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The works must be unpublished and refer to topics of Basic education, higher education, higher education, comprehensive education reform, national agreement for modernization, basic education and other topics related to Humanities and Behavioral Sciences.

Presentation of Content

In the first article we present *Teacher autonomy support and psychological control, gender and academic engagement in secondary school students*, by RAMÍREZ-CHÁVEZ, Jaime, PARRA-PÉREZ, Lizeth Guadalupe and MEJÍA-CARRILLO, Manuel de Jesús, with adscription in the Universidad Pedagógica de Durango, Instituto Tecnológico de Sonora, Universidad Pedagógica de Durango, as second article we present *Educational agents and sensitive and receptive interactions for learning in early childhood in vulnerable contexts*, by DÁVILA-NAVARRO, Mónica Cecilia, CHÁVEZ-NAVA, Roberto, GUTIÉRREZ-RODRÍGUEZ, Alejandra Guadalupe and RIVERA-IRIBARREN, Maricel, with adscription in the Instituto Tecnológico de Sonora, as third article we present *Perception, awareness, and appreciation of the territory through TikTok: A lesson for Basic Education*, by MARTÍNEZ-OROZCO, Flavio & CARBAJAL-MARISCAL, Oscar, with adscription in the Telebachillerato Comunitario COBAEJ - TBC47, CUCBA de la Universidad de Guadalajara, as fourth article we present *The obscured structure of the number in Preschool Education (pre-symbolic stage). Second Part*, by FOKIN, Sergei Konstantinovich, ARICEAGA-PAREDES, Rafael and AGUILAR-ROMERO, Martha Patricia, with affiliation at the Universidad Autónoma del Estado de México, Centro Clínico de Oído, Nariz y Garganta and Escuela Normal No. 3 de Toluca.

Content

Article	Page
Teacher autonomy support and psychological control, gender and academic engagement in secondary school students RAMÍREZ-CHÁVEZ, Jaime, PARRA-PÉREZ, Lizeth Guadalupe and MEJÍA-CARRILLO, Manuel de Jesús <i>Universidad Pedagógica de Durango</i> <i>Instituto Tecnológico de Sonora</i> <i>Universidad Pedagógica de Durango</i>	1-9
Educational agents and sensitive and receptive interactions for learning in early childhood in vulnerable contexts DÁVILA-NAVARRO, Mónica Cecilia, CHÁVEZ-NAVA, Roberto, GUTIÉRREZ-RODRÍGUEZ, Alejandra Guadalupe and RIVERA-IRIBARREN, Maricel <i>Instituto Tecnológico de Sonora</i>	10-16
Perception, awareness, and appreciation of the territory through TikTok: A lesson for Basic Education MARTÍNEZ-OROZCO, Flavio & CARBAJAL-MARISCAL, Oscar <i>Telebachillerato Comunitario COBAEJ - TBC47</i> <i>CUCBA de la Universidad de Guadalajara</i>	17-25
The obscured structure of the number in Preschool Education (pre-symbolic stage). Second Part FOKIN, Sergei Konstantinovich, ARICEAGA-PAREDES, Rafael and AGUILAR-ROMERO, Martha Patricia <i>Universidad Autónoma del Estado de México</i> <i>Centro Clínico de Oído, Nariz y Garganta</i> <i>Escuela Normal No. 3 de Toluca</i>	26-34

Teacher autonomy support and psychological control, gender and academic engagement in secondary school students

Apoyo a la autonomía y control psicológico del docente, género y compromiso académico en estudiantes de educación secundaria

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Abstract

Objective: The Present Study Analyzed The Relationships Between Autonomy Support, Teacher Psychological Control, Gender And Academic Engagement. Methodology: The Sample Consisted Of 324 High School Students Aged 10 To 13 Years (M = 12.88 Years, SD = 1.52) From Six Public High Schools Located In Different School Zones Of The State Of Durango. Results: Multiple Linear Regression Results Indicate That Student Autonomy Support Favors Students' Academic Engagement, While Teacher Psychological Control Is Negatively Associated With Students' Academic Engagement. Furthermore, Gender Does Not Seem To Be Associated With Students' Levels Of Academic Engagement. Contribution: It Is Concluded That Autonomy Support And Psychological Control Are Predictors Of Academic Engagement Of Secondary School Students.

Autonomy, Psychological Control, Engagement Academic

Resumen

Objetivo: El Presente Estudio Analizó Las Relaciones Entre El Apoyo A La Autonomía, El Control Psicológico Del Docente, El Género Y El Compromiso Académico. Metodología: La Muestra Está Compuesta Por 324 Estudiantes De Educación Secundaria Con Edades Entre Los 10 Y 13 Años (M = 12.88 Años, DE = 1.52) De Seis Escuelas Secundarias Públicas Ubicadas En Diferentes Zonas Escolares Del Estado De Durango. Resultados: Los Resultados De La Regresión Lineal Múltiple Indican Que El Apoyo A La Autonomía Del Estudiante Favorece El Compromiso Académico De Los Estudiantes, Mientras Que El Control Psicológico Del Docente Se Asocia Negativamente Al Compromiso Académico De Los Estudiantes. Aunado A Ello, El Género No Parece Estar Asociado A Los Niveles De Compromiso Académico De Los Estudiantes. Contribución: Se Concluye Que El Apoyo A La Autonomía Y El Control Psicológico Son Predictoras Del Compromiso Académico De Los Estudiantes De Educación Secundaria.

Autonomía, Control Psicológico, Compromiso Académico

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Introduction

Academic engagement is a concept that attracts the attention of researchers in the field of education, especially for its protective effect against endemic problems in school communities such as low achievement and school dropout. In Mexico, the problems of underachievement and school dropout were exacerbated as a result of the COVID-19 pandemic.

According to official data, the pandemic has left around 5 million students out of the education system in the last three years (INEGI, 2022). In this sense, according to estimates by the Ministry of Public Education, the dropout rate in secondary education increased by 7.8% between the school years 2019-2020, 2020-2021 and 2021-2022, as a direct result of the COVID-19 pandemic (SEP, 2023). In addition, it is estimated that there has been a setback in the expected learning outcomes of Mexican students, a situation that exacerbates the historical problems of low learning achievement among secondary school students (CONEVAL, 2020; OECD, 2018).

In this context, it should be noted that both dropout and underachievement are sensitive and worrying phenomena for the scientific community due to their permanent negative effects not only on the student but also on their respective communities because of their impact on their productivity, competitiveness and development.

Academic engagement is considered an important predictor of school achievement and completion (Finn & Zimmer, 2012; López-Angulo *et al.*, 2021; Gutiérrez, 2018). It is considered in the literature as a protective factor against dropout and low school achievement as the construct refers to student participation in academic and extracurricular activities reflected in their behaviour, emotions and cognition (Christenson *et al.*, 2012; Fredricks *et al.*, 2004). Conversely, students' level of academic engagement is often threatened by factors both inside and outside the school. While external factors focus on problems related to the home environment, school disengagement has the greatest impact on academic engagement among school-related factors.

Disinterest in school, translated into little or no academic engagement, in addition to affecting students' participation in academic and school activities, in the worst cases leads to dropout (Molina *et al.*, 2014).

Some authors point out that interest, translated into the level of student engagement, is not an immutable attribute, but one that changes through teaching and institutional practices (Fredricks *et al.*, 2016; Miranda-Zapata *et al.*, 2018; Parada-Contreras & Pérez Villalobos, 2014; Schaufeli *et al.*, 2002), which is why the role played by the teacher in these changes is fundamental. Africano (2021) point out that the lack of commitment to school stems from a significant wear and tear on the mood and minds of students, as a result of teaching that lacks stimulus, is full of authoritarianism and is saturated with information that is far removed from the student's reality.

In this sense, Pineda-Espejel *et al.* (2019) found that low student engagement with school is associated with inhibitory, oppressive and imperious teacher behaviours. Rigo & Donolo (2019) suggest that students who are engaged in their classes tend to have teachers who support their autonomy and provide them with socioemotional support, i.e., avoid coercive and controlling actions in their school dynamics.

The above suggests that old paradigms in the educational field should be questioned for the adaptation and redirection of teachers' competences and their work in the classroom (Moreno-Murcia *et al.*, 2019; Reeve, 2002; Trautwein & Koller, 2003). This premise is supported by some authors who consider support for teacher autonomy as a high-impact factor for optimising a state of student engagement (Grolnick *et al.*, 1991; Moreno-Murcia *et al.*, 2012; Vansteenkiste *et al.*, 2005).

Some studies indicate that there is a directly proportional relationship between autonomy support and engagement in learning activities (Bois *et al.*, 2015; Deci & Ryan, 2008; Gutiérrez *et al.*, 2018; Reeve, 2002). In addition, academic engagement, stimulated by autonomy, has been found to generate the enhancement of human capabilities, personal growth and individual satisfaction. (Moreno-Murcia, Hernández, Alonso, *et al.*, 2019).

On the other hand, there are studies focused on teacher psychological control and its negative repercussions on student academic engagement (Ramos *et al.*, 2020; Ramos & Gómez, 2019). The literature consulted refers to it as a manipulative style that undermines students' confidence, enjoyment and engagement (Gallegos *et al.*, 2014; Trigueros-Ramos *et al.*, 2019). In addition, Polyte *et al.* (2015) have found that teacher control produces high rates of cognitive and somatic anxiety in individuals who feel intimidated and frightened by their teachers, making them more susceptible to disinterest and dropping out of school. Conversely, some authors (Espinoza, 2006; Moreno-Murcia *et al.*, 2018) found no significant relationship between teacher psychological control and student academic functioning.

Another factor that continues to be debated in the literature is student gender, as it is claimed that student engagement ordinarily depends on the gender of the individual (Mandermach, 2015; Kinzie *et al.*, 2007; Ni Fhloinn *et al.*, 2016). While Sontam & Gabriel (2012) have found that females have higher levels of academic engagement, Harper *et al.* (2004) have found that males have higher levels.

Therefore, the aim of the present study is to determine the correlations between autonomy support, teacher psychological control and gender with academic engagement of secondary school students. Three research hypotheses are derived from this:

1. A positive correlation is expected between teacher support for autonomy with academic engagement of secondary school students.
2. A negative correlation is expected between teachers' psychological control and secondary school students' academic engagement.
3. Being male is expected to be negatively related to the academic engagement expressed.

