and one of them is how to design or adapt the resources of traditional classes to a digital format to achieve specific objectives according to a curriculum. There are indeed countless applications or digital tools for this purpose. Nonetheless, their design requires digital competencies where teachers use information and communication technologies in the educational context with academic-pedagogical competencies to make their creation possible.

In the specific case of this research, the digital resource analyzed is infographics as a digital tool for the appropriation of knowledge in different contexts (undergraduate and upper secondary level) and languages (Spanish and English). The study has the following hypothesis: infographics allow the appropriation of concepts in different contexts and languages if the essential characteristics for its design are considered during a conscious reading comprehension process.

Theoretical framework

Because of the new educational spaces in the contingency stage, different proposals and studies conclude that students show a desirable academic performance if their learning process includes varied resources in congruence with their previous knowledge, interests, learning styles, skills, and competencies with flexible learning. Besides, different multimedia resources support the teaching-learning process, among which infographics are one of them.

Infographics

It is a graphic format to synthesize specific thematic content through images and text. In the words of Davis and Quinn (2014), infographics are a creative tool that develops critical thinking skills and meaningful learning through graphic representations.

Such a tool should contain pedagogical elements that help to structure thoughts into outlines through paragraphs and main ideas with logical sequence (Kibar & Akkoyunlu, 2014) to reach the representation of knowledge (Polman & Gebre, 2015), through keywords, drawings, graphics (Calvo, 2014), concise texts, images or sounds that together convey a message accurately to an audience. In summary, definitions describe infographics as a technological tool where cognitive aspects, comprehension, and effective communication converge (Kos and Sims, 2014), evidenced in a graphic representation. At this point, it is vital to identify the fundamental elements that an infographic must contain to succinctly communicate those cognitive aspects and content extracted from a written document and be considered a didactic tool to promote knowledge learning (Guzmán-Cedillo, Lima and Castilla, 2013).

In addition, Dunlap and Lowenthal (2016) mention that in the infographic, each element has a clear purpose related to the content and learning objective, which facilitates the reading comprehension process. Therefore, drawings, graphics, or audio with text, present a concise and clear message (Taspolat et al., 2017) for the appropriation of knowledge (Valero, 2010; Brigas et al., 2013).

Then, infographics are a visual communication with three fundamental elements: visual (graphic representations), content (statistics, references, and frames), and information (facts) (Ru and Ming, 2014), where a story or thematic content aimed at a specific audience is narrated with own style, easy to read and attractive format for the audience with the inclusion of reliable information, confirmed in respective sources of origin. The three factors have an objective recurrence in the symbolic representation (Balbuena, 2014).

Other authors consider that the key elements are an attractive and brief title, the use of simple language to convey the message (Krauss, 2012), which must be in harmony with the images and the design of the graphic representation (discursive relations) in such a way that, as a whole, they allow the understanding of concepts in a quick, interactive and, above all, entertaining way (García, 2014).

Moreover, images are a fundamental element in this type of design since they allow the concept to be engraved in the reader's mind as he makes the association between the meaning and the signifier. As a result, infographics must show a discursive sequence like a story that shows relationships between visual representations and information in logical order.

For their part, Taspolat et al. (2017) suggest that the first thing to do to create the infographics is to determine its purpose and audience. Another element is the story or content, which must include a context, scheme with logical order, images, clear, concise information, and registration according to the audience. Furthermore, teachers should check the design, considering the font size, pictures, and colors.

It is crucial to point out that there are different types of infographics like static, animated, and interactive. The first ones are the most ordinary since they are a graphic representation through images and information (Franco, 2005), which is brief, and pleasant to the audience, without neglecting its purpose to present coherent information based on a practical reading.

Animated infographics allow the simulation of reality through the reproduction of static images following a temporal or cycle sequence, ideal for the flow of content, the attraction of students in the learning process, and the development of participation (Chevalier et al., 2016).

Interactive infographics demand active participation from the audience (Cairo, 2008) to browse other pages due to the hypertextuality (Zwinger and Zeiller, 2017) and explore the information or data either individually or collaboratively.

In the three forms of infographics, there is the characteristic of universality: no Spatio-temporal barriers to access the information that makes it a digital tool to potentialize knowledge with a varied and attractive format for the audience.

Nevertheless, students need digital skills to represent their concepts, definitions, or content in any infographic design.

It also requires the support and guidance of the teacher to specify explanations or clarify possible misunderstandings since the successful use of infographics depends on the existing relationships between visual representations, written information, its sequence, contextualization, and hypertextuality according to the technological resources used.

Appropriation of concepts

Pedagogical innovation and innovative didactics in learning promote the appropriation of knowledge. According to Morales et al. (2018), the concept of appropriation is the form and resources through which the student makes knowledge his own. Here, the cognitive structure plays a vital role since the representation of the concepts is integrated into levels based on his perceptions.

This cognitive structure is the set of ideas that the learner has about knowledge. This appropriation is under two principles: private logic (highly related to intellectual property) and social logic (what we know as common knowledge).

For Mite (2018), the following elements are in the development of knowledge appropriation:

Perception: promotes the interpretation and understanding of the context in which it unfolds, which involves the processing of new information and acquisition of new concepts, organization, and recognition of these.

Attention: it allows gathering information from the context, analyzing it, retaining or rejecting it; a process for learning.

Thinking: is a cognitive process generated along with the development of language that contributes to their knowledge.

Language: is an indispensable tool for the appropriation of new knowledge since it leads to communication through words, images, and graphics, facilitating communication.

Knowledge: is produced from self-reflection, experiences, and its relationship with the object.

The assimilation of this relationship results in the apprehension of new concepts that the content acquires meaning in the student's life when he learns in terms of its application (Bermúdez and Pérez, 2015).

Moreover, Cañas (2010) points out other elements to generate knowledge and its innovative use in teaching, such as the development of autonomous learning in self-management of knowledge, which promote learning activities related to practical aspects for the resignification of perception based on a cognitive imbalance, ensuring the construction of new knowledge. In this case, the use and generation of concepts are closely related to the use of know-how in a given context, since the prominent the cognitive production (generation of ideal schemes), the greater the ability to abstract and generate concepts, fostering the understanding of specific content (Cañas & Alonso, 2012).

Methodology

The study was analyzed from a quantitative perspective (Cruz, Olivares, & González, 2014) to find out whether the use of infographics as a digital tool allows the appropriation of concepts in different languages and contexts based on the following research questions:

RQ1 Does infographics promote the appropriation of concepts?

RQ2 Is there any association between the main features of infographics and such an appropriation?

It is worth mentioning that to obtain the results analyzed in this stud, initially, a pre-test, an educational intervention (where infographics were the only means for the appropriation of knowledge for four months), and a post-test. According to the latter, the hypothesis: infographics is an adequate tool for knowledge appropriation is confirmed or refuted.

Sample

The sample includes the total population; 20 undergraduate and 20 high school students belonging to the Benemérita Universidad Autónoma de Puebla.

In the first group, the appropriation of concepts was in English, and the second group, in Spanish, with the same interactive infographics contextualized according to each educational level.

Instrument

As previously clarified, the study will only analyze the post-treatment. In this phase, subjects from each context took two instruments to e knowledge appropriation quantitatively.

The first instrument consists of a standardized test of 50 items that inquire about the appropriation of basic knowledge related to each student's area, according to the syllabus, general and specific objectives.

Since the present study aims to analyze the students' appropriation of concepts written and orally, the second instrument is a rubric with 20 criteria to evaluate such an appropriation in oral discourses that arise from interactive infographics.

Data collection

Both instruments were applied in the spring of 2021, once the students had worked for four months with infographics.

The application of the instruments took place in two days. On the first day, subjects took the standardized test, and on the second day, the rubric to assess them in the appropriation of concepts in oral speeches.

Subsequently, SPSS software treated the data quantitatively.

Analysis models

RQ	Instrument	Purpose
RQ1	Standardized test	Measuring the appropriation of concepts
RQ2	A rubric to evaluate the appropriation of concepts in their oral speeches.	Identify the possible association between the main features of infographics and the appropriation of concepts.

