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In the first article we present, *Interactions in children's musical teaching with professional and artistic educative ends*, by JUAN-CARVAJAL, Mara Lioba & VDOVINA, María, with adscription in the Universidad Autónoma de Zacatecas, as the next article we present, *Customer Information System for performance evaluation of three Public Utilities. Case study PBL*, by LAGUNES-GÓMEZ, Isabel & HERNÁNDEZ-Y ORDUÑA, María Graciela, with adscription in the Instituto Tecnológico Superior de Alvarado, El Colegio de Veracruz , as the next article we present, *Educational and labor inclusion of the elderly in the UAEM*, by MORENO-AGUIRRE, Alma Janeth, GUAJARDO-RAMOS, Eliseo, ORTIZ-RODRÍGUEZ, María Araceli and DELGADO-SÁNCHEZ, Ulises, with adscription in the Universidad Autónoma del Estado de Morelos, as the last article we present, *Protocol design to assess the attention of children with Autism Spectrum disorder (ASD)*, by ORTIZ-SIMÓN, José Luis, HERNÁNDEZ-SILVA, Gabriela Abigail, AGUILERA-HERNÁNDEZ, Martha and CRUZ-HERNÁNDEZ, Nicolás, with adscription in the Instituto Tecnológico de Nuevo Laredo.

Content

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Interactions in children's musical teaching with professional and artistic educative ends

Interacciones en la enseñanza musical infantil con fines educativos artísticos y/o profesionalizantes

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Abstract

Through the ages, music has always been a fundamental element in the cultural development of mankind. Musical apprenticeship among children has had a positive impact in their psychomotor development, as well as in their sociocultural medium, either coming from general arts education, or, a specialist-oriented musical training. There are certain parameters that contribute to the broad arts education of children, and others that impact specifically the children that are perceived as future professional performers. The information that integrates this work was gathered from a comparative study and analysis of documents. The objective in this article is to observe the interactions of the infants' musical teaching processes with professional and artistic educative ends, highlighting identity values and the methods applied, which contribute to a better integration of a child's musical culture, his own formative needs considered.

Artistic teaching, Methods, Specialized musical teaching

Resumen

La música ha sido un elemento primordial en el quehacer cultural del hombre a través de los tiempos. El aprendizaje musical en los niños, ya sea para la estimulación temprana, desde la educación artística, o de manera especializada, ha tenido un impacto positivo tanto en el desarrollo psicomotriz como en el ámbito socio-cultural. Existen algunos indicadores que aportan a la enseñanza artística general con los infantes, y otros que son específicos para el entrenamiento de niños que se perciben como futuros intérpretes profesionales. A partir de realizar un estudio comparativo y el análisis de documentos, se obtuvo la información para este trabajo. El objetivo propuesto es observar las interacciones de los procesos en la enseñanza musical infantil con fines artísticos y/o profesionalizantes, destacando valores identitarios y los métodos empleados, en atención a cómo estos tributan a una mejor integración de su cultura musical al considerar sus necesidades formativas.

Enseñanza artística, Métodos, Enseñanza musical especializada

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Introduction

A fine line separates musical artistic training and professional training in primary schools both in Mexico and in most Latin American countries, and even in Europe, since all children can appreciate, enjoy and share musical art, or play a musical instrument instrument in a playful way. This experience is recognized as part of the artistic education that is contemplated in the school curricula, and that, as a whole, is supported as one of the basic rights of the integral education of the human being. This has a positive impact on socio-emotional well-being and learning outcomes: "Giving higher priority to arts education in educational systems can be very useful to open minds to the diversity of the world's cultural experiences, creating generations of students endowed with the knowledge, skills, values and attitudes required to build stronger, more sustainable and peaceful societies (…) (United Nations Educational, Scientific and Cultural Organization [Unesco], 2020).

In a global sense, there is a group of recognized methods, especially from the educational reforms of the late nineteenth and early twentieth centuries, which have allowed a standardization of artistic teaching as an axis complement for psychological, physical-motor development, social, cultural and educational of children in the early stages of their development, which impacts on the assimilation of values and the acquisition of practical knowledge for the development and value formation of the human being.

In turn, there are selective initiation schools, specialized in the training of children who acquire specific skills in learning a musical instrument and that, although at that time it cannot be defined whether in the future they will be professional musicians, at least they are prepared for that purpose.

The reforms that began with school education in the last century have fueled questions about how to teach and make art with children. Based on these objectives, we have detected a trend in the use of specific methods for musical artistic teaching where, as a general rule, songs with traditional, patriotic and / or folk themes are integrated.

But also, there are currently specific proposals in Latin American countries about the need to use these same topics at the beginning of the teaching of an instrument for professionalizing purposes, as a way to "break" with the Euro-centrist tradition of recognized music education as "classical or academic", and that has been, for times, the formative foundation in conservatories and specialized music schools.

The acculturation-transculturation processes are well known, among other ways of naming the cultural miscegenation that points to the Latin American societies that were conquered centuries ago, and there is also evidence about the resulting significance regarding the so-called cultural identity; the recognition of a tangible or intangible heritage and the accumulated heritage that enriches the artistic culture of the peoples, where identity music is inserted. This supports and justifies the claim about the need to have and address this repertoire at the beginning of specialized education, since in the upper grades there is already a wide catalog of Latin American concert music.

The objective of this work is focused on observing the interactions of the processes in children's musical teaching for artistic and / or professional educational purposes, highlighting identity values and the methods used, taking into account how these contribute to a better integration of musical culture of the child according to their training needs. The methodology combines the analysis of documents and the comparative study based on the goals or purposes, the objective, the content, the methods, the forms and the context in which these processes are carried out.

Development

The promotion of identity values through artistic education

In the 20th century there was an important revolution in all areas of life, societies, science, culture, politics, religion, philosophy, technological and research advances, the arts and others; all of this was decisive in the mode of action of the human being; the changes in their behavior have set guidelines for the realization of dynamic transformations in the approach to education in all forms of teaching.

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The place of art and music in education has also been revalued, its scope in the aesthetic and humanistic order has come to be interpreted as essential in the formative processes at all levels; musicology and ethnomusicology are also consolidated, which have had a direct impact on musical research and the recognition of values and identities in the Latin American context.

Understanding the role of art in the social system, various teaching methods have appeared, and attention has been given to the training of teachers who teach the subject of art education and, within this, music. The massive nature of teaching responds to the needs of enhancing culture, expanding the possibilities of human development and offering a world of opportunities in a multiculturalism, freedom of action and thought, in line with modern times. An essential place in this relationship is constituted by artistic education and the recognition of talent from an early age, which represents direct attention to the development of childhood. In a multicultural world it is natural to use multidisciplinary educational methods from the primary levels.

There are various ways of understanding and putting into practice arts education; the most widespread are seen as a teaching method or subject, whose objectives are oriented, in some cases, to "(…) development of the individuality of each student (…) to provide the necessary tools for the subject to act with them and to exploit its potential "(International University of Valencia, 2018); in others, they are aimed at the training of young people of their time, capable of judging artistic manifestations with an integral vision in accordance with the society in which they live (Directorate of Institutional Communication, 2020).

These points of view, which may appear in a particular way or in parallel, are based on the approaches enunciated in the Artistic Education Roadmap proposed at the World Conference in 2006, which highlights its inclusion in school curricula as a method of teaching, or its implementation in disciplines that enhance artistic competence, sensitivity and appreciation of the arts. In either case, it will be based on the culture (s) of the environment to which the learner belongs, in a way that strengthens their confidence based on their own culture, as a starting point, to explore, respect and appreciate others.

This indicates the need to be attentive to the changing nature of culture and its value in historical and contemporary contexts (Unesco, 2006).

The practice in art education is manifested in the interaction of students with art objects, artists or with their teachers; with her own creation; or through study and research; all of which contributes to the right to education and participation in culture, the development of individual capacities, the improvement of the quality of education and the promotion of the expression of cultural diversity, which are conformed as formulated objectives for this practice (Unesco, 2006)

Once the artistic perception in the educational process has been understood, it can be concluded that, through it, identity values are instilled in students, through an interaction between educators and children (in the case at hand), creating human values, expectations and experiences, stimulating the development of personality and motivational and emotional growth, as well as the understanding of who we are as individuals and why we interact personally and collectively in our environment, with the family and with society.

This capacity for self-recognition and self-improvement is then acquired from artistic practice. Through the arts, not only a better understanding of life and the universe has been achieved, but also a greater incidence in the development of our capacities to face the experiential and educational processes (Custodio and Cano-Campos, 2017).

To perceive the identity values that musical education contributes to the integral formation of children, we rely on reflective criteria based on certain realities of the current moment. The history of art has been linked since ancient times to the development of civilizations; the logic of thought, communication, language, judgments on racial, religious, geographic, territorial identification, of societies and nations, were coexisting and manifesting as cultural identities. Through music, dance or painting, the human being not only left his traces in the civilizational evolution, but, in turn, seized art as a means of transforming reality.

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The artistic and musical tradition coins concepts of cultural typification recognized as the folklore of the peoples. In the contrast of interpretations that it has been given, its look from the traditional is revealed, enriched with the social needs of a specific moment and with the exchange of native artistic expressions and from other regions. "Normally musical folklore by its oral transmission remains stored in the memory of all those who create, transform and reproduce it, it is also exposed to continuous variation and reinvention" (Arévalo, 2009, p. 3).

When scrutinizing the cultural riches in Latin America and the Caribbean, he stands out above all "(…) this paraphernalia of syncretisms and mixtures, [where] the back and forth musics are born, the conformation of Creole music (...)" (Brouwer, 2004, pp. 12, 13). The diversity and richness of folklore has championed the popular identity culture of the peoples and, in this sense, it has been one of the most genuine expressions in its classification. For this reason, traditionally, one of the aspects of greatest emphasis in the teaching of artistic education is the enjoyment and recognition of folklore and popular traditions.

The main values that folklore contributes from artistic education as a pedagogical and didactic instrument were summarized, since the last century, by María Jesús Martín Escobar, who relates individual and collective aspects based on respect, understanding, help, integration and human improvement (Martín, 1992). In this sense, Isamitt (2002) advocates the strengthening of intimate ties that lead to the consolidation of the national spirit by exalting feelings of nobility, generosity, brotherhood and love for the land.

Folk music is, in itself, an element of cultural identity with universal recognition. Traditional music is part of a collective memory that is reproduced in daily experiences; however, folklore - as a reflection of community evolution - has undergone changes. Currently, the meaning of belonging has been transmuted; migration, plural freedom of thought and scientific-technological advances (which allow access to knowledge in real time) have generated important permutations in the use of the media; added to this are social, work, school and even family relationships with multicultural profiles.