Methodology to be developed

Participants

A total of 324 students from six public secondary schools located in different school zones in the state of Durango were selected non-randomly. The study included 164 (51%) male students and 160 (49%) female students. Their ages ranged from 10 to 13 years ($M = 12.88$ years, $SD = 1.52$). Of the total, 117 (36.1%) were in their first year, 126 (38.8%) in their second year and 81 (25.1%) in their third year of secondary school.

Instruments

Academic Engagement

Based on the work done by some authors (Fredricks *et al.*, 2005; Kuh, 2009; Skinner *et al.*, 2008; Veiga *et al.*, 2014; Wang *et al.*, 2011) a scale was developed to measure the academic engagement of secondary school students in Mexico. The scale consists of 17 items following the use of inductive and deductive methods (Hinkin, 1995; DeVellis, 2017; Osterveld, 1996) during the item generation process.

The items are grouped into three dimensions:

- a) Behaviour, which refers to effort and positive participation in academic and extracurricular activities (six items, e.g., "I get up early every day to get to school on time", $\alpha = .86$, $\omega = .87$).
- b) Emotion, which refers to appreciation and enjoyment of learning and academic activities (seven items, e.g., "I know that when I go to school I have a good time", $\alpha = .86$, $\omega = .87$)
- c) Emotion, which refers to appreciation and enjoyment of learning and academic activities (seven items, e.g., "I know that when I go to school I have a good time", $\alpha = .86$, $\omega = .87$), "I know that by going to school my future will be very good", $\alpha = .90$, $\omega = .90$).

- d) Cognition, involves self-regulation in learning and the use of learning strategies for the achievement of higher order skills and knowledge (four items, e.g., "I search the internet (e.g., Google, YouTube) for information that helps me to better understand what I am taught at school.", $\alpha = .71$, $\omega = .69$). The response format used was Likert-type (0 = never to 4 = always).

Autonomy Support

The Perceived Teacher Autonomy Support scale (Jang *et al.*, 2016) was adapted to measure Mexican secondary school students' perceptions of their teachers' support for their school and academic autonomy. This scale consists of thirteen items that indicate the extent to which the teacher motivates the student to regulate his or her academic motivation (e.g., "My teachers let me decide the topics I want to research and expose.", $\alpha = .80$, $\omega = .82$). Items were answered in Likert-type format with options from 0 (strongly disagree) to 4 (strongly agree).

Psychological Control

Based on the work developed by several authors (Jang *et al.*, 2016; Soenens *et al.*, 2012; Trautwein *et al.*, 2006) a scale was developed to measure the psychological control exercised by teachers over secondary school students in Mexico. The scale consists of 17 items following the use of inductive and deductive methods (Hinkin, 1995; DeVellis, 2017; Osterveld, 1996) during the item generation process. The scale consists of seven items indicating the extent to which the teacher uses intrusive techniques such as guilt and shame induction to pressure students to think, feel or behave in certain ways (e.g., "When I make mistakes in class my teachers say things that make me feel ashamed and afraid.", $\alpha = .80$, $\omega = .82$). Items were answered in Likert-type format with options from 0 (strongly disagree) to 4 (strongly agree).

Procedure

Permission to conduct the research was granted by the Ethics Committee of the Instituto Tecnológico de Sonora. Subsequently, an invitation to participate in the study was sent to the authorities of multiple secondary schools located in the different municipalities of the state of Durango.

Following the acceptance of some school communities to participate in the study, parents were sent a letter of consent to authorise their children to participate in the study. Only students whose parents signed the informed consent were explained the project and the nature of their voluntary participation in the study. Confidentiality of participation was assured for parents and guardians as well as for participating students.

Data analysis

Missing data were less than 3% for all items of the scales. These were treated using the multiple imputation method available in SPSS 27. First, means and standard deviations and correlations of the variables were calculated. Subsequently, a multiple regression with binary variables (dummies) was calculated. Finally, the effect size was analysed with G*Power 3.1.9.7 software.

Results

Descriptive analysis and correlations

Table 1 reports the means, standard deviations and correlations of the variables included in the study (academic engagement, teacher support for autonomy, teacher psychological control and being a male student). The results of the means indicated that students placed their response in the "almost always" category, which indicates that students state that their behaviour, emotions and cognitive processes are focused on their academic activities.

Variables	M	DE	1	2	3	4
1. Academic commitment	3.60	.47	-			
2. Teacher support for autonomy	3.60	.77	.56**	-		
3. Psychological control	2.89	.47	-.32**	-.30**	-	
4. Male gender	2.86	0.64	.08	.44	.14	-

**p < 0.01

Table 1 Means, standard deviation and correlations between study variables

Source: Own Elaboration

On the other hand, the responses on the perception of teacher support for autonomy were placed in the category "sometimes", which indicates that students do not frequently perceive their teachers' support for the development of their school and academic autonomy.

In addition, students placed their response in the "sometimes" category when questioned about the psychological control exercised by their teachers.

Finally, the results suggest that the variables included in the model explain a significant part of academic engagement in secondary school students ($R^2 = .34$). The effect size is large ($f^2 = .61$), indicating the practical value of the relationships found.

From the coefficient analysis β it is inferred that teacher support for autonomy is positively related to academic engagement, while psychological control is negatively related to students' academic engagement. This implies that both variables have a significant effect on the degree of engagement of secondary school students (Table 2).

Steps and predictor variables	B	SE B	β	R2	ΔR^2
Step 1	3.47	.15	.51	.38*	.00
Teacher support for autonomy	-.10	.13	-.17	.33*	.000

**p < 0.01

Table 2 Hierarchical regression results for the predictors of academic engagement (N=324)

Source: Own Elaboration

Conclusions

The present study analyses the correlations between teacher support for autonomy, psychological control, being male and academic engagement of secondary school students. The results confirm the hypotheses put forward in the study. Consistent with expectations, autonomy support is found to be positively correlated with students' academic engagement. The results are consistent with those reported in the literature (Grolnick *et al.*, 1991; Moreno-Murcia *et al.*, 2012; Vansteenkiste *et al.*, 2005), so the present study confirms the positive effect of autonomy support on having more academically engaged students, who not only stay in school, but also acquire the knowledge and skills necessary to continue with further studies.

Additionally, the results of the study contribute evidence of the negative effects of teacher psychological control on students' academic engagement. This result is consistent with that reported by Polyte *et al.* (2015) and adds evidence to the few studies that have explored this relationship in the literature.

Finally, the results indicate that being male is not negatively related to academic engagement, this result agrees with that reported by Leeras *et al.*, (2018), indicating that being male is not a predictor of low academic engagement, as suggested by some studies.

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Educational agents and sensitive and receptive interactions for learning in early childhood in vulnerable contexts

Agentes educativos e interacciones sensibles y receptivas para el aprendizaje en la primera infancia en contextos de vulnerabilidad

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Abstract

The objective of this research is to identify Sensitive and Receptive Interactions for Learning in Educational Agents serving Early Childhood children in educational instances in Vulnerable Contexts. It is a quantitative, descriptive and non-experimental cross-sectional study. The Participants were educational agents supporting children who attend a Play Center and a Shelter School. The Responsive Interactions For Learning: Educator Version (RIFL-E) Scale was used, which is used to identify how sensitive and receptive a caregiver is, which is done by observing them when they interact with a child (observational assessment) through a 5 minutes video of a cooperative game. Although there are natural differences between both scenarios due to their accentuation, the Shelter School is formal and at the primary level, while the Playground is non-formal and early education, this research allows us to emphasize the importance of the playful, the meaningful, attentive listening, flexibility, adaptation, inclusion, in the teaching-learning process.

Inclusion, Interactions, Responsive

Resumen

El objetivo de esta investigación es identificar las Interacciones Sensibles y Receptivas para el Aprendizaje en Agentes Educativos atendiendo niños de Primera Infancia en Instancias educativas en Contextos de Vulnerabilidad. Es un estudio de tipo cuantitativo, descriptivo y no experimental de corte transversal. Los Participantes fueron agentes educativos apoyando a niños que asisten a una Ludoteca y una Escuela Refugio. Se utilizó la Escala Responsive Interactions For Learning: Educator Version (RIFL-E) que se usa para identificar qué tan sensible y receptivo es un cuidador, lo cual se hace observándolo cuando interactúa con un niño (evaluación por observación) a través de un video de 5 minutos de un juego cooperativo. Aunque hay diferencias naturales entre ambos escenarios por su acentuación, la Escuela Refugio es de ámbito formal y de nivel primaria, mientras que la Ludoteca es de ámbito No Formal y de educación temprana, esta investigación nos permite enfatizar la importancia de lo lúdico, lo significativo, la escucha atenta, la flexibilidad, la adaptación, la inclusión, en el proceso de enseñanza aprendizaje.

Inclusión, Interacciones, Receptiva

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Introduction

According to a study by CONEVAL (2012), 54.6% of babies from 0 to 1 year old and 56.4% of boys and girls from 2 to 5 years old live in poverty. Of them, 12.5% and 13.4%, respectively, are in extreme poverty. It is observed that the percentages of poverty and extreme poverty are higher for early childhood than for the total population, and also for children in middle childhood or adolescence.

Maropa and Kaga (2015), citing some experts such as Sall, Lata, Legrand, *et al.*, show that inadequate child care, poor nutrition, health problems, and physical and emotional safety can affect the learning potential of children. children in different ways: intellectual delay, decreased cognitive and behavioral abilities, delay in motor development, depression and difficulties in attention and concentration.

Studies in neuroscience also show the importance of early childhood education and care in lifelong learning and well-being; Furthermore, the emotional care and timely stimulation of children's abilities in the development of the architecture of the brain, promotes the great difference between being an empathetic citizen to being responsive, from being a safe person to a violent person. It is at this age that interventions have a greater effect on reducing inequalities.

The results of the PISA 2015 assessment (OECD, 2016) reveal that, in practically all OECD countries, 15-year-old children who had access to Early Childhood Education and Care (ECEC) showed better performance than their peers without ECEC.

According to the report, children who live in disadvantaged contexts are the ones who benefit the most and focusing on them would provide the best results, as it offers them the basis for successful continuous training and promotes the development of socio-emotional skills, which, without it, would hardly be possible they could be guaranteed.