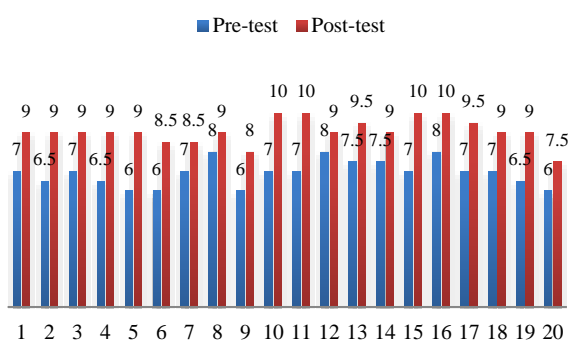
Table 1 Analysis model

Source: Own Elaboration

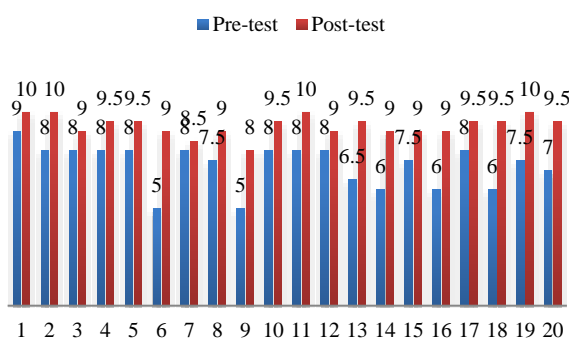
Results

RQ1. Does the infographic promote the appropriation of concepts?

The following graph shows the results obtained in the standardized test in both the diagnostic and post-treatment at the Bachelor's and High School levels.



Graph 1 Results of standardized test to measure knowledge appropriation in English
Source: Own Elaboration



Graph 2 Results of standardized test to measure knowledge appropriation in Spanish
Source: Own Elaboration

As seen in both tables, the data show that infographics as a digital tool promote the appropriation of concepts in different languages and educational levels in the teaching and learning process. The results also permit deducing that using technological resources in the classroom is a positive element that contributes to the student's attention and thus increases their interest and motivation in their immersion process in virtual learning environments.

However, it is crucial to know what elements affect or influence this process for students' appropriation of concepts (knowledge) that contribute to their academic performance, as shown in the previous graphs.

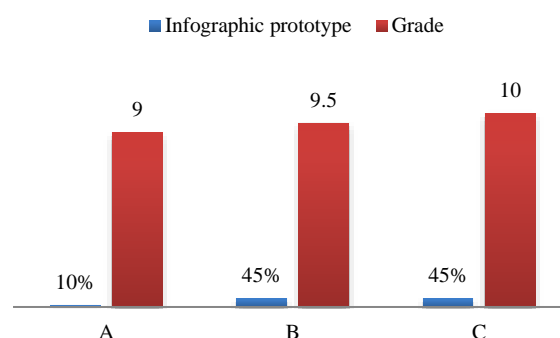
That is why the second research question is necessary.

RQ2. Is there any association between the main infographic features and concept appropriation?

For interpretative purposes of the infographics features used by students during oral discourses, they are into three prototypes of interactive infographics: A, B, and C. The first includes keywords and moving graphic representations related to the title and hypertext elements. However, they do not present a linkage-logical sequence and lack discursive relationships and hypertextuality.

The second contains fundamental aspects of infographics as title, concepts expressed through graphic representations, and definitions described in the text. They have hypertexts to deepen the meaning of the concept, too. There is also a logical sequence of the story in the visual representation, all facts provide reference sources, and in some cases, it has statistical content.

The third one demonstrates elements of a more interactive infographic, including prototype B, hyperlinks to interactive-explanatory videos of the concept, and examples of its usage in different contexts and its respective meanings. Moreover, students perform an active role when explaining their infographic, which denotes the appropriation of concepts and the absence of misconceptions. Graph 3 below shows the results of the elements found during the evaluation of oral speeches with the undergraduate students' infographics.

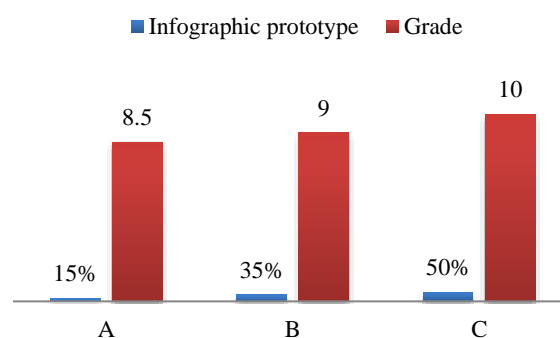


Graph 3 Identification of main characteristics of infographics and their possible association with the appropriation of concepts in English at the undergraduate level
Source: Own Elaboration

As shown in the graph, 10% used prototype A, 45% used prototype B, and the rest of the sample used prototype C (45%).

Even though with the three infographics the students obtained an acceptable academic performance, which contributes to confirming that infographics do promote the appropriation of concepts, definitely with prototype C, which includes interactive infographics with hypertext and multimedia resources, higher performance and higher grades were obtained, compared to prototypes A and B. These data allow us to make the following assumptions:

1. There is an association between the elements of an infographic and the students' appropriation of concepts.
2. The infographic is a visual representation that, by way of synthesis, presents a complete thematic, with visual and discursive linkage through relationships between concepts and their definitions (Ru and Ming, 2014; Dunlap and Lowenthal, 2016; Taspolat et al., 2017).
3. The use of images, sounds, videos, and hypertexts foster concepts. Therefore, they are must elements to reinforce understanding and offer the reader a simple and attractive comprehension process, but at no time are they a decorative part of the educational tool (infographics), which implies avoiding their excessive use (Franco, 2005).
4. Hypertextuality and video hyperlinking were identified as important characteristics that influence the results of knowledge appropriation in English. It is possible because these resources allowed students to access more visual and auditory representation through processes such as perception (processing of new concepts), attention (information gathering), thinking (organization of ideas), language (appropriation of new knowledge), knowledge (relationship with the object), and assimilation (apprehension of new concepts) (Mite, 2018).



Graph 4 Identification of the main characteristics of infographics and their possible association with the appropriation of concepts in Spanish at High school
Source: Own Elaboration

As in the undergraduate level, at High school, students used three infographic prototypes, and as in the previous case, prototype C shows the highest academic performance. In this case, students who used prototype A obtained 8.5 in their oral speeches, those who used B, 9, and C, 10, respectively.

These data allow us to make the following interpretations:

1. Prototype C allows a clearer and deeper understanding and appropriation of concepts avoiding misconceptions, thanks to the relationship of visual representations and fundamental concepts, semantic and discursive relationships, contextualized in that interactive infographics.
2. The visual flow of the topic and the presence of a logical sequence (Taspolat et al., 2017) among concepts, text, hypertext (Zwinger and Zeiller, 2017), and hyperlinked multimedia elements provide coherence and cohesion to the graphic representation. Those elements make possible the appropriation of knowledge innovatively.
3. Constant and interactive students' participation with infographics (Cairo, 2008) promotes knowledge appropriation.

4. The strategy of designing infographics with information and communication technologies focuses the student's visual attention, enabling the appropriation of concepts more simply with the construction and deconstruction of knowledge until the assimilation. In addition, this digital tool facilitates the review of concepts regardless of time or space, contributing to the long-term retention of information since the visual representation remains lodged in the mind.
5. Infographics provide an added value by generating and sharing knowledge because the user develops critical thinking and incorporates previous learning into the appropriation of new concepts.

Based on the results found in the two contexts analyzed, there is an association of the characteristics or attributes of infographics with the appropriation of concepts. The following lines describe them.

1. Keywords or concepts, which are part of the structure of the graphic representation and denote the identification of signifiers by the student.
2. Information. It alludes to the meanings of each concept and contains textual grammar, semantic structure, principal, and secondary ideas with a register *ad hoc* to the audience.
3. Relationships between visual representations (images, text, hypertext, and hyperlinked digital objects) that show cause-effect, contrast, consequence, and comparison in a specific context enabling understanding of a topic.
4. Logical sequence or linkage among visual representations, text, hypertext, and hyperlinked digital objects contribute to the coherence and global cohesion of the graphic.

5. Design according to the audience. It allows capturing the reader's attention and appropriating new concepts from multimedia graphic representations.

Conclusions

The results demonstrate that interactive infographics are a didactic digital resource that promotes the appropriation of concepts in English or Spanish at different educational levels, which confirms the hypothesis of this research. They are also recognized as an instructional and learning environment based on technology, and therefore, easily adaptable to virtual learning environments whose effectiveness depends on the implementation of the fundamental characteristics of the infographics in the design since the study evidenced the association between attributes and the appropriation of concepts, potentiating autonomous learning experiences according to the learning styles of the users. At this point, the relevance of this study lies, being one of its contributions to the current educational modality. Finally, this research provides a guideline for future research because it is necessary to determine the correlation between the characteristics of infographics and the appropriation of concepts by users.

