

Antología de resúmenes científicos traducidos al Inglés del Consejo de Ciencia y Tecnología del Estado de Puebla



Mónica Watkins Díaz Errickson

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Introducción

ENGLISH

In an increasingly interconnected world, the exchange of scientific knowledge knows no boundaries. As such, this work emerges as a vital bridge and as a testament to the power of cross-cultural collaboration, presenting a collection of meticulously translated scientific abstracts from Spanish to English. Each abstract is a snapshot of a diverse array of disciplines, each encapsulating the essence of innovation, discovery and human ingenuity.

As we venture into the minds of Spanish-speaking researchers, we would like to invite the reader to partake in the universal language of science, transcending borders, fostering collaboration and hopefully igniting their own curiosity. This anthology stands as a testament to the power of language and communication, as these abstracts not only inform but also inspire, underscoring the vital importance of transcending linguistic barriers in our collective quest for knowledge.

With heartfelt gratitude, we acknowledge the unwavering support of CONCYTEP (Science And Technology Council Of State Of Puebla), whose dedication has made this endeavor possible. We celebrate the intersection of language, discovery, and collaboration. We honor the shared pursuit of truth that binds the global scientific community, and we offer this collection as a testament to the potential that arises when diverse perspectives converge in the pursuit of knowledge. By enabling these translations, CONCYTEP has illuminated pathways to understanding that reach beyond borders and create a unified foundation for global scientific progress.

ESPAÑOL

En un mundo cada vez más interconectado, el intercambio de conocimientos científicos no conoce fronteras. Como tal, este trabajo surge como un puente indispensable así como un testimonio al poder de la colaboración intercultural, presentando una colección de resúmenes científicos meticulosamente traducidos del español al inglés. Cada resumen es una pequeña captura de una diversa gama de disciplinas, cada una de las cuales encapsula la esencia de la innovación, el descubrimiento y el ingenio humano.

Mientras nos adentramos en las mentes de los investigadores de habla hispana, nos gustaría invitar al lector a participar en el lenguaje universal de la ciencia, trascendiendo fronteras, fomentando la colaboración y, con suerte, despertando su propia curiosidad. Esta antología es un testimonio al poder del lenguaje y la comunicación, ya que estos resúmenes no solo informan sino que también inspiran, subrayando la importancia vital de trascender las barreras lingüísticas en nuestra búsqueda colectiva del conocimiento.

Con profundo agradecimiento, reconocemos el apoyo incondicional del CONCYTEP (Consejo de Ciencia y Tecnología del Estado de Puebla), cuya dedicación ha hecho posible este emprendimiento. Celebramos la intersección del lenguaje, el descubrimiento y la colaboración. Honramos la búsqueda compartida de la verdad que une a la comunidad científica mundial, y ofrecemos esta colección como testimonio del potencial que surge cuando diversas perspectivas convergen en la búsqueda del conocimiento. Al permitir estas traducciones, el CONCYTEP ha iluminado caminos hacia la comprensión que van más allá de las fronteras y crean una base unificada para el progreso científico global.

Physics-Mathematics and Earth Sciences

Físico - Matemáticas y Ciencias de la Tierra

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Bibliographic Review of the Current Environmental State and Implications for Human Health in the Atoyac River, One of the Most Polluted Rivers in Puebla, Mexico.

ISBN: 978-607-8839-04-9

Authors: *Abrahan Mora, Maritza García-Gamboa, Mari Sol Sánchez-Luna, Lilian Gloria-García, Pabel Cervantes-Avilés, Jürgen Mählknecht.*

Link: Read Full Publication

Abstract:

For over four decades, the Atoyac River, situated in central Mexico, has endured relentless anthropogenic pressures stemming from urban and industrial wastewater discharges, as well as the infiltration of leachate from intensive peri-urban agricultural practices. This comprehensive bibliographical review furnishes a comprehensive examination of the organic, inorganic, and microbiological contaminants observed within the Atoyac system over the past decade and their repercussions on human health.

In broad strokes, Atoyac's waters bear a substantial load of nutrients, BOD5, COD, TDS, and trace elements (Al, Fe, Zn, Pb, Cr, Cu). Bacteriological contamination reaches alarming levels, with total coliform values soaring to an astonishing 1012 MPN/100 mL. Anthropogenic organic compounds like PAHs, PCBs, and organophosphate and organochlorine pesticides have also left their mark on the river water. Though the investigation into pharmaceutical products remains somewhat limited in scope, significant concentrations of Triclosan, Naproxen, and Diclofenac have been detected in the river water.

With regard to sediment, anoxic conditions promote the precipitation and enrichment of sulfides and their associated trace elements (As, Fe, Mo, Pb, Zn, Cu, Cr). Microplastic contamination in sediments include films (25.9%), fragments (22.2%), fibers (14.8%), and pellets (11.1%). Notably, fibers from the textile industry accumulate within the aquatic biota of the Valsequillo dam. Quality indices conclusively identify the city of Puebla as hosting the most contaminated waters and sediments, earning the waterway the classification of “highly polluted.” Furthermore, the sediment bears the brunt of major and trace element accumulation/enrichment within riparian zones.

Human health outcomes underscore the gravity of the situation, with documented cases of gastrointestinal diseases among adults and elevated cancer biomarker levels among children residing in vulnerable areas. Research indicates a high risk of carcinogenic diseases in children who consume contaminated groundwater, as well as the elevated risk of non-cancer ailments in adults involved in agricultural activities utilizing river water for irrigation. Additionally, children who consume milk with elevated arsenic content from fluvial sources face heightened health risks.

Keywords: Heavy metals, agrochemicals, microplastics, pharmaceuticals, microbiological contamination, urban river.

Glossary:

BOD5 - Biochemical oxygen demand

COD - Chemical oxygen demand

TDS - Total dissolved solids

MPN - Most probable number

PCB's - Polycyclic aromatic hydrocarbon

Photosynthetic Activity as a Productive Potential in Fragmented Ecosystems

ISSN: 2644-0903 (Journal)

5

Author: *Ana María Perez Ramirez*

Link: Read Full Publication

Abstract:

Ecosystems in a constant state of change exhibit a remarkable inertia, necessitating an exploration of complementary functional mechanisms at the species level within fragmented forest ecosystems. In this context, assessing photosynthetic activity as an indicator of functional capacity offers insights into the management of these ecosystems. It leads to the proposition of utilizing species with exceptional potential to sequester CO₂ and sustain ecosystem productivity by contributing to organic matter, facilitating mineralization, and fostering microbiological activity conducive to creating healthy conditions in recovery zones.

Hence, this study aimed to scrutinize and quantify the photosynthetic rates of individual species within a fragmented forest ecosystem categorized into three areas: conserved (AC), in transition (AT), and agricultural (AA). The analysis involved the measurement of various parameters, including radiation, chlorophyll content, water content, percentage of nitrogen, carbon, Leaf Area Index (LAI), height, and species density. Additionally, direct measurements of CO₂ emissions from soil with and without vegetation were conducted. Data analysis employed principal component analysis to unveil relationships among parameters and their correlation with photosynthetic rates. Furthermore, comparisons of parameter averages between different areas were carried out.

As a result, species exhibiting photosynthetic activity surpassing area averages were identified, comprising 4 species from AC, 9 from AT, and 9 from AA. These species hold the potential for productivity recovery. It was also observed that the agricultural area displayed a

greater dynamism compared to the conservation or transition areas, primarily due to the increased presence of herbaceous species characterized by their rapid carbon fixation and storage capabilities. This phenomenon contributes to the expedited accumulation of organic matter, thereby fostering soil property restoration.

Keywords: fragmented ecosystem, photosynthetic activity, recuperative species.

Impact of Erosive Processes on Soil Characteristics and Properties in the Southern Region of Valsequillo, Puebla

ISSN: 2644-0903 (Journal)

Author: *Itzel Fabiola Arroyo Ortega*

Link: [Read Full Publication](#)

Abstract:

This study seeks to investigate the influence of erosive processes on soil characteristics and properties, alongside their socioeconomic impact of the communities within the study region. The chosen study area encompasses the southern region of Lake Valsequillo, Puebla. Our sampling protocol meticulously selected 16 soil profiles, each exhibiting distinct visual indicators of erosion. These profiles were further categorized into contours that align in terms of parent material, soil type, topography, and climate. The assessment of erosion took into account the horizon losses concerning the best-preserved profiles, denoted as pattern profiles, leading to categorizations of null, mild, moderate, strong, very strong and severe erosion.

For each horizon within the profiles, comprehensive evaluations encompassed morphological characteristics, alongside physical, chemical, and biological properties. Subsequently, we estimated soil loss utilizing the Universal Soil Loss Equation. By employing Geographic Information Systems and conducting supervised image classification on satellite data spanning 30 years, we quantified changes in vegetation cover. Furthermore, we implemented a structured survey to discern social and economic parameters of the study area, facilitating an exploration of changes in agricultural production. Finally, with the data obtained from the changes in agricultural production, the marginalization index by localities and the average of the estimate of soil loss by contour, a correlation matrix was made by means of the Pearson Correlation Coefficient.

Our findings reveal that soils within the study area exhibit varying degrees of erosion, ranging from mild to severe. This erosive process is expedited by both natural factors such as steep terrain and concentrated rainfall within short timeframes, as well as anthropic factors, including the loss of vegetation cover due to inadequate agricultural, forestry, and livestock practices. These factors collectively influence the soil's characteristics and properties to varying extents. Consequently, we observe temporal transformations in social aspects, including changes in labor patterns and migrations among the area's inhabitants due to low crop yields caused by soil loss. The lack of public policies geared towards rural reactivation, coupled with a deficiency in conservation, restoration, and soil management strategies, contribute to the current inadequacy of soils for agriculture. This phenomenon not only jeopardizes farmers' livelihoods but also exacerbates poverty and marginalization rates in the region.

Keywords: soil erosion, socioeconomic implications, rural reactivation, soil management.

Production of Neutral Higgs Bosons in the Future LHeC Accelerator

ISSN: 2644-0903 (Journal)

9

Author: *Edwin Alí Herrera Chacón*

Link: Read Full Publication

Abstract:

In this research, titled “Production of Neutral Higgs Bosons in the Future LHeC Accelerator,” by Edwin Alí Herrera Chacón, we study the production mechanism $e-p \rightarrow \nu q \varphi_0$, where $\varphi_0 \rightarrow f\bar{f} + \text{h.c.}$, at the partonic level. Our primary objective is to unveil a significant signal, surpassing the previously reported results of $h \rightarrow s\bar{b} + \text{h.c.}$ at the detector level. Our findings demonstrate an amplified level of significance, compelling us to pursue further simulation studies at this level for other potential signals.

Keywords: Neutral Higgs Bosons, LHeC Accelerator, partonic level, $e-p$ interaction.

Study of the Properties of Adfractional Beams

ISSN: 2644-0903 (Journal)

Author: *Paula Ortega Vidals*

Link: [Read Full Publication](#)

Abstract:

This research project investigates the properties of adfractional beams, with a particular focus on the role of caustics within these beams, employing a combination of geometric optics and physical optics. Building upon findings from a master's research, we delve into topics such as light rays, wavefronts, and caustics associated with the refraction of a spherical wave by an Axicon lens. To analyze the refracted field produced by this lens, Kirchhoff's theory is applied in conjunction with a comprehensive integral denoted as S , derived from the eikonal equation. Utilizing the Fresnel-Kirchhoff diffraction formula alongside the full integral S , we derive an integral representation for the field associated with the refraction phenomenon, referred to as the geometric optical field approximation. This representation is expressed in terms of secondary plane waves and the k -function introduced by Stavroudis. Our analysis demonstrates that the complete integral S yields information about diffracted wavefronts and caustics, enabling the generation of real adfractional beams, particularly those replicable in laboratory settings. The distinctive characteristics of the k -function, contingent upon the surface in question, are investigated, revealing its significance in elucidating diffraction pattern formation. This study encompasses examinations of the Axicon lens and the spherical plano lens. Ultimately, our results culminate in the description of the intensity pattern associated with a caustic corresponding to a straight line segment, a phenomenon described by the zero-order Bessel function.