These processes are identified by the ethnomusicologist Josep Martí as cultural frameworks in times of globalization (Martí, 2002).

The historian Sánchez Usón (2015) pointed out the complexity and ambiguity of the term identity from the individual and the collective; in addition, Fraile (2010) revalued the contemporary dialectic in which universality and national identity are not at odds, forming part of the processes of heterogenization and homogenization as a fundamental characteristic of our era. From the musical point of view, this means the expression of all kinds of techniques, proposals and ideas, and the importance that these acquire significance both in the creative processes and in the sound interpretation. As a result, the Mexican electroacoustic music composer Sigal (2005) advocates not to limit the artist's goal of personal and creative innovation, and exemplifies how his music, with a new language, constitutes that patrimonial link of the past, present and future.

As a result of this constant evolution, regarding the new cultural identity, Sánchez Usón (2015) asserts:

... in this case the new musical identity of the peoples will have to be built from the recognition of the idiosyncratic, but breaking the ideological isolation that it entails, and on the acceptance of diversity, in the knowledge of the heterogeneous, assuming its challenges, although without losing tradition, a tradition that, at some point, has been built up with hybrid elements of syncretism and acculturation. (p. 66)

The contextual appropriation of music as an element of identity allows approaching artistic teaching through diverse and creative methods with different languages, and combining non-exclusive teaching models (Lorenzo, 2020); an important component is the teacher who, in order to motivate the student, must make a selection content taking into account the appropriate methodology and mode of action; this led in the last century, the origin of currents of pedagogical renewal and changes of approaches in the teaching process. In music, new educational models appear; to aimed at the appreciation of its beauty.

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This indicated that the student should be in contact with music from his own creations, which constitutes the genesis of the application of the concepts of play, freedom, creativity, globality, as methodological principles in the arts.

Methodology

The combination of general methods of scientific research, such as analytical-synthetic and historical-logical, served as the basis for the use of document analysis and comparative study. The analysis of documents made it possible to identify those aspects in which, from the point of view of promoting values, particularly identity, the greatest influence is perceived from musical teaching. Likewise, the methods most used in musical teaching for professional purposes and their use in the formation of identity values in children were examined. The comparative study made it possible to identify the interactions between both teachings, based on indicators such as the end or goal, objectives, content, methods, means, form, and the context in which the activity takes place.

The wide creative universe of musical art formalized the return to the varied proposals that, through the methods, propose how to approach the teaching of music from the initial levels, either within artistic education, or in specialized training centers. of talent with interpretive emphasis. Certain methods perfected towards the 20th century have had different approaches: some directly musical and others that, with the support of music, facilitate the integral development of the child and contribute to their socio-cultural and universal recognition. Some are applied internationally and others are more specific, which also responds to the orientation of the schools themselves.

To establish the contributions of musical methods in art education, their concordance with those of specialized teaching and their differences, we have used a bibliography that is based on the analysis of research, studies and theses that address the subject. The proposal is to revalue the identity and training contributions that can be found from an early musical training.

The main references are concentrated in the authors: Iotova (2009); Gertrudix and Gertrudix (2011); García (2014); Murray (2014); Alvillar (2015); Cuevas (2015); Milanovic (2015); Pons (2015); Valencia (2015); and Capistrán-Gracia (2018). The importance of this selection is that it is based on diverse experiences and with varied purposes; what the methods have contributed in different areas of knowledge in working with children is analyzed, for any of the options presented and even others, since music has had a direct impact on supporting efficiency in other school subjects and in the development for therapeutic purposes.

As a result, some of the more generalized methods used both in art education and in other schools are outlined. The difficulty lies in the fact that we have observed that it is not always made clear of why one or another educational model has been taken; consequently, it has not been stated which methods are most appropriate for a certain type of musical teaching, despite being generalized; the limits of one and the other, and the possible justifications for their application, have largely depended on the schools, their models and study plans, to which must be added as a decisive factor the educational profile of the student teacher.

Results

Art education and its methods in music teaching

The practice of music education in the development of the child is proven; Starting from the intuitive and cognitive elements, the impulse to creativity, the capacities of perception, reflection, improvisation and decision-making, occur in a way as natural and spontaneous as language, communication and family contact. Consistent with the child's environment, singing, dancing, listening to sounds, timbres, rhythms, etc., are synonymous with processes of individualization, affirmation and recognition. Educational methods reinforce these objectives and as a result provide identity values; however, these may vary fortuitously according to the experiences and objectives of its creators, who translate their vision of the world into an artistic and educational philosophy.

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Some methods are classical and are formally developed in musical art teaching. The Austrian composer Émile Jaques-Dalcroze (1865-1950) stands out in the foreground, who created his method from his own experiences with students from the Geneva Conservatory of Music who, in their professional studies, presented basic learning difficulties that were not resolved naturally t an early age and before theory learning. His proposal focused on three aspects: rhythmic (eurythmy), music theory and improvisation; the pedagogical bases are left to the educator's consideration.

Disciple of Dalcroze, the Belgian musicologist Edgar Willems (1890-1978) emphasizes through play the psychological value of music in the humanist sense by applying laws of nature, cosmic and human, developing social values such as philosophy of life, which stimulates the teacher to research and educational innovation, to awaken the natural and harmonious potential of the human being. For him the song is the musical training seat, since in it are all the basic elements to develop in this knowledge; in that sense, it emphasizes rhythmic movement, voice and the freedom to create and improvise.

On the other hand, inserted in the avant-garde of electroacoustics and based on years of experiences that start from a mixed training as an engineer, player of a bowed-string instrument (cello), and composer, the Frenchman Maurice Martenot (1898-1980) takes up the ideas of the Italian María Montessori (1880-1952) on sensory perception and creates a monophonic instrument close to a synthesizer "Ondas Martenot" (1928).

It particularly estimates spontaneous sensations, vibrations and psychomotor reactions, giving value to internal rhythm, pure sound, silence (breathing), language (memorization and repetition of syllables and rhythmic cells), the discrimination of timbres and pitches in the form of games. He pays attention to concentration, relaxation, inner singing, and improvisation, enhancing the improvement of the ear and aspiring to a humanistic training.

Attention to listening was also raised from another angle by Canadian composer, musical educator and environmentalist Raymond Murray Schafer (1933) who in the field of acoustic ecology sealed the term “soundscape”, a method that is based on the recording of sounds from the natural environment (water, air, wind, animals, sound swings, noises and silences) and combines them both with the human voice (which sings, recites, hums, intones) and with instruments, and with it, more than teaching, makes music creatively. The composition makes sense because it is alive, it is spontaneous and improvised, the voice is integrated, there are imitations and interactions that diversify the sound. The teacher is also a researcher, as well as a participant in the collective learning process.

In agreement with Dalcroze and Schafer, and among the methods most used for the purposes of the art education class from the initial levels, stands out the German composer Carl Orff (1895-1982) who emphasizes the importance of the basic elements of music, in particular rhythm, also expressed in body movement and language, from the primitive, instinctive and perceptual. Lover of traditions and classical antiquity, he handled vocal and instrumental formations with an emphasis on percussion, paid for the interaction of the arts, and the active participation of the child in creative and interpretive processes, for which the formative role is important. of the teacher.

While Orff develops in neoclassical aesthetics with a new reading of tradition, in Hungary another trend is developing based on the research carried out by composers, ethnomusicologists and folklorists Zoltán Kodály (1882-1967) and Béla Bartók (1881-1945) who searched a wide geographic space for the authentic identity roots. The Kodály method has been characterized by success since it is inclusive, it is based on massive choral music, where character, nobility and childhood development are based on collective discipline and the learning of traditional singing, rhythmic development -melodic-harmonic, voice management and learning music theory (phononymy) for ear training and music reading. Taking the voice as an instrument and through play, he proposes singing in various voices, dancing, memorizing and improvising. He considered musical education a right of all the people.

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Focused on learning an instrument, the method of the Japanese violinist Shinichi Suzuki (1898-1998) has gained worldwide popularity, and although he started with the violin, his plan has been transferred to almost all musical instruments. Under the principle that learning music should occur as naturally as knowledge of the mother tongue, this early stimulation program is developed collectively and at the same time in individual attention to each child from the age of 3. Family support, training, discipline, encouragement, creativity and stage presence are basic elements for achieving the goal of living, experiencing and becoming passionate about music. Due to its characteristics, this method is not easy to put into practice in the generality of art education classes, however, the aim is not professional training either. It is constituted, from the methodological point of view, in an intermediate point of motivation that gives advantages over the development of musicality and interpretive capacity.

Although there are many methods, some of the main ones have been outlined here, illustrating both the various techniques and methodologies used as well as the capacity and freedom of pedagogical approaches for similar purposes. As can be seen, they respond to certain stimuli, motivations and interests, which define their objectives. Regardless of the proposal used to impart musical education at infant levels, the set of methods offers certain characteristics that positively affect the formation process of identity values.

Art education promotes, as has been expressed, emotional, cognitive and volitional development. During the analysis, it was possible to appreciate identity values that are promoted with musical education, among them they reiterate:

- Appreciation and respect for one's own culture and for those of other regions or countries.
- Appropriation of concepts about folklore, cultural heritage and identity.
- Respect for the wealth, nature and cultural diversity of peoples.
- Understanding and acceptance of other lifestyles.
- Maintenance of the collective memory of traditions, promotion of a culture of peace.
- Coexistence, helps to explain certain human behaviors and better understand man and his integration into society.

Recapitulating from the different sources, it is summarized that the methods have generally contributed to the affirmation, respect and appreciation of childhood in the socio-cultural educational machinery of nations. In the sense of contact with tradition, family and social collectivity, it has allowed, especially children: the appreciation of multiculturalism; the identification and management of character, will and creativity, as well as collaboration and humanistic appreciation from diversity. Regarding the parallelism between learning and the cognitive impulse (the relationship between music, psychology and development), the identity of the subject, self-improvement and self-recognition stand out; appreciation of motivation, expressiveness, and reflective awareness; observation of the relative dimension of spaces and temporalities. All this contributes to the improvement of imagination, memory and fantasy.

In itself, the recognition of the body, the refinement of coordination and movements, which constitutes an opening to physical and psychomotor development, have been important. Also, the methods underline the growth in the sensory and emotional aspect intelligence, the sense of rhythm, melody and harmony according to natural principles, which gives significance to the natural and the nature-related, and boost the intuitive capacity for improvisation, facilitating creativity in the broadest sense of the word.

With the rise of these methods, the practical and didactic move towards a theoretical development of thought, enhancing, in all cases, the value of education.