The Loving and Sensitive Care model, developed by the World Health Organization and the United Nations Children's Fund (Organización Panamericana de la Salud, 2021), is based on recent research from The Lancet series (2016) and others scientific publications.

Has recommended a change in child development care practices, considering the importance of bonding relationships, emotional support and the quality of interactions as decisive factors in the lives of young children.

Research shows that children's brains develop more rapidly in the first 2-3 years than at any other time in life. These early years are also a critical period of adaptability and responsiveness to interventions. Lack of adequate nutrition, stimulation and protection in early childhood has harmful effects that can have long-term impacts on families and communities.

Beyond the evidence that exists regarding the importance of initial education and its impact on people's lives, it is important not to lose sight of the fact that initial education is made and built in educational services and care modalities and that the main promoters of change are the members of the groups of educational agents, who face different challenges every day to deliver actions and interventions focused on sensitive and loving care. An Educational Agent exercises a substantive educational function "accompanying the development and learning of girls and boys from zero to three years of age, in the different services" (SEP, 2017, p.182).

Bowlby's (1989) studies on attachment affirm that girls and boys need to have the presence of their reference figures, they need family environments of care and the natural availability of caregivers and educators when due to needs they require that their daughters, sons or wards be cared for by others. To do this, we must encourage girls and boys to develop a secure attachment that allows them to feel safe and thus move towards autonomy.

Many experiences show that girls and boys who have attended children's centers or maternal institutions, and have enjoyed this type of environment; enriched with good books, a variety of music, unstructured toys, a large and clear space to develop movement practices spontaneously, and affectionate and attentive interventions from educational agents; They develop in them a great capacity to think, listen, live together, create and propose; the emergence of own ideas intensifying.

Educational agents play a fundamental role in the accompaniment and execution of quality education, since they have the obligation to make an intentional, organized and systematized contribution to the attention, care, development, education of children from birth, independently of the institution, modality or function inside and outside a school center. The participation of educational agents is decisive in building an environment that favors the development of intellectual, emotional, social, academic and physical capacities through a set of learning experiences in early childhood children, since they are the ones faces a process in which he has to face problems related to students with difficulties, for example, attention, concentration, behavior, learning, etc., and who in turn is pressured to complete study programs that are often far from of the real needs of the community it serves.

Promoting autonomy from an active position is the basis of educational support systems in early childhood from the perspective of boys and girls as subjects of law, which is why the following research question is posed: what are the sensitive and receptive characteristics that educational agents favor for learning when working with the boys and girls they support in educational instances in contexts of vulnerability?

The objective of this research is to identify Sensitive and Receptive Interactions for Learning in Educational Agents serving Early Childhood children in educational instances in Vulnerable Contexts.

Justification

Thanks to the Sustainable Development Goals (SDGs), which were adopted by the United Nations as a universal call to end poverty, protect the planet and ensure that by 2030 all people enjoy peace and prosperity, we can generate awareness and action on the importance of providing quality environments to provide sensitive and responsive interactions with early childhood children (UN, 2015). The fourth objective mentions seeking inclusive and quality education for all, based on the firm conviction that education is one of the most powerful and proven drivers to guarantee sustainable development. To this end, it seeks to ensure that all children complete their free primary and secondary education by 2030.

It also aims to provide equal access to affordable technical training and eliminate gender and income disparities, in addition to achieving universal access to higher education quality.

As a result of the legislation and policies that have emerged in the world on the issue of early childhood, since the international convention on the rights of the child (UN, 1989), the conception of the child has been transformed towards the right approach, where the recognition of children as people with dignity and with an active role in their own integral development process is presented.

Based on this interest, international studies have made contributions related to guaranteeing the development and comprehensive care of children, based on the legal approach, emphasizing the complex situation implied by the high degree of vulnerability of this population group which requires intervention and articulation between the State, initial education programs, the family and the community in general. In this process, the educational agent plays an active role in forming intersectoral work teams in favor of action planning joint ventures that benefit and meet their needs.

The benefits that this Project will bring to society are mainly the articulation of the University with educational and community entities to respond to the challenges represented by this change in the country's educational policy of caring for Early Childhood as subjects of law, in especially children with greater support needs.

As a scientific contribution, there is mainly the validation of the training work model that is done with the students of the Educational Programs of Associate Professional in Child Development and Graduate in Early Childhood Education in Professional Practice Scenarios based on a Model of Inclusion, Appropriate Practices for Development and Flexible Curriculum.

This validation will increase the quality of our training processes for future students of these Educational Programs and even more so with the Interinstitutional Bachelor's Degree in Initial Education and Institutional Management that recently began its activities at the Technological Institute of Sonora.

In addition, it will contribute to the state of knowledge of Early Childhood studies from the operationalization of an innovative concept such as Loving and Sensitive Care (OPS, 2021). The commitment of this Project to the challenges of Early Childhood care in terms of considering them subjects of law, leads it to articulate first-hand with educational and community entities with great support needs to be able to comply with these principles.

This project responds to what was proposed by ITSON in its Institutional Development Plan 2024 (ITSON, 2023) in its Governing Axis 2, which refers to Research and technological development understood as Science, technology and innovation that generates sustainable and sustainable solutions to social, economic and environmental problems in a global scope, specifically in its Strategic Objective 2.3, Develop research, innovation and knowledge dissemination capabilities.

Likewise, it responds to Governing Axis 3, referring to university Extension and social projection, meaning this to university Services that transfer the benefits of science, technology, culture, sports and life skills, for the well-being of the community, specifically in its Strategic Objective 3.2, Strengthen the link with the Institution's sectors and interest groups, and Strategic Objective 3.7, Strengthen the intervention model to improve the social fabric of the vulnerable population.

Finally, this project is part of the lines of research followed by the Academic Group of Educational Alternatives for Social Inclusion, specifically regarding early childhood care in contexts of vulnerability. It is also part of the creation of the Educational Program for a Bachelor's Degree in Initial Education and Management of Institutions, in which the Academic Group itself has had a fundamental participation in both its management, development and implementation. By being associated with said Educational Program, we are part of the efforts of various instances at the national level to be able to comply with the modifications in constitutional articles 3, 31 and 73, highlighting that initial education will be provided and guaranteed by the State, in its three levels of government: Federal, State, and Municipal, and what is a child's right (Diario Oficial de la Federación, 2019).

Methodology

This is a quantitative, descriptive and non-experimental cross-sectional study.

The Participants will be obtained through convenience sampling with children who attend a Play Center and a Shelter School, as well as the educational agents who support them in these institutions.

The Responsive Interactions For Learning Scale: Educator Version (RIFL-E) by Sokolovic, Brunsek, Rodrigues, Borairi, Jenkins, & Perlman (2021) will be used. RIFL-E is used to identify how sensitive and responsive a caregiver is, which is done by observing them interacting with a child (observational assessment), which is done in eight minutes so that it can be used effectively at the child level. the population.

The caregiver and child participate for five minutes in a challenging cooperative game. Play could include sorting shapes or building a Lego structure, depending on each child's developmental level. The trained rater watches the interaction video and rates the caregiver on fifteen items using a five-point Likert scale (scoring takes approximately three minutes per video). The fifteen items assess the extent to which the caregiver identifies and responds to the feelings and thoughts of the child with whom he or she is interacting, including providing the child with meaningful verbal and nonverbal directions, taking into account what the child knows and understands, and promote reciprocity.

The average of the fifteen items is calculated, producing a composite caregiver sensitivity level score that ranges from 1 to 5. RIFL-E has demonstrated good psychometric properties when used for mealtime observations and scores are associated with the domains of emotional and behavioral support ($b = 0.19$, $p = 0.02$) and, to some extent, with committed support for learning ($b = 0.15$, $p = 0.07$). Less than half of the variance in scores was shared among their educators.

A translation will be made by a professional translator to undergo a judging by early childhood experts, to achieve its own adaptation to the culture of the region of Mexico where it will be applied.

In the first instance, the study protocol will be submitted for approval by the Ethics Committee of ITSON. The phases to be developed will be the following:

- Phase 1. Identification of participants: The project will be developed with children who attend a Play Center and a Shelter School, and the educational agents who support them. Children whose legal guardians give their written authorization through a letter of informed consent will participate, which will guarantee the confidentiality of the information and video records.
- Phase 2. Field work: As part of the Community of Childhood Support (COMANI, for its acronym in Spanish) Professional Practice Circuit of the Educational Programs of PADI and LEI of ITSON, They assign teachers (educational agents) to different scenarios, two of which stand out for serving vulnerable children: COMANI Playground and the Corazón de María Shelter School. Video records will be made of interactions between educational agents and children in key activities of their daily routine throughout the period January-May 2023.
- Phase 3. Analysis of results: The data obtained will be analyzed using the Statistical Package for the Social Sciences 26 (IBM® SPSS Statistics), in which descriptive statistics will be obtained for each item as well as the Scale in total.

Results

6 daily activities were selected for each Scenario. For the Refuge School they were: School Entry, Training, Food, Color Play, Painting, and Teaching. While for the Playroom they were: Sensations, Colored Fabric in Movement, Bits, Rhythms, Movement, and Butterfly.

Each activity was coordinated by a Teacher Monitor assigned to each Scenario as part of the Professional Practice Course of the Third Semester of the Educational Programs of PADI and LEI of ITSON.

There were 6 Teachers for each of the aforementioned Scenarios, with an average age of 19 years.

The Refuge School provides Primary Level Education to children from 6 to 12 years old at risk of being homeless while the COMANI Playground does so with children from 1 to 8 years of age: from 1 to 3 years in Non-Formal Education, while from 3 to 8 years in Homework Club as a complement to Formal Preschool and Lower Primary Education.

Both Scenarios are located in urban neighborhoods with high rates of marginalization and crime.

RIFL-E divides its 15 items into 4 Categories: Clarity in Communication, Affective Interaction, Prediction, and Equity.

Clarity in Communication involves an educational agent communicating with a child using language that is understandable (i.e., use of clear, developmentally appropriate language) and that enhances the child's own vocabulary.

Affective Interaction refers to positive back-and-forth interactions (Aksan *et al.*, 2006) and is observed when an educational agent invites children to participate in an activity, promotes turn-taking, asks questions, and is friendly, warm, adaptable, responsive and flexible (Pauker *et al.*, 2018).