Keywords: Adfractional beams, caustics, geometric optics, physical optics, Axicon lens, diffraction pattern, k -function, eikonal equation, refracted field, Kirchhoff's theory.

Leidenfrost Effect on Conical Surfaces

ISSN: 2644-0903 (Journal)

Author: *Yesica Yazmín Escobar Ortega*

11

Link: [Read Full Publication](#)

Abstract:

The primary focus of this thesis is the Leidenfrost effect, specifically the phenomenon of water droplets levitating on their vapor. This remarkable occurrence is observed when a liquid comes into contact with a surface considerably hotter than its boiling point. While the Leidenfrost effect has been extensively studied on nearly flat surfaces with negligible curvature, where millimeter-sized drops maintain the Leidenfrost state but become unstable when exceeding the capillary length, our work takes a novel approach. We experimentally investigate this phenomenon by placing water droplets on conical substrates with angles ranging from 1° to 65° , aiming to comprehend the impact of confinement on the liquid evaporation process.

The conical geometry introduces a unique perspective, allowing us to observe the existence of giant, stable drops, measuring several centimeters in size. This significantly prolongs the lifetime of the drops. Interestingly, our observations reveal that the Leidenfrost state persists even on remarkably sharp cones, with no apparent upper limit to the volume of deposited drops. Additionally, we identify a transition temperature to the Leidenfrost state, $TL = 195 \pm 5^\circ\text{C}$, is unique within our system and is independent of the confinement angle. Our research spans various temperatures above TL , and we report evaporation times depending on the volume of deposited water, confinement angle, and substrate temperature.

For small drops, surface tension dominates over gravity, rendering the evaporation time practically independent of the substrate used. However, for significantly larger volumes, we observe diverse dynamics. In the case of 20 ml drops deposited on shallow-angled

dishes, the presence of steam chimneys traversing the water volume enhances the evaporation process but shortens the system's lifetime. As the angle increases beyond 9° , the chimneys vanish, and the lifetime τ reaches its maximum value. For even larger angles, τ decreases due to instabilities arising from the interplay between hydrostatic pressure and surface tension.

Finally, we construct a phase diagram that visualizes various regimes (stable, chimneys, oscillation modes, and other instabilities) occurring during the droplet evaporation process, as a function of its surface area and the substrate's angle. In the theoretical section of the thesis, we provide an overview of the physics underlying heat transfer during the Leidenfrost effect. We discuss the mixed transfer mechanisms responsible for drop levitation and evaporation and delve into heat transfer via radiation. Additionally, we analyze the theoretical model of evaporation on flat substrates and propose an enhancement by considering a van der Waals-type cubic equation of state to improve the ideal gas approximation.

Keywords: Leidenfrost effect, conical surfaces, drop evaporation, heat transfer, surface tension, phase diagram.

Lorentz Invariance in Crystals: Implications and Applications in Honeycomb Lattices

ISSN: 2644-0903 (Journal)

Author: *Yael Hernández Espinosa*

Link: [Read Full Publication](#)

Abstract:

This research focuses on investigating the physical consequences of applying Lorentz group transformations to an effective Dirac theory within the framework of honeycomb lattices, employing a tight-binding approximation. The application of these transformations leads to the development of Hamiltonians, describing novel crystal lattice models with couplings extended to third nearest neighbors. Furthermore, the study proposes implementations of these models in atomic systems, considering the diminishing nature of the localized wave functions beyond lattice sites. These transformations induce topological changes, resulting in geometric deformations of the crystal lattice, particularly relevant in describing the conduction band of a single layer of molybdenum disulfide.

Keywords: Lorentz invariance, crystals, honeycomb lattices, Dirac theory.

Nonlinear Directional Fiber Couplers in Optical Communication Systems: A Performance Analysis

ISSN: 2644-0903 (Journal)

Author: *Néstor Lozano Crisóstomo*

Link: Read Full Publication

Abstract:

Multi-core fibers (MCFs) utilizing space-division multiplexing (SDM) have emerged as a promising solution to overcome transmission capacity limitations and enhance the performance of optical fiber communication (OFC) systems. However, when considering MCFs for SDM transmission, the linear coupling among MCF cores becomes a crucial aspect requiring in-depth analysis. The fundamental impacts of linear coupling on nonlinear light-matter interactions occurring within MCF cores during optical signal propagation remain unexplored. Addressing this challenge is pivotal for realizing the technological advancements promised by MCFs in OFC systems.

In this thesis, we expand upon and reevaluate the foundational concepts and limitations of single-core fibers (SCFs), including guided mode characteristics, nonlinear phase shift, nonlinear phase noise, self-phase modulation (SPM), and the core size effects. We extend these principles to nonlinear directional fiber couplers (NLDFCs), the simplest form of MCFs comprising two coupled SCFs. Through theoretical analysis, we investigate the influence of linear coupling on the nonlinear phase shift and frequency spectrum of unchirped optical pulses propagating through NLDFCs, even under noisy signal conditions. Our primary focus is on NLDFCs, as they provide valuable insights into the effects of linear coupling on SPM and nonlinear phase noise phenomena. We find that studying the elementary switching process in NLDFCs yields comprehensive and significant results.

Our research reveals spectral narrowing during the propagation of initial unchirped optical pulses through NLDFCs, a phenomenon induced by linear coupling between NLDFC cores. The degree of spectral narrowing depends on the peak power of the input optical pulse. Furthermore, we demonstrate that linear coupling reduces the nonlinear phase noise of optical signals during the initial transfer of optical power between NLDFC cores. This reduction occurs because the maximum nonlinear phase shift diminishes during the first coherent interaction between NLDFC cores, signifying an attenuation of the SPM effect. Additionally, we identify the existence of a power-dependent critical coupling coefficient crucial for NLDFC design.

Keywords: Multi-core fibers, space-division multiplexing, optical fiber communication, linear coupling, nonlinear phase shift, spectral narrowing, self-phase modulation, nonlinear phase noise, directional fiber couplers.

Novel Formulation for CuXSeY Thin Film Synthesis via Ammonium-Free Chemical Bath Deposition

ISSN: 2644-0903 (Journal)

Author: *Dulce Maria Peña Cabrera*

Link: Read Full Publication

Abstract:

In this study, a novel ammonium-free formulation was developed for growing CuXSeY (copper selenide) films utilizing the chemical bath deposition (CBD) technique. To establish a structured work environment, the Japanese 5S system (cleanliness, order, classification, standardization, and discipline maintenance) was initially implemented.

Precursor solutions comprising CuCl₂, Na₃C₆H₅O₇, KOH, and Na₂SeSO₃ were prepared at elevated concentrations, guided by dissolution principles and a design of experiments methodology to determine initial growth parameters. Subsequently, we varied the Cu:Se volume ratio to assess its influence on film properties.

The deposition process involved applying these films onto Corning-type glass substrates, maintaining conditions at 25°C and pH 8. Film growth was carried out in a multilayered fashion, with a film being deposited every 60 minutes, resulting in a total of five baths.

Our investigation of the growth kinetics revealed distinct mechanisms: ion-by-ion growth for the D and C series and cluster-by-cluster growth for the M series. Notably, the C series exhibited the most substantial thickness, ranging from 30 to 150 nm. Structural characterization employing X-ray diffraction and Raman spectroscopy confirmed that the films possessed a hexagonal Klockmannite-type structure. Atomic Force Microscopy (AFM) demonstrated a gradual evolution in film morphology with increasing bath cycles, ultimately achieving a more homogeneous and compact film structure.

Furthermore, optical characterization unveiled a diminishing

trend in optical transmittance as the number of deposition cycles increased, while reflectance remained consistent across all cases. Finally, four-point electrical analysis elucidated the highly resistive nature of the films, with resistivity values ranging from $104 \Omega \cdot \text{cm}$ to $106 \Omega \cdot \text{cm}$.

Keywords: CuXSeY thin films, chemical bath deposition, ammonium-free formulation, precursor solutions, growth kinetics, Klockmannite-type structure, optical characterization, electrical resistivity.

Automation of a Control System for the Thermodynamic Flow Circuit of a Parabolic Trough Type Solar Collector

ISSN: 2644-0903 (Journal)

Author: *Israel Cerón Morales*

Link: [Read Full Publication](#)

Abstract:

This study outlines the development of an automated control system for the thermodynamic flow circuit within a parabolic trough type solar collector. The control scheme incorporates fractional order control, alongside fractional order PID control, specifically tailored to the thermodynamic model of the concentrator tube in a parabolic trough solar collector.

The achieved outcomes demonstrate that the steady-state control error tends toward zero, confirming the effectiveness of the control strategy. Transitioning the control to its digital form necessitated the resolution of equations that determined the sampling period. These equations facilitate the seamless integration of fractional order control into diverse digital control architectures.

Furthermore, with regard to temperature regulation within the solar collector, the results illustrate both stability and convergence of the fractional order control, emphasizing its suitability for efficient operation.

Keywords: Digital Control, Fractional Order control, Solar Energy, Thermodynamic fractional model.

Vegetative Propagation of *Ceiba pentandra* (L.) Gaertn through Apical Stakes

ISSN: 2644-0903 (Journal)

19

Author: Daniela Jorge Marcelino

Link: Read Full Publication

Abstract:

Mexico ranks fourth globally in biodiversity and vegetative endemism, encompassing thirteen distinct ecosystems. However, a concerning trend has emerged: a reduction of 1,589.112 hectares in forest area from 2002 to 2007. This decline can be attributed to clandestine logging and land-use alterations. In response, comprehensive measures have been implemented to rehabilitate forest cover and soil quality. These include reforestation initiatives employing native species with economic and ecological promise, as endorsed by FAO (2010).

This study centers on *Ceiba pentandra*, a species of paramount cultural, economic, and ecological significance. *Ceiba pentandra* holds a pivotal position on CONABIO's list of valuable species for ecological restoration and reforestation. We explore vegetative propagation through apical stakes as a viable strategy to overcome challenges associated with the species' yearly seed production and limited seed viability.

Our investigation underscores *Ceiba pentandra*'s vital role in soil rehabilitation and forest cover. To propagate this species, we conducted cutting experiments, utilizing three commercial powdered rooting agents (Radix 1500, Radix 10000) and a liquid rooting agent (Root kaax) enriched with auxin (AIB). These treatments were compared with a control group. The rooting medium comprised a blend of three locally-sourced substrates—Earth, Sawdust, and Gravel—in a 2:1:1 ratio, supplemented by an inert commercial substrate, agrolite.

Employing a completely randomized design with four treatment groups, each with three replicates of ten stakes, we assessed the stakes after 20 days of establishment. The evaluation revealed variations in callus formation among treatments. Notably, the control group and the Root kaax-treated stakes exhibited increased callus formation compared to stakes treated with Radix 1500 and Radix 10000.

Keywords: *Ceiba pentandra*, vegetative propagation, apical stakes, ecological restoration, reforestation, rooting medium, callus formation, native species, timber potential, ecological value, soil rehabilitation

Control and Instrumentation of an Adaptive Optics System for Wavefront Correction

ISSN: 2644-0903 (Journal)

Author: *Ezequiel Paz Totolhua*

Link: Read Full Publication

Abstract:

This research presents the utilization of Adaptive Optics (AO) to establish an experimental system dedicated to the precise correction of laser beam wavefronts. The integrated system incorporates a Hartmann-Shack wavefront sensor and a deformable mirror, collectively orchestrating the compensation of optical aberrations.