Specialized music education and the general characteristics of its methods

It is evident that the benefits that artistic education offers towards the knowledge of music in one way or another also accompany specialized music education, in which, in some way, the set of methods used in artistic education are implicit and with identical values. In the pedagogy of Willems (as mentioned by Milanovic, 2015) it is proposed:

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If a child clearly expresses hir desire to play a musical instrument or to become familiar with it, it is because there is a motivation and, in general, it should be respected. From there, a process emerges that can be named as the incorporation of the instrument into the child's life. Depending on age, that emerges more when playing or when more rationally chosen but that process has to happen because it allows, us to go deeper. (p. 184).

Generally, specialized schools that work with children in the training of instrumentalists receive them between 8 and 9 years of age, especially for those instruments that, such as the piano, violin and cello, are subjects of long careers. The importance of starting at these ages lies in the fact that children already have the capacities that allow them to start a more specific job: they can already assimilate and reproduce elements related to music, and they also have enough physical flexibility to start studying music positions (sometimes unnatural), without affecting their bone-muscular structure, relying on an adequate technique, knowledge of the body and the mental-physical relationship. Elementary education prepares children to acquire physiognomic abilities and skills, and to develop a technique and an intellectual dimension that allow them, later on, to pursue professional studies in music. The logic of this objective requires a more individual and specialized work.

The methods of specialized education have general characteristics that distinguish them from artistic education and, in this sense, it is very difficult to speak of methods created in a particular way, although sometimes we speak of schools, that is, students go to schools of famous pedagogues and interpreters and, in turn, they go through a very rigorous selection and decantation that limits not only the number of students, but also the particularity of the selection.

These schools use very specific methodologies that have several centuries of experience and tradition, because in addition to contributing to the general objectives of artistic education mentioned above, they also focus with equal value on technical-musical learning and the development of artistic values.

These methods do not divide theory and practice; the bases of learning generally encompass science while, specifically, there are subjective aspects that involve the relationship between the teacher and the student.

A particular point (of a discriminatory nature) that makes this difference is the physiology, physical characteristics, age and even origin, hygiene habits, the size of the hands, the length of the fingers and the movement of the joints, the width of the palm of the hand, the length of the pinky finger, the characteristics of the fingertips, the length of the arms, the anatomical shape of the body (shoulders, neck, etc.), all this requires a personal treatment. Applicants take an exam where the natural degree of tuning, musicality, shyness or fluency in the scene, the abilities to sing and what it entails and expresses, the development of memory, what they brings from their cultural environment is assessed, the development of the ear, the discrimination of voices, timbres and heights, the physical flexibility, the conditions of the hands for the instrument, and others. Children pass these tests around the age of 7 or 8. The lesson plan is totally individual.

Another element is the relationship between the score reading in the learning process and the ability to memorize when performing the stage, which implies not only a particular process of methodical learning and attention, but also the will to improvise, correct, assess and exclude; aspects that require discipline and conscience. Some instrumentalists such as violinists are normally accompanied on the piano by a teacher, in this case, another teacher who intervenes in the training process in addition to the violin teacher.

The relationship with the teacher-interpreter starts from a game where the child takes on leading role and is accompanied by an adult, but this becomes a challenge. The interaction with various specialists during the learning of playing an instrument, the family environment and social recognition are key factors that determine the motivation of these children to put aside experiences of habitual work compared to others (hours of video games, TV and others social media) and enter the world of art in a particularly responsible way, which includes individual hours of study.

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In this sense, it can be said that, while the methods in artistic education are inclusive and also contribute to the development of musicality, specialized teaching is selective and discriminatory; however, there is a common idea or goal: the humanity of it is what must be transmitted through the instrument.

The violinist of russian origin born in the United States Yehudi Menuhin (1916-1999) founded a children's school in England (1963) to provide all the conditions in the best training of his students; a magnificent group of renowned specialists and teachers works there. His method uses the experience of the principles of yoga. From practice he expressed: "… no violin is the same as another; each one is as different and particular as humans are and as different in their response to the bow that touches its strings as a series of people would be when faced with an opinion "(Menuhin, 1987, p. 12).

Iván Galamián (1903-1981), of Russian descent and training, carried out important work as a pedagogue in several countries and founded his violin school in New York in 1944. His academy includes the same specialized methodological principles and highlights that the results depend on certain factors, which Milanovic (2015) cites and acknowledges:

Physical, considering both the anatomical aspects of each individual and the psychological actions related to the movements carried out during the performance and the muscular functions that accompany it. // · Mental, the ability of the mind to prepare, direct and monitor muscle activity. // · Aesthetic-emotional, the ability to understand and feel the meaning of music, plus the innate talent to project its expressive message to the public. (p. 182).

Teaching methods in schools and conservatories are generally created by a group of pedagogical teachers, methodologists and even psychologists, instead of by a single teacher, therefore, in most cases, they do not respond to a name, but rather to the pedagogical practices of a group that come together in a school; these are also made up of multicultural teachers, and with diverse training.

The great experience of the Russian-Soviet school is widely known, and has produced many renowned interpreters in the teaching of the violin, for example, which in turn, has spread to various intercontinental countries. This educational multiplicity has enriched the musical endeavor throughout the Latin American continent. Normally, the curricular programs created by these groups include the methodology to be used and in the objectives they propose flexibility margins that allow the differentiated use of an appropriate repertoire for each child: it is about respecting the personalized balance between technical-academic rigor and freedom of artistic expression, emphasizing at all times only those aspects that are necessary to correct; there is permanent observance of individual and family behavior.

In the specialized school the values that are acquired and promoted in artistic teaching are present and are points of agreement; the point is that, instead of a subject, a series of complementary subjects are taught, and between all, these values are promoted. With different names, these components focus on: instrument teaching (individual), choral ensembles class and music appreciation class (collective), music theory class (collective, but with small groups for individual attention) and instrumental ensembles.

Each of them has, in turn, its specific objectives, but in general, certain common proposals that are worked on in the methods of artistic education can be pointed out, such as: the practice of and instrument individually, as well as collectively (in the class of instrumental ensembles, sometimes the instrument being studied is used, but other times others with harmonic and / or percussive characteristics are used), choral singing (in this case with several voices), listening practice (the development of hearing by distinguishing features such as the character of music, the tones and timbres of the various instruments), the handling of the body through dance or the rhythmic or sung reproduction of music, the ability to imitate rhythms and melodies both in an individual and collective settings, as well as improvising (exercises typical of music theory); the bases of harmony contribute to the character and the expression of emotions, the development of creativity and memory.

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In short, he is educated in making music from music, assuming a role as a performer and learning to work individually and collectively while assimilating aesthetic, social and identity values.

Regarding the study, the similarity between musical education for artistic education purposes and professional education with regard to the development of identity values is concluded. However, differentiating points can be identified between them:

- The end or goal; in the artistic general (1) a general cultural integration is sought, not a musical result; however, in the particular specialized (2), the important thing is the musical result, the technical development and the artistic growth.

- The objective; Its essence in (1) is to know or play one or several musical instruments that provide general culture and develop physical-mental abilities. In (2), emphasis is placed on playing an instrument, guaranteeing quality learning of technique and creative interpretation.

- The content; in (1) rhythmic learning (danceable and with participation of the body) is weighed, without neglecting the melodic and the accompaniment. In (2) the melodic result is distinguished (in most instruments) taking care of the quality of the singing (tuning), the sound and the integration of other harmonic, rhythmic or accompaniment elements.

- Methods; in (1) they are based on the educational policies of the school system or center; on the experiences of the music teacher or criteria of the educational directors (especially in private ones); schools can usually use one of the particular teaching methods. There is a wide variety of options and methods in the application of the subject, as well as freedom in the use of instruments and repertoires. Its emphasis is directed to the domain of works with folkloric-traditional or patriotic purposes.

The teaching-learning process is developed with a certain foundation in repetition and the capacity for collective improvisation. In (2) they are based on the traditional options of music teaching: the selection of the method (scores) is, applicable according to international study programs; generally, what changes are the levels of application, according to the degree of demand, preparation and individual development (specialized study program in terms of technique and elementary works). There is consensus on the basic methods for the progressive methodological learning of the technique of playing the instrument. The emphasis is on mastering the technical methods and concert pieces of the universal catalog. The teaching-learning process is methodologically oriented to the analysis and development of individual capacities.

- The media; in (1) not much attention is paid to the quality of the instrument; its execution is not essential. The quality is determined by the socio-cultural objective on which the repertoire will depend and the way of executing it. In (2) it is important that the instrument has an adequate minimum quality to respond to the technical and interpretive objectives. There is a catalog of scores (methods) specific to the technique and the concert repertoire.

- The shape; in (1) it is developed in practical classes; in (2) practical and theoretical classes are adopted.

- The context; in (1) artistic activities, singing, or the practice of an instrument are usually developed in the classroom, in social and school life. In (2) learning the particular music of an instrument requires individual study at home or in specialized educational institutions.

The methodology applied in one or another musical education describes strategies based on the objectives for the training of students.

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However, in both cases respect for diversity in the group, the management of instinct and character, the appreciation of multiculturalism are promoted; increasing motivation, expressiveness, creativity, and the development of imagination and memory. Also, humanism and group work are promoted.

Some universities in Mexico, such as UNAM, the Autonomous University of Zacatecas and the Veracruzana University, aware of the importance of specialized musical education from childhood levels and of its values and significance in the formation of a cultured man, have in their plans of studies several years of attention to children. In turn, there are teachers-researchers and artists with postgraduate studies who have been trained abroad, or foreign professors who are integrated into these groups, which provides variety and enrichment of the methods, methodologies and knowledge that allow the improvement of educational quality in music teaching.

Conclusions

In a linear sense, a continuity can be established, and sometimes a parallel, between general artistic education and specialized education, since the former begins, many times, from a very early age (3 or 4 years), from preschool studies It continues throughout primary school, while specialized education usually begins at around 8 or 9 years of age in most schools.

We consider that the interactions of an expanded catalog from a Latin American, national, regional and folkloric perspective constitute an enrichment of the cultural heritage and artistic heritage. When using them also from specialized teaching, it will be necessary to think about how to approach learning, what are the proposed objectives and what are the methodologies used in the application of these methods; this will make a difference in the quality of teaching. All music adds identity value in the broadest sense of the use of the term.

The experience and the study sample allow us to conclude that there is no single learning method, and none is more valid than another except that it is analyzed from a personalized perspective of both the educator and the learner (child); The important thing is to be clear about why one or the other is applied, and to make the selection appropriately based on the needs and objectives to be achieved.

In any case, in the music teaching a balance is needed that offers certainty to children in their intellectual growth.

The specialized school will focus on method, methodology, technique and individual study; basic quality and intellectual physical positioning, so artistic technical knowledge will determine the way to where to introduce the rest.