Prediction is defined as understanding children's thoughts, feelings and abilities. Which allows the educational agent to take perspective and, therefore, understand the emotional and cognitive states of the children.

Finally, Equity refers to the distribution of care and timely response to all children.

Table 1 shows the means for each of the Categories as well as the entire Scale.

Categories	Scenery	
	Shelter	Playroom
Clarity in Communication	7.00	15.00
Affective Interaction	9.67	20.00
Prediction	9.67	20.00
Equity	35.50	74.00
Responsive Interaction	35.50	74.00

Table 1 Category Means and Total

Conclusions

Statistically, it is not possible to establish significant differences between both scenarios given the difference in age range, as well as the educational focus (in one formal environment, the Shelter School, and in another non-formal environment, the Playground), but it is possible to deduce important lessons regarding the method of attention and teaching.

The Educational Agents, although they have the same curricular training and are similar in age, are determined in their actions by the situational context. At the Shelter School there is a hierarchical structure and rigid processes in which its function is more passive and reactive support to the regular teachers, which is why its averages are lower in all categories compared to those of the Play Center.

For its part, the Playground, although it has a Planning with clearly delimited stages, these are not so rigid that they do not allow innovation and initiative from the Educational Agents. Even though they have pre-established times, the dynamics that are followed, of patience, empathy and attentive listening, make the children enjoy the activities without frequently showing disruptive behaviors.

This type of disposition of the teachers makes it impossible to avoid considering them as dependent given their risk context and their initial reluctance as boys and girls to maintain receptive communication, as found by Schneider *et al.* (2023) in the preschool teachers they evaluated.

Playfulness predominates in the educational approach managed in the Playroom, as well as dynamics and the promotion of initiative on the part of boys and girls.

Significant experiences in early childhood are encouraged through adult figures who, in turn, can lead to support for the family support scheme. Similar to the mediation effect on the socioeconomic level of mothers of attending daycare at an early age found by Aranbarri *et al.* (2023).

For future research that resumes the experience gained in this project, it is advisable to increase the sample and establish comparisons in similar age ranges, as well as select an activity that is as common as possible that encourages greater exchanges of various types between educational agents and children.

Continuing in this line of research would contribute to what some authors (Pianta & Hofkens, 2023; Seo & Song, 2023) mention about the positive influence of interactions between teacher and students on the development and learning of the latter.

A final recommendation lies in monitoring the children with whom there are the most positive interactions to evaluate their evolution and the way in which it affects their development in all areas.

Gratitude

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Perception, awareness, and appreciation of the territory through TikTok: A lesson for Basic Education

Percepción, conocimiento y valoración del territorio a través de TikTok: Una herramienta para la Educación Básica

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Abstract

In this research, a questionnaire was administered to 129 individuals in three secondary schools in the Altos Sur region of the State of Jalisco, aiming to diagnose the students' environmental perception, as there is no evidence of similar studies in the region. The results highlight that adolescents are sensitive to environmental issues and exhibit a predisposition towards altruism, gender equality, socio-environmental equality, as well as their relationship with other living beings. They also provide an overview of their career and academic aspirations upon completion of their current studies. Some of the surveyed students used the diagnostic results to create videos shared through the social media platform TikTok, in order to provide information about the environmental situation in the region and promote the formation of values.

Environmental Education, Perception, TikTok

Resumen

En esta investigación se aplicó un cuestionario a 129 personas en tres escuelas secundarias de la región Altos Sur del Estado de Jalisco, con la finalidad de realizar un diagnóstico de la percepción ambiental de los estudiantes, debido a que no hay evidencia de estudios similares en la región. En los resultados se destaca que los adolescentes son sensibles ante las problemáticas ambientales, y presentan una actitud proclive hacia el altruismo, la igualdad de género y de condiciones socioambientales, así como de relación con otros seres vivos, y brindan una semblanza de las aspiraciones laborales y académicas al término de sus estudios actuales. Algunos de los estudiantes encuestados se basaron en los resultados del diagnóstico para la creación de videos que compartieron a través de la red social TikTok, para brindar la información sobre la situación ambiental de la región e impulsar la formación de valores.

Educación Ambiental, Percepción, TikTok

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Introduction**Environmental Diagnosis of the Municipality of Arandas, Jalisco**

One of the economic activities in the State of Jalisco, and particularly in the municipality of Arandas, is the production of tequila from the *Agave tequilana* var. *Weber* species, which has increasingly positioned itself in international markets after the denomination of origin of this crop was established. To get an idea of the importance of this industry, in 1995 a total of 104.3 million litres of tequila were produced and in 2019 production rose to 351.7 million litres (Consejo Regulador del Tequila, 2020), which represents an increase of 337 % in a span of 24 years. This growing agricultural activity has displaced the region's traditional grassland ecosystems, which still make up 25.1% of the territory, and it is anticipated that this trend will continue due to the high demand for agave.

The grassland ecosystem, despite having few tree and shrub species, is of great ecological importance as it contributes to climate regulation, aquifer recharge and cleansing, pollination, invasive species control and carbon sequestration. It is also attributed cultural, recreational and even spiritual value (CONABIO, 2019). Agave monoculture requires an average of 7 years to be harvested, therefore, it does not allow the proliferation of other organisms as it is maintained with herbicides and weed removal, so the natural balance has been fractured and could be defined as a predatory relationship.

The change in land use, which now covers 61.7% of the municipal territory used for agriculture, has caused the disappearance of some animal species (coyotes, sparrow hawks, wildcats, among others) and plant species characteristic of the grassland ecosystem; in conjunction with this activity, there is also an upward trend in livestock production, which extends the impact inherent to this practice, given the need for more land for its production (CONABIO, 2019).

There is a study conducted by INEGI dating from 2014 called: "Information on the generation, composition and management of solid waste originating from domestic and commercial activities in the localities".

Within this, the municipality of Arandas is among the 17 municipalities that produce the largest amount of solid waste in the State of Jalisco, totalling more than 70 tonnes per day, of which only 6% is recycled; this is an indicator of the absence of sustainable strategies and responsible consumption by the population and producers who could make changes in their lifestyles and systems of manufacturing goods.

According to the municipal environmental index, Arandas is in the "very low" category, ranking 122nd at the state level (IEEG, 2019). This index takes into account important aspects such as solid waste generation, deforestation, exploitation of aquifers, forest cover, existence and care of protected natural areas, among others.

The large number of tequila factories in the municipality produces a significant amount of waste, most of which is vinasse, which together with industrial waste contaminates 10 litres of water for every litre of tequila produced; most of this waste is discharged into the Lerma Santiago river, causing a high degree of disruption to the aquatic ecosystem, causing problems for the environment and the health of the municipality's population (El Informador, 2009).

Diagnosis of the society, culture and economy of the municipality of Arandas**Demographics**

The municipality of Arandas belongs to the Altos Sur Region, its population in 2020 was 80,609 people, of which 51.01 per cent were women and 48.99 per cent men (INEGI, 2020); of the total municipal population, the majority is concentrated in the city centre, with 74 per cent of inhabitants (IEEG, 2023).

Migration

Like many municipalities in the State of Jalisco, which is considered or characterised by a migratory tradition, there is a degree of migratory intensity to the United States with a value of Low, determined by the percentage of homes that receive remittances, the number of homes with emigrants in the United States of America as well as circular emigrants (IEEG, 2023).

Poverty

During 2020, the population in moderate poverty was 31 per cent. The highest deprivation with 65.3 per cent was access to social security (IIEG, 2023).

Economy

Arandas is characterised as a municipality with agricultural activity and during the last few years it has positioned itself as the 12th municipality at the state level within INEGI's National Statistical Directory of Economic Units (IIEG, 2023). The composition of enterprises in the municipality is 46.9 per cent dedicated to commerce, 41.22 per cent to services, 9.86 per cent to manufacturing industry. On the other hand, the value of agricultural production in 2021 was 3.41 per cent of the state total, and livestock production has remained constant and growing, for the same year it represented 4.75 per cent of the total state production.

Culture

At the cultural level the municipality and the region are characterised by their values and high sense of identity which, according to Serrano-López (2017) these characteristics were consolidated over the years in part due to the relative isolation of the community and its strong Spanish heritage.

This isolation underwent a radical change when influenced by the current economic development model and globalisation, which led to an opening up of the Arandense culture and even the social dynamics to change, for example, not only is it characterised by the decreasing migration of its members to other parts of the country or abroad, but it is now common to receive migrants from other states, most of whom work as day labourers.

Job prospects in the region for young people

Durand (2014) conducted a relevant study on the decline of Mexico-US migration, specifically in the Arandan scenario, where he highlights that the generation from 1990 onwards stopped moving due to the costly and problematic nature of undocumented migration, resulting in greater labour competition in the region and a rise in agricultural activities such as day labourer or mediero work, for which they must compete with immigrants from other states, which made such work even cheaper.

In the same research, Durand highlights that recent generations of young people with higher academic degrees aspire to integrate into the tequila industry, whether in factories or in farms and specialised agricultural production, which allows them access to benefits and credits, such as the means to acquire their own housing. It is important to mention the role of women in the economy, who went from being housewives to being active in industry or in the agricultural sector.

In the bibliographic search, no previous diagnosis was found regarding the population's perception of environmental problems in the municipality, nor on the valuation of the territory or knowledge of it, nor on the existing opportunities and limitations from a cultural-ecosystemic point of view.

Although it is a recent practice in our biogeographical environment, it is important to try to understand and structure the biological history of the region, in order to have an overview of what has been the connection and relationship between the environment and society and how nature determines some of the characteristics. Quoting Olvera (2019): "Environmental history contributes to the urgent change that society-nature relations require in order to mitigate the civilisational crisis we are experiencing".

Environmental perception is defined as part of the psychological process that is developed and established between the individual and the natural environment, for which a research tool must be designed to consider this relationship in the context to be carried out (Garcia, 2006).

Through a study of this nature it will be possible to establish the differences in the environmental perception of secondary school students and teachers, to evaluate the level of commitment, values and appreciation of local environmental issues, and to evaluate the level of commitment, values and appreciation of local environmental issues.