Optical aberrations, responsible for producing distorted images, are rigorously characterized. Employing a wavefront sensor, aberrations are quantified and expressed in terms of Zernike polynomials, with each coefficient signifying the magnitude of a specific aberration. These coefficients collectively form a vector that facilitates the comprehensive reconstruction of the wavefront.

The deformable mirror, a pivotal optical element within the system, is empowered to manipulate the incident image. Initially, the image is adjusted to optimally cover the deformable mirror's surface. In the absence of feedback, the mirror assumes a passive, non-deformable state, behaving as a conventional reflective surface. Its primary function, at this juncture, is to reflect the image and, consequently, the wavefront, towards the sensor. Subsequently, the wavefront is scrutinized by the sensor, and the analysis results are communicated to the deformable mirror. Now activated as a wavefront compensator, the mirror undergoes deformations corresponding to the aberration values, thereby enhancing the ultimate image quality.

This work details the seamless integration of the wavefront sensor and the deformable mirror within an adaptive optics system. The

methodology delineates the closed-loop operation of this integrated system, encompassing wavefront reconstruction, measurement, and precise correction. For measurement and reconstruction, a HASO4 VIS imaging-type Hartmann-Shack sensor was employed, while correction was achieved using a deformable mirror equipped with 69 actuators of the “DM 69 ALPAO” type. Real-time wavefront corrections are facilitated through control gains, visualized via the ACE interface, MATLAB, and LabVIEW software.

Keywords: Adaptive optics, wavefront correction, Hartmann-Shack sensor, deformable mirror, wavefront sensor, optical aberrations, Zernike polynomials, closed-loop system, real-time control.

Comprehensive Technical-Scientific Analysis of a Sinkhole in the Municipality of Juan C. Bonilla, Puebla State

ISBN: N/A

Authors: *Rogelio Ramos-Aguilar, Máximo Ávila-Cruz, Patricia Máximo-Romero, Paulina Hernández-Ortiz, María de la Cruz Vázquez-García.*

Link: Read Full Publication

Abstract:

This study presents a comprehensive investigation into the structural collapse, subsidence, or “sinkhole” event that occurred in the agricultural fields of Santa María Zacatepec, located within the municipality of Juan C. Bonilla, in the hydrological basin of the Alto Atoyac River (RH18 hydrological region). The research combines geomorphological, geohydrological, geostatistical, and remote sensing techniques to understand the dynamic processes behind this significant geological event.

The study provides detailed insights into the geological and geomorphological characteristics of the sinkhole and its immediate surroundings. It employs cartographic models to visualize and analyze the evolving nature of this phenomenon. Field investigations were conducted at distances of 100 and 200 meters from the structural collapse site, aided by telemetric techniques, particularly remote sensing. Remote sensing techniques, utilizing processed images and the interpretation of various spectral bands and channels, were employed to discern the area’s geometry, geology, geomorphology, and cartography.

To facilitate this study, geostatistical data was collected and utilized to model and simulate hydrological flows and water acceleration on the identified slopes within the runoff zone. These data were instrumental in graphic modeling. Topographic, geological, and geo-

morphological surveys were conducted utilizing total stations and telemetry, complemented by satellite technology. Specialized topography software and geospatial programs were employed to generate 2D and 3D models of the sinkhole and its vicinity.

Field visits were conducted to physically identify the geoform and determine potential risk zones, aligning with guidelines set forth by the United Nations (UN) Disaster Risk Reduction program.

The geohydrological analysis focused on gravitational acceleration calculations, slope assessments by distance-elevation relationships, height-gravity considerations, liquid force, and river flows. The culmination of these investigations led to the conclusion that there is a risk zone extending within a radius of 1000 meters from the site of the event.

This integrated approach provides a comprehensive understanding of the structural collapse and subsidence event, facilitating informed decision-making and risk assessment in the affected region.

Keywords: sinkhole, remote sensing, geostatistical analysis, hydrological flow, gravitational forces, slope analysis.

Construction of a Salient Pole Synchronous Generator

ISSN: 2644-0903 (Journal)

Author: *Miguel Angel Nava González*

Link: Read Full Publication

Abstract:

The evolution of electrical machines has been driven by the dynamic demands of various applications, prominently among them, the burgeoning need to meet the world's ever-increasing electrical energy consumption. Synchronous machines, serving as generators, stand as the cornerstone of global electrical power generation. Their prevalence can be attributed to their cost-effectiveness, minimal maintenance requirements, and exceptional reliability.

While renowned methodologies such as the one pioneered by John N. Kuhlmann have been instrumental in designing large-capacity generators, this study focuses on a distinct endeavor: the design and construction of a low-capacity generator derived from components salvaged from a decommissioned three-phase motor. This undertaking applies principles from Kuhlmann's work [Kuhlmann, 1993], complemented by testing methodologies outlined in [Wildi, 2007], [Enríquez, 2005], and others. These tests aim to elucidate the machine's performance characteristics.

The study encompasses not only the electrical and mechanical design processes but also the creation of a dedicated test system and data acquisition setup. All experimental investigations took place within the Electrical Laboratory of the Faculty of Engineering at the Benemérita Universidad Autónoma de Puebla.

Keywords: Electric generator, experimental analysis, design methodology, electrical machines, sustainable practices, electrical power generation, recycling.

Valuation by Physical Approach of Land Mobile Robots

ISSN: 2644-0903 (Journal)

Author: *Vianey González García*

Link: [Read Full Publication](#)

Abstract:

This thesis introduces a novel approach to the technical valuation process of land mobile robots, focusing on sumo robots, via a physical or cost-based methodology. Drawing inspiration from the technical valuation of machinery and equipment by IN-DAABIN, a dedicated format is proposed. The valuation process involves the identification of critical elements through a survey, enabling the assessment of associated costs. Subsequently, the thesis presents a comprehensive valuation of a sumo robot using the established format.

Keywords: Valuation, physical approach, land mobile robots, sumo robot, technical valuation, machinery and equipment.

Production of Hydrolytic Enzymes of Industrial Interest from Fermentation of Agro-Industrial Waste

ISSN: 2644-0903 (Journal)

Author: *Eva Luz Hernández Teyssier*

Link: Read Full Publication

Abstract:

The disposal of lignocellulosic waste, including apple bagasse (dry pulp), orange peel, and Mexican hawthorn (tejocote), presents a growing environmental challenge in regions of production. To mitigate this issue, biotechnological approaches are increasingly employed to reduce waste volume and promote reuse. The complex composition of these residues, conducive to microbial growth, makes them suitable substrates for fermentation, leading to the production of industrially valuable metabolites, including enzymes.

Microorganisms capable of secreting hydrolytic and extracellular enzymes, such as endoglucanase, amylase, pectinase, xylanase, inulinase, and invertase, are essential for the degradation of these complex substrates. Among the strategies for extracellular enzyme production, solid state fermentation and liquid state fermentation stand out. Solid state fermentation, while closely resembling the natural habitat of microorganisms, lacks control over critical parameters such as pH, biomass quantification, and product separation. Conversely, liquid state fermentation offers precise control over pH, biomass quantification, temperature, and product separation, albeit at the cost of mimicking the natural microbial habitat less faithfully.

This study aims to evaluate both fermentation approaches, alongside five different agro-industrial residues, to determine the most efficient method for producing hydrolytic enzymes. The experimental design, employing a block design, encompassed two types of fer-

mentation and five enzyme products. Microorganism screening led to the selection of the CPHD13 strain, a *Penicillium* sp. filamentous fungus, as a suitable candidate for enzyme production.

Quantifying biomass in solid state fermentation proved challenging due to substrate adhesion. To overcome this, the methodology of Córdova-López et al. (1996) was employed for indirect biomass quantification. Growth kinetics were modeled using logistic, Aborhey and Williamson, and Luedeking and Piret models for biomass, substrate, and product (enzymes), respectively.

Enzyme production from various agro-industrial residues exhibited variability. Endoglucanase production was highest during submerged fermentation on Mexican hawthorn residues (12 IU grs⁻¹). Amylase production peaked at 16.4 IU grs⁻¹ during solid state fermentation with orange peel and 12 IU grs⁻¹ during liquid state fermentation with apple bagasse. Pectinase production was notably more efficient in solid state fermentation, yielding over 40.5 IU grs⁻¹. Xylanase production favored liquid state fermentation with orange peel. While inulinase production was inconspicuous, invertase activity increased notably in liquid state fermentation with orange peel.

This research sheds light on the optimal conditions for hydrolytic enzyme production using diverse agro-industrial residues, contributing to sustainable waste management and biotechnological advancement.

Keywords: Hydrolytic enzymes, lignocellulosic waste, solid state fermentation, liquid state fermentation, agro-industrial residues, enzyme production, biotechnology, waste management.

Evaluating the Impact of Public Spaces on Property Valuation: A Mathematical Approach

ISSN: 2644-0903 (Journal)

Author: *Mariana Thalía Castuera Bautista*

Link: [Read Full Publication](#)

Abstract:

The evolving urban lifestyle, characterized by an increase in individual and virtual activities, has led to a concerning decline in the significance of public spaces within cities. This shift has resulted in reduced attention to the creation, rehabilitation, and maintenance of these vital communal areas, posing challenges to urban planners and policymakers.

The crisis facing public spaces is exacerbated by the absence of a mathematical framework capable of quantifying their influence on the commercial value of neighboring properties for sale. To address this issue, this report endeavors to develop an equation that effectively captures the intricate relationship between public spaces and commercial property values.

The research journey begins with an in-depth exploration of the fundamental concepts underpinning property valuation and the essence of public spaces within urban landscapes. Building upon this foundational knowledge, a robust methodology is devised. This methodology, when applied to case studies, discerns the specific characteristics of public spaces that wield the most significant impact on property values.

These identified characteristics serve as variables in the formulation of a novel metric, termed the Factor Espacio Público (FEP), or Public Space Factor. The FEP encapsulates the essence of public spaces and their interplay with property valuation.

To illustrate the practical application of the developed FEP, this report provides a demonstrative analysis of its impact on the commercial value of four distinct properties.

Keywords: Public spaces, property valuation, commercial value, urban lifestyle, city dwellers.

Dynamic Response Analysis Applied to a CubeSat Using Advanced Simulation in NX Nastran

ISSN: 2644-0903 (Journal)

Author: *Gabriel Alejandro Medel Méndez*

Link: Read Full Publication

Abstract:

This thesis presents a meticulous exploration of dynamic response analysis applied to the structural model of a Pumpkin CubeSat, employing advanced simulation techniques within Siemens NX software. The results of the numerical tests are compared with respect to experimental tests, documented in other publications, to determine the virtual application capabilities of the space environment, in which the missions awarded to this type of satellite are developed, speaking in terms of accelerations. All this with the aim of providing a primary test for innovations based on drag&lift, the use of new materials and new design geometries, later systematizing and combining them in a series of well-defined instructions.

The simulation process adheres to a Knowledge-Based Engineering System (KBES), streamlining data collection, V&V, test automation, and process optimization.

The execution of the tests has shown that a reliable virtual analysis can be established as a prelude to any new prototype, saving manufacturing costs and preventing a new model from failing the experimental application tests, with the obvious that they are not replaced, but complemented. To conclude, the simulation process was captured step by step with the objective that the simulation tasks are reproducible in different models of this type of satellite and can be used with basic automation tools, such as journal, macros or SNAP.