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Mental health and school life in Durango Parents' perspective**La salud mental y la convivencia escolar en Durango Perspectiva de los padres de familia**

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Abstract

Objective: Identify the effects of the National School Coexistence Program on mental health in parents of primary and secondary education students, applied in the 2020-2021 school year, a period characterized by confinement caused by COVID-19. Methodology: research carried out by an exploratory, non-experimental, observational and cross-sectional survey with descriptive statistical analysis. A non-probabilistic sampling was used by accident and convenience, selected with 95% reliability. To carry out the present investigation, the questionnaires, GAD7, PHQ9 and Burnout of Shirom-Melamed Burnout were used, for the statistical analysis of the characteristics of the studied population, measures of central tendency and dispersion were used. Contribution: significant data are presented on the emotional well-being of parental figures, during the 2020-2021 school year, in which educational institutions worked online due to COVID-19 and the National School Coexistence Program was applied.

Mental health, Parental figures, Emotional state

Resumen

Objetivo: Identificar los efectos del Programa Nacional de Convivencia Escolar en la salud mental en los padres de alumnos de educación primaria y secundaria, aplicado en el ciclo escolar 2020-2021, período caracterizado por el confinamiento causado por el COVID-19. Metodología: investigación efectuada por encuesta de tipo exploratoria, no experimental, observacional y transversal con análisis estadístico descriptivo. Se utilizó un muestreo no probabilístico por accidente y conveniencia, seleccionada con un 95% de confiabilidad. Para la realización de la presente investigación se utilizaron los cuestionarios, GAD7, PHQ9 y Burnout de Shirom-Melamed Burnout, para el análisis estadístico de las características de la población estudiada se emplearon medidas de tendencia central y dispersión. Contribución: se presentan datos significativos sobre el bienestar emocional de las figuras parentales, durante el ciclo escolar 2020-2021, en el que las instituciones educativas laboraron en línea a causa del COVID-19 y se aplicó el Programa Nacional de Convivencia Escolar.

Salud mental, Figuras parentales, Estado emocional

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Introduction

Beyond the absence of mental disorders, mental health is related to a state of complete physical, mental and social well-being, through which people can cope with the normal stress of everyday life (WHO, 2004).

In this sense, school coexistence as a Mexican educational policy seeks to strengthen both in the students and in their families aspects that support the adequate development of the child's mental health (WHO, 2004).

With the National School Coexistence Program (PNCE), the federal government proposes a comprehensive intervention to strengthen the educational community (students, teachers and parents) through the development of social and emotional skills in order to provide them with the necessary resources to face the challenges of daily life. Face the challenges posed by daily life, emphasizing the work with mothers, fathers and guardians (SEP, 2018).

The present study integrates the results obtained with the application of the GAD7 and PHQ9 questionnaires to parents of elementary and high school students benefited by the program in question, in order to identify the effects of this, on the aforementioned actors; during the 2020-2021 school year, a period characterized by the confinement caused by COVID-19.

Justification

Mental health is an important pillar for the general wellbeing of the members of any community, therefore, it is as important as health and physical wellbeing. Its conscious promotion of rewarding emotional relationships and positive emotional expressions of coping in adults (WHO, 2004).

With programs such as the PNCE, which involves in actions for the development of socioemotional skills in mothers, fathers and guardians, conditions are put in place that promote respectful coexistence in the educational community (SEP, 2018).

Therefore, with programs such as the aforementioned, it is possible to develop confidence to express emotions and feelings in a respectful manner, with positive weighting on the participation of mothers and fathers (SEP, 2019).

Problem

Mental health problems can affect each and every one of the members of society; therefore, their strengthening constitutes a challenge for the development of proposals that contribute to their emotional well-being (WHO, 2004). In conditions such as those currently detected, in which the lack of social and emotional skills has been related to a wide variety of anxiety and mood disorders, among other emotional conditions (SEP, 2018), it becomes necessary to develop skills for self-regulation, to avoid behaviors related to impulses, to avoid unassertive expressions of emotions and for the positive coping of conflicts (SEP, 2019).

Objective

To identify the effects of the National School Coexistence Program on mental health in parents of elementary and high school students, applied in the 2020-2021 school year, a period characterized by the confinement caused by COVID-19.

Theoretical framework

The theoretical references related to mental health and school coexistence, as well as the parents' perspective on the subject, are presented below.

National School Coexistence Program

Education in Mexico should contribute to a better human coexistence. Within the framework of this constitutional mandate, the Government of the Republic has implemented the National Policy for a School Free of Bullying. Derived from it, the Ministry of Public Education, through the Undersecretary of Basic Education, promotes the National Program for School Coexistence (PNCE), which has the purpose of favoring the development of peaceful school environments. In this task, the teacher's activity is a fundamental factor for children to learn to coexist (Odalk, *et al.*, 2016).

The PNCE is an initiative that the Federal Government has undertaken through the Secretariat of Public Objective Education (SEP), to promote favorable relationship and coexistence environments for teaching and learning, in basic education schools. It is also part of the National Policy for a Bullying-Free School, which proposes a formative and preventive strategy for the personal strengthening of students in the following aspects:

1. The development of social and emotional skills.
2. The expression and management of emotions in a respectful manner.
3. Conflict resolution through dialogue and the search for agreements.

This is an intervention proposal of an experiential nature, so that the school learns to live together through classroom activities, with the support of educational materials (SEP., 2017). Similarly, it promotes the participation of the school community in this process, mainly managers, mothers, fathers and tutors, as an integral and inclusive action to improve coexistence from the family environment, which contributes to establish harmonious, peaceful and inclusive relationships between students, teachers, mothers and fathers, at the same time as between staff with management functions and support staff (Díaz, García, & Legaña, 2018).

This proposal has its origin and experience in two years of work as a Project in favor of School Coexistence (PACE): first in 18 500 schools of the Full-Time Schools Program, during the 2014-2015 school year and subsequently, it was implemented in 35 000 schools of the Full-Time Schools Program and the Safe School Program, in the 2015-2016 school year; in both cases, only in third grade of elementary education.

Based on the experience and in order to meet the needs detected in schools, the Undersecretary of Basic Education (SEB) proposes a process of evolution of the PNCE coverage in the short and medium terms towards 2018, considering the advances in the Educational Reform, as well as the definition of the Curricular Proposal and the new Educational Model.

In this context, during the 2016-2017 school year, the National School Coexistence Program was made official, with a coverage of attention from first to sixth grades in public elementary schools and with educational support materials for teachers, students and families (PNCE, 2021).

Background

The PNCE has its antecedent in the Project for School Coexistence (PACE), which began in the 2014-2015 school year, with the participation of 18,500 full-time elementary schools. The objective of PACE in these two stages was to promote the creation of harmonious, peaceful and inclusive school coexistence environments, to promote the improvement of educational quality and contribute to prevent bullying situations.

PACE reached 1,325,014 students in third grade of primary education and 49,104 participating teachers. The main actions of PACE were:

- Training to State Technical Teams (ETE) in the topics of self-esteem, emotion management, inclusive coexistence, peaceful conflict resolution, respect for rules, and family communication, as well as the use of educational materials. The technical teams trained supervisors, school principals and classroom teachers.
- Three national meetings were held with ETEs to provide training and information on the implementation of the Project.
- Preparation and distribution of 434,000 copies of the third grade teacher's manuals and 350,000 copies of the work manual. Workshops for mothers, fathers and tutors.
- Preparation of audiovisual materials and design of a website as a resource for dissemination and support to raise awareness, inform and orient teachers, directors, students, mothers and fathers about the contents of PACE and the creation of harmonious, peaceful and inclusive coexistence environments.

According to a survey of 850 technical pedagogical advisors, supervisors, directors and teachers from different entities, PACE was accepted by the actors of the school community, who participated in the training and in the implementation of the Project. According to their opinions, the materials for third grade are adequate and can be easily used for classroom work (98%); they can generate favorable changes in students in the classroom (98%); the Work Manual. Workshops for parents and guardians contribute to improve coexistence in the students' families and facilitate reflection on the six PACE themes (98%). The implementation as a project during two school cycles allowed recovering lessons learned, through the information shared by the academic heads of the entities, just as it offered solid bases for its generalization in the 2016-2017 school cycle, as PNCE in all grades of primary education (PNCE, 2021); (Díaz, García, & Legañoa, 2018).

Fundamentals

The school climate is one of the variables that most influences student learning (Casassus, Froemel and Palafox, 1998); (Treviño et al., 2010). According to students' perception of school climate, it can be stated that "they learn more when they attend schools where they feel welcomed and where there are cordial and respectful relationships between students and teachers. A good school climate is synonymous with a school with harmonious functioning, where the educational community relates positively" (Treviño, Castro, Costilla, Donoso, & Valdés, 2010).