Nowadays, given the scope and nature of social networks, as well as the predilection of recent generations for multimedia content, audiovisual material is an excellent interpretative medium. According to the research carried out by Gruber (2001), it was concluded that the use of audiovisuals is a very good solution in contexts where communication processes are complicated, especially when dealing with large groups. In order to reap the benefits of this communication, it is necessary to reformulate a new pedagogy that is capable of integrating the different socio-environmental dimensions and interactions.

According to M. Stoicescu et al. (2018), the availability of various educational materials has boosted social services, attracting the academic environment to provide correct, applicable and constantly updated knowledge. The development of core capacities, which include: planning, self-control, flexibility and generating awareness, are developed from the age of three, and continue to develop from the age of 15 to 23 (Holmstrand, 2016), so it is of paramount importance to have a far-reaching impact on the way this group interprets reality.

For this project, the research questions were posed:

1. What is the current view of young people on the environment and environmental problems present in the locality?
2. What characteristics should the production process of a participatory audiovisual material with adolescents have in order to facilitate an educational-environmental process that contributes to the reformulation of the ecological-cultural perception of their locality?

For its part, the general objective established the elaboration of an educational audiovisual material that contemplates the formation and reformulation of the ecological-cultural perception of students of basic education, secondary level in the municipality of Arandas, Jalisco in the period before and during the confinement due to the COVID-19 pandemic, based on the valuation of the territory from a cultural-ecosystemic point of view, as well as the valuation and perspective of the biological-cultural history of the region.

Development

Method and methodological approach

Although the aim is to create an audiovisual material in a participatory manner with and for secondary school students in the municipality of Arandas, a research tool with a qualitative and quantitative approach was developed in order to collect the necessary inputs for the creation of such material, therefore several categories were made, which were divided into:

- Knowledge about the local environment and its relationship with the current society, as well as such interaction throughout the biological history in the region.
- Pro-environmental scale. It includes items based on the definitions of Corral-Verdugo et al. (2004), seeking to measure the willingness and application of actions that protect the environment and its impact individually and as a group, which serves as a parameter to establish how important the environment is nowadays for secondary school students, what actions are already taken to care for the environment, as well as the willingness to change habits in order to minimise impacts.
- Models to which young people aspire in the municipality and the environmental implications in the short and long term, taking into account the history of the main economic activities in the region, as well as their impact on the environment.

The second stage or conformation of the audiovisual material, had a qualitative approach, since according to Hernández-Sampieri (2014), in the particular case of the students, in conjunction with their environment and the influence of the current system of basic education in secondary school, feeds or favours a vision of the world, as well as to interpret the events that occur in this, we tried to understand it according to that context, it was taken into account that given the conditions with the isolation due to the pandemic of COVID-19, much of the educational weight had migrated to the family environment, creating a different context of study.

Research instrument

A mixed questionnaire of closed and open-ended questions, which were assessed using a Likert-type scale including items based on the scale of Corral-Verdugo et al. (2004), was administered to a total of 129 individuals. Of the total sample, 80 were female and 49 were male, grouped according to their school grade: 8 first graders, 43 second graders, 71 third graders, three teachers and two secondary school graduates.

Some items with open-ended questions were also included, adapting several of the ideas present in the Training European Teachers for Sustainable Development and Intercultural Sensitivity (TETSDAIS) project. This programme used open-ended questions to try to elicit information without influencing students, as Zohrabi (2013) points out, "using open-ended questions can lead to a higher level of discovery".

The values obtained from the application of the research instrument formed the basis for the organisation of the videos that were produced and shared through the social network TikTok.

For the elaboration of the audiovisual material, the diagnosis was shared with teachers, school authorities and secondary school students, in order to evaluate and specify the structure and contents of the documentary video, enriching the information with current data in the municipality in the environmental and sustainable field.

Characteristics of the research instrument

The diagnostic tool was divided into the following parameters:

1. Personal information and level of education.
2. Knowledge about the local environment and its relation to the current society.

The results obtained were used as a guideline for decision-making regarding the contents to be included in the narrative of the audiovisual material.

– Altruism.

This parameter gathered information from the interviewees' self-analysis of their behaviour and willingness to help others.

– Pro-ecological behaviour.

Considered as actions and activities that contribute to the conservation, care and improvement of the environment.

– Austerity.

Involves behaviours and lifestyles that are characterised by reduced or measured consumption, avoiding unnecessary expenses.

– Equality.

These domains are part of the pro-environmental scale, which measured the willingness and application of actions that protect the environment and its impact individually and as a group.

– Models to which young people aspire in the municipality and the short and long term environmental implications.

– Participation in the development of audiovisual material.

This area measured and established participatory working groups of students and teachers with direct and indirect input to the audiovisual material that was shared on the social network TikTok.

The survey was applied through Google forms.

Methodology for the application of the research tool

The research tool was applied to a total of 129 individuals from 3 schools. Of the total sample, 80 were female and 49 were male. Three teachers and two secondary school leavers also participated in the exercise.

Results

Knowledge about the local environment and its relationship with today's society.

In response to the question: What are the most important natural resources of the Altos de Jalisco? 29% of the respondents identified these riches as agave, maize and bean crops (Table 1).

Domestic fauna (Cows, Chickens, sheep...)	Crops (Agave, corn, beans)	Precious stones	Local fauna (coyote, vulture, deer, wildcat...)	Local flora (Huizache, ash, cactus...)	Ecosystem (Grassland/shrubland)	Forest	Riquezas de otra región.
17%	29%	9%	14%	6%	1%	3%	15%

Table 1

To the question: What are the problems that threaten or degrade these natural resources? 42% of respondents identified pollution as the predominant factor (Table 2).

Climate change	Deforestation / Logging.	Pollution	Hunting	Fires	crops	Chemicals	Humanos
9%	16%	42%	9%	5%	5%	5%	9%

Table 2

To the question: How much are these problems related to what people (population) do or don't do? 62% of the respondents answered that they are very much related to human activities (Table 3).

Very much / Closely related	Related	Not much / Not closely related	It is not	Nothing related
62%	29%	5%	2%	1%

Table 3

To the question: If altruism is a selfless behaviour to help others, what altruistic behaviours do you think you have practised lately? 35% of respondents answered that they have given away money, clothes or groceries (Table 4).

Helping family	Helping the elderly	Helping strangers	Giving clothes, money, food	Care animals, water, plants	No / none
9%	7%	26%	35%	6%	8%

Table 4

For their part, 45% of the respondents answered that they have helped without expecting anything in return to improve the environment in their locality (Table 5).

Yes	Yes, not littering	Yes, collecting rubbish	Yes, preventing others from littering	Yes, reducing the use of plastics	Yes, reducing water consumption	Community projects	No
45%	18%	16%	3	4%	2%	8%	8%

Table 5

On pro-ecological behaviour, more than 50% of the people surveyed:

- Look for ways to reuse things, before throwing them away and replacing them with new ones.
- Try to save energy at home (by switching off lights, using energy-saving bulbs or buying energy-saving appliances).
- Try to consume mainly seasonal and locally produced food (to avoid excessive consumption due to transport) (Table 6).

Field	Strongly disagree	Disagree	Neither agree nor disagree	Agreed	Totally agree
Behaviour					
You look for ways to reuse things, before throwing them away and replacing them with new ones.	8	8	18	35	60
You try to save energy at home (by switching off lights, using energy-saving bulbs or buying energy-saving appliances).	7	5	20	32	65
You try to consume mainly seasonal and locally produced food (to avoid excessive consumption due to transport).	6	5	24	31	63

Table 6

In terms of equality, more than 75% of the respondents were of the opinion that:

1. Men and women have equal rights to development, the same as humans and non-humans (plants and animals).
2. Poor and rich have the same rights to access to water and to live in a dignified and joyful environment.
3. A person has the same value regardless of their origin or physical appearance / just as you think your locality is just as important as a jungle. (Table 7).

Field	Strongly disagree	Disagree	Neither agree nor disagree	Agreed.	I fully agree
Equality					
For you, men and women have the same rights to development, as do humans and non-humans (plants and animals).	3	1	10	16	99
You believe that rich and poor have the same rights to access water and to live in a dignified and joyful environment.	1	6	4	7	111
For you, a person has the same value regardless of his or her origin or physical appearance / just as you think that your locality is as important as a jungle.	4	3	4	13	105

Table 7

Regarding the role models students aspire to, more than 50% of the respondents were of the opinion that:

- They plan to study and prepare themselves to get a good job in a local company or job.
- There are alternatives to industry and agriculture that help us protect the environment.
- They could be part of the change needed to take care of the environment in the municipality. (Table 8).

Field	Strongly disagree	Disagree	Neither agree nor disagree	Agreed.	I fully agree
Aspirational role models					
You plan to study and prepare yourself to get a good job in a local company or job.	4	2	12	12	99
You believe that there are opportunities for everyone in the municipality, if they have the necessary skills.	8	8	24	27	62
You believe that there are alternatives to industry and agriculture that will help us protect the environment.	4	2	10	36	77
You could be part of the necessary change to take care of the environment in the municipality.	6	2	13	34	74

Table 8

50% of the people surveyed expressed interest in participating in the production of a video documentary on the history and current environmental issues in the municipality. In response to this population, two online courses were given in 2021 and advice was provided so that students would have the knowledge and develop the skills to write scripts for audiovisual media, as well as the handling of the camera and the theory of the composition of the images in the video.

Audiovisual production

The students made a total of nine videos that were uploaded to the social network TikTok. It was decided to create a user profile on the TikTok social network that would have its own identity, similar to the channels on Google's YouTube social network, that would not be related to a particular user and whose content would be dedicated to education and scientific dissemination, with an emphasis on the care and knowledge of the environment. It was then that the logo was designed and the name "Tlaloc code" (<https://bit.ly/47jwkn8>) was created for this user profile, alluding to the Aztec deity dedicated to the phenomenon of rain, which is at the centre of ecosystems and whose dynamics are interdependent.

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This project did not receive any funding.

Conclusions

The people surveyed expressed the causes of current environmental deterioration, such as pollution, industry, livestock farming and other anthropogenic activities. On the other hand, there was a lack of knowledge about the natural environment, its history and its values, which has a bearing on the current crisis in the region. In terms of audiovisual production, the response from the students was modest, but some students and a former student were able to make their own style in the videos they made. A total of nine titles have been visited by various users on the platform www.tiktok.com.