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Customer Information System for performance evaluation of three Public Utilities. Case study PBL

Sistema para evaluar tres servicios municipales de utilidad pública. Caso de estudio de ABP

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Abstract

In the present work we show an extra academic activity (EAA) developed through a university innovation project: "Design and construction of a system to evaluate the quality of municipal public services" developed at the Instituto Tecnológico Superior de Alvarado by a group of teachers of Computer Systems and Basic Sciences, with student participation of Engineering in Computer Systems. Our objective is to analyze the contribution of the Project-Based Learning (PBL) methodology to university education and professional development of teachers. We use the qualitative research method Participatory Action Research (IAP), field experience log and portfolio of evidence for data collection and coding and scales for processing. As a result, we found that the educational experience created meaningful learning, as well as verifiable academic products, and verifiable competencies and professional experience for the mutual benefit of students and teachers. Therefore, we conclude that the ABP is an effective Strategy for Creating Meaningful Learning Experiences in technological higher education, because its results have a positive impact on university education and Professional Development of Teachers. To conclude from this experience we offer recommendations to obtain better results.

Project Based Learning (PBL), Case studies, Participatory Action Research (PAR)

Resumen

Se estudió la contribución del Aprendizaje Basado en Proyectos (ABP) al ejercicio de funciones universitarias en la experiencia educativa extracurricular «Diseño y construcción de un sistema para evaluar la calidad de los servicios públicos municipales», desarrollada en el Instituto Tecnológico Superior de Alvarado por un grupo de docentes de Sistemas Computacionales y de Ciencias Básicas, con participación estudiantil de la Ingeniería en Sistemas Computacionales. Se empleó el enfoque cualitativo y el método Investigación-Acción Participativa (IAP), para la toma de datos la bitácora de campo y el portafolio y para su procesamiento codificación y escalas. Como resultado, se observó que la experiencia desarrollada contribuyó a la formación de recursos humanos y al desarrollo profesional docente, a través de la generación de competencias, productos académicos, y experiencia profesional comprobables. Por lo cual, se concluye que el ABP se puede emplear en contextos de educación superior tecnológica con resultados efectivos e integradores, tanto en la formación de recursos humanos, como en el desarrollo profesional docente. Para finalizar, basados en esta experiencia, se ofrecen recomendaciones para obtener mejores resultados.

Aprendizaje Basado en Proyectos (ABP), Estudio de caso, Investigación-Acción Participativa (IAP)

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Introduction

From the institutional vision of the current Mexican government, quality in education consists of achieving excellence, relevance and relevance of education at all levels and modalities. In higher education, the concept of quality is associated with the exercise of central functions (Tobón, Rial, Carreto, and García, 2006), which for this case are defined as: strengthening the commitment of educational institutions with their community (local, regional and national) and its cooperation and link with the productive sector; promote the training of students through the development of projects that improve their practical, theoretical and methodological capacities; and revalue teacher professional development and its continuous improvement (Presidencia de la República, 2020).

Specifically speaking of the technological higher education developed within the framework of the National Technological Institute of Mexico (TecNM) 1, the excellence, relevance and relevance of education is pursued through instruments such as: the Program for Teacher Professional Development, for the Higher Type (PRODEP) coordinated by the Secretary of Public Education, through the Directorate of Academic Improvement; the National System of Researchers of the National Council of Science and Technology; and the Program of Incentives for the Performance of Teaching Personnel, the Dual Education Model for the undergraduate level and the Manual of Academic-Administrative Guidelines, the latter three exclusive to TecNM.

These actions and programs establish priority functions of the educational task, among which are: the teaching of classes, tutoring, research, technological development and innovation, and academic management activities and links with the environment. However, in practice its exercise is conditioned by contextual restrictions specific to each educational institution (Montes, 2020), whether these are organizational, budgetary, by management styles, and / or by the disposition, preferences or abilities of the students themselves. teachers or students;

Therefore, in this work it is in our interest to present an experience of strategic integration of teaching substantive functions, developed using as a technique learning based on the project "Design and construction of a system to evaluate the quality of municipal public services". its objectives, the methodology used, as well as its results, scope and possible applications. This experience was developed, between December 2017 and March 2020, at the Alvarado Higher Technological Institute (ITSAV) 2 by a group of teachers from the Computer Systems Academy, under the coordination of the Academy of Basic Humanistic Sciences, with the purpose of paying for the social function of the university as a transformer and creator of changes (Samour, 2015).

State of the question

Studies show that the efficiency with which citizens perceive government results influences public trust and their willingness to align with it (Díaz, 2017; Scartascini, 2019); Despite this, in Mexico the measurement of the quality of procedures and public services is limited (INEGI, 2016, 2018) and this deficiency mainly affects municipal public administrations, for which since 2011 there are 2 official projects, aimed at monitoring the quality of the procedures and services they provide: the National Survey of Government Quality and Impact (ENCIG) and the National Census of Municipal and Delegation Governments (CNGMD), both coordinated by the National Institute of Statistics and Geography (INEGI). Unfortunately, the information that these projects manage presents attributes that make it little useless to generate diagnoses focused by municipality and by locality, since its coverage does not include all Mexican municipalities and delegations of Mexico City.

Therefore, and since the main objective of the ITSAV is to positively impact its environment and train professionals and researchers capable of applying and generating scientific and technological knowledge, in accordance with the requirements of the economic and social development of the region, of the State and the country; The purpose of the working group was to develop a contribution that, combining their profiles, would seek to address the deficiency in access to systematized information and by locality of the quality with which municipal public services are provided.

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Theoretical framework

In this study we use a qualitative approach because we consider that it is compatible with educational practice and enriches it, while, returning to Taylor and Bogdan (cited in Alvarez-Gayou, 2016), for this type of study all scenarios are worthy study, allows the use of flexible research designs, its perspective is holistic, researchers are sensitive to the effects they cause on the people under study, it tries to understand people within the same frame of reference, and it is interested by all the perspectives of the participants.

The methodological foundation of the design is congruent with the methodological position of Alvarez-Gayou (2016) who, in opposition to the positivist approach, chooses: authenticity versus validity and structural corroboration (Eisner cited in Alvarez-Gayou, 2016) versus reliability. The research design is based on triangulation of data and methods (Denzin and Lincon cited in Alvarez-Gayou, 2016). In our case, the methods used are Participatory Action Research (PAR) and Project-Based Learning (PBL).

We selected Participatory Action Research (PAR) since, according to Reis-Jorge, Ferreira and Olcina-Sempere, (2020) it is the research model most frequently associated with systematic reflection and critical analysis of teachers as researchers of their practices. In addition, knowing reality aims to transform it (Colmenares, 2012; Hernández and Mendoza, 2018; Ballester, 2004), and by focusing on one's own practice, it allows developing the critical reflective capacity of teachers and improving their capacity for intervention in their daily work (Ballester , 2004) when they plan and explore educational situations, they check the limits and effects of their practice, and reformulate or reorient it to avoid the unwanted.

For its part, Project-Based Learning (PBL) can be defined as a methodology (Ausín, Abella, Delgado and Hortigüela, 2016; Cobo and Valdivia, 2017; Serna and Melgar, 2020) or as a technique or strategy (Maldonado, 2008 ; Martí, Heydrich, Rojas, & Hernández, 2010) of student-centered learning that has demonstrated positive impacts on learning motivation and learning autonomy (Maldonado, 2008) as it confronts the student with real-world situations (Cobo and Valdivia, 2017).

That is to say, with practical application problems (Martí et al., 2010), thus promoting socioformative teaching (Tobón cited in Hernández-Mosqueda, Tobón-Tobón, and Vázquez-Antonio, 2014). Although the extracurricular educational experience has been addressed in the literature in an ambiguous and unclear way in the literature, there is consensus that it provides relevant benefits for the professional development of students and therefore it is considered an important aspect in educational practice (Bartkus, Nemelka, Nemelka and Gardner 2012), since it promotes the creation of knowledge through experiential learning in the meaning that Gleason and Rubio (2020) give to this term.

Methodological procedures

The focus of this study is qualitative, oriented towards change, and the method used to study the Project Based Learning (PBL) experience (Maldonado, 2008; Martí et al., 2010) is Participatory Action Research (PAR). The research design is of the single case type N = 1 (Ato, López, and Benavente, 2013; Meza-Mejía and Flores-Alanís, 2014). Returning to the common approach of the qualitative methodological process proposed by Ballester (2004), the intervention was developed in 4 phases and 8 steps (see table 1).

Phase	Steps
High school	1. Definition of the problem
	2. Selection of design methodology
Field work	3. Negotiation and access to the research field
	4. Systematic collection of data and information
Analysis	5. Data transformation and reduction
	6. Preparation of analysis schemes
	7. Interpretations and discussion of results
Informative	8. Preparation and presentation of results

Table 1 Common approach to the qualitative methodological process
Source: elaborated from (Ballester, 2004, p. 241)

A non-probability type of sampling was used to select the participants, based on available subjects. For data collection, the field log and the portfolio and for its processing, coding and scales, defining 10 categories of analysis with the competencies that were considered key for the development of the activities entrusted to the student: documentation, validation tests and dissemination of results.

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Analysis and discussion of results

Preparatory phase-Definition of the problem

As a result of the recognition by the National Institute of Statistics, Geography and Informatics (INEGI, 2016, 2018) of the limitations in measuring the quality of procedures and public services in Mexico, we carried out a diagnosis to know the scope and limitations of official projects in charge of your care.

Based on the result, we define as a problem the deficiency in access (of municipal authorities, citizens and civil society) to systematized information (by municipality and by locality) on the quality with which municipal public services are provided, which hinders the evidence-based decision making at this level of government. It was identified as causes that the ENCIG and the CNGMD present attributes that make them little useless to generate focused diagnoses (see Table 2), such as:

– Partial geographic coverage that does not include the 2,456 Mexican municipalities and the 16 delegations of Mexico City;

– Level of disaggregation of the data that does not include the locality;

– Although the collection or capture and recording of data is direct through an electronic system, the consultation is not immediate since there is a waiting period (17 months for the Census and 4 months for the Survey) for it to be carried out. The registration, identification, classification, grouping, processing and storage of data, and finally, the information is legible and useful for its recipients; as well as what

– In both cases, data collection requires the training and deployment of interviewers and the expenditure of expenses to finance the operation.

Attributes	CNGMD	ENCIG
Data disaggregation level: national	Yes	Yes
Level of disaggregation of the data: by state	Yes	Yes
Level of disaggregation of data by municipality	Yes	NO
Level of disaggregation of data by locality	No	No
Dynamic update of data	No	No
Periodicity	Biannual	Biannual
It includes the public service of Public Security	Yes	Yes
It includes the public service of Public Lighting	Yes	Yes
It includes the public service of Parks and Gardens	NO	Yes
Duration of the survey period	5 months	1 month
Processing the results	12 months	3 months
Results presentation	17 months	3 months
Provides quality management indicators for public services	NO	Yes

Table 2 Attributes of the CNGMD and ENCIG
Source: Self Made

In such a way that the reasons why it was decided to carry out this intervention are its potential contributions to teaching, its social relevance to solve an unmet need that is also linked to Sustainable Development Goal 16 Peace, justice and solid institutions, and the National Development Plan 2019-202, general axis of Justice and the Rule of Law, and transversal axis Combating corruption and improving public management.