The PNCE proposes a comprehensive intervention with formative actions that contribute to strengthening the educational community as a whole, with the coordinated action of state educational authorities. Its emphasis lies in the personal and social strengthening of students, teachers and parents, through the development of social and emotional skills, so that they recognize their own worth, respect themselves and others, express and manage their emotions, resolve conflicts assertively through dialogue and the search for agreements, and become autonomous individuals capable of internalizing rules and respecting them, as well as assertively facing the situations and challenges of daily coexistence (Sánchez, 2018).

The PNCE, is based on the national regulatory framework, programmatic documents and Federal Government policies on education, which establish the principles and criteria to address the issue and provide support for actions to promote harmonious, inclusive and peaceful coexistence in schools, which will contribute to meeting the national objective of providing quality education that favors learning and the comprehensive development of children and adolescents (CNEPDS., 2018).

From the constitutional framework, Article 3° establishes the values and criteria that should be sought in the education provided by the State, among which are: "develop harmoniously, all the faculties of the human being" and "contribute to the best human coexistence, in order to strengthen the appreciation and respect for cultural diversity, the dignity of the person, the integrity of the family, the conviction of the general interest of society, the ideals of fraternity and equal rights of all, avoiding privileges of races, religion, groups, sexes or individuals".

The General Law of Education (LGE), in addition to considering the principles and criteria of Article 3° constitutional, establishes that "Education is a fundamental means to acquire, transmit and increase culture; it is a permanent process that contributes to the development of the individual and the transformation of society, and is a determining factor for the acquisition of knowledge and to form women and men, so that they have a sense of social solidarity" (LGE, Article 2°). (DOF., 2017).

In addition, education must "promote the value of justice, observance of the Law and equality of individuals before it, foster the culture of legality, inclusion and non-discrimination, peace and non-violence in any type of its manifestations, as well as knowledge of and respect for Human Rights" (LGE, Article 7°). For its part, Article 8 establishes, among other criteria, that education shall be oriented to fight against fanaticism, prejudice, stereotyping, discrimination and violence.

It also provides that such education "shall contribute to a better human coexistence, both by the elements it provides in order to strengthen in the student, together with the appreciation for the dignity of the person and the integrity of the family, the conviction of the general interest of society, and by the care it takes to support the ideals of fraternity and equal rights of all men, avoiding privileges of race, religion, groups, sexes or individuals". (DOF., 2013).

On the other hand, the National Development Plan 2013-2018 establishes two goals linked to coexistence: "Mexico in peace", which states that the country demands a social coexistence that has as a framework the respect and valuation of plurality; and "Mexico with quality education", which recognizes that in schools there is an increase in group, institutional and contextual violence, which affect the processes of coexistence and teaching and learning (DOF., 2013).

The General Law on the Rights of Children and Adolescents (LGDNNA) establishes that the authorities, within the scope of their respective competencies, are obliged to foster "the culture of respect, promotion and protection of the rights of children and adolescents, based on the guiding principles of this Law", among which are the best interests of the child, substantive equality, non-discrimination, inclusion, interculturality, the pro-person principle and access to a life free of violence (DOF., 2017).

Objectives of the PNCE with the Rules of Operation in Force.

The National School Coexistence Program is carried out in Mexico, with the purpose of promoting coexistence environments in schools that favor student learning, in order to comply with the aforementioned, objectives were established in accordance with the Rules of Operation in Force, by the PNCE. Said objectives, are the following:

General Objective:

To favor the establishment of harmonious and peaceful coexistence environments, which contribute to prevent bullying situations in Basic Education Public Schools, favoring conditions to improve school achievement.

Specific objectives:

- To promote with the support of educational materials the pedagogical intervention of a formative and preventive nature in public basic education schools, aimed at having students recognize their own worth and learn to respect themselves and other people, to express and regulate their emotions, to establish agreements and rules, as well as to manage and resolve conflicts in an assertive manner.
- Encourage the development of technical skills of educational personnel to promote the improvement of healthy and peaceful school coexistence in their schools with the support of educational materials.
- Promote the informed and proactive participation of students' families in public elementary schools, in favor of healthy and peaceful school coexistence.
- To contribute to the prevention of bullying situations.
- Strengthen the Basic System of Educational Improvement in the schools benefiting from the PNCE. (Caso, Osuna, & Gallegos, 2019).

The family and its influence on school coexistence

The family as a relevant social institution in the integral formation of the human being constitutes the first educational environment for boys and girls in their socio-personal formation process, since there is a close relationship between people who share feelings, emotions and relationships of intimacy, respect and other essential values to strengthen the integral formation of people in their first years of life.

The education and training given in the family should be oriented towards the formation of an adequate coexistence in order to provide the necessary basis for the resolution of school conflicts that may arise in educational institutions. The current situation of conflicts in school coexistence has led to rethink the role of the family in the education of schoolchildren because there is a direct relationship between the influence it plays in the social formation of the individual and the role of the family in the education of schoolchildren. (Bolaños & Stuart, 2019).

Thus, the family influences the social formation of those individuals of school age who interact in the socialization processes, since they are the first and the most persistent because they generate, with great importance and repercussion, a positive or negative school coexistence, depending on the degree of integral formation acquired in this social group. Today, this is weakened as a social institution in charge of providing the first knowledge of life and the formation of values necessary for the socialization and coexistence of every human being, because it has been displaced by other elements that develop a wrong orientation in the teaching process of students in educational establishments. (Borrows & Olivares, 2006.).

A real family structure rich in values and norms, belonging to social groups that value and respect life, and the proper guidance provided to children and students regarding the use of new communication and entertainment technologies contribute to the improvement of the socialization processes that take place in educational establishments, an aspect that is evident in the school coexistence of children throughout their teaching and learning process, which contributes to the formation of useful citizens for the social advancement of a country. (Bolaños & Stuart, 2019).

Well-being in parents

An adequate family functioning promotes greater psychological well-being of all members, and acts as a protective factor in the face of difficult situations that must be faced and overcome. Therefore, family functioning may be one of the most influential aspects when facing changes within family systems, to such an extent that they may or may not adapt to new transformations. (Álvarez & Salazar, 2018).

Similarly, an inadequately functioning family can generate symptoms and illnesses that put the psychological well-being of the children at risk. Therefore, family functioning can be one of the most influential aspects when facing changes within family systems, to the point that they can adapt or not to new transformations, becoming one of the main indicators for an adequate state of health and psychological well-being.

It has been widely reported in research that the presence of depressive symptomatology in mothers decreases their levels of reciprocity, synchrony and coordination with their child, compromising the dyadic and triadic capacity that allows affective regulation. (Feldman, 2007).

Likewise, mothers with high levels of stress report feeling overwhelmed by the demands of their children, being less available to respond to their needs (Rodrigo, Martín, Cabrera, & Máiquez, 2009).

In families in which one of the parents has a mental illness, the child's development depends more on the level of family functioning than on the dyadic interaction with the parent with a pathology (Seifer & Dickstein, 2000). This experience also favors emotional regulation in the child during the interaction, contributing to the reduction of tension and stress (Fivaz-Depeursinge and Favez, 2006). For their part, there is some evidence that would indicate that fathers are sensitive to maternal risks, including depressive symptomatology (Cummings, Goeke-Morey, & Raymond, 2004) and that the father's adequate mental health acts as a protective factor for the child in the relationship between maternal and child depressive symptomatology (Gere, et al., 2013).

The combination of financial pressure, loss of child care and health problems is proving very difficult for families, and mental health problems are expected to increase as a side effect of the current pandemic, secondary to COVID-19 and the measures that have been taken to contain it (Beacons, 2020).

The potential long-term consequences on children due to increased parental stress, anxiety, and depression are still unknown. However, previous research tells us that children exposed to these problems are more likely to suffer mental health problems, in addition to developing possible learning and behavioral problems.

We are currently witnessing an escalation of anxiety and depression in fathers and mothers. Current studies show that pregnant mothers, and those with young children, experience increased symptoms of anxiety and depression.

A history of mental illness, domestic conflict and financial stress have been associated with poorer mental health in various child age groups. These figures are especially troubling because young children are highly vulnerable to maternal mental illness due to their near total dependence for basic health and safety needs.

The increase in parental mental illness, combined with the fact that children spend more time at home due to COVID-19, present multiple risks, including alterations in children's stress system function, higher rates of physical health problems, and cognitive impairment.

Parental stress associated with mental illness can also lead to negative interactions, including harsh discipline and being less responsive to children's needs. In addition, depression can contribute to aggravated health problems and poor quality of life (Faros, 2020).