The present project served scientifically as an initial environmental diagnosis that included several dimensions and laid the foundations for further regional studies; at the social level, an impact was generated by personalising the audiovisual production process in which the students collaborated.

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The obscured structure of the number in Preschool Education (pre-symbolic stage). Second Part

La estructura oscurecida del número en la Educación Preescolar (etapa pre-simbólica). Segunda parte

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Abstract

The article highlights certain aspects of the obscured structure of the number, which occur irregularly in the teaching of numeracy in Preschool Education. Its absence, as an effect, leads to the child's misunderstanding of the concept of number. In the pre-symbolic stage, the number is taught through the word. Structural particularities are found in the semantics and phonetics of the number word and are substantial in the processes of speech and listening. The objectives are to make known the obscured structure of the number and its elements and to analyze the nature of the name of the number. It is justified that the basis of the word "ONE" are the first sound manifestations of the infant. It states that there is the same and equal relationship between the acquisition of knowledge of language and speech with the acquisition of knowledge of number through the development of tonal auditory balance. Methodology: the theoretical analysis of the structural parts (semantics and phonosemantics) of the number and the identification of reciprocal correlation between the constructions of the knowledge of spoken numeral word in Preschool Education through the implemented technology. Contribution: the development of the method for learning the concept of number.

Number, Word, Method

Resumen

El artículo destaca ciertos aspectos de la estructura oscurecida del número, que se presentan irregularmente en la enseñanza de aritmética en Educación Preescolar. Su ausencia, como efecto, conduce a la incomprensión del concepto de número por parte del niño. En la etapa pre-simbólica el número se enseña a través de la palabra. Las particularidades estructurales se encuentran en la semántica y fonética de la palabra del número y son sustanciales en los procesos del habla y la escucha. Los objetivos son: dar a conocer la estructura oscurecida del número y sus elementos y analizar la naturaleza del nombre del número. Se justifica, que la base de la palabra "UNO" son las primeras manifestaciones sonoras del infante. Hace constar, que existe la relación idéntica e igual entre la adquisición de los conocimientos del lenguaje y del habla con la adquisición de los conocimientos del número mediante del desarrollo del equilibrio auditivo tonal. Metodología: el análisis teórico de las partes estructurales del número y de la identificación de correlación recíproca entre la construcción del conocimiento de nombre de número y su expresión verbal en la Educación Preescolar. Contribución: el desarrollo del método para aprender el concepto del número en la etapa pre-simbólica.

Número, Palabra, Método

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Introduction

In the first part of the article, the obscured structure of the number, which is the word, and its elements, which are: syllabic organization and tones, the representative sounds of vowel letters and consonants, were revealed. The structural element investigated and the analyzed nature of the name of the number was the word "ONE", which on the number line is manifested after the "ZERO", but before the "TWO".

The syllabic organization of the word "ONE" is presented with a partition in the syllables (Figure 1) and with the graphic construction through a "connector" (Figure 2).

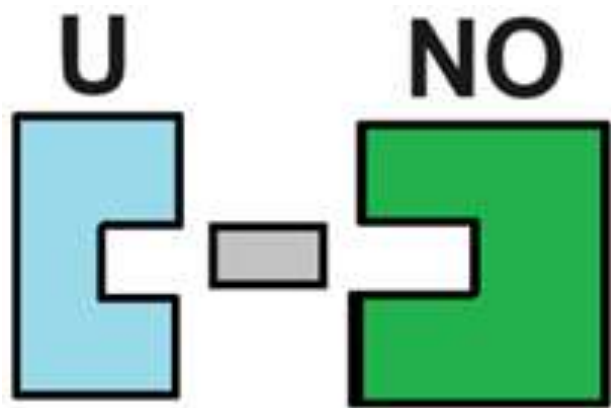


Figure 1 Division into "U" and "NO"
Own Elaboration

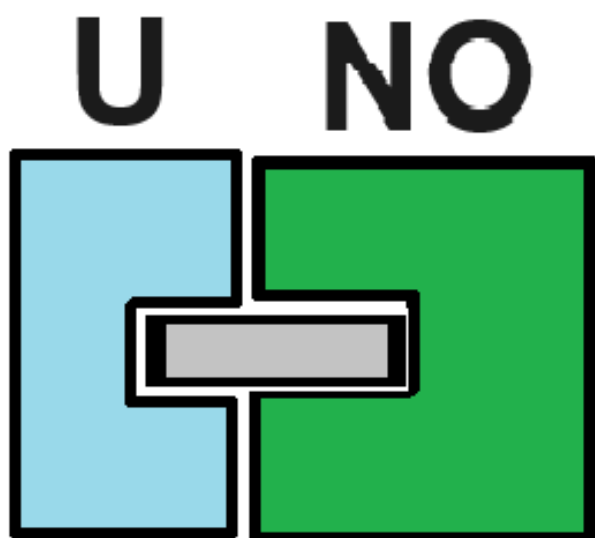


Figure 2 Word "ONE" under construction
Own Elaboration

It is safe to state that the data of the results of the research were equated with the results of the research of the acquisition of reading knowledge, where the object of speech formation was also the word.

That is to say, something common in the didactics of the teaching of number and language is noticed, namely, it is the construction of the visual and auditory images of the word.

The auditory knowledge of the word is vowel, it has all the particularities of sound and is acquired in childhood from its origin as psychic and mental abilities and later appears as cognitive functions. The common basis for language and mathematical thinking is a set of common elements, which are: the word perceived, thought and pronounced, the syllabic division of the word and the correspondence of the tones transmitted and perceived by the teacher and the student in both directions.

We agreed that, in order to be a part of the child's mental system as a concept of number, the word "ONE" in its structure, should pass through the entire sequential procedure of its auditory formation and relevance in the already established image. That is to say, the word transmitted by the teacher in the form of speech and heard by the child must be the same as the one thought by him. The correlation of assimilated information about the name of the number can be understood as the encoding of a certain fragment (reason) and section (feeling) of the mental image of the word "ONE" by linguistic means.

We reconcile that language is a system of signs through which individuals communicate with each other. These signs are: sound, corporal and graphic. The word is presented as a sound object through the pitch of the syllable, constructed into an auditory image, and an idea of the number is formed without symbolic representation. According to researchers of language acquisition by children, the stages of speech and listening development in the first and second years of a man's life are presented in the form of shouting, humming, babbling and singing, manifesting sound reactions (vocalizations) and forming the first words. Vocalizations as a whole are tonal or atonal representatives with or without certain melodic constructions (Ushakova, 2011). That is why there is no doubt that the formation of auditory knowledge of the word "ONE" is in the early stage of speech acquisition.

Development

Everything would be fine if it weren't for a dark spot. In other words, it is said that the tense moments of the obscured structure of number and Frege's logical determinism are eliminated, that there is no decision-making, but it is worthwhile or not, to recognize the principles of sensory and cognitive development as Tonal Ear Balance for the acquisition and formation of the name image of the number that is the word "ONE".

The word "ONE" in its structure, on the one hand, should pass through the entire sequential procedure of its auditory formation and relevance in the already established image and, on the other hand, the word transmitted by the teacher in the form of speech and heard by the child must be the same as the one thought by him. It is clear that the word spoken by the teacher and perceived by the student should be thought and expressed by the equal. But only the thousands of dozens of data from the results of the research testify to the situation of the states of the auditory systems of the people, which can be transcribed as a situation of when "Everyone hears, but not everyone listens", in other words, the child does not listen to what the educator is saying, because he has difficulty in discriminating the sounds of the teacher's speech.

The perception and oral expression of the word is transformed in the child's mind into something that is different from what is spoken by the teacher. That situation is leading to speech incomprehension. The mind is forked. In mathematics education that means "A baculo ad angulum" ("The Absurd Conclusion"). And with that, the nature of speech and language remains largely mysterious. Some steps were taken by Piaget and Vygotsky.

Piaget y Vygotsky

Faced with this situation, it is necessary to pay homage to some of the thoughts of the two outstanding scientists mentioned in Part 1, Piaget and Vygotsky. It should be recalled that Piaget wrote about the teaching of the concept of "Number" through the word in the pre-symbolic stage, and Vygotsky emphasized the role of the adult in the transfer of knowledge.

According to Piaget (Piaget, 1953), "when adults try to impose mathematical concepts on a child prematurely, the child learns them only verbally; Although the child knows the names of numbers, he has not yet grasped the essential idea of number, namely, that the number of objects in the group remains the same."

In outlining the three stages of a child's intellectual development, Piaget pointed out that it is only at the age of 6 or 7 and with the correlation of "1" to "1" that children spontaneously develop the concept of number and learn it only verbally.

According to Vygotsky (Vygotsky, 2008), the mental development of the child and the special role of the adult was developed in the concept of the "zone of proximal development". It is mentioned that the child can do for himself with what he is capable of. And with what he is not able to do, for example, learning the number, he has to cooperate with the adult and do with his help. That is, as in our case, the adult teaches the child the word that means the name of the number. The child learns it only verbally (Figure 3).

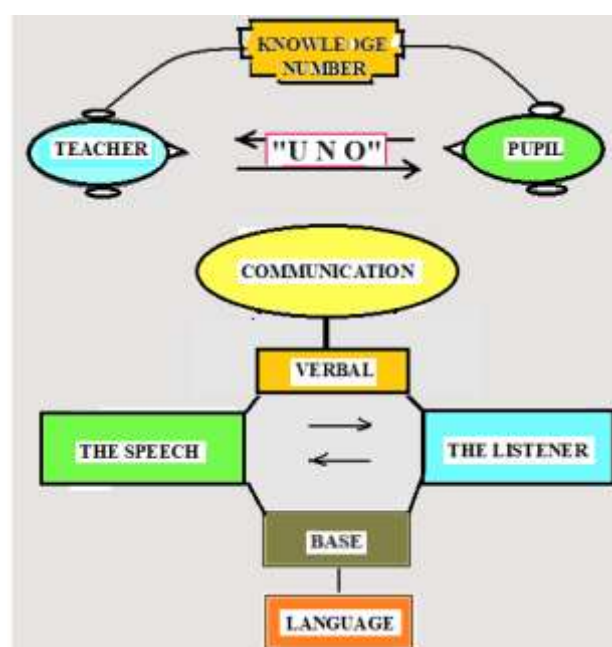


Figure 3 Word "ONE" in transmission
Own Elaboration

As can be seen from the diagram, the processes of current teaching and learning in their broad outline are similar to the processes mentioned by Piaget and Vygotsky. The sage was right.