Preparatory phase-Selection of design methodology

To address the problem, we conducted a documentary review in scientific and technical search engines and repositories, concluding that the use of Information Technology Systems (STI) is an effective strategy to manage information, identify areas of opportunity to improve local government management , and develop evidence-based public policies. Therefore, we decided to present as a proposal for the modernization and improvement of municipal public management an ITS that would include in its knowledge base a meso-level analysis of the expected and perceived quality (Mora, 2011) of municipal public services from the client's perspective external, through satisfaction surveys, and the agile Extreme Programming (XP) methodology (Letelier and Penadés, 2006) was chosen for its development.

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In this first phase, it was decided to develop a demo version for the municipality of Alvarado, considering public safety services, lighting, streets, parks and gardens, on a web platform using technologies: MVC pattern, PHP and JavaScript languages, leaf framework Bootstrap style, and standard for JSon and HTML5 data exchange.

Since this project was developed in an educational context, the PBL was also used.

Fieldwork phase-Negotiation and access to the research field.

With the operational support of the ITSAV and the City Council of the Municipality of Alvarado, Veracruz, the working group, made up of specialists in the area of Computer Systems and Management and Public Policies, formulated the proposal «Design and construction of a system to evaluate the quality of municipal public services "that was presented to the Call for support for scientific research, technological development and innovation of the TecNM, in which it was benefited with financial support for its implementation.

In this phase, the SIT was developed, which at this time was functional and had been validated in a simulated operating environment. In addition to recording, storing and processing the responses provided to the public services evaluation instrument (see figure 1), this system allows us to know how well or how acceptable the performance of public services is perceived. To achieve this, it translates the frequencies of the responses into points, stores them in the database and accesses them using an SQL query. With this information, and with the support of a programmed logic algorithm, the system reasons the answers consulted and offers an expert interpretation (see figure 2) to calculate the average per question and the general average per public service, as shown in the figure 3.

Assessment of public services

Using a scale from 1 (one) to 10 (ten), where 1 is in complete disagreement and 10 in complete agreement, evaluate your position regarding the following statements about the public services provided by the Municipality in which you reside:

	Completely Disagree									Completely Agree
Item	1	2	3	4	5	6	7	8	9	10
1.- The provision of the public lighting service is constant, that is, without interruptions for any cause attributable to the service provider.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
2.- The lighting is adequate and there are no dim places on public roads.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
3.- The response time of the authority to make repairs to flaws or failures in the public lighting service is acceptable.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
4.- The maintenance and equipment and cleaning in general of the streets, is adequate, that is to say without imperfects that hinder their transit.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
5.- The maintenance and equipment and cleaning in general of the parks and gardens is adequate, that is to say, without imperfects that hinder their use.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
6.- In general, the response time of the authority to make repairs to damages or failures in the service of streets, parks and gardens is acceptable.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
7.- The municipal preventive police are adequately trained and equipped to provide the public security service.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
8.- The response time of the municipal preventive police in the event of a call from the public is adequate.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
9.- The municipal preventive police performs with legality and ethics in the provision of the service.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
10.- Municipal transit personnel are adequately trained to provide public safety services.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
11.- The response time of municipal transit personnel in the event of a call from citizens is adequate.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
12.- The municipal transit personnel act with legality and ethics in the provision of the service.	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

Figure 1 Response interface to the public services evaluation questionnaire
Source: Municipal services evaluation system of Alvarado, Veracruz

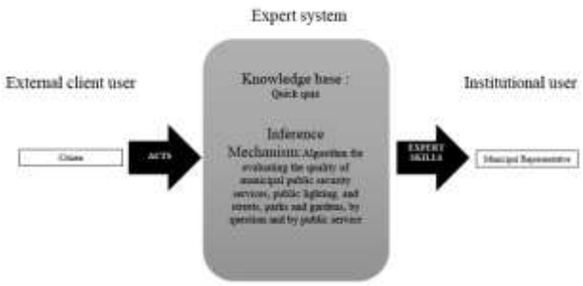

Figure 2 Problem domain scheme
Source: Self Made

Street lighting

Items	Frequencies										Average per Item
	1	2	3	4	5	6	7	8	9	10	
1.- The provision of the public lighting service is constant, that is, without interruptions for any cause attributable to the service provider.	1	◎	◎	1	◎	◎	◎	◎	◎	◎	**2.50**
2.- The lighting is adequate and there are no dim places on public roads.	1	◎	◎	1	◎	◎	◎	◎	◎	◎	**2.50**
3.- The response time of the authority to make repairs to flaws or failures in the public lighting service is acceptable.	1	◎	◎	◎	◎	1	◎	◎	◎	◎	**3.50**

Figure 3 Public lighting results interface
Source: Municipal services evaluation system of Alvarado, Veracruz

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Once the STI was developed, the support of the Academic area of the Institute was requested for 3 students to join professional residencies (2 industrial engineering students, and 1 computer systems engineering student); receiving a response from a computer systems engineering candidate, who joined the work team to support documentation, dissemination and validation tests (Blanco-Llano and Rodríguez-Hernández, 2011) of product quality in an environment real by peer category review (Zamora, 2011) based on user acceptance (Jústiz-Núñez, Gómez-Suárez, and Delgado-Dapena, 2014; Sánchez, 2015; Zamora, 2011) and with which the methodology of job under which your professional residency would be developed (see tables 3 and 4).

Principles of the work methodology
1. Joint, well-founded, critical and purposeful participation in the construction of knowledge
2. Permanent and direct communication
3. Goal orientation
4. Mutually beneficial relationship
5. Accuracy over speed
6. Socialization of knowledge and information
7. Under identical conditions, the simplest option is preferred to the more complex one
8. Translation of effort into experience and products

Table 3 Work methodology
Source: Self Made

Student	Teacher
– Protagonist in the construction of knowledge – Co-responsible for the achievement of objectives – Beneficiary of curricular experience	– Guide, tutor and advisor in the extracurricular experience – Generator of an environment of trust so that the student can express their views and doubts. – Student empowerment catalyst

Table 4 Roles of the participants
Source: Self Made

With the incorporation of the student, the PBL experience began according to the 5 phases suggested by García and Tobón (cited in García, 2010) for competency-based training schemes: 1) Study of the context, 2) Understanding of the problem, 3) Search for alternatives, 4) Selection of the best alternative, and 5) Execution scenario.

Field work phase-Systematic collection of data and information.

For data collection in the process of implementing the educational experience, we used the observation technique, the field log and the portfolio. The behavior of the 10 previously established categories of analysis was observed and recorded throughout the 5 phases of the PBL experience, at the beginning (I) and at the end (F) (see Figure 4).


Field log
Project Based Learning experience log
Draft:
Student participant
Name: Profile: Role: Responsibility in the project
Observation record
Phases
Analysis Categories | Context study | Understanding the problems | Search for alternatives | Selection of the best alternative | Execution scenario | Deviations | Settings
Domain of the subject I F
Problem and situation resolution I F
Information integration structure I F
Kinesthetic expression I F
Interaction with the audience I F
Support materials I F
Security I F
Drafting I F
Argumentation I F
Autonomous Learning I F

Figure 4 Field log
Source: Self Made

Analysis phase-Data transformation and reduction

To record the observations of each category of analysis, a coding system was defined by level and by color (see Figure 5).

Level	Coding
Deficient	Deficient
Good to	Good to
Regular	Regular
Outstanding	Outstanding

Figure 5 Coding
Source: Self Made

We use coding since "The codes provide a focus to think about the text and its interpretation" (Gibbs, 2012, p. 79); which makes the information easier to understand.

Analysis phase-Preparation of analysis schemes.

The observations were coded with the support of a matrix to simplify the processing and understanding of the information (see Figure 6). In addition, an electronic folder was integrated to house the portfolio of evidences of the project's products.

Analysis Categories		Phases				
		Context study	Understanding the problema	Search for alternatives	Selection of the best alternative	Execution scenario
Domain of the subject	I	Deficient	Good	Good	Good	Outstanding
	F	Good	Good	Good	Good	Outstanding
Problem and situation resolution	I	Regular	Regular	Regular	Regular	Good
	F	Regular	Regular	Regular	Good	Good
Information integration structure	I	Regular	Regular	Good	Good	Good
	F	Regular	Regular	Good	Good	Good
Kinesthetic expression	I	Deficient	Deficient	Deficient	Regular	Regular
	F	Deficient	Deficient	Deficient	Regular	Regular
Interaction with the audience	I	Deficient	Deficient	Deficient	Deficient	Regular
	F	Deficient	Deficient	Deficient	Regular	Good
Support materials	I	Deficient	Deficient	Deficient	Regular	Good
	F	Deficient	Deficient	Deficient	Regular	Good
Security	I	Deficient	Deficient	Deficient	Deficient	Regular
	F	Deficient	Deficient	Deficient	Regular	Good
Drafting	I	Regular	Regular	Regular	Good	Good
	F	Regular	Regular	Good	Good	Good
Argumentation	I	Regular	Regular	Regular	Regular	Good
	F	Regular	Regular	Regular	Good	Good
Autonomous Learning	I	Regular	Regular	Good	Good	Outstanding
	F	Regular	Good	Good	Outstanding	Outstanding

Figure 6 Coding matrix
Source: Self Made

Analysis-Interpretations phase and discussion of results

At the starting point of the PBL, practical skills were observed with a fair and poor level. As I agreed, progress was made in the phases, a general growth was observed in the competencies studied, but with a differentiated level. The main growths were observed in the domain of the subject, the creation and use of support materials, safety and autonomous learning (see Table 5).

Competences	Evolution	
Domain of the subject	+++	Poor to Excellent
Resolution of problems and situations	+	Fair to Good
Information integration structure	+	Fair to Good
Kinesthetic expression	+	Poor to Fair
Interaction with the audience	+	Poor to Fair
Support materials	++	Poor to Good
Security	++	Poor to Good
Drafting	+	Fair to Good
Argumentation	+	Fair to Good
Autonomous Learning	++	Fair to Outstanding

Table 5 Evolution of the competences evaluated
Source: Self Made

When starting their participation in the project, the student was unaware of the problem that the project seeks to address. At the time of his incorporation, he received an induction in which he was provided general and material information on the problematization, development methodology and access to the SIT with administrator and citizen user level. The activities and responsibilities entrusted to him, together with the constant teaching support and feedback, allowed him to know the project in depth, apply the knowledge acquired during his career and obtain practical experience, both in the execution of the project and in its dissemination, also allowed to deepen its foundations and scope, and to a lesser extent develop greater security and improve their kinesthetic expression and interaction with the audience, their writing and argumentation skills.