Achieving a positive and responsible relationship with stable and protective emotional bonds between adult caregivers and children is very important for the good development of boys and girls. It is of concern that 3 out of 10 caregivers present depression and 5% of caregivers present signs of distress, anxiety or hopelessness.

Research methodology

The research conducted was an exploratory, non-experimental, observational and cross-sectional survey with descriptive statistical analysis. A non-probabilistic sampling by accident and convenience was used, selected with 95% reliability. The questionnaires GAD7, PHQ9 and Burnout of Shirom-Melamed Burnout were used to carry out the present research. For the statistical analysis of the characteristics of the studied population, measures of central tendency and dispersion were used.

Sample

A statistically significant sample of 1185 participants (parents from the State of Durango) was defined, which were precisely those analyzed in the final sample. A non-probabilistic sampling by accident and convenience was used, selected with 95% reliability.

The criteria used for the selection of the sample were:

- Having a child in primary or secondary education.
- That the school where their child(ren) attend(s) has implemented the National School Coexistence Program.
- To agree to answer the survey.

Procedure

A total of 1185 parents from the State of Durango with children in primary and secondary school participated voluntarily and anonymously. The questionnaires GAD7, PHQ9 and Burnout of Shirom-Melamed Burnout were applied in order to evaluate the incidence of the National Program of School Coexistence on the mental health of these actors; estimation implemented to be filled in by means of hyperlinks (URL).

Once the information was collected, the data were processed with SPSS version 25 software for statistical analysis where measures of central tendency and dispersion were used to describe the most notable results of each of the sections of the instruments used.

Results

The results of the application of the GAD7, PHQ9 and Shirom-Melamed Burnout questionnaires to 1185 parents in the state of Durango are presented below in order to evaluate the incidence of the National School Coexistence Program on the mental health of these actors.

In order to carry out this weighting, the values of the measures of central tendency and dispersion applied were taken, which allowed describing the most notable results of each of the sections that make up the study carried out.

Item	Values *			
	CTD	MMD	VD	N
During the past 2 weeks, how often do you feel uneasy because you are worried and cannot control it?				47%
During the past 2 weeks, how often do you feel discomfort from worrying about too many things at once?			49%	
During the past 2 weeks, how often have you been bothered by: Difficulty relaxing?			43%	
During the last 2 weeks, how often are you able to relax?			41%	
During the past 2 weeks, how often do you feel restless or anxious that it is difficult for you to sit still?				54%
During the past 2 weeks, how often do you become easily irritable?			44%	
During the last 2 weeks, how often do you feel afraid that something terrible might happen?				52%

*Values

CTD Almost Every Day

MMD More than half of the days

VD Several Days

N Never

Table 1 Mental Health I GAD-7

Source: Own Elaboration

Mental health I GAD-7

One of the aspects assessed to the mothers and fathers with the GAD-7 instrument is mental health, integrated by items related to the management of the discomforts that could have been presented and the ability to relax during the 2020-2021 school cycle.

Regarding the emotional well-being of mothers and fathers during the COVID-19 pandemic, according to the results obtained in the GAD-7 and within the framework of the National School Coexistence Program, somewhat opposite results were obtained since, while about 50% of the respondents never felt discomfort related to worries:

– For not being able to control themselves.

– For not being able to relax.

– Fear that something terrible might happen.

On the other hand, 50% said that several days of the week they felt discomfort:

– Worrying about too many things at once.

– Being restless or anxious to the point of not being able to sit still.

– Being easily irritated.

However, it is also important to mention that 41% of the cases, several days a week they were able to relax, which leads to the conclusion that in half of the cases they had elements to eliminate emotional tensions.

Item	Values*			
	My	L	Mo	S
Resultats	12%	29%	35%	24%

*Values

My Minimal

L Mild

Mo Moderate

S Severe

Table 2 GAD-7 Results

Source: Prepared by the authors

GAD-7 Results

Regarding the results found on the mental health of mothers and fathers, with the application of the GAD-7, 50% did not feel discomfort or worries and at the same time they had elements to eliminate emotional tensions, and 50% felt moderate discomfort and worries (35%) and 24% felt severe discomfort and worries.

Item	Values *			
	CTD	MMD	VD	N
During the past 2 weeks, how often have you been affected by the following problem: Little interest or enjoyment in doing things?			35%	53%
During the last 2 weeks, how often have you been affected by the following problem: Have you felt down, depressed, or hopeless?			35%	49%
During the past 2 weeks, how often have you been affected by the following problem: Difficulty falling or staying asleep, or sleeping too much?			53%	28%
During the last 2 weeks, how often have you been affected by the following problem: Have you felt tired or low in energy?			31%	55%
During the last 2 weeks, how often have you been affected by the following problem: poor appetite or overeating			28%	61%
During the last 2 weeks, how often have you been affected by the following problem: Have you felt bad about yourself - either that you are a failure or that you have been a failure to yourself or your family?			27%	63%
During the last 2 weeks, how often have you been affected by the following problem: Have you been moving or talking so slowly that other people might have noticed it, or the opposite - very restless or agitated that you have been moving around much more than usual?			8%	88%

*Values
 CTD Almost Every Day
 MMD More than half of the days
 VD Several Days
 N Never

Table 3 Mental health II PHQ9
 Source: Own Elaboration

Mental Health II PHQ9

The second test used to assess the mental health of mothers and fathers is the PHQ9 instrument, composed of items related to personal, interpersonal or contextual problems that may have occurred during the 2020-2021 school year, the period in which the COVID-19 confinement was experienced and in which the National School Coexistence Program was applied in educational institutions.

Statistical processing shows that the participants scored the lowest values on the scale (VD Several Days and N Never), when questioned about the aforementioned problems. As can be seen in Table 3: Mental Health II PHQ9 in most of the indicators, percentages ranging from 49% to 88% in the value of the scale "Never" indicate that in these cases on no occasion have they felt affected by any problem, except for the difficulty in falling or staying asleep, or on the contrary sleeping too much several days a week, value of the scale applied, where about 30% of the respondents state that several days a week they have had the following difficulties:

- Little interest or pleasure in doing things.
- Feeling down, depressed or hopeless.
- Feeling tired or low in energy.
- Poor appetite or overeating.
- Feeling of failure, that you have looked bad to yourself or your family.
- To move or talk so slowly that other people may have noticed, or to be so restless or agitated that you have been moving around a lot or more than usual.

Ítem	Values*				
	My	L	Mo	MS	S
Results	19%	13%	19%	24%	25%

*Values
 My Minimal
 L Mild
 Mo Moderate
 MS Moderately Severe
 S Severe

Table 4 PHQ9 Results
 Source: Own Elaboration

PHQ9 Results

The main difficulty found in the parents to whom the PHQ9 questionnaire was applied is related to problems falling or staying asleep, or on the contrary sleeping too much several days a week in 53% of the cases and, nevertheless, that only one third of the participants state that several days a week they have had the following difficulties:

- Little interest or pleasure in doing things.
- Feeling down, depressed or hopeless.
- Feeling tired or low in energy.
- Poor appetite or overeating.
- Feeling of failure, that you have looked bad to yourself or your family.
- To move or talk, doing it so slowly that other people could have noticed it or on the contrary to be very restless or agitated that has been moving much more than normal.

In either case about 50% consider that when these problems occur it affects them moderately severely or severely.

Item	Values*						
	MV	CS	M T	BS	AV	PV	CN
Do I feel tired?		23%				35%	
Do I feel energized?					17%	26%	
Do I feel physically fatigued?					17%	29%	
Do I feel I've had enough?				27%	41%		
Do I feel full of energy?					18%	21%	
Do I feel out of energy?						31%	33%
Do I feel alert?		20%				18%	

*Values

MV Many times

CS Almost always

MT Half the time

BS Quite often

AV Some of the time

PV A Few Times

CN Almost Never

Table 5 Mental health III BURNOUT

Source: Own Elaboration

Mental Health III BURNOUT

The third questionnaire applied to the mothers and fathers is the Shirom-Melamed Burnout, which assesses different situations that may affect their emotional well-being.

As can be seen in Table 5: Mental Health III BURNOUT, the percentages reached in each of the values of the scale represent about a third of the participants, highlighting that 64% of them almost never or rarely felt without energy. With similar percentages they rarely feel tired, with 41% that several times they have had enough and that they almost always feel tired or on the contrary feel alert.

Analysis and conclusion

Mental health is the aspect that mothers and fathers were evaluated, with the GAD-7; so that significant data were obtained on the emotional well-being of parental figures, during the 2020-2021 school cycle, in which educational institutions worked online because of COVID-19 and the National School Coexistence Program was applied.