"Knowledge" of the word "ONE" in the processes of speech and listening is transformed into the shadowy. The cognitive process evolves and becomes the dark spot: "everyone hears, but does not understand". Learning gets worse. The word "ONE" pronounced by the teacher in the manner of existence that, yes, it is, but in the perception and thought by the student the word is presented, but as the different and completely different tone. That is to say, in a rough way, the word "ONE" accompanied by some sounds does not exist. It guides us to think about the beyond of the real, in other words, we have to "enter" the metaphysics of sound, where we can notice that an essence of the non-existent is presented.

Essence of the non-existent (Fokin, S. K, 2009)

First of all, we must continue with the following. This article was inspired by the most interesting reasoning of the Sextus Empiricus "Critique of the Platonic Concept of One" (Empírico, Crítica del concepto Uno (11 - 20), 1997).

According to Sextus Empiricus (Empírico, *Ezbosos pirronicos*, 2014), "... no one is likely to hesitate as to whether the subject is such or otherwise, but he doubts whether it is really what it appears to be." The need to consider the metaphysics of sound and its perception by man in space is caused by a number of reasons:

- The limited possibilities of explaining some sound phenomena by the methods of exact sciences in psychoacoustics;
- Insufficiency of modern methods in traditional medicine, in neuro-otorhinolaryngology;
- The inevitability of establishing metaphysics as an element in scientific research programs and recognizing its importance in the creation of new hypotheses, experiments, and discoveries.

Let's explain:

- By proving that Essence may not exist, we are obliged to admit the existence of truth, that which exists as Essence is true;
- The philosophical tandem - Parmenides, Kant and Hegel - is united in the main thing, it is the comprehension of being, substance, and essence. The basis for this is reason, understanding, and feeling.

Let's confirm the following:

The universe is a collection of material and ideal entities that have their own being and their own being. At the same time, the being (existence) of ideal essences depends on the being (existence) of material entities, and the essence of ideal essences can exist or not exist (the only agreement is that the essence of material entities always exists). As you know, sound is elastic waves that propagate in the medium and create mechanical vibrations in it, as well as the subjective perception of these vibrations by special human organs. In perception, sound is detected by the subject as a sounding phenomenon.

The modal structure of the metaphysics of Essence, which has been formed through the efforts of many thinkers of both the past and the present, could and should be supplemented by another mode as *the essence of the non-existent*. The addition is connected with the urgent need, on the one hand, for a philosophical comprehension of the problem of perception and thinking of sound, and on the other hand, for a metaphysical study of the transcendental conditions of existing and non-existent in the sound phenomenon that arises in the consciousness of man and forms subjective reality. Subjective reality is the totality of ideal images of human consciousness.

As is known, the presence of sound (sound matter) can be recorded by instrumental means of control or by the human auditory system, while the auditory system has a limit (frequency) in the perception of a sound signal (music, speech and noise).

The long history of the study of auditory phenomena by psychoacoustics (the science of quantitative dependencies between external stimuli and the sensations they evoke) has not led to the explanation and solution of a large number of problems, one of which is that a person, perceiving a sound signal in the form of a musical tone (essence) with a fixed pitch (existing), cannot determine it. To distinguish from other signals, in other words, to discriminate against the sound signal with its own given pitch. As a consequence, a musical tone (essence) appears (exists) in a person's consciousness with a different, non-given pitch (non-existent). In this regard, how is it possible to understand the metaphysical nature of sound?

Firstly, according to Parmenides (Parmenidas, 1914-1919): Being is, there is no non-being. Everything that is conceivable is Being, that is, the thinking of sound, no matter what pitch, is also Being, its existence.

Secondly, according to Kant (Kant, 2001-2006): the inner sense presents an object to consciousness only as it is, and not as it exists in itself, i.e., the representation of a tone in consciousness of another height is a phenomenon (existing as a height), but the pitch of another tone (non-existent) in a phenomenon is not the pitch of the tone, which serves as the primary source for the phenomenon. Thus, the essence of non-existence is nothing.

Thirdly, according to Hegel (Hegel, 1929): Being as the substance of the existence of essence (existing) and Nothingness as the substance of the existence of essence (non-existent) are one and the same, and the simple unity of Being and Nothing is Present Being, i.e., the essence of the existent and the essence of the non-existent are the transcendental conditions of the presence of the existent and the non-existent in the sound phenomenon. Thus, metaphysical studies of sound provide a basis for confirming the earlier observation that everyone can hear the music, but only some can listen. The writing reminds us of argumentative flying thinking: "Everyone hears, but some listens."

Results

Something is shown in some examples, which is made conspicuous by the obscured structure of the number: that is the word "ONE". At the same time, arguments are provided not only to the lack of development of the auditory system and the strengthening of tonal balance in the human being, but also to demonstrate the need to teach arithmetic from the acquisition of language knowledge, remembering that the word transmitted by the teacher in the form of speech and heard by the child must be the same as that thought by him. It is clear that the word spoken by the teacher and perceived by the student should be thought and expressed by the peer and vice versa.

Understanding of Being of Sound (Figure 4) and Being of a Sound Phenomenon (Figure 5)

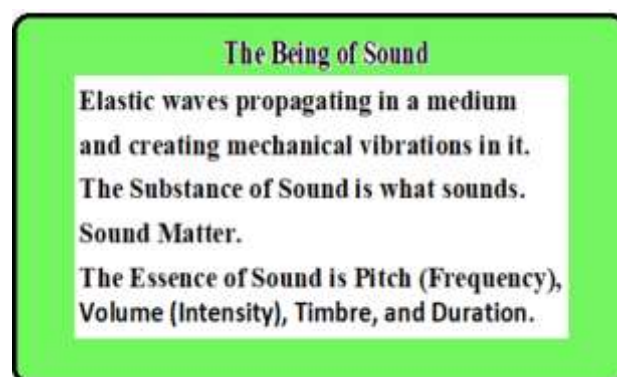


Figure 4 The Being of Sound
Own Elaboration

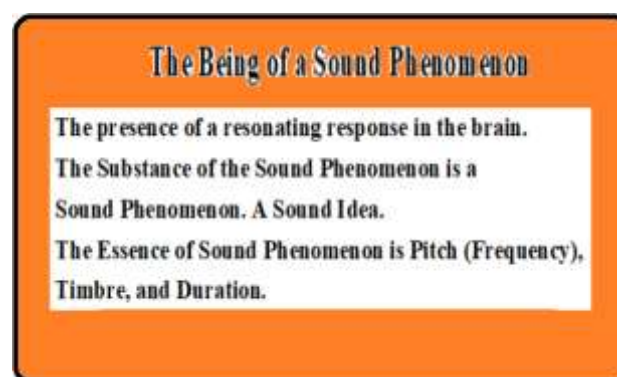


Figure 5 The Being of a Sound Phenomenon
Own Elaboration

Visual demonstration (Figure 6)

- Its pitch is used as the "Essence" of sound.
- The Essence of Sound – St (2) Pitch.

- The response to a stimulus is a mental act.

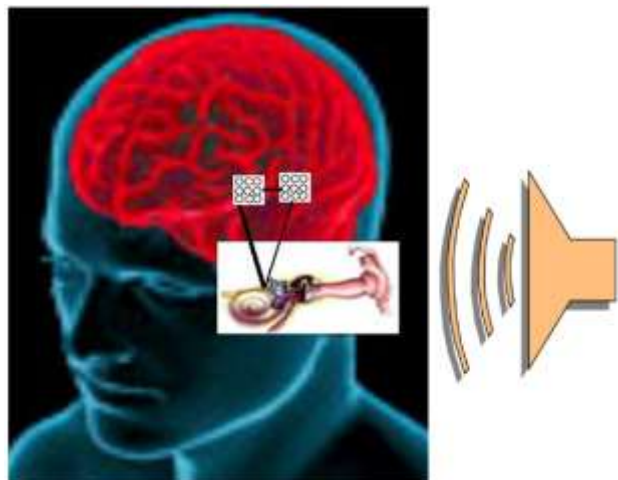


Figure 6 Visual demonstration
Own Elaboration

Numbers 1, 2, 3, 4, 5 ... n stands for the sequential numbers of neurons in the auditory area (Figure 7).

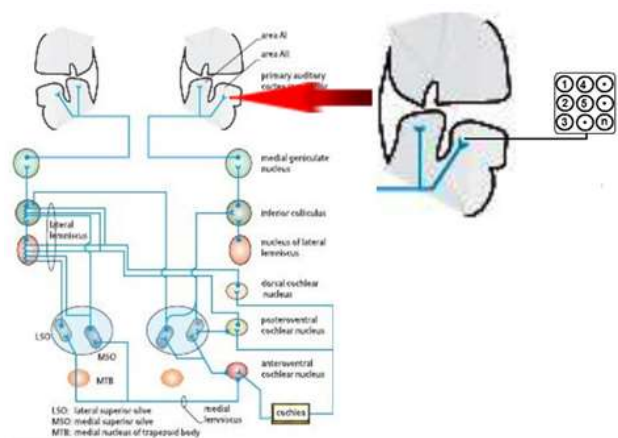


Figure 7 The Auditory Area
Own Elaboration

Inference (Figure 8)

- The essence of the sound phenomenon - the pitch of St (2) – is identical to the essence of the sound St (2).
- The essence of sound and the essence of sound phenomenon are identical St (2) = St (2), similar.
- The essence of the sound phenomenon St (2) is true and exists.