This growth materialized in outstanding participations in 2 academic events with state and international recognition, achievements that were of curricular relevance for the student, who for the first time in his school career participated in events recognized for their academic quality.

As a result of these participations, the following were obtained: recognition as one of the 20 finalists, out of 180 projects nominated for the Sixth Meeting of Young Talent Veracruz 2019, organized by the highest authority of National Science and Technology and the State of Veracruz; a gold medal and an accreditation to the continental final as a representative of the Gulf South Mexico delegation in the XIV Latin American Contest of Student Projects in Science and Technology; recognition for participation in the continental final in which the project was presented to an international audience.

In these meetings, by exposing the project and answering questions formulated by national and international experts, in addition to exchanging experiences with peers, the student was able to exercise, evaluate and strengthen their argumentation, autonomous learning, linguistic, paralinguistic and sociolinguistic communication skills,.

As can be seen in Table 6, the goals programmed in productivity associated with the intervention were met, with the exception of the participation of residents in the project.

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The main limitation for the incorporation of residents was the preference of students to carry out their professional residency in a company with the expectation of being hired; therefore, in future occasions an adjustment in this goal will be considered.

Programmed	Programmed	Obtained	Compliance
Book	1	1	100%
Indexed article	1	1	100%
Refereed article	1	1	100%
Participation in academic event	1	2	200%
Prize in academic event	1	1	100%
Funded project	1	1	100%
Participating residents	3	1	33%
Thesis	2	2	100%
Prototype	1	1	100%

Table 6 Productivity associated with the project
Source: Self Made

Regarding the thesis development goal, difficulties were observed to meet it at the undergraduate / engineering level since the academic-administrative guidelines of the TecNM establish options for comprehensive degree or performance in the General Bachelor's Exit Exam (EGEL) , which are more agile than the thesis degree, therefore we do not consider it advisable to set it as a commitment to verify financing.

Regarding scientific articles, whether refereed or indexed, due to the waiting times between the moment they are submitted and the moment they are approved for publication and published, we recommend committing them as only sent, like patents, packages technological and other products.

Informative phase-Preparation and presentation of the results.

This phase included the preparation of the technical report of the project in which a balance of compliance with the objectives and committed products is presented.

We believe that the main results of the PAR include:

- Impact on the training of human resources.
- Academic products of curricular value for both students and teachers.
- Recognition of the quality of the project and dissemination at the state, regional and international level.
- A functional prototype of an application category SIT to evaluate the performance of 3 municipal public services (public security, public lighting, and streets, parks and gardens) in real time, which, compared to the ENCIG and CNGMD, has attributes that characterize an expansion more than a competitor (see Table 7).

Attributes	National Census of Municipal and Delegation Governments (CNGMD)	National Quality and Government Impact Survey (ENCIG)	Municipal services evaluation system of Alvarado, Veracruz
Data disaggregation level: national	And it is	Yes	And it is
Level of disaggregation of the data: by state	And it is	And it is	And it is
Level of disaggregation of data by municipality	And it is	NO	And it is
Level of disaggregation of data by locality	NO	NO	And it is
Dynamic update of data	NO	NO	And it is
Periodicity	Biannual	Biannual	Permanent
It includes the public service of Public Security	And it is	And it is	And it is
It includes the public service of Public Lighting	And it is	And it is	And it is
It includes the public service of Parks and Gardens	NO	And it is	And it is
Duration of the survey period	5 months	1 month	And it is
Processing the results	12 months	3 months	Instant
Results presentation	17 months	3 months	Instant
Provides quality management indicators for public services	NO	Yes	And it is

Table 7 Comparison of the SIT developed with the CNGMD and the ENCIG
Source: Own Elaboration based on INEGI (2016, 2018)

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Conclusions

Based on the results obtained, we consider that the IAP implemented constituted a successful experience, since despite being an ambitious project, the expected objectives were met and significant learning was obtained for the participants that will serve to guide the management of future projects. Among these learnings are:

– For the teacher, the experience allowed the integration of activities considered substantive in the educational policy instruments and that govern teacher professional development, as well as maximizing the impact on productivity associated with the project. His participation as a tutor, motivator and detonator of student talent contributed to the academic benefit of the student body, in which growth was observed as feedback and teacher support and interaction with external expert evaluators increased.

– For the student, the experience of participating in the project was enriching on a theoretical-practical level, since it allowed him to practice, evaluate, develop and perfect his knowledge and skills; giving rise to a reflective and growth process that served to improve their self-knowledge and personal commitment to take advantage of their areas of opportunity. This exercise represented a first academic experience in a broader context than the classroom and a first encounter with reality, under the guidance and individual and personalized advice of a teaching team. Thanks to this exercise, he was able to exercise, evaluate and strengthen his argumentation, autonomous learning, linguistic, paralinguistic and sociolinguistic communication skills.

Among other benefits of the project-based extracurricular learning experience, we found that it promotes the relevance of educational practice in the environment.

Transforms the traditional teacher-student relationship and stimulates their interaction in the construction of knowledge and technological development; it promotes the contextualized and practical exercise of the professional competences of teachers to know areas of opportunity in the attention of problems and participate in their solution; and requires updating of teaching knowledge, which allows them to guide their courses effectively to develop learning environments that promote practical skills in students; and in students it promotes the development of skills of knowing, knowing how to do and knowing how to be.

For the aforementioned reasons, we conclude that PBL can be used in contexts of technological higher education as a method of teaching work with effective and inclusive results, both in the training of human resources, and in the professional development of teachers, and based on our experience For best results we recommend: planning teamwork to achieve common goals; clearly establish the scope and goals of the project; designate responsible for task; constantly assess progress to identify deviations and make adjustments; stimulate motivation and enthusiasm in participants; maintain permanent and direct communication channels; socialize knowledge and information; and ensure that the effort is translated into experience and products of mutual benefit.

Notes:

1. Deconcentrated administrative body of the Ministry of Public Education, with technical, academic and management autonomy in charge of providing, developing, coordinating and guiding technological higher education services, through the Institutes, Units and Centers attached to it (Presidency of the Republic , 2014)

2. Decentralized public body of the Government of the State of Veracruz, with its own legal personality and assets, created by decree published in the Official Gazette on April 12, 2004 (Executive Power, 2004).

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Educational and labor inclusion of the elderly in the UAEM

Inclusión educativa y laboral del adulto mayor en la UAEM

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Abstract

Objective. Analyze the process of educational and labor inclusion of the elderly in higher education of the UAEM. Methodology. An analysis of the process of educational and labor inclusion in the older adult population who are workers and students of the UAEM was carried out. The needs they present, the conditions in which they are found, and the supports provided were identified. This analysis was carried out from a cognitive, neurobiological perspective with or without the presence of disability or chronic-degenerative disease; as well as the search for socio-affective indicators or other psychosocial factors that may impact this inclusion process. Contribution. The results obtained will allow establishing strategies to improve the process of educational and labor inclusion in this population considered as vulnerable.

Elderly, Educational and Labor Inclusion, Higher Education

Resumen

Objetivo. Analizar el proceso de inclusión educativa y laboral del adulto mayor en educación superior de la UAEM. Metodología. Se realizó un análisis del proceso de inclusión educativa y laboral en población adulta mayor que son trabajadores y estudiantes de la UAEM. Se identificaron las necesidades que presentan, las condiciones en las que se encuentran y los apoyos brindados. Este análisis se realizó bajo la perspectiva cognitiva, neurobiológica con o sin presencia de discapacidad o enfermedad crónico-degenerativa; así como la búsqueda de indicadores socioafectivos u otros factores psicosociales que puedan impactar en este proceso de inclusión. Contribución. Los resultados obtenidos permitirán establecer estrategias para mejorar el proceso de inclusión educativa y laboral en esta población considerada como vulnerable.

Adulto Mayor, Inclusión Educativa y Laboral, Educación Superior

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Introducción

The human being always presents modifications in his state of health, which can be both favorable and unfavorable changes throughout life, if observed from the biopsychosocial model where there is presence of both biological, psychological and social factors that will influence his well-being. However, despite neurobiological, affective, social and cultural conditions, among others; there will be a need for the person to grow in different areas and periods of development, such as in childhood, adolescence, adulthood and without hesitation also in the older adult stage (Ceh, 2020; Moreno-Aguirre, Ortiz-Rodríguez, Cruz Abarca & Capistrán-Pérez, 2019).

In Mexico, the person considered as Elderly in accordance with the H. Congress of the Union, is one who is sixty years old or over and who is domiciled or in transit in national territory, the same criteria used by the Official Mexican Standard NOM-167 -SSA1-1997 used by the Ministry of Health (Moreno-Aguirre et al., 2019; Saldaña-Ibarra & Hernández-Guerson, 2017).

Although there has always been an interest in ensuring the health of the elderly population, actions in general are more aimed at neurobiological well-being, as reported by Benavidez-Caro (2017), about the implementation of policies focused on the management of older adults, and patients at risk of dementia and cognitive alterations, which allow the development of physical activity programs for the elderly, programs for the control of chronic-degenerative diseases, programs to avoid smoking, etc.

These programs support the human rights of the elderly, not only by seeking and preserving their physical health, which has increased life expectancy and at the same time new needs in order to have a quality of life in all spheres of the biopsychosocial model. In recent decades, the average age of the elderly has increased, by 2014 life expectancy of women reached 77.5 years and that of men 72.1 years, ages that will increase by 2050 to 81.6 and 79.4 years respectively, a reason that has allowed new projects to arise in this population in different contexts for a fuller life (Ceh , 2020; INAPAM, 2014).

The contexts most approached by the elderly person are educational and work without leaving aside the health context, that is, the elderly adult, in addition to acquiring a stable and functional organic level, allows them to propose new tasks such as continuing to train through courses, diplomas and even higher level studies; as well as establishing new goals or projects of a work nature that is not only the search for material or economic well-being, but also personal objectives that allow a realization as a human being.

It has been proposed by the World Health Organization (WHO, 2014) in the Second Assembly on Aging, that the elderly have rights such as: to their independence, to food, housing, education, and also to protection that safeguards it from the exclusion mentioned in article 12, on page 4 the following:

"Older persons must have the opportunity to work until they want to and are able to do so while performing satisfactory, productive jobs and continue to have access to education and training programs" (Mogollón, 2012, p 57).

As already well said, these academic and work needs arise, which at the same time have a favorable impact on other areas such as cognitive, affective and social, which will allow more favorable contexts for inclusion in the different scenarios of their activities everyday. Hence the importance of inquiring about this phenomenon of educational and labor inclusion in the elderly population at the Higher level.