On the one hand, 50% of those surveyed stated that they felt uneasy several days of the week:

- For worrying about too many things at once.
- Being restless or anxious to the point of not being able to sit still.
- Being easily irritated.

And, on the other hand, 41% of the cases, several days a week they were able to relax, which leads to the conclusion that in half of these cases they had elements to eliminate emotional tensions.

Similarly, with the PHQ9 test, it was found that in most of the indicators, percentages ranging from 49% to 88% in the value of the scale "Never" were found, which indicates that in these cases on no occasion have they felt affected by any problem, except for the difficulty in falling or staying asleep, or on the contrary sleeping too much, and nevertheless, that only one third of the participants stated that several days a week they had the following difficulties:

- Little interest or pleasure in doing things.
- Feeling down, depressed or hopeless.
- Feeling tired or low in energy.
- Poor appetite or overeating.
- Feeling of failure, that you have looked bad to yourself or your family.
- To move or talk, doing it so slowly that other people could have noticed it or on the contrary to be very restless or agitated that has been moving much more than normal.

In either case about 50% consider that when these problems occur it affects them moderately severely or severely.

Additionally, with the Shirom-Melamed Burnout test, the percentages reached in each of the values of the scale represent about a third of the participants, highlighting that 64% of them almost never or rarely felt without energy. With similar percentages they rarely feel tired, with 41% that several times they have had enough and that they almost always feel tired or on the contrary feel alert.

Proposal

In this research process, useful knowledge was generated on the emotional wellbeing of parental figures during the 2020-2021 school cycle, a period in which children and adolescents were provided with online education due to the confinement by COVID-19 and the National School Coexistence Program was also applied.

Linked to the conclusions obtained, new research possibilities arise with proposals that raise the management of discomforts that help mothers and fathers to eliminate tensions especially in situations such as the following:

- For worrying about too many things at the same time.
- For being restless or anxious to the point of not being able to sit still.
- Being easily irritated.
- Not being able to sleep well.
- Having little interest or pleasure in doing things.
- Feeling down, depressed or hopeless.
- Feeling tired or low energy.
- Having a poor appetite or overeating.

- For having a feeling of failure, that he/she has looked bad to himself/herself or to his/her family.
- For moving or talking so slowly that other people may have noticed it or, on the contrary, being very restless or agitated and moving much more than usual.

Likewise, some suggestions for parents are derived, with the purpose of eliminating tensions (Maristas, n/d and Macías, Madariaga, Valle and Zambrano, 2013):

- Perform relaxation exercises.
- Perform breathing exercises.
- Apply positive coping strategies.
- Search for spiritual support.

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Organizational knowledge based on ISO 9001: 2015 in a higher education institution

Conocimiento organizacional con base a ISO 9001:2015 en una institución de educación superior

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Abstract

The purpose of the research was the implementation of a methodology to determine the organizational knowledge of the key processes of the areas of Cultural Extension, Sports Extension and Coordination of Academic Development, of a Higher Education Institution, given the need to achieve recertification in ISO 9001: 2015, in compliance with requirement 7.1.6 called organizational knowledge. The procedure was: identify the knowledge, acquire that knowledge, develop the knowledge, transfer the knowledge and use that knowledge. The objective was to generate evidence through an organizational knowledge methodology for the compliance of requirements oriented to the fulfillment of organizational knowledge stipulated in section 7.1.6 of the standard; The findings being a contribution to the recertification achieved in 2018; Through achieving a broad vision in the approach of each area in question; and in knowing how current knowledge is leveraged in each of its eleven key skills.

Knowledge management, Organizational knowledge, Knowledge transfer

Resumen

El propósito de la investigación fue la implementación de una metodología para determinar el conocimiento organizacional de los procesos clave de las áreas de Extensión Cultural, Extensión de Deportes y Coordinación del Desarrollo Académico, de una Institución de Educación Superior, dada la necesidad de lograr la recertificación en ISO 9001:2015, en cumplimiento del requisito 7.1.6 denominado conocimiento organizacional. El procedimiento fue: identificar el conocimiento, adquirir ese conocimiento, desarrollar el conocimiento, transferir el conocimiento y utilizar ese conocimiento. El objetivo fue generar evidencia a través de una metodología de conocimiento organizacional para la conformidad de requisitos orientados al cumplimiento de conocimiento organizacional estipulado en el apartado 7.1.6 de la norma; siendo los hallazgos un aporte en la recertificación alcanzada en el año 2018; a través de lograr una visión amplia en el abordaje de cada área en cuestión; y en saber cómo se aprovecha el conocimiento actual en cada uno de sus once conocimientos clave.

Gestión del conocimiento, Conocimiento organizacional, Transferencia de conocimiento

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1. Introduction

The organizational evaluation of the university is a social function with improvement purposes; To approach Knowledge Management (CG), resulting in Organizational Knowledge (OC) in Higher Education Institutions (HEI), it is essential to evaluate the management of intellectual assets based on the importance that the development of knowledge provides to society specialized from HEIs. That is why Obeso et al., (2013), and Cantón and Ferrero (2016) argue that globalization and the use of information technologies to which today's society is subjected gives rise to increased competition in markets around the world, and what produces wealth is no longer access to raw materials or financial resources; but rather the ability to apply knowledge, resulting in the search for efficiency, in such a way that QA has been identified as a fundamental tool for conveniently managing an organization's knowledge, emphasizing its importance in labor mobility, which can cause that knowledge that is only the domain of a person can be lost if it is not transferred in a timely manner.

Soulejman-Janu (2016) asserts that an expert organization in creating, acquiring and transferring knowledge and in modifying behavior reflects the management of OC, in this way they exhibit five main characteristics; personal mastery, mental models, a shared vision, team learning and systematic thinking. Krogh et al., (2011) and Pérez-Soltero et al., (2017) and Torres-Nevares (2014), indicate that GC is a strategic resource that is transforming the forms of competition, the process of strategy development and decision making. of decisions. KM is a process of transforming information and intellectual assets into lasting value, it is the ability of a company to increase tacit knowledge, being the one that is used intuitively, and unconsciously, it is in the mind of the individual and that is acquired through experience itself, characterized by being personal and contextual (Pérez-Fuillerat et al., (2019) and Hernández (2016).

While explicit knowledge is that which is structured, has form and is systematic. articulated, expressed and recorded with words, numbers, images, codes, universal principles, scientific formulas, etc.

Your information is usually stored in documents, procedures, programs, processes, manuals, specifications, tutorials or in databases (Aranda-Díaz , 2018; Cantón and Ferrero, 2016 and Hernández, 2016). Regarding the transformation of knowledge into information, Cantón and Ferrero (2016) approach it under an organizational approach. ional, since this knowledge is produced between the people of the organization (human capital, relational capital and intellectual capital).

They argue that, although a computer is capable of capturing and transforming data into information, only the human being can convert that data and that information into knowledge and in turn learn from it, so, in all this process, it is necessary to go from the information management to the GC. It is the ability of a company to increase tacit knowledge and create the preconditions for the exchange of information among employees, being an organized process, of creation, capture, storage, dissemination and use of knowledge within and between organizations to maintain the competitive advantage (Giraldo, 2018).

For Fornes-Rivera et al., (2017) and Ontiveros (2018), KM is the ability to organize and create new knowledge, disseminate and encapsulate it in products, services, systems and the organization of these knowledge flows, tacit and explicit , is a dynamic that occurs through a process of exchange and dialogue in the broad sense of the term. For (Pereira-Alfaro 2011; Hernández, 2016; Giraldo, 2018; Velázquez, 2017 and Canteli, 2019). It is the orderly and systematic process that allows to detect, select, organize, filter, present and use the information by the participants of the company, to exploit in an articulated way the knowledge resource based on the intellectual capital of the organizations, oriented to enhance people's skills and the generation of value.

For Arjona-Villanueva (2014), GC improves processes, employs networks of experts supported by a powerful intranet accessible to all employees, learning lessons in problem solving to improve productivity.

While KM consists of the process of identifying, capturing, organizing and using the means to create and maintain a competitive advantage; A QA system allows intangible information to be managed as an organizational asset, as if it were tangible (Evans and Lindsay, 2020; Krogh et al., 2011; Zavala (2014) and Soulejman-Janu, 2016). Meanwhile the CO, shows the competitive advantages in organizations. In this way, it is defined as a response to change, a complex educational strategy whose purpose is to minimize costs, capture new markets, change the beliefs, attitudes, values and structure of organizations, so that they can better adapt to new trends, positioning in new markets and at the dizzying pace of change, reducing uncertainty and excess competition Evans and Lindsay (2020) and (Nonaka and Takeuchi (1995), cited in Hernández (2016)), the creation of organizational knowledge is the capacity of the company as a whole to create knowledge and disseminate it to the organization and incorporate it into products, services and systems.