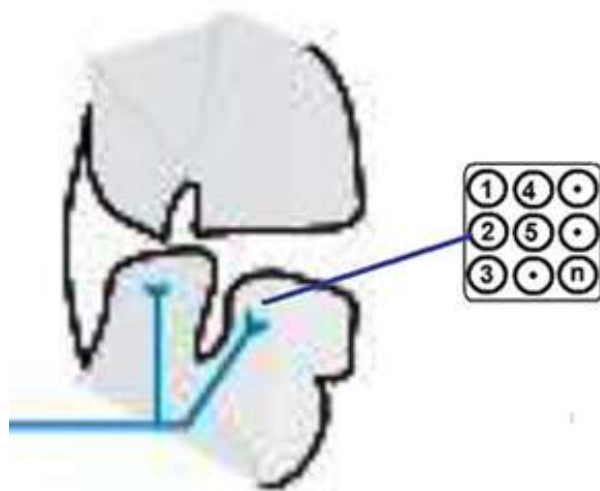


Figure 8 Inference
Own Elaboration

Inference (Figure 9)

- The essence of the sound phenomenon - the pitch of St (3) – is not identical whit the essence of the sound of St (2).
- The essence of sound and the essence of sound phenomenon are not identical St (2) ≠ St (3), they are not like.
- The essence of the sound phenomenon St (3) is not true and does not exist.

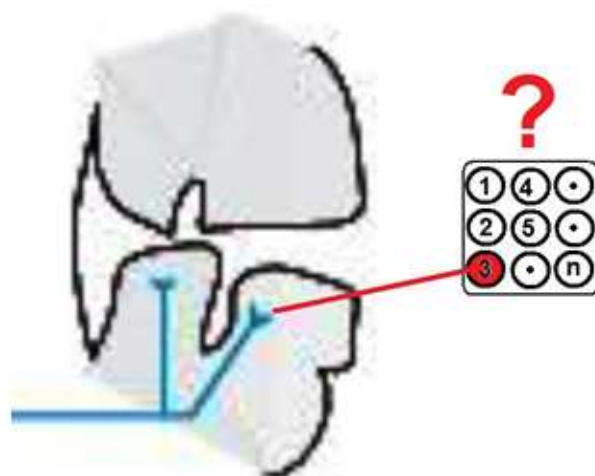


Figure 9 Inference
Own Elaboration

Creating the Image of the Word "ONE"
Pre-Symbolic Stage

Identity of the sound St and of the sound phenomenon RSt (Figure 10)

- The essence of the sound phenomenon - the pitch of RStG5 (U) – is identical to the essence of the sound StG5.
- The essence of the sound phenomenon - the pitch of RStC5 (NO) – is identical to the essence of the sound StC5.
- The essence of sound and the essence of sound phenomenon are identical StG5 = RStG5, similar.
- The essence of sound and the essence of sound phenomenon are identical StC5 = RStC5, similar.
- The essence of the sound phenomenon of StG5 and StC5 are true and exists.

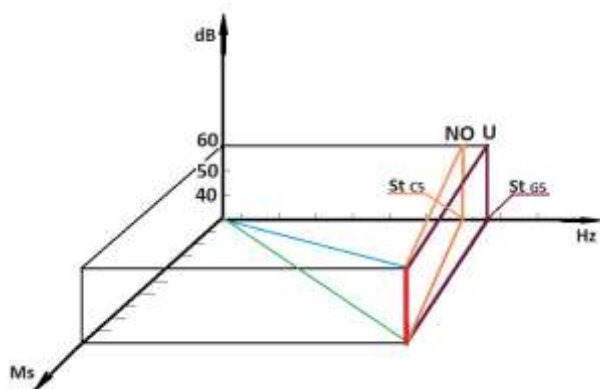


Figure 10 Identity of the sound and of the sound phenomenon
Own Elaboration

Identity of the sound and of the sound phenomenon (Figure 10a)

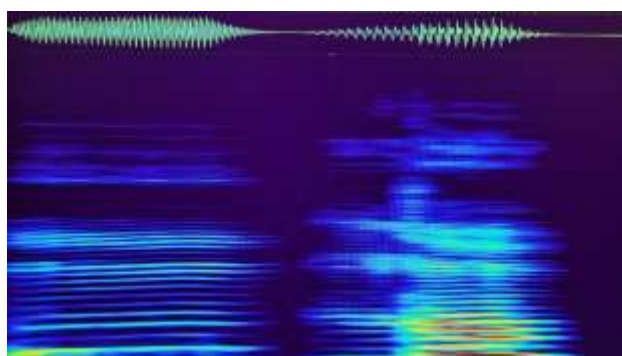


Figure 10a The Word “U-NO”
Own Elaboration

Figures 10 and 10a show the transmission of the word "ONE" divided into syllables by the teacher and the child's perception and thinking are identical, the same. It is worth mentioning that there is an understanding and comprehension of the word "ONE".

Not Identity of the sound St and of the sound phenomenon RSt (Figure 11)

- The essence of the sound phenomenon - the pitch of RStF5 (U) – is not identical with the essence of the sound of StG5 (U).
- The essence of the sound phenomenon - the pitch of RStE6 (NO) – is not identical with the essence of the sound of StC5 (NO).
- The essence of sound and the essence of sound phenomenon are not identical StG5 (U) \neq RStF5 (U), they are not like.
- The essence of sound and the essence of sound phenomenon are not identical StC5 (NO) \neq RStE6 (NO), they are not like.
- The essence of the sound phenomenon RStF5 (U) is not true and does not exist.
- The essence of the sound phenomenon RStE6 (NO) is not true and does not exist.

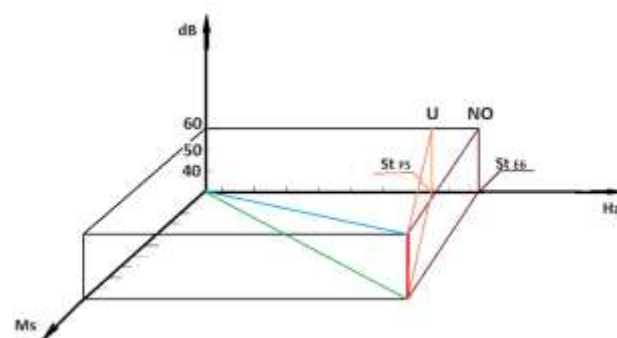


Figure 11 Not Identity of the sound and of the sound phenomenon
Own Elaboration

Not Identity of the sound St and of the sound phenomenon RSt

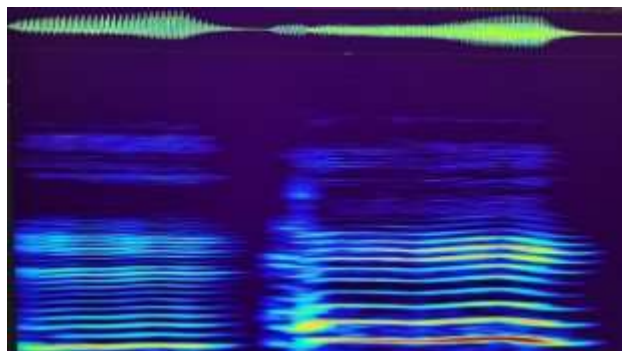


Figure 11a Palabra "U-NO"
Own Elaboration

Figures 11 and 11a clearly show the deviation of the sound signal of the word "UNO" divided into syllables. It is observed that the transmission of the word "ONE" divided into syllables by the teacher and the perception and thought of the child are not identical, they are not the same. It is worth mentioning that there is NEITHER the understanding nor the comprehension of the word "ONE".

The situation with the teaching and learning of number in the preschool classroom is inconceivable, but it can be reformed, changed, and improved. It is proposed to use as the principle of sensory and cognitive development for the acquisition and formation of number in the child of Preschool Education, the Balance of the tonal ear, also the Syllabic Organization of the word and the Evolutionary Method Learning to Read, which includes: software TOTEM 1.0 y 1.2, NOMOS 1.0 (Fokin, Ariceaga Paredes, & Perez Perez, Intelligent system in sensory y cognitiv development for the pre-reading stage, 2021) and Aprende a leer (Fokin & Ariceaga Paredes, Evolutionary Method for Learning to Read, 2021).

The Learn Number Method is extended with counting and arithmetic operations. Phase I is pre-symbolic and develops together with the acquisition of language and the formation of reading skills. The preschooler can construct the linguistic reality with the teacher.

Conclusions

The objectives of the research: to make known the obscured structure of the number and its elements, and to analyze the nature of the name of the number were achieved.

It was shown that there is a principle that can be called universal, since it is at the basis for the acquisition, construction, and development of language and arithmetic.

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[Title in Times New Roman and Bold No. 14 in English and Spanish]

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General explanation of the subject and explain why it is important.

What is your added value with respect to other techniques?

Clearly focus each of its features

Clearly explain the problem to be solved and the central hypothesis.

Explanation of sections Article.

Development of headings and subheadings of the article with subsequent numbers

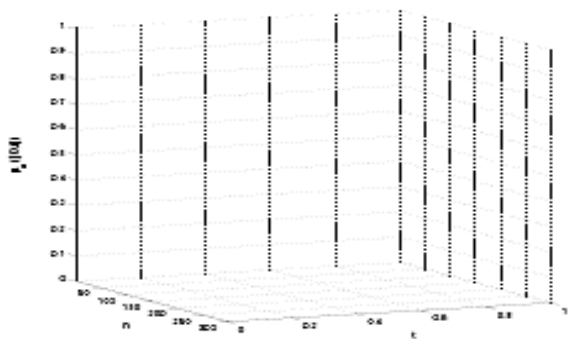
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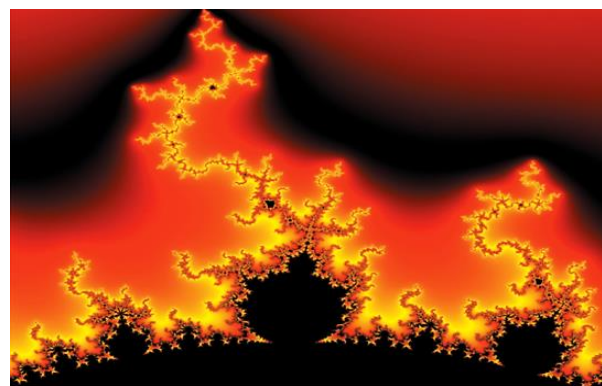


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$$Y_{ij} = \alpha + \sum_{h=1}^r \beta_h X_{hij} + u_j + e_{ij} \tag{1}$$

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Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

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The results shall be by section of the article.

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Tables and adequate sources

Thanks

Indicate if they were financed by any institution, University or company.

Conclusions

Explain clearly the results and possibilities of improvement.

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