Keywords: Dynamic response analysis, CubeSat, advanced simulation, NX Nastran, vibration analysis, structural model

Definition of the Design and Development Process of New Products for Medical Devices

ISSN: 2644-0903 (Journal)

Author: *Ulrick Alan Gomez Aguilera*

Link: Read Full Publication

Abstract:

This work introduces a systematic methodology for designing and developing new products for medical devices, undertaken at Hemost Company. The proposed methodology not only optimizes manufacturing times but also enhances overall company profitability by harnessing technological advancements and innovative design strategies.

The research commences with a comprehensive analysis of the current design and development processes, unraveling existing strategies, processes, and documentation. This analysis unveils technological limitations as the primary hindrance to unleashing the full potential of the company's infrastructure and workforce

The implementation of the devised methodology has unlocked a realm of professional and personal growth, signifying the transformative power of academic knowledge applied within the industry.

Keywords: Design and development process, new products, medical devices, technical valuation, methodology, innovation.

Biology and Chemistry

Biología y química

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Development of a Gas Monitoring Prototype for Biological Systems

ISSN: 2644-0903 (Journal)

Author: *Emanuel Moreno Reyes*

Link: Read Full Publication

Abstract:

Monitoring gas composition is a pivotal parameter in biological systems, conventionally assessed by techniques such as gas chromatography and mass spectrophotometry. This project introduces an innovative prototype gas monitoring system tailored for biological applications, capitalizing on metal oxide semiconductor sensors (MOS). Specifically designed MOS sensors target four essential gases: methane (MQ4), hydrogen (MQ8), carbon dioxide (Mg811), and oxygen (ME2-O2-φ20).

The prototype system underwent meticulous design, construction, and rigorous validation encompassing chemical reactions stoichiometry, anaerobic digestion, and solid-state fermentation processes. Comprehensive testing, both online and offline, was conducted, with the obtained results meticulously compared to those from a gas chromatograph. While the prototype exhibited commendable performance, certain limitations emerged, primarily related to sensing capacity, chamber geometry, and the sampling system.

Keywords: Gas monitoring, metal oxide semiconductor sensors, bioprocess monitoring, anaerobic digestion, biogas, solid-state fermentation.

Molecular Characterization of β -Lactams and Quinolones Resistance in *Citrobacter* spp. and Foodborne *E. coli* Strains

ISSN: 2644-0903 (Journal)

Author: *Enrique Hernández Alonso*

Link: Read Full Publication

Abstract:

Bacteria have developed numerous resistance mechanisms to evade the action of different antimicrobials, generating resistance to them. On the other hand, the constant exposure of microorganisms to antibiotics generates selection pressure. As a result, antimicrobials become ineffective, and infections persist in the body, increasing the risk of spreading to other people (WHO, 2015). Patients with infections caused by resistant bacteria are at a higher risk of mortality. In addition, they consume more healthcare resources. Various studies have shown the presence of resistant bacteria isolated from different samples, including clinical, food, and even animals (Porres-Osante et al., 2015; Koovapra et al., 2016; Rocha-Gracia et al., 2015).

The general objective of this work consisted of the molecular characterization of resistance to different antibiotics in strains of *Citrobacter* spp. and foodborne *E. coli*. Thirty strains were collected, including 16 *E. coli* isolated from cow's milk and 14 *Citrobacter* spp. from food and clinical samples. The 30 strains underwent a Kirby-Bauer susceptibility profile and ESBL phenotypic production. The *E. coli* strains were classified by phylogenetic group (A, B1, B2, D, C, E, and F), and the search for diarrheagenic pathovars was performed. The search for genes involved in resistance to beta-lactams (*bla*CTX-M, *bla*TEM, *bla*SHV, *bla*OXA-1), quinolones (*gyrA*, *parC*, *qnrB*, *oqxA/B*, *qepA*), aminoglycosides, tetracycline, and chloramphenicol (*aaC*(3')-II, *aaC*(6')-Ib, *tet*(A/B), *cmlA*) was conducted in

all strains. A plasmid profile was performed on 22 strains of both *E. coli* and *Citrobacter* spp., and PFGE was carried out on the BUAP385Cf strain for plasmid identification. Finally, the plasmids of the *E. coli* strains were classified by their incompatibility group (Carattoli et al., 2005), and those of *Citrobacter* spp. by their mobility (Alvarado et al., 2012). The BUAP94Ec strain is an atypical EPEC, and phylogroups A, B1, C, D, and F were identified. Out of the 30 strains, 24 were multi-resistant (15 *E. coli* and 9 *Citrobacter* spp.).

All *E. coli* strains carry ESBL CTX-M (12 CTX-M-79, CTX-M28, CTX-M-1, and CTX-M-27 and CTX-M), and 7 carry TEM-1b. Fourteen *E. coli* strains carry TetA and/or TetB proteins, and 10 carry AAC(3')-II. In the *E. coli* strains, the FIB, IncI1-g, and B/O replicons were identified. In the *Citrobacter* spp. strains, 3 carry CTX-M, 2 carry SHV, and 13 carry CMY. The BUAP385Cf strain carries a new CMY allele, which was designated by the NCBI database as CMY-144, and its genetic background was also identified. Upstream of CMY-144, the AmpC transcriptional regulator AmpR and part of the fumarate operon were identified. Downstream, the outer membrane protein Blc and the efflux pump SugE (GenBank accession No.: KY066478.1) were identified. Two *Citrobacter* spp. strains carry AAC(3')-II, and one carries TetA and another TetB. In the *Citrobacter* spp. strains, the MOB P51 and C12 families were identified. Lastly, mutations in the *gyrA* (positions 83 and 87) and *parC* (positions 80 and 84) genes involved in quinolone resistance were identified. In addition, 5 *Citrobacter* spp. strains carry the *qnrB* gene.

In conclusion, the strains of foodborne *E. coli* and *Citrobacter* spp. are carriers of various resistance mechanisms, which have been reported worldwide in these and other bacteria from different hosts (Carattoli, 2013). It is necessary to continue investigating the fre-

quency, prevalence, and appearance of new mechanisms of antimicrobial resistance in Mexico, where information in the literature on this public health problem is scarce.

Keywords: Antibiotic resistance, *Citrobacter* spp., *E. coli*, ESBL, plasmid profiling, phylogenetic groups, resistance genes.

Exploring the Relationship Between Environmental Factors, Microbiota, and Obesity

ISSN: 2644-0903 (Journal)

Author: *Marco Angel Simoni Berra*

Link: Read Full Publication

Abstract:

Obesity results from an energy imbalance between the number of calories consumed and expended, leading to weight gain and an increased susceptibility to chronic diseases such as type II diabetes (DM II) and cardiovascular diseases. Its etiology is multifactorial and includes genetic, environmental, and social factors. The prevalence of obesity is on the rise, making it one of the primary public health concerns in the state of Puebla and Mexico as a whole.

The objective of this research is to determine how environmental factors influence the composition of specific microorganisms, including *Lactobacillus* spp., *Bifidobacterium* spp., *Akkermansia muciniphila*, and *Fusobacterium nucleatum*, in the intestinal microbiota and their contribution to obesity in individuals. In this investigation, environmental factors potentially impacting obesity were assessed through a survey conducted among thirty individuals in the city of Puebla. This group comprised ten obese individuals, ten triathlon athletes, and ten individuals with a normal weight. The survey collected data on their diet, physical activity, sedentary lifestyle, habits, and socioeconomic status. The survey data were analyzed using the statistical program GraphPad InStat 3.10.

In addition to completing the survey, all participants provided fecal samples to determine the presence or absence of the microorganisms of interest in this study, employing the endpoint PCR technique to establish their relationship with environmental factors. It

was found that diet, physical activity, sedentary lifestyle, mood, and stress are the primary environmental factors influencing the composition of gut microbiota. These findings suggest that addressing obesity may involve making environmental changes.

The composition of the bacteria investigated in this study did not show significant differences between the three study groups. However, a higher presence of the genus *Lactobacillus* spp. was observed in individuals who consumed a greater amount of carbohydrates compared to other macronutrients. The presence of microorganisms *Bifidobacterium* spp. and *Fusobacterium nucleatum* was consistent across all three groups, while *Akkermansia muciniphila* was more prevalent in the group of obese individuals.

Keywords: Obesity, microbiota, environmental factors, diet, physical activity, sedentary lifestyle.

Identification and Characterization of Nonsense-Mediated mRNA Decay (NMD) Factors in *Ustilago maydis*

ISSN: 2644-0903 (Journal)

Author: Nancy Martínez Montiel

Link: Read Full Publication

Abstract:

Proper quality control of protein translation is essential for cellular physiology and survival. In eukaryotic cells, certain mRNA molecules, after nuclear splicing, undergo decay processes—EJC-dependent in mammals and DSE-dependent in yeast—to halt translation. Alternative splicing events predominantly affect coding sequences, with approximately one-third leading to nonsense-mediated mRNA decay (NMD). NMD not only degrades faulty transcripts but also finely tunes the levels of numerous physiological mRNAs involved in diverse cellular processes. Despite its significance, the physiological and pathological implications of NMD across species remain largely unclear.

From *Saccharomyces cerevisiae* to *Homo sapiens*, NMD relies on a set of conserved regulatory factors. At its core, this mechanism involves UPF1, UPF2, and UPF3 proteins. However, a complete ensemble of specific and accessory factors, beyond the UPF proteins, is essential for NMD to occur. Furthermore, subtle variations in the NMD machinery and its regulatory mechanisms have been observed across different organisms.

In this study, we conducted a comprehensive bioinformatic analysis of the NMD machinery across 299 eukaryotic species with available complete genomes, spanning 99 metazoans, 48 plants, 109 fungi, and 43 protists. We identified homologs for 70 distinct NMD factors by mining the KEGG database. Our analysis not only shed light on the distribution of various NMD-related factors but also revealed

their involvement in other critical pathways, including mRNA processing, splicing, RNA surveillance, RNA export, and RNA degradation. Although these pathways display substantial similarities across organisms, slight variations were observed among specific groups.

Intriguingly, we explored the case of *Ustilago maydis*, where NMD had not been previously described. Here, we identified putative UPF1, UPF2, and UPF3 factors, alongside several core and auxiliary proteins involved in NMD regulation. Surprisingly, UPF1 exhibited a remarkable 66% identity at the protein level between *U. maydis* and *H. sapiens*, with UPF2 and UPF3 displaying extreme conservation. Our structural, biochemical, and mutational in silico analyses of the *U. maydis* UPF1 homolog indicated striking similarities in sequence, structural organization, mechanical stability, physicochemical properties, spatial organization, and catalytic potential when compared to the NMD factor in *Homo sapiens*.

These findings strongly support the hypothesis that human and fungal UPF1 may execute equivalent biological activities. Consequently, *Ustilago maydis* emerges as a compelling alternative model for studying NMD. In addition to these bioinformatic findings, our experimental evidence confirmed the expression and functionality of UPF1, UPF2, and UPF3 homologs in this basidiomycete through techniques like RT-PCR, Western-Blot, immunofluorescence, pull-down assays, and emetine assays. Notably, UPF1 appeared to be indispensable for cell survival, as the interruption of Upf1 in the fungal mutant resulted in sub-lethality. Furthermore, the identification of NMD targets in *U. maydis* upon emetine treatment provided strong evidence for the functional existence of the regulatory pathway in this model organism.

To gain deeper insights, we compared the entire NMD machinery of *U. maydis* to that of *H. sapiens*, revealing identity percentages ranging from 40% to 60% for most putative NMD factors. Particularly striking similarities were observed at the protein level

for eRF1 (71%) and MAGOH (66%). Moreover, NMD factors described in humans but absent in the classic yeast model *S. cerevisiae* were also identified in *U. maydis* (MAGOH, SMG1, SMG5-7, EJC-components). This high homology underscores the significant conservation between human and fungal control of NMD. Conversely, NMD factors found in *S. cerevisiae* but absent in humans were also absent in *U. maydis*.