Freitas and Yaber (2015) define that Knowledge Management Systems (QMS) as the set of elements that intervene in the QA process, in order to improve the different activities carried out in organizations, and in particular in the IES, this allows optimizing the decision-making process, the creation of a study plan, the development of research, academic and administrative activities, reducing operating costs, and this is how competitive advantages are obtained. For HEIs and Scientific Research Centers, in the knowledge environment, KM is essential, especially for the researcher, its vision and mission imply, objectively relating the creation, acquisition, retention and transfer of knowledge in a responsible environment, social and cooperation to the development of the integration of knowledge locally and nationally (Barroso-Tanoría, 2011).

At present, there is a consensus that the countries that will have the best chance of developing in the 21st century will be those that bet on comparative advantages based on the education and qualification of their workforce.

These are what some authors and multilateral organizations have called “knowledge economies”, defined by the World Bank as those that are based mainly on the use of ideas instead of physical skills and on the application of technology instead of transformation. of raw materials or the exploitation of labor (Lomelí, 2018). According to Ferreyra et al. (2017) in the search for growth and equity, no country can afford to ignore higher education. Through higher education, a country builds a skilled workforce and builds the capacity to generate knowledge and innovation, which in turn boosts productivity and economic growth. Since the acquisition of skills increases productivity and people's expected income, a good educational system is the basis for achieving greater equity and shared prosperity at the social level.

Another important achievement is that state public universities, in which more than a quarter of all students are enrolled, now have more than 80% of their undergraduate students enrolled in programs whose quality has been externally accredited. In addition, the creation and expansion of technological and polytechnic universities in the last two decades, and the recent development of distance education, make the offer of higher education now more diverse and better aligned to different profiles of students and needs of the labor market (Gurría, 2020).

In an HEI, the knowledge they generate allows guiding the reorganization of processes, decision-making and the improvement of teaching, research and innovation, in this way, it would be advancing towards the competitiveness of the institution to respond to the demands of the same and external to society, for this reason the institution is registered in a national body of universities (National Association of Higher Education Universities [ANUIES], 2021). In such a scenario, HEIs play a very favorable role in the development of the country, the well-being of people, through the accreditation of educational programs by organizations such as (Council for the Accreditation of Engineering Education [CACEI] 2021), In turn, to improve the effectiveness and efficiency in achieving its objectives, the institution guides its operation through its management by processes, see Figure 1.



Figure 1 Process-based model of the ITSON QMS
Source: ITSON (2021)

Note: this project is within the support processes, specifically in the measurement, analysis and improvement.

The clients are students, academic and non-academic personnel, federal, state and municipal government agencies, as well as the society to which the Institution owes itself. The population served is 17,173 students (ITSON, 2020).

The ISO 9001: 2008 version does not require a section dedicated to the knowledge of the organization, due to this, the institution will have an outdated version of its QMS, thus jeopardizing the recertification by the ISO 9001: 2015 standard. Due to what has been described above, the proposal is made of what action should be carried out in the QMS processes to comply with requirement 7.1.6, determining to generate evidence through an organizational knowledge methodology, for the compliance of the requirement.

2. Methodology to be developed

The type of research according to the object under study was applied, as it was focused on finding mechanisms or strategies that allow achieving a specific objective. Consequently, the type of scope to which it applies is very specific and well defined. Due to its depth, it is considered that it was exploratory because it was a first approach that allows later research to be directed to an analysis of the subject matter. Due to the type of data used, the research was qualitative since the data obtained can be worked on at another time in order to be analyzed, making the explanation about the phenomenon studied more complete.

Due to the degree of manipulation of the variables, it is considered non-experimental, and due to the type of inference, the inductive method, and due to the temporality of the study, it is considered longitudinal because the same processes are followed over a specific period of time. ; Hernández-Sampieri, Fernández-Collado and Baptista-Lucio (2014), focusing on the construction of a route consisting of five stages: 1) Identify knowledge; 2) Acquire knowledge; 3) Develop knowledge; 4) Transfer knowledge; and 5) Use knowledge.

The objective was to generate evidence through an organizational knowledge methodology for the compliance of requirements oriented to the fulfillment of organizational knowledge stipulated in section 7.1.6 of the standard. For this, documentary information was specifically reviewed on the processes contained in the institution's SGC, such as: Cultural Extension (EC), Sports Extension (ED) and Academic Development Coordination (CDA), at the same time the process map was assessed of the institution represented through the value chain (Figure 1), in order to analyze and understand the relationship and the impact of the processes and their activations in the generation of key knowledge; Finally, empirical information was collected through a 22-item perception survey to determine key knowledge with response options such as (Always; Almost always; Regularly;

Almost never; and Never) validated by a pilot test and responsible expert consultants. of the institutional QMS to identify organizational capacities in terms of identifying, acquiring, developing, transferring and using key knowledge in the aforementioned processes. The stages were: 1) identification of knowledge; and includes questions 1, 2, 3 and 7; 2) acquisition of knowledge; with questions 4, 6, 8, 11 and 12; 3) knowledge development; with questions 5, 9, 12, 14, 15; 4) knowledge transfer; with questions 13, 16, 17, 18, 20; and 5) use of knowledge; with questions 19, 21, 22, respectively (Fornés-Rivera et al., (2017) which is supported by the criteria proposed by Nonaka and Takeuchi (1995), cited in Hernández (2016) for the development of knowledge, defined the means and resources to achieve an understanding of the knowledge that was developed.

Information supported by Pereira-Alfaro (2011) as mapping tools were used to align that key knowledge to the information of the investigated areas through indicators and / or goals and information validated by the institutional SGC. This survey was applied to one hundred percent of the personnel of the three areas, a total of 62 people including department heads, coordinators of educational programs and internal (plant) and external (auxiliary) personnel, reporting the intention of the study. To analyze the data in a first and second application of the instrument, perceptions of the respondents were collated to find areas of opportunity. and within the organizational structure in relation to OC.

3. Results

The information obtained from the implementation of the methodology for the impulse of CO and GC is shown, in the object under study. Note: For the purposes of results and their broadness, only those of the CE area are presented in the first four stages; In the last stage, the results of the two remaining areas are integrated, which are: ED and CDA.

1. **Identification of key knowledge:** The intervention was in the key process of programming art workshops to the community; which is made up of four activities of the process, composed of the name of the activity, its description and coding, which are:
 1. Plan art workshops to the community - the programming proposal -001-A is made
 2. Plan art workshops for the community - spaces and infrastructure are managed - 001- B
 3. Offer workshops - the promotion of workshops to the community is carried out -002
 4. Check the status of workshops - the number of students registered for each workshop is analyzed - 003

Four activities of the key process mentioned above were identified.

2. **Acquisition of key knowledge:** By identifying the activities that generate key knowledge for the process of programming art workshops to the community, the direct source of that knowledge was obtained as a result, which are:
 1. Availability (external and internal)
 2. Epistemological (tacit and explicit)
 3. Ontological (group, individual and organizational)
 4. Source (process, person and client)

It was sought to acquire knowledge from the direct source, which is in people, but in some cases the knowledge comes from part of a software, from the client, it was identified that in all activities they are developed in a group way, one depends on external form (an ITSON department), two activities 001-A and 003 were considered tacit as they are not clear but are understood by the context of the description of the activity, none of the activities are of origin by the client and only the activity 001-A is carried out directly by the knowledge of the people.

3. **Key knowledge development:** The key knowledge was defined, by applying the resource definition format to develop the corresponding area, in which information is appreciated from the people who are involved in the key knowledge defined in the previous step, as well as the people with the work. After transferring their knowledge, they determined the means and / or resources to be able to develop, and their schedule of sessions to demonstrate and formalize their development. It continued to describe those responsible, the position they hold and the total number of activities in their charge.
4. **Key knowledge transfer:** The result was the compilation of necessary information (formats, hierarchies, work instructions, brochures, catalogs, among other supports), for the CE area. See Figure 2.