Background

There are various research works that report statistical figures of university activities of the elderly population both in the student and work settings. One of these works is that reported by Saldaña-Ibarra and Hernández-Guerson (2017), with the emergence of the project of the formation of the Universities of the Third Age (UTE) in 1973, in Toulouse, France due to a need manifested by the population itself in this age group. This initiative was followed by some European countries and the United States of America, where the formation of new UTEs was also promoted.

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The experience of these countries generated that, according to the purposes and organizational characteristics of the different educational institutions, three models were proposed: 1) The French Model, 2) The British or Cambridge Model and 3) The Hybrid Model or Mixed. Hence, this trend was also manifested in countries such as Mexico, among others that make up Latin America (Ramírez & Víctor-Ramírez, 2010; Saldaña-Ibarra & Hernández-Guerson, 2017).

This phenomenon, which also impacted in Mexico, allowed its participation in the UTE NETWORK, with the first University of the Third Age being founded in Mexico City in 2009 (Saldaña-Ibarra & Hernández-Guerson, 2017; Velis, Viteri, Terranova & Ordoñez, 2018).

The National Autonomous University of Mexico (UNAM), was included in this project in 2011, when creating the Interdisciplinary University Seminar on Aging and Old Age (SUIEV), whose purpose was to build networks, collaborative activities and interdisciplinary projects, which promote UNAM. In 2013, thanks to SUIEV, the University Network on Aging and Old Age was formed, made up of 21 academic entities, with the purpose of analyzing and studying the elderly population from different perspectives on research, training, updating and training. (Narro-Robles, Martuscelli-Quintana & Barzana-García, 2012; Saldaña-Ibarra & Hernández-Guerson, 2017).

Other states joined this proposal to name a few, such as Nuevo León with the Binational University of the Third Age (U3E), which has the purpose of integrating Older Adults into society, contributing to the right to a life with quality; in addition to receiving education and training for work (Saldaña-Ibarra & Hernández-Guerson, 2017; Vázquez-Galicia, 2009);

The state of Puebla, through the Ibero-American University, proposed a university program to strengthen the knowledge and experience of older adults through a diploma course in which different topics were addressed; Another state was Yucatán, with the participation of the Marista University, which created a space for older adults to develop their human potentialities, and the possibility of acquiring tools for a full life and enriching their cultural knowledge, through a diploma addressing the topics such as: healthy eating; Indoor growth,

Cinema and society, Human development, Brain gymnastics, among others, and the state of Oaxaca participated with the University of the Elderly (UNIDAM), through the Diploma of the Elderly Host of Oaxaca, where older adults are trained as hosts, to meet the needs not only of its elderly population, but also of other elderly people who visit Oaxaca (Saldaña-Ibarra & Hernández-Guerson, 2017; Vázquez-Galicia, 2009).

As mentioned, in Mexico, various university institutions have continued to promote the participation of the elderly until today, another clear example was the proposal to build the Veracruzana University for the Elderly under the axis of an intergenerational program, where the community participates of academics who are older adults (Saldaña-Ibarra & Hernández-Guerson, 2017). Another institution that has not been the exception is the Autonomous University of the State of Morelos (UAEM). In 2013, by agreement of the University Council, the University Program for Educational Inclusion and Attention to Diversity was implemented (now known as the Unit for Inclusive Education and Attention to Diversity).

In a recent study, the needs and supports provided in the cognitive, neurobiological and socio-affective aspects were identified and analyzed during the process of educational inclusion of the older adult population at the higher level of the UAEM, where it was carried out by the Unit for Education Inclusion and Attention to Diversity in a census for the period between 2015-2017, identifying a population of 320 older adults classified in the following categories: 2 students, 269 academics and 49 administrative workers, which suggests that these figures will increase (Moreno-Aguirre et al., 2019; UAEM, 2012-2018a). With these findings, the need arises to analyze this process of educational and labor inclusion of the elderly in higher education of the UAEM, to identify the supports that are currently provided and what needs still exist, as well as the scope and limitations of this process, already that the results will make it possible to establish improvement strategies in educational and labor inclusion

Objective

Analyze the process of educational and labor inclusion of the elderly in higher education of the UAEM.

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Method

An analysis of the process of educational and labor inclusion in the older adult population who are workers and students of the UAEM was carried out.

The analyzed population was obtained from a database that was formed by the application of questionnaires to administrative and academic personnel of the UAEM in 2018, to identify a condition or situation of vulnerability, through a census carried out by the Unit for Attention to the Diversity and Inclusive Education. The inclusion criteria to make up the sample were under these premises: 1) that the worker or student is included in the referred database, 2) that they have an age equal to or greater than 60 years and 3) that they are active personnel (not retired or pensioned staff). Main characteristics were identified in relation to the variables considered in the database and a descriptive analysis was carried out.

The needs of the studied population, the conditions in which they are found and the support provided were identified. This analysis was carried out from the cognitive, neurobiological perspective with or without the presence of disability or chronic-degenerative disease; as well as the search for socio-affective indicators or other psychosocial factors that may impact on this inclusion process. For the statistical analysis, the SPSS version 22.0 program and Office 365 Excel were used.

Results

The database was analyzed, identifying 347 people with administrative and academic activities (teachers and students) of the UAEM in a condition or situation of vulnerability, from which the data of 311 people were selected according to the inclusion criteria to conform the sample, where 27.7% (N = 86) were women and 72.3% (N = 225) men. The mean age of the study sample was 65 years (SD ± 5), with a minimum age range of 60 years and a maximum of 83 years. 26.7% (N = 83) of the sample were administrative personnel and 73.7% (N = 228) were academic (Teachers / Students). Both administrative and academic workers had an average work seniority (years worked) of 18 years (SD ± 10.6 years), with a minimum time range of less than one year in service for 1.6% (N = 5) of the sample and a maximum time of 49 years worked.

Another parameter analyzed was the presence of disability and only 0.6% (N = 2) of the sample with motor disability and 100% of the sample with a condition or situation of vulnerability were reported because they were within the age range of 60 or furthermore, no other disabilities were reported in this database.

The supports provided by the institution to promote educational and labor inclusion were the following: architectural modifications for admission and permanence in university facilities in buildings for administrative activity, in academic units and research centers. About support for the academic population (teachers / students), adjustments have been made to access information in libraries and documentary information centers in each academic unit and research centers.

In addition, since 2013, strategies have been implemented to eliminate the administrative barriers of admission and permanence to the university to population with disabilities and / or with some other condition or situation of vulnerability, one of them is the application of a differentiated general examination that has allowed the entry of a large number of applicants to study a bachelor's degree, another strategy is to carry out curricular adjustments (now reasonable adjustments) to the study programs, as well as the formation of Support Services Units for Educational Inclusion (USAIE -UAEM) and the University Units of Community Care (UUAC). As mentioned in the background section, at the beginning all the support was aimed at the student population with disabilities, but now the student population made up of older adults is also contemplated and its vision has recently been expanded to the population of university workers (administrative and academic), which fall within this age group.

The database could not accurately identify some important aspects that should be considered in the elderly population, of neurobiological aspects such as chronic-degenerative diseases, or other conditions such as oncological, cognitive, neurological, mental, among others. Nor was the information accurate to identify emotional, social, and cultural factors that could be barriers to educational and labor inclusion. These limitations within the database were considered for the development of strategies.

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Important research considerations

Based on the results found of the older adult population of administrative and academic (teachers / students) in the UAEM, a favorable point is that it is already considered as a population that requires specific support like any other group in a vulnerable situation; However, more dimensions still need to be evaluated to more precisely identify the possible barriers that impede the process of educational and labor inclusion. It is observed that there is a predominance of the male population than female (27.7% women and 72.3% men), so this proportion must be considered due to the possible health problems that may occur more frequently based on the sex of person.

According to the reports of the total population aged 60 years or over in 2014, there is a predominance of chronic-degenerative pathologies such as systemic arterial hypertension in 40%, diabetes mellitus in 24.3% and hypercholesterolemia in 20.4% in the global population, but differences by sex are observed, that is, there is a higher percentage in these three pathologies that occur more frequently in women than in men. Such is the case of arterial hypertension in women it is 46.2% and in men it is 32.9%, diabetes mellitus is 25.8% in women and in men it is 22.4%, in the case of hypercholesterolemia in women it was 23.6% and 16.7% in men.

Others Important diseases reported are heart disease, stroke, and cancer. In mental pathology there may be significant depression in 17.6%, a more frequent cognitive deterioration in women in 22.1% and in men 12.5%, 22.1% of women and 12.5% of men; 7.3% present cognitive impairment, 8.3% of women and 6.3% of men; and 7.9% suffer from dementia, 9.1% are women and 6.9% are men. (INEGI, 2012; INAPAM, 2014).

Regarding the activity within the UAEM, 26.7% (N = 83) of the sample were administrative personnel and 73.7% were academic (teachers / students), these results indicate the importance of developing strategies in the different areas (administrative and academic), although the teacher / student population predominates, both contexts are important for both the work and academic environment to be inclusive, as was done by the Veracruz University.

Where it involved its teachers who were older adults to participate in the project to promote an intergenerational university space between teachers and students where the active aging of its university community where there are older adults was promoted, with this it was possible to identify the phases and negotiations, ends, facilitators and obstacles to generate a university policy and at the same a change paradigm of aging, the possibility of growth and academic personal development of the adult To major, the development it can have in a university community and the promotion of health.

All this proposal favors labor and educational inclusion (Benet-Gil, 2020; Saldaña-Ibarra & Hernández-Guerson, 2017). Another reference is the awareness programs for the perception and attitude of the teacher towards educational inclusion in students with disabilities at the higher level, where the perception and attitude of teachers towards the educational inclusion of deaf students in the UAEM has been investigated, facilitating the design of awareness programs, since the role of the university teacher is fundamental and a key point for the educational inclusion process to take place (Álvarez, 2020; Valle-Aparicio, 2014).

Another point to consider is whether there is the presence or absence of disability. In the case of the sample made up, only motor disability was recorded (0.6% of the sample), so other possible disabilities will have to be investigated through other instruments. Regarding motor disability in the elderly, there are various instruments to assess it and determine functional capacity, such as the scales 1) "Basic Activities of Daily Living" (ABVD) and 2) "Instrumental Activities of Daily Living" (AIVD), among others. (INSP, ENSANUT, 2012). Motor disability can be considered an important barrier to the process of labor or educational inclusion and impact other areas of development that affect the quality of life. It is important to make modifications to the instrument that formed the database, in order to focus it more precisely on the dimensions mentioned in order to obtain more specific data and thus continue to develop strategies that can gradually solve the current problem and future situations that could be foreseen when knowing possibilities situations that may be barriers of different kinds that affect the inclusion process.