A notable feature of *U. maydis* is that nearly 40% of its genes contain introns, with intron retention being the primary alternative splicing event. This prevalence of introns raises the likelihood of generating aberrant transcripts, which may subsequently be targeted for NMD.

In conclusion, our study provides compelling evidence for a substantial degree of conservation in the NMD machinery and mechanistic control of this process between *H. sapiens* and *U. maydis*.

Keywords: Nonsense-mediated mRNA decay (NMD), quality control, protein translation, alternative splicing, regulatory factors, UPF1, UPF2, UPF3, bioinformatic analysis, evolutionary conservation, *Ustilago maydis*, model organism, intron retention, gene expression regulation.

Laboratory Reproduction and Embryonic Development of Native Social Crayfish (*Procambarus* sp.)

ISSN: 2644-0903 (Journal)

43

Author: *Nayeli Ameyalli Bautista Estrada*

Link: Read Full Publication

Abstract:

This study investigated the laboratory reproduction and embryonic development of *Procambarus* sp., a native social crayfish. Three different Female:Male (F:M) ratios were examined under semi-controlled conditions with natural photoperiod. Crayfish, averaging 5 g in weight and 4 cm in length, were used. Eggs were harvested from the pleopods of females (3-5 eggs per female) and subjected to microscopic examination and photographic documentation. The progression of embryonic development was monitored by observing changes in the coloration of the ovigerous mass. Additionally, measurements of circumference and the weight of 100 eggs were recorded.

The morphological condition of the ovigerous mass attached to the abdomen varied, with coverage ranging from 15-25% for the first female to 100% for the last female, with intermediates at 60-70%. Over time, the coloration of the eggs evolved, starting with a yellowish-cream hue in the first two days, transitioning to yellowish-green olive (days 3-4), khaki-olive green (days 5-7), olive-brown (days 8-10), light-khaki coffee (days 11-13), and finally orange-green-olive-green coloration from day 14 onwards. The average diameter and weight of the eggs were approximately 0.218 ± 0.44 cm and 0.00979 ± 0.0012 g, respectively.

Crayfish reproduced year-round, with approximately 20 spawning events per year under laboratory conditions. Embryonic develop-

ment was completed in about 70-80 days on average, with juveniles emerging around 90 days after fertilization, depending on environmental conditions. The study identified four embryonic stages, two post-embryonic stages, and the juvenile stage.

Keywords: Development, embryo, eggs, coloration.

Assessment of Sperm DNA Fragmentation Resulting from Ultra-vitrification

ISSN: 2644-0903 (Journal)

45

Author: *Edith Sánchez Hernández*

Link: Read Full Publication

Abstract:

Male infertility is a pressing public health issue, affecting 50% of couples facing involuntary childlessness. The causes of male infertility are diverse, encompassing congenital or acquired urogenital abnormalities, malignant neoplasms, urogenital tract infections, increased scrotal temperature, endocrine disorders, genetic abnormalities, immunological factors, and idiopathic male infertility. Advances in cryobiology and assisted reproductive technology (ART) have significantly improved the prospects of infertile couples in their quest for parenthood. Various techniques are available, each with its own indications, advantages, and disadvantages.

It is now well-established that the cryopreservation process can lead to an increase in the proportion of sperm cells with fragmented DNA. This study was undertaken to determine the percentage of sperm cells exhibiting fragmentation in samples cryopreserved using different methods, under varying conditions, and for different durations. The objective was to ascertain whether the duration of storage plays a pivotal role in determining the extent of DNA fragmentation.

The study revealed that, in the case of human samples, a storage duration of 30 months does not appear to be a determining factor in observing a statistically significant increase in DNA fragmentation, regardless of the cryopreservation method employed. Furthermore, an analysis of murine spermatozoa showed a significant increase in DNA fragmentation, detectable as early as the second month of storage, as evidenced by the comet test.

Notably, there is variation in the detection of increased fragmentation between human and murine samples, suggesting that the extent of DNA fragmentation over time may vary depending on the species and the cryoprotectant used.

Overall, this research sheds light on the impact of cryopreservation on sperm DNA integrity and highlights the importance of understanding these effects in the context of male infertility and assisted reproduction.

Keywords: Sperm DNA fragmentation, cryopreservation, male infertility, assisted reproductive technology, comet test.

Computational Analysis of Hydroxyxanthone Interaction with P-Glycoprotein and Their Potential as Anticancer Agents

ISSN: 2644-0903 (Journal)

Author: *María José Vega del Real*

Link: Read Full Publication

Abstract:

Cancer cells often exhibit resistance to multiple drugs, necessitating adjuvant therapies to enhance the effectiveness of chemotherapy. One promising approach is the inhibition of factors that confer drug resistance, such as permeability glycoprotein (P-glycoprotein).

While various phytochemicals, including hydroxyxanthones, have demonstrated anticancer activity, their precise mechanisms of action remain largely unknown. This study focused on twelve hydroxyxanthones with reported antitumor properties that exhibit a high affinity for P-glycoprotein (P-gp). Molecular docking studies were conducted using both the “inward” and “outward” conformations of P-gp as receptors. The results were compared with the affinities of third-generation P-gp inhibitors, including zosuquidar, laniquidar, and tariquidar. Prior to docking, the active site of the “outward” conformation of P-glycoprotein was predicted using the online tool <https://proteins.plus/> for precise localization.

When the “inward” conformation of P-glycoprotein served as the receptor, it was observed that hydroxyxanthones X1, X4, and X6 exhibited interaction energies comparable to ATP in the nucleotide-binding domain, suggesting their potential as inhibitors of ATP hydrolysis. In contrast, hydroxyxanthones X1, X3, and X5 demonstrated the highest interaction energies in the substrate binding do-

main, although these values did not reach the levels seen with specific P-gp inhibitors like zosuquidar, laniquidar, and tariquidar.

Additionally, interactions in the substrate-binding domain of the “outward” conformation of P-glycoprotein yielded lower interaction energies compared to previous docking experiments, likely due to the cavity size limitations that hinder interactions.

Notably, this study identified hydroxyxanthones X4, X6, and X8 as having the most favorable drug-like potential values, suggesting their potential as future drug candidates. Computational analysis, including molecular docking in the substrate-binding domain of both P-gp conformations using the SYBYL-X program, reaffirmed the affinity of X4, X6, and X12 hydroxyxanthones in the “inward” conformation and X1, X8, and X9 hydroxyxanthones in the “outward” conformation.

This research contributes valuable insights into the interaction of hydroxyxanthones with P-glycoprotein and their potential utility as anticancer agents.

Keywords: Hydroxyxanthones, P-glycoprotein, anticancer activity, molecular docking, drug-like potential.

Development and Validation of Molecular Markers for the Identification of Mexican Endemic Plants Accumulating Calendic Acid

ISSN: 2644-0903 (Journal)

Author: *María Fernanda Zepeda Osorno*

Link: [Read Full Publication](#)

Abstract:

The petrochemical industry plays a central role in producing a wide range of industrial products. To mitigate environmental impact, reduce costs, and support sustainable industries, there is growing interest in replacing petrochemical-derived materials with natural alternatives. Fatty acids found in vegetable oils offer a promising alternative as industrial raw materials. However, unique and unusual fatty acids are primarily found in exotic or ornamental plant species, posing challenges for their commercial utilization.

Calendic acid, a valuable fatty acid, is naturally present in *Calendula officinalis*, a plant traditionally used for medicinal and ornamental purposes. Recent discoveries have highlighted calendic acid's potential as a sustainable raw material for various industrial products. However, large-scale cultivation of *C. officinalis* for calendic acid recovery has encountered significant challenges.

To address this issue, we have developed molecular markers (primers) for Polymerase Chain Reaction (PCR) techniques capable of identifying the CoFADX gene responsible for calendic acid synthesis in *C. officinalis* and related species. Mexico's rich biodiversity offers a high probability of finding phylogenetically related species with similar calendic acid synthesis capabilities.

Our research involved aligning sequences of various conjugase and desaturase enzymes to design specific primers for CoFADX. We validated DNA extraction methods for plants, selected phylogenet-

ically related species, and confirmed primer efficiency through PCR tests in both *C. officinalis* and the selected species.

The results from our study have demonstrated the effectiveness of DNA extraction methods, underscoring the importance of using techniques that eliminate PCR inhibitors. We also assessed the design of degenerate primers and their efficiency when applied to *C. officinalis*, subsequently validating them in the selected species.

Remarkably, a single successful amplification was achieved in one of the selected species, *Matricaria chamomilla*, using the FAXF3R3 primers. Although this species is not endemic, we tested the primers in phylogenetically close species that were readily available.

The discovery of a species capable of amplifying with our primers is significant, as it provides valuable guidance for the correct primer design and screening of collected species. Our future perspectives include the selection of other genetically related plants, whether endemic or not. Having validated primers in hand will facilitate a more extensive and efficient screening process.

Keywords: Calendic acid, molecular markers, PCR, sustainable raw materials, biodiversity, industrial products.

Pharmacoeconomic Analysis of Adverse Antibiotic Reactions in a Secondary Hospital in Puebla State

ISSN: 2644-0903 (Journal)

51

Author: *Pamela Belén Olarte Sánchez*

Link: Read Full Publication

Abstract:

Introduction: The study and analysis of Adverse Antibiotic Reactions (AAR) is an underexplored area that can serve as a valuable tool for understanding its impact within a hospital setting. Moreover, a pharmacoeconomic evaluation of this subject can inform decision-making processes related to the allocation of financial resources and the rational use of medications.

Objective: To conduct a descriptive pharmacoeconomic study of the direct costs associated with antibiotic therapy and those incurred due to the presence of AARs between January and July 2016 in a selected medical unit within the hospital.

Methodology: This study employed an observational, descriptive, retrospective, and cross-sectional design. Data analysis involved descriptive statistics. Phase 1: Identification of patients with AARs, followed by a review and analysis based on NOM-220-SSA1-2012 guidelines. Phase 2: Pharmacoeconomic analysis, including a review of direct costs encompassing various economic variables such as hospitalization, antibiotic therapy, drugs for treating AARs, supplies, medical consultations, laboratory tests, and other healthcare interventions resulting from AARs.

Results: During the study period, 23 notifications of AARs were recorded. The antibiotics (AB) associated with these AARs were Clindamycin (17.3%), followed by Levofloxacin (13%) and Ceftriaxone (13%). Dermatological disorders were the most frequent

clinical manifestations (62.2%). Categorizing AARs based on prevailing regulations showed that 6 (26%) were deemed true, 14 (60.8%) probable, and 3 (13%) possible in terms of causality. Regarding the severity of clinical manifestations, 2 (8.6%) were classified as severe, 7 (30.4%) as moderate, and 14 (60.8%) as mild. Cost analysis revealed that the estimated total cost of antibiotic therapy plus the cost of treating reactions in the 23 patients with AARs was \$9,138.01 MXN. Quinolones (\$1,453.74 MXN) and Cephalosporins (\$1,080.44 MXN) were the AB families with the highest prices. The direct cost of treating AARs in 14 patients (61%) was \$4,463.81 MXN, representing 49% of the total cost. The treatment for AARs predominantly involved drugs such as Loratadine, Hydrocortisone, and Diphenhydramine. In 4 patients with AARs, hospitalization was prolonged by an average of 2 days, incurring a cost of \$3,139.78 MXN, while 5 patients required specialized medical consultations, totaling \$845 MXN. Health professional fees were not included.