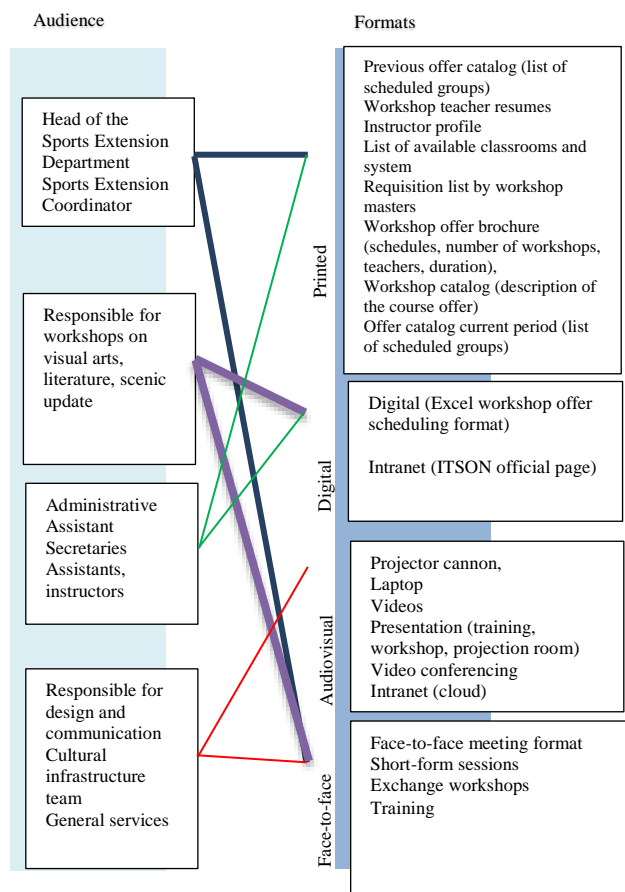
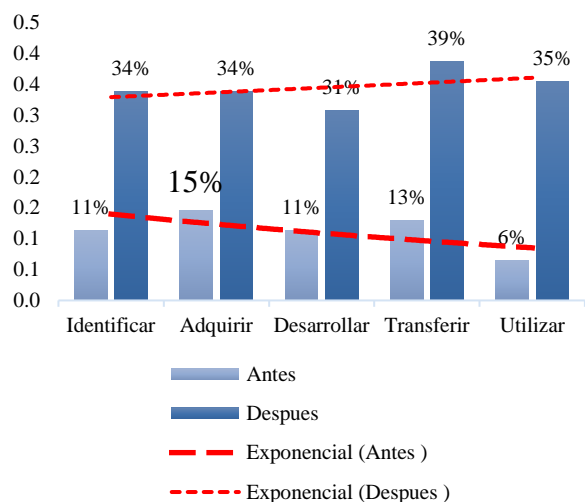


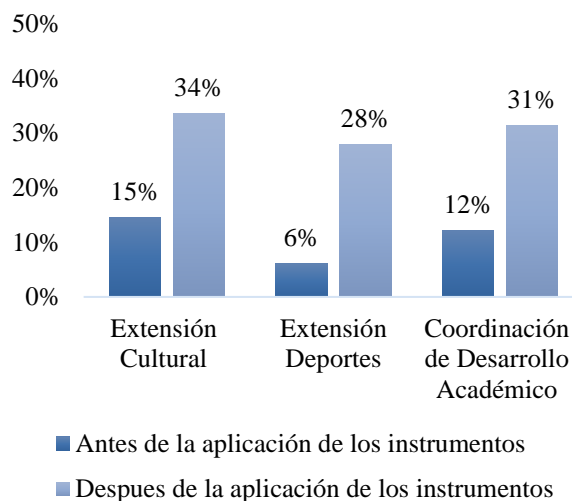
Figure 2 Knowledge transfer model

5. **Use of key knowledge:** Which was achieved through the application to a total of 62 employees in the three areas EC, ED and CDA, with a survey (explained in the method) carried out before and after the organizational knowledge process, see Graph 1.



Graphic 1 Organizational knowledge results by stages

In Graphic 1, the result derived from the application of the instrument is shown, showing an increase in organizational knowledge in each of the five stages. In turn, in Graphic 2, the general result is shown in each of the three areas.



Graphic 2 General results before and after the ED, EC and CDA areas

Graphic 2 shows the result before and after the application of the instrument, a greater benefit was obtained in ED, with a change from 6% to 28%; achieving an improvement of 22%; then CDA with a change from 12% to 31%; achieving an improvement of 19% and finally EC, with a change from 15% to 34%; achieving a 19% improvement in positive perception and knowledge towards the organization. In order to expand what has been done in each area, the key EC process is presented, which was the programming of art workshops to the community, showing its key knowledge:

- 001 - Define an art workshop offer for the university and general community;
- 002- Determine the installed capacity and the space requirement;
- 003- Analyze the level of customer acceptance;
- 004- Decision-making to open or cancel the workshop.

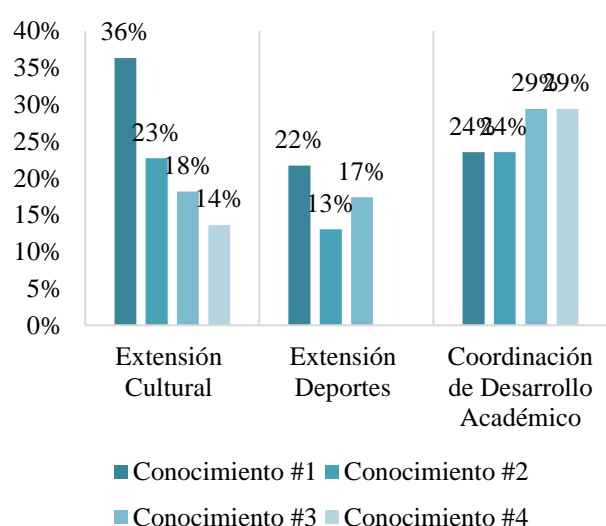
Key knowledge of the ED area, in its key process of selecting teachers to teach curricular courses:

- 001- Determination of the programming of courses to schools and academies;
- 002- Analyze availability of sports offer to courses, schools and academies;
- 003- Manage the process of payment of fees to staff;

Key knowledge of the CDA area, in its key process of selecting teachers to teach curricular courses

- 001-Identify teachers who meet the requirements established in the teacher profile;
- 002- Determination of requirements that the candidate must meet;
- 003-Final decision of the requirements that the candidate must meet;
- 004- Final decision for the selection of highly recommended and recommended candidate.

Graphic 3 shows the result for key knowledge.



Graphic 3 Change results for each key knowledge detected

Graphic 3 shows the result in each of the three areas studied, specifically at the level of each key knowledge, with the best result being 001 defining an art workshop offer for the university and general community with 36%, in EC; in ED the best was activity 001, determining the programming of courses to schools and academies with 22%; and finally in CDA two key knowledge are observed, 003 final decision of the requirements that the candidate must meet with 29%, and 004 final decision for the selection of highly recommended and recommended candidate with 29% respectively.

4. Conclusion

Organizational knowledge objective was achieved; It contributed to the fulfillment of section 7.1.6 of the standard, the findings being a contribution to the recertification achieved in 2018.

Through achieving a broad vision in the approach of each area in question; and in knowing how current knowledge is used in each of its eleven key knowledge.

5. Recommendations

This research gives rise to other studies both in the field of universities or in general in education, as well as in the industrial sector, since activities and processes present in any productive sector are evaluated working with the most valuable thing they have, which is the knowledge of its personnel, which must manage and preserve.

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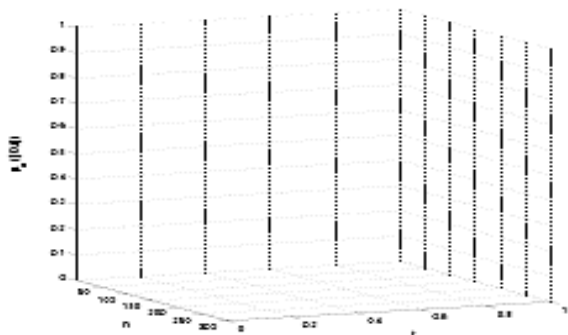
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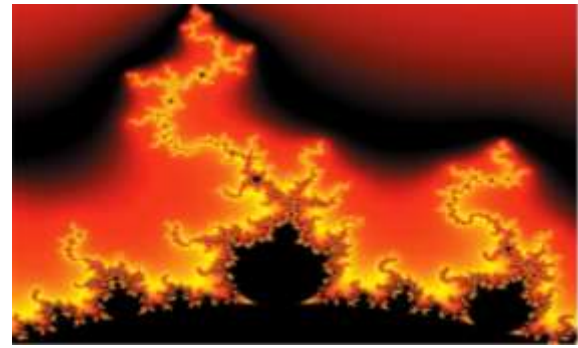


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