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Conclusions

The various programs focused on the well-being of the elderly have allowed an increase in life expectancy and therefore an increase in needs. If the average life span in this population is higher, there will be a percentage of it that will continue to be independent and functional not only in the economic aspect, but also in its cognitive, neurobiological and socio-affective state in general, allowing a better quality of life and inclusion in the different scenarios of their daily activities such as academic and work.

Therefore, age should not be an excluding element, in any condition of vulnerability, it is necessary to favor the elimination of biological, psychological, affective, educational, labor, social, cultural barriers, among others, to achieve the inclusion process.

In addition, it is important to continue advancing with public policies at the national and international level in favor of the rights and needs of the elderly, which is why this motivates us to continue building an inclusive culture in all contexts.

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Protocol design to assess the attention of children with Autism Spectrum disorder (ASD)

Diseño de protocolo para evaluar la atención de niños con Trastorno de Espectro Autista

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Abstract

A correct assessment of the academic level of students with attention deficits is essential for any teacher and parent who is interested in integrating the student into a conventional education school. Centros de Atención Multiple (CAM) that care children with Autism Spectrum Disorder (ASD) do not always have the right way to evaluate a student with these characteristics. This work presents the design of a protocol for evaluating students presenting ASD by using simultaneously a mechanical pedaling system as an aid element to focus the student's attention on assigned tasks.

Asperger's Syndrome, Attention Deficit, Autism Spectrum Disorder

Resumen

Una correcta evaluación del nivel académico de los alumnos con déficit de atención es fundamental para cualquier docente y padre de familia que se interesa por integrar al alumno a una escuela de educación convencional. Los Centros de Atención Múltiple (CAM) que atienden a niños con Trastorno de Espectro Autista (TEA) no siempre cuentan con la correcta forma de poder evaluar a un estudiante con estas características. En este trabajo se presenta el diseño de un protocolo para evaluación de estudiantes que presentan TEA mediante el uso simultáneo de un sistema de pedaleo mecánico como elemento de ayuda para concentrar la atención del alumno en las tareas asignadas.

Síndrome de Asperger, Déficit de atención, Trastorno de espectro autista

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Introduction

At the international level, ASD is still being studied by specialist scientists to determine the best teaching-learning methods that are applied to children with this disorder. Since special education schools were created, different methods have been used to teach their students, and many of these centers use specific teaching and evaluation methods according to the individual characteristics of the student's condition. In the Multiple Attention Centers (CAM) throughout the country, children with attention deficit and hyperactivity are treated to integrate them into conventional schools.

However, according to the censuses, the number of children with ASD continues to increase and the number of CAMs is not enough to provide care for all children; so it becomes a problem to consider in Mexico. In Nuevo Laredo Tam. CAM51, seeking more effective teaching methods, proposed the use of a pedaling system coupled with specific work tasks to improve student learning.

The attention deficit in children with ASD has been well documented: they cannot respond to stimuli, they cannot keep their gaze fixed on another person and they cannot orient sounds when speaking. According to CAM experts, the use of a pedaling system helps children achieve better concentration and can focus on performing a task to achieve better performance. That is why in this document it proposes tasks to be carried out simultaneously with a pedaling system to measure the attention of the CAM student.

Because the minimum average time period for the implementation of a therapy is one year, the data collected during the project with a shorter period of time will not be specific enough, however, they will provide an approximate panorama of the expected results. medium and long term. Each infant presents different characteristics and degrees of autism, and in order to provide a personalized record of the effects of the system, the response in children with similar psychological profiles was documented and, in turn, personalized care, evaluation, and comparison thereof. It was recommended to evaluate a minimum number of subjects in order to focus in detail on their profiles and responses.

Materials and methods

The evaluation protocol was designed based on the need to evaluate the performance of the dynamic pedaling system to concentrate the attention of children with autism spectrum disorder, so it was considered for the development of the protocol, children with ADD and attention deficit were considered and the ethical advice of the expert team of the Multiple Service Center.

Initially, it was sought to analyze the student through a series of interactive tests, but later the protocol was adapted so that it was not necessary to intervene between the student's school sessions, thus achieving that the evaluation of the level of attention is directed by anyone outside the school session.

Tests

Due to issues of sanitary isolation during this time of the appearance of the COVID19 disease, we have proposed, since we are not yet allowed face-to-face approach with the children of CAM51, the proposal of tests to evaluate the student's attention. In this protocol, a record is kept of the motor progress reflected in the students through simple tests designed from general objectives, broken down into particular activities.

Task 1 Stroke. In order to develop literacy skills, the first test consisted of a practice device made up of a table with perforated silhouettes in which students can practice their coordination to make lines. For this task, the pedaling system is used at low speed and the student is instructed to make the path guided by the guide device.

Figure 1 Stroke task

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Task 2 Name. After the tracing session, the subjects were asked to write their names before and after using the system. Taking into account the aspects of ability to follow instructions and coordination. Similarly, the pedaling system is programmed at low speed. (Figure 2)

Task 3 Puzzles. Final basic test, put together a puzzle of less than 20 pieces analyzing the effect on muscle memory. Similarly, the pedaling system programmed at low speed.

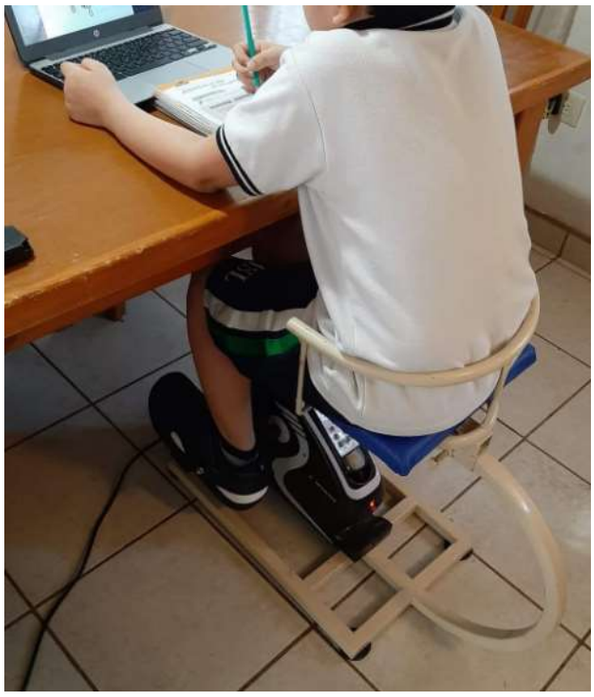

Figure 2 Student performing name task pedaling simultaneously

Participants

The students who were evaluated (face-to-face classes had not been stopped due to the health emergency caused by the Covid 19 virus) at the level of care have the following characteristics: Students from the Multiple Attention Center No. 51, with a age within the range of five to ten years, they may present: Autism Spectrum Disorder (ASD), Asperger's Syndrome (AS), attention deficit and hyperactivity.

Student ID	Gender	AGE (months included)	Diagnostic	School level
1	Male	6 years	ASD	Preschool
2	Female	8 years and 2 months	ASD	1st school
3	Female	5 years and 8 months	AS	Preschool
4	Male	6 years and 1 months	ASD	Preschool
5	Female	8 years and 1 months	AS	1st school
6	Male	6 years and 6 months	ASD	Preschool
7	Male	7 years and 2 months	ASD	1st school
8	Female	5 years and 2 months	AS	Preschool
9	Male	7 years and 8 months	AS	Preschool

Table 1 Characteristics of participants

Results

In on of the views of the CAM51 to test the interaction the students with the pedaling system, some tasks were carried out to see the behavior of the test subject and it was decided to reduce the engine speed so that all the children followed a standard speed at the time of the pedaling on. It should be mentioned that despite being subjects with attention deficit traits, objectivity was not lost on their part to make use of the system, a characteristic that was useful to assess short-term outcomes.

Through the tests it was tried to measure the attention, concentration and permanence of the student while using the dynamic pedaling system. An exam was applied to 9 students of which the first five used the dynamic pedaling system and the remaining four did not, the results are shown in table 2:

Subject Rating Using the system	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
72	1	1	0	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
77	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1
50	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1
22	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
38	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1
27	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0

Table 2 Preliminary results

Key

A. Attend by hearing your name
B. Take turns
C. Attend the instruction
D. Recognize the numbers
E. Recognize geometric shapes
F. Recognizes himself
G. Recognizes his father
H. Recognizes his mother
I. Recognize your sibling
J. You acknowledge that you belong to a family
K. Identify the circle
L. Identify the square
M. Identify the triangle
N. Identify the rectangle
O. Know the concept above
Q. Know the concept below
Q. Know the concept ahead
R. Know the concept behind
1. = yes
0. = no

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Conclusions

The testing protocol presented here in conjunction with the dynamic pedaling system presents an experimental option for schools wishing to innovate their teaching strategies; However, we are faced with a process in which we are obliged to generate formalized information accepted by an ethical council that allows us to implement it safely both for the subjects and for those responsible. This formalization of knowledge also depends on the constant confirmation of results, which, although there are some preliminary advances to the study, may be more specific and precise in terms of objectives carried out in certain periods of time evaluated with statistical tools, providing alternative support to children with ASD.

We consider, according to the preliminary results, aware that a greater number of samples is necessary, which have not been achieved until now due to health issues, that this protocol together with the pedaling system presents a complementary aid that can focus on activities based mainly in the areas of language and communication and mathematical thinking. Said program will be mathematically evaluated for the development of statistics and will be designed in cooperation with educational institutions.

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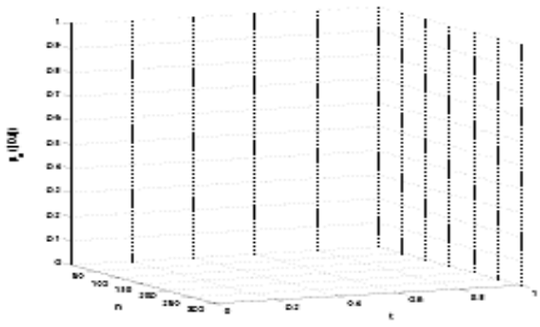

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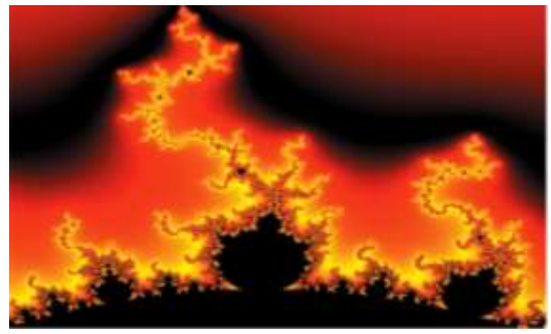

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