Conclusions: The findings regarding AAR notifications provide additional support for the development of an internal policy aimed at controlling antibiotic prescriptions, with a focus on ensuring safety, rationality, and cost-effectiveness for society. The estimated costs of AARs amount to a substantial monetary sum, which could further increase when considering notifications related to adverse drug reactions involving analgesics and antihypertensive medications. Additionally, discontinuing antibiotics at the first sign of an adverse clinical manifestation could potentially reduce the estimated total cost. Moreover, given that 52% of antibiotic prescriptions were for nosocomial infection prophylaxis, exploring first-choice alternatives with a similar antimicrobial spectrum but lower cost could contribute to the fight against antimicrobial resistance.

Keywords: pharmacovigilance, pharmacoeconomics, adverse reactions to antibiotics, direct costs.

Assessment of the Antibacterial Effect of Silver Nanoparticles (AgNPs) Against Foodborne Pathogens

ISSN: 2644-0903 (Journal)

Author: *Yasmín Perlita Muñíz Soperáñez*

Link: Read Full Publication

Abstract:

Foodborne illnesses pose a significant public health threat, affecting nearly 1 in 10 individuals worldwide each year. Effective disinfection is a crucial step in preventing foodborne illnesses. However, cases of bacterial resistance to commonly used disinfectants have emerged, highlighting the need to develop new antimicrobial agents for surfaces that come into contact with food. Nanotechnology offers a promising avenue for creating novel materials, such as silver nanoparticles (AgNPs), which have been extensively studied for their antimicrobial properties.

This study aimed to investigate the potential bacteriostatic or bactericidal effects of AgNPs on *Listeria monocytogenes* (L. monocytogenes) and *Escherichia coli* O157:H7 (EHEC O157:H7). The antibacterial efficacy of AgNPs, along with their precursors, silver nitrate (AgNO₃), and *Aegle potatorum* (A. potatorum) extract, in both aqueous and ethanolic solutions, was compared using the macrodilution and pour plate methods. Additionally, this study determined the minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC), and minimum contact time (TMC) of AgNP solutions in aqueous and ethanolic extracts of A. potatorum through macrodilution and pour plate techniques. The MIC was determined using macrodilution, while the MBC and TMC were established using the pour plate method, with an initial inoculum of 5×10^5 CFU/mL of L. monocytogenes and EHEC O157:H7.

The results demonstrated that AgNPs in aqueous solution had a bacteriostatic effect on *L. monocytogenes* and a bactericidal effect on EHEC O157:H7. Conversely, AgNPs in ethanolic solution exhibited bactericidal effects against both bacteria. These findings suggest the potential utility of AgNPs, particularly those prepared in ethanolic solution, as disinfectant agents for surfaces that come into contact with food, contributing to enhanced food safety.

Keywords: Silver nanoparticles, AgNPs, foodborne pathogens, antibacterial effect, disinfectant, nanotechnology.

Medicine and Health Sciences

Medicina y Ciencias de la Salud

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Effect of Heparin on the Maturation of Oocytes In Vitro Obtained on Three Different Days of the Estrous Cycle of the Hartley Guinea Pig

ISSN: 2644-0903 (Journal)

Author: Zeenen Margarita Calitl Flores

Link: Read Full Publication

Abstract:

Reproduction is a complex process in which the oocyte and sperm unite to generate a zygote. The oocyte must undergo various highly regulated processes, influenced by intra- and extra-ovarian factors, to mature and become fertilizable. Disruptions in any of these processes can lead to infertility. In recent years, numerous techniques have been developed to address fertility issues in women. One such technique is in vitro fertilization, where oocyte maturation is induced using exogenous substances.

Heparin, a glycosaminoglycan, has been shown to induce oocyte maturation in rats (which have short estrous cycles) and cattle (which have seasonal cyclicity). However, the effect of heparin on oocyte maturation in laboratory species with long estrous cycles has not been tested. Therefore, this study aimed to use the guinea pig as a model, given its long gestation period, spontaneous ovulation, active corpora lutea, and long estrous cycle, closely resembling that of humans. The study evaluated the number of oocytes obtained on three different days of the estrous cycle and the effect of heparin on maturation.

Twenty-two adult female guinea pigs of the Hartley strain were sacrificed on three different days of the estrous cycle: day 2, day 9, and day 15. Their uterus, adrenal glands, and pituitary gland weights were recorded. The oocytes obtained from each stage were divided into four groups: control group 1 (TLP Solution), group 2 (1mg/ml heparin), group 3 (3mg/ml heparin), and group 4 (6.5mg/ml hepa-

rin). Oocyte maturation was assessed over 35 hours using two indicators: cumulus oophorus cell expansion and the formation of the first polar body.

The results reveal that, on day 15 of the estrous cycle, the highest number of oocytes was obtained compared to those collected on days 2 and 9 of the cycle. Notably, when oocytes obtained on day 9 of the estrous cycle were cultured in vitro with TLP solution without heparin, they took more time to expand the cumulus oophorus cells compared to oocytes obtained on day 2 of the cycle (13.05 ± 2.65 vs. 5.44 ± 0.44 , $p = 0.02$). However, the percentage of oocytes that responded to cell expansion of cumulus oophorus was greater on day 9 compared to day 2 of the cycle (35% vs. 16%, $p < 0.05$).

In terms of the development time of the first polar body, it was lower in the oocytes obtained on day 15 of the cycle compared to those obtained on day 2 (10.62 ± 3.65 vs. 17.00 ± 3.03 , $p = 0.01$). Additionally, oocytes obtained on all three days of the estrous cycle and cultured with a heparin concentration of 6.5 mg/ml took less time to expand the cumulus oophorus cells.

Oocytes obtained on all three days of the estrous cycle and cultured with 6.5mg/ml heparin took less time to expand cumulus oophorus cells and develop the first polar body. Heparin, at concentrations of 1mg/ml, 3mg/ml, and 6.5mg/ml, stimulated cumulus oophorus cell expansion, first polar body formation, and the in vitro maintenance of oocytes obtained on all three days of the estrous cycle.

These findings indicate that heparin stimulates the maturation and maintenance of guinea pig oocytes in in vitro cultures. Day 15 of the estrous cycle is the most suitable stage for obtaining a greater number of oocytes. However, oocytes obtained on day 9 are more sensitive to the stimulation of exogenous substances such as heparin.

Keywords: oocyte maturation, heparin, guinea pig, estrous cycle, in vitro fertilization.

Glossary: TLP: Tyrode Lactate Pyruvate

Study of the BfpI, BfpJ, and BfpK Minor Pilins of the Tuft-Forming Pili of Enteropathogenic Escherichia coli

ISSN: 2644-0903 (Journal)

Author: *Maria Patricia Reyes Bravo*

Link: Read Full Publication

Abstract:

This research, titled “Study of the minor pilins BfpI, BfpJ, and BfpK of the bundle-forming pili of enteropathogenic Escherichia coli,” conducted by María Patricia Reyes Bravo, focuses on the minor pilins of the bundle-forming pili of enteropathogenic Escherichia coli (EPEC). EPEC is a diarrheagenic pathogen that predominantly affects children under six months in developing countries. Understanding the potential functions of the BfpI, BfpJ, and BfpK minor pilins is crucial, and obtaining the protein structures is a key step in this process.

To determine the probable functions of the minor pilins BfpI, BfpJ, and BfpK, it is essential to obtain their protein structures. X-ray crystallography is a technique commonly used to resolve protein structures, but it requires that the proteins are soluble. In this study, specific oligonucleotides were designed to amplify each of the bfpI, bfpJ, and bfpK genes, excluding the N-terminal hydrophobic portion to enhance solubility. These amplified genes were then cloned into the pET-3a vector (Novagen). Each constructed vector (BfpI-pET-3a, BfpJ-pET-3a, and BfpK-pET-3a) was verified through PCR, double restriction analysis, and DNA sequencing.

Subsequently, the BfpI and BfpJ proteins encoded by the cloned genes in pET-3a were expressed in Escherichia coli BL21 (DE3) and purified under denaturing conditions using urea. However, the expression of BfpK was unsuccessful due to issues with the sequence verification. Unfortunately, when the urea was removed during dial-

ysis, the dialyzed BfpI and BfpJ proteins precipitated. As a perspective for this thesis, it is proposed to modify the dialysis conditions by introducing agents that promote oxidizing conditions and to explore alternative purification techniques.

In summary, this thesis successfully amplified genes encoding the BfpI and BfpJ proteins and expressed these proteins. These results pave the way for future structural studies of these proteins and further characterization of the bundle-forming pili components in enteropathogenic *Escherichia coli* (EPEC).

Keywords: BfpI, BfpJ, BfpK, minor pilins, bundle-forming pili, Enteropathogenic *Escherichia coli* (EPEC), protein structure, solubility.

Comparison Of Quality Of Life In Patients With Temporomandibular Disorders And Decreased Postural Balance

ISSN: 2644-0903 (Journal)

Author: *Verónica Anuette Mayoral García*

Link: Read Full Publication

Abstract:

Quality of life measurement involves assessing a patient's perception of how a disease and its treatment affect their overall well-being. This study aimed to compare the quality of life among patients with temporomandibular disorders (TMD) accompanied by decreased postural balance with two other groups: those with only one of these conditions and a healthy population for contrast.

Materials and methods: This was an observational, comparative, cross-sectional, prospective, and homodemic study with convenience sampling. Eighty-one patients meeting selection criteria and attending the diagnostic clinic of the Faculty of Dentistry at BUAP participated. They were divided into four groups: those with TMD and decreased postural balance, those with TMD and better postural balance, those without TMD and decreased postural balance, and those without TMD and better postural balance. Quality of life was assessed using the OHIP49 instrument, which evaluates the impact of oral health, and the Diagnostic Criteria for Temporomandibular Disorders (CD/TMD) were used to confirm or rule out TMD diagnoses. Postural balance was evaluated using the Wii Balance Board platform, with patients categorized into lower and higher postural balance performance groups. All assessments were conducted by a previously standardized researcher.

Analysis of general characteristics by group did not reveal significant differences ($p > 0.05$), with a mean age of around 23 years.

Quality of life results, when contrasted by participation group, showed statistically significant differences ($p < 0.05$), except for disagreement. However, the presence of temporomandibular disorders seemed to significantly impact quality of life, as evidenced by comparisons between populations with and without TMD, where most quality of life dimensions exhibited statistically significant differences ($p < 0.05$). Quality of life contrasted by gender did not show significant differences.

Conclusion: Quality of life varied among the four studied groups, but it appears that temporomandibular disorders have a notable impact on this outcome.

Keywords: Quality of life, Temporomandibular disorders (TMD), Postural balance, Oral health, OHIP49, CD/TMD.

Convalescent Plasma Infusion is Associated with Clinical Improvement in Critically Ill Patients with COVID-19: Pilot Study

ISBN: N/A

Authors:

Juan Carlos Olivares Gazca, Jose Manuel Priesca-Marin, Martin Ojeda Laguna, Javier Garces Eisele, Silvia Soto Olvera, Abraham Palacios Alonso, Judith Izquierdo Vega, Romulo Chacon Cano, Daniel Arizpe Bravo, Miguel Antonio López Trujillo, Yahveth Cantero Fortiz, Danitza Fernandez Lara, Guillermo Jose Ruiz Delgado, Guillermo José Ruiz Argüelles

Link: Read Full Publication

Abstract:

The ideal treatment for COVID-19 has not yet been definitively defined, but convalescent plasma (CoPla) has shown promise. This pilot study investigated the administration of CoPla to critically ill COVID-19 patients at an academic medical center. Ten patients were prospectively treated with plasma obtained from convalescent COVID-19 donors. Over an 8-day period, several significant improvements were observed in these patients. The Sequential Organ Failure Assessment (SOFA) score decreased significantly in all patients, dropping from 3 to 1.5 ($p = 0.014$). The Kirby index score ($\text{PaO}_2 / \text{FiO}_2$) increased from 124 to 255 ($p < 0.0058$), body temperature decreased significantly from 38.1 to 36.9 °C ($p = 0.0058$), and ferritin levels also decreased significantly from 1736.6 to 1061.8 ng/ml ($p = 0.0001$). Chest radiographs showed improvement in 7 out of 10 cases, and CT scans revealed lung lesion improvement in 6 out of 10 cases. Additionally, decreases in C-reactive protein and D-dimer levels were observed. Of the five patients on mechanical

ventilation, three were successfully extubated, nine were transferred to conventional hospital floors, and six were discharged home, while two patients unfortunately did not survive. Importantly, CoPla administration had no side effects, and the overall survival rate at 24 days was 77%. While it is challenging to interpret the data due to the administration of other treatments, it appears that CoPla, when added to the treatment regimen, contributed to improved lung function in critically ill COVID-19 patients.

Keywords: COVID-19, Convalescent Plasma, Treatment, Clinical Improvement, Pilot Study.

Cancer in Infancy, Childhood, and Adolescence in the State of Puebla: Health Situation Analysis during 2018 - Final Report as of October 14, 2020

ISBN: N/A

Authors: *Ma. del Rocío Baños Lara, Andrés Miguel Cruz, Guadalupe Rosete Axcal, Sandra Silvia Solís Solano, Valeria Magali Rocha Rocha, Alfonso Carús Sánchez, Jesús Meneses Hernández*

Link: [Read Full Publication](#)

Abstract:

Childhood and adolescent cancer constitutes a prominent global cause of mortality [1]. Timely diagnosis and treatment are pivotal for enhancing survival rates, a circumstance predominantly observed in high-income countries [2]. Regrettably, over 90% of pediatric cancer cases occur in developing nations where comprehensive health-care access is limited [3]. Despite the gravity of this condition, there exists significant underreporting of incidence. In Latin America, for instance, cancer frequency among individuals under 19 years old is documented in less than 16% of the population [4].

This study aims to conduct a comprehensive analysis of the healthcare landscape in the state of Puebla and its correlation with cancer incidences among children and adolescents. By elucidating these connections, we aim to provide a snapshot of the realities faced by this demographic. To accomplish this, we meticulously examined data from diverse sources including the Ministry of Health (Dinamico Cubes) [5], CONAPO [6], INEGI [7], SEMARNAT [8], CONEVAL [9], CONABIO [10], and, when applicable, generated maps to visually represent our findings.

Our study concentrated on the population aged 0-19 years for morbidity analysis and 0-21 years for mortality assessment. Data from 2015 and 2018 facilitated our understanding of the health con-

ditions within the state of Puebla. Notably, the population under 20 years old, representing individuals susceptible to pediatric cancer, accounted for 38.04% of the total population (19.41% male and 18.65% female). Among those aged 15 and older, 90.85% were literate, constituting the potentially economically active segment of the population. The reproductive age group (15-40 years) comprised approximately 40.6%, while 8.6% were living in extreme poverty, and 50.3% in moderate poverty. A significant proportion of the population, 4.15%, resided in areas with a very high lag, while 33.64% inhabited regions characterized by a high lag. Additionally, 17.51% of the population in Puebla endured a very high degree of marginalization, while 28.57% experienced a high level of marginalization.

In the context of healthcare services within the state of Puebla, we identified 67 municipalities where only 10% of the population had access to such services. In contrast, merely eight municipalities granted healthcare access to 41-50% of the population through IMSS, ISSSTE, ISSSTEP, SEDENA, or Marina. Of significance, Puebla featured only one accredited medical unit specializing in pediatric cancer treatment, namely, the Hospital para el Niño Poblano (HNP).

Turning our attention to health outcomes (based on 2018 data and Seguro Popular records), we noted that 47 medical facilities addressed 1,012 events (discharges) due to cancer among children under 19 years of age. A substantial majority of these cases, exceeding 80%, were treated at the HNP, the General Hospital of the Southern Medical Complex, and the Oncology Unit of the Southern Medical Complex. Acute lymphoblastic leukemia (ALL) accounted for 66% of the cases. In the same year, 158 cancer-related deaths were recorded (across all types) in this age group. Among them, 49 occurred in the city of Puebla. The municipalities of Tenampulco (76.54), Santa Inés Ahuatempan (75.77), Atexcal (61.92), and Tepango de Rodríguez (49.19) exhibited the highest specific mortality rates. Notably, despite Puebla reporting the highest number of cancer-related

deaths (49) among children under 21 years of age, the municipality possessed one of the lowest mortality rates (7.81).

Cancer-related deaths were most frequently observed among individuals affiliated with Seguro Popular (57.0%), IMSS, and IMSS-Oportunidades (19.6%). Leukemias constituted the predominant cause of death among individuals aged 1-21 years (ranging from 40.74% to 65%). For children under one year of age, tumors of uncertain or unknown behavior accounted for the leading cause (50%). Notably, across all cancer types and particularly in leukemia, male individuals exhibited higher mortality rates than their female counterparts.

Finally, our analysis unveiled a weak yet statistically significant positive correlation between the social lag index and the specific cancer mortality rate by municipality, as well as between the marginalization index and the specific cancer mortality rate by municipality ($r = 0.321$, $p = 0.0097$; and $r = 0.372$, $p = 0.002$, respectively).

This study represents the inaugural comprehensive exploration of the healthcare scenario affecting children and adolescents afflicted with cancer in the state of Puebla. Our findings illuminate the prevalence of poverty, marginalization, and lag within a considerable segment of the population, underscoring the disparities in healthcare accessibility. Furthermore, our results underscore the pressing need for additional accredited hospital units specializing in pediatric cancer care. Importantly, the study presents evidence suggesting a positive correlation between social lag, marginalization, and specific cancer mortality rates.

Keywords: Childhood cancer, adolescent cancer, pediatric cancer, cancer incidence, healthcare access, social disparities, cancer mortality, cancer treatment, healthcare services, marginalized populations, epidemiology, public health, socioeconomic factors, cancer research, health disparities, medical facilities, cancer screening, healthcare infrastructure, healthcare inequality, cancer epidemiology.

A Comparative Analysis of Internet Health Information on Pediatric Cancer in English and Spanish

ISBN: N/A

Author: *Not Specified*

Link: Read Full Publication

Abstract:

The availability of health information on the Internet has provided both advantages and challenges. Information dissemination has become effortless, but the quality and reliability of such information can be questionable. This study focuses on an important aspect of online health information, specifically addressing pediatric cancer, as it pertains to childhood cancer. Parents of children diagnosed with cancer often turn to the Internet for guidance, potentially impacting critical decisions regarding their child's treatment.

The objective of this investigation is to evaluate the quality of online resources related to childhood cancer available in both English and Spanish. To accomplish this, we employ three established tools for information assessment: JAMA Benchmarks, DISCERN, and HONCode.

Our findings reveal disparities between the quality of English and Spanish language websites regarding pediatric cancer information. English-language resources consistently exhibit superior information quality when assessed using the JAMA Benchmarks and DISCERN score criteria, whereas results using the HONCode standards do not exhibit a significant difference. These results emphasize the importance of considering linguistic disparities and quality evaluation when seeking health information on the internet, especially for sensitive topics such as pediatric cancer.

Keywords: Pediatric cancer, childhood cancer, internet health information, information quality, online resources, health information, English language, Spanish language, JAMA Benchmarks, DISCERN, HONCode.

Geographical Distribution of Childhood Cancer Types in the State of Puebla

ISBN: N/A

Authors: *Humberto Cantellano Rodríguez, Mariano Velasco Torres*

Link: Read Full Publication

Abstract:

Objective: This study aims to assess the incidence, prevalence, and geographic distribution of childhood cancer in the state of Puebla, with the goal of informing the development of a health policy focused on prevention and early diagnosis to mitigate morbidity and mortality among children in the region.

Methodology: We analyzed 394 cases of childhood cancer (0-19 years) with various types of neoplasia. Data were sourced from the Child and Adolescent Cancer Registry via the National Transparency Platform for the years 2017-2019. Incidence, prevalence, and mortality rates were calculated based on case numbers and population projections provided by the National Population Council (CONAPO).

Results: The average annual incidence rate was 5.4 cases per hundred thousand inhabitants, with an average annual prevalence rate of 3.8 cases per hundred thousand inhabitants. The average annual mortality rate stood at 2.2 cases per million inhabitants. The highest number of cases between 2017 and 2019 was concentrated in specific municipalities, notably Puebla (84) and San Martín Texmelucan (16) in the Metropolitan region, Tehuacán (16) in the Tehuacán region, Tecamachalco (11) in the Central region, Teziutlán (7) in the North region, and Chiautla (3) in the Mixteca region.

Conclusions: Leukemia emerged as the predominant childhood cancer type, constituting 59.6% of cases among infants (0-19 years) during the 2017-2019 period, with an average of 131 new

cases per year. The observed average mortality rate per year was 2.2 cases per million inhabitants. While there was a reduction in the time between diagnosis and first treatment, the duration between initial symptoms and diagnosis remains unknown. Therefore, a comprehensive analysis of this timeframe is imperative to reduce childhood cancer mortality.

Keywords: Childhood cancer, childhood neoplasia, risk factors, childhood leukemia, geographical distribution.

Relationship of Neck Circumference with Cardiometabolic Risk Factors in the Superintendent Staff of the Universidad Iberoamericana, Puebla

ISSN: 2644-0903 (Journal)

Author: *Oscar Daniel Ajuria Romero*

Link: Read Full Publication

Abstract:

Neck circumference, an anthropometric measure linked to the distribution of subcutaneous adipose tissue, can serve as an indicator of cardiometabolic risk factors. To substantiate this relationship, a cross-sectional study was conducted involving 47 adults of both sexes, with assessments encompassing anthropometric measurements, body composition, blood pressure, and biochemical parameters.

The findings of this study revealed significant associations in women, where a neck circumference of ≥ 34.9 cm correlated with elevated levels of serum glucose, HDL cholesterol, abdominal circumference, BMI (Body Mass Index), and ICC (Intra-abdominal Circumference). Among men, a neck circumference of ≥ 36.9 cm was linked to increased systolic blood pressure and abdominal circumference. Consequently, a neck circumference of ≥ 34.9 cm in women and ≥ 36.9 cm in men serve as indicative thresholds for identifying individuals at risk of cardiometabolic disorders.

Keywords: Neck circumference, cardiometabolic risk factors, anthropometric measurements, subcutaneous adipose tissue, biochemical indicators, abdominal circumference, body composition, BMI.

Effects of a Symbiotic Beverage on the Gut Microbiota of Overweight and Obese Female University Students in Mexico

ISSN: 2644-0903 (Journal)

Author: *Michelle Magaña Graillet*

Link: Read Full Publication

Abstract:

Introduction: Imbalances in the gut microbiota, known as dysbiosis, have been observed in overweight and obese individuals. Prebiotic and probiotic treatments have shown promise in addressing intestinal dysbiosis associated with obesity. However, a comprehensive understanding of the overall changes in gut microbiota composition is still needed.

Objective: This study aimed to evaluate changes in the gut microbiota of overweight and obese female university students following an intervention with a symbiotic beverage. Molecular techniques, specifically real-time qPCR, were employed to enrich existing research on the Mexican population's gut microbiota and explore new perspectives for obesity treatment.

Methodology: The symbiotic beverage was formulated using microorganisms isolated from pulque and aguamiel. A controlled clinical trial was conducted, involving female subjects aged 18 to 30 years ($n = 7$) with a BMI > 25 kg/m². Body composition and biochemical parameters were assessed, and fecal DNA was extracted for real-time qPCR to identify and quantify the Firmicutes and Bacteroidetes phyla present in the gut microbiota before and after an eight-week intervention with the symbiotic drink.

Results: The symbiotic beverage was prepared using the microorganisms *Lactobacillus plantarum*, *L. paracasei*, and *L. brevis*. There were no significant differences in anthropometric and biochemical parameters between the control and intervention groups

after the eight-week supplementation. While the copy number of the 16S ribosomal RNA gene corresponding to the Firmicutes phylum did not show significant changes, a significant increase ($p < 0.05$) was observed in the Bacteroidetes phylum among participants who consumed the symbiotic drink, suggesting an improvement in the intestinal dysbiosis associated with obesity.

Conclusion: Consumption of the symbiotic beverage led to an increase in the copy number of the 16S RNA ribosomal gene corresponding to the Bacteroidetes phylum, although no significant changes in anthropometric or biochemical parameters were noted. Longer intervention periods and the inclusion of participants with dyslipidemias may be necessary for further insights.

Keywords: gut microbiota, real-time qPCR, obesity, probiotics, pulque.

Effect of Feeding Types on Texture Profile, Collagen Content, and Volatile Compound Profile in Tudanca Calves' Meat

ISSN: 2644-0903 (Journal)

Author: *Myriam Gisel Carmona Viveros*

Link: Read Full Publication

Abstract:

This study aims to analyze the impact of three distinct feeding systems on the meat characteristics of Tudanca breed calves, evaluating the potential effects on the final meat quality. Tudanca cattle, classified as an endangered breed in Spain, have traditionally been utilized for meat production, primarily focusing on calf meat. Due to their rustic nature and adaptability to low-quality forage, these cattle play a vital role in sustainable and resilient meat production, especially in regions with varying food resource availability.

The research investigates whether differentiated diets contribute to distinct meat characteristics, providing insights into the potential changes and their underlying mechanisms. Understanding these aspects not only supports breed preservation but also ensures the production of sensory-quality meat aligned with market demands.

Meat samples were collected from 22 Tudanca breed suckling calves, reared at the Center for Agricultural Research and Training (CIFA) of Cantabria. The calves were initially fed with grass and mother's milk from birth to five months. After weaning, they were divided into three groups and subjected to different feeding regimes.

The study comprises three experiments:

Texture Profile Analysis (TPA): This experiment assessed meat quality attributes related to sensory characteristics. TPA was performed using a texture analyzer, measuring parameters such as hardness, elasticity, cohesion, and chewiness.

Collagen Content: The total, soluble, and insoluble collagen

content was determined to evaluate its impact on meat tenderness. Feeding had a significant effect on total collagen content, favoring one feeding group.

Volatile Compounds Analysis: This experiment aimed to evaluate meat quality attributes related to taste and aroma by analyzing volatile compounds. Gas chromatography coupled with mass spectrometry was used for the analysis, revealing the presence of various volatile compounds, primarily derived from lipid degradation/oxidation and the Maillard reaction. A more stable feeding system resulted in distinct volatile profiles.

Additionally, the study includes an analysis of terpene compounds found in the animals' food, which may contribute to the meat's flavor. These terpene compounds are believed to transfer directly from the food to the animals' tissues.

Overall, this research provides valuable insights into how different feeding systems can influence the meat characteristics of Tudanca calves, contributing to both breed preservation and the production of high-quality meat.

Keywords: Tudanca Calves, Feeding Systems, Meat Quality, Texture Profile, Collagen Content, Volatile Compounds, Terpene Compounds.

Note: Some information found in the original Spanish abstract has been omitted for brevity.

Effect of Fluoxetine on Neuronal Morphology in the Prefrontal Medial Cortex and Dorsal Hippocampus of Aging Mice: Implications for Senescence

ISSN: 2644-0903 (Journal)

Author: *Sandra García García*

Link: Read Full Publication

Abstract:

The global increase in the elderly population necessitates improved healthcare strategies to maintain their well-being. Fluoxetine hydrochloride, commonly known as Prozac, is a widely used treatment for mood disorders such as anxiety and depression. Previous studies have indicated that fluoxetine may impact neurogenesis by increasing neurotrophic factors and growth markers. Therefore, investigating the long-term effects of fluoxetine treatment in a senescence model can provide insights into its potential benefits or drawbacks in advanced age.

This research not only examines the current landscape of the elderly population but also delves into how the central nervous system is affected during the natural aging process. It explores various drugs that contribute to enhancing the quality of life for the elderly. The study evaluates the chronic administration of fluoxetine hydrochloride (prozac) in a senile animal model, involving daily subcutaneous applications. Subsequent assessments encompass tests to measure learning and memory processes and morphological analyses of neurons in critical regions, including the prefrontal medial cortex (layers three and five) and dorsal hippocampus (CA1, CA2, CA3). These brain regions commonly undergo alterations in connectivity during old age, either due to reduced activity or neuronal population decline.

The results indicate that sustained elevation of serotonin concentrations in the microenvironment, facilitated by transporter protein blockers, induces morphological changes in neurons due to the altered environment. These heightened serotonin levels are believed to play a crucial role in maintaining effective neuronal connectivity, promoting neurotrophic factors and even favoring neurogenesis, particularly in the hippocampus. However, the study finds minimal effects on behavior and no noticeable changes in the morphology of the mid-prefrontal cortex. Conversely, a reduction in dendritic spines is observed in the hippocampus.

Keywords: Fluoxetine, Neuronal Morphology, Aging, Prefrontal Medial Cortex, Dorsal Hippocampus, Neurotrophic Factors, Serotonin.

Evaluation of the Effect of a Symbiotic Drink on the Intestinal Microbiota of Mexican Students with Irritable Bowel Syndrome

ISSN: 2644-0903 (Journal)

Author: *Sara Paulina Gallegos Orozco*

Link: Read Full Publication

Abstract:

Introduction: Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder characterized by recurring abdominal pain and alterations in bowel movement frequency and appearance. Although various treatments are available, there is no universally preferred therapeutic approach. The pathophysiology of IBS remains unclear, but emerging evidence suggests a significant role for the gut microbiota. Meta-analyses indicate a modest yet significant impact of probiotic therapy on IBS symptoms across its sub-classifications.

Objectives: This study aimed to develop a symbiotic beverage and assess its impact on the gut microbiota, specifically targeting Bacteroidetes and Firmicutes using molecular techniques. The intervention was conducted among Mexican students with IBS in a simple, placebo-controlled trial.

Materials and Methods: Eight Mexican students enrolled in the Bachelor of Medicine program at UPAEP with diagnosed IBS according to Rome IV criteria and the IBSSS questionnaire participated. The average age was 18.8 ± 1.08 years, with both sexes represented (87.5% female, 12.5% male). The study encompassed three phases: first, the development of a symbiotic beverage using aguamiel and probiotic bacteria sourced from pulque; second, an 8-week intervention with one group receiving the symbiotic beverage and another a placebo; stool samples were collected before and after the intervention in both groups. The third stage involved

bacterial DNA extraction from fecal samples, analyzed via qRT-PCR before and after treatment.

Results: Consumption of the symbiotic beverage led to subjective improvement in symptomatology according to Rome IV Questionnaires and the IBSSS by the end of the treatment. Furthermore, the composition of the gut microbiota underwent changes, particularly in the Bacteroidetes and Firmicutes phyla, based on IBS sub-classifications. In IBS-E and IBS-M, Bacteroidetes decreased while Firmicutes increased ($p < 0.000$). In SII-D, both phyla increased ($p < 0.001$). Finally, in SII-NC, both phyla decreased at the end of treatment ($p < 0.000$).

Keywords: IBS, probiotics, prebiotics, diet, microbiota.

Behavioral and Education Sciences

Ciencias de la Conducta y la Educación

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Radio Speakers: Radio Speakers: Penetrating Urban Public Life and Spaces in Mexico City

ISSN: 2644-0903 (Journal)

Author: *Belegui Enríquez Santiago*

Link: Read Full Publication

Abstract:

This research delves into the world of radio speakers in Mexico City, a unique form of radio broadcasting that seeks to foster encounters, freedom of expression, dialogue, and social organization by reclaiming public spaces. Examining the nexus between communication, citizenship, and public space, this study uncovers the motivations and organizational processes of diverse groups hailing from marginalized areas affected by gentrification. These groups utilize streets, squares, and parks as impromptu radio studios to facilitate dialogue, promote art, recover individual and collective memories, and fortify community bonds.

Keywords: Public space, radio speakers, dialogue, citizenship, communication.

Best Teacher-Tutors Practices at the Upper Secondary Level: A Perspective on Educational Guidance at BUAP

ISSN: 2644-0903 (Journal)

Author: *Citlalli Estefanía Balbuena Soriano*

Link: Read Full Publication

Abstract:

Effective implementation of mentoring programs necessitates well-prepared teachers equipped with specific competencies that underpin their interventions and complement their teaching roles. This professionalization calls for contextually relevant and meaningful content. Consequently, the systematization and dissemination of best practices by teacher-tutors offer an opportunity to establish a body of conclusions derived from mentoring activities. These conclusions can serve as benchmarks for action and support focused training initiatives.

This thesis project focuses on identifying best practices employed by teacher-tutors at the Upper Secondary Level (HSE) of Benemérita Universidad Autónoma de Puebla (BUAP). These practices have contributed to certain Academic Units (AU) within the HSE being recognized as the best-evaluated units by BUAP's Comprehensive Student Accompaniment Coordination. The project aims to create an inventory of these practices, which, when shared, could potentially inform future innovative proposals. The research employs a mixed-methods approach with a sequential explanatory design, combining quantitative and qualitative perspectives.

This thesis project focuses on identifying the best practices of teachers-tutors at the Higher Secondary Level (HSE) of Benemérita Universidad Autónoma de Puebla (BUAP). These practices have contributed to certain Academic Units (AU) within this level being recognized as the highest-rated based on evaluations by the Coordination of Comprehensive Student Accompaniment at BUAP. The

aim is to create an inventory of these practices, which, when shared, can potentially serve as valuable input for future innovative proposals. This mixed research study employs a sequential explanatory design, incorporating both quantitative and qualitative perspectives.

The significance of this thesis work can be observed in three main dimensions:

The theoretical dimension involves identifying effective tutoring practices in the HSE of BUAP within a constructivist theoretical-practical framework and an educational guidance perspective.

The practical dimension pertains to the creation of the inventory.

The methodological dimension encompasses the establishment of dimensions, categories, and items of best tutoring practices for the development of instruments to collect data.

Keywords: Mentoring, professionalization, educational guidance, best practices.

Inventory of Strategies to Strengthen Reading Competence in UVP High School Students: A Comparative Study

ISSN: 2644-0903 (Journal)

Author: *Arcenia Soriano Marín*

Link: [Read Full Publication](#)

Abstract:

This research aims to assess the impact of reading strategies, focusing on the “aspects” dimension as proposed by PISA, on the reading competence (CL, *competencia lectora* in Spanish) of UVP high school students. The objective is to compare the reading competence levels of students before and after the implementation of suitable reading strategies, with the intention of identifying effective approaches for strengthening reading competence.

The study follows a structured process, including a pilot phase, pretest, intervention, and post-test. It involves both experimental and control groups to facilitate a comparative analysis. The research is formally situated within the quantitative paradigm, adopting an experimental design with a quasi-experimental approach, and its scope is descriptive.

To provide a comprehensive understanding of the research context, this paper explores the theoretical underpinnings of reading competence assessment. Subsequently, the results are analyzed based on variables observed at each stage of the intervention.

Keywords: Reading competence, reading strategies, student assessment, educational research.

Addressing Emotional Challenges in Adolescents and Young Adults During the COVID-19 Pandemic: A Public Policy Proposal for the State of Puebla

ISBN: 978-607-8839-12-4

Authors: *Graciela Isabel Wilson Corral (MA), Pedro Rivera Martínez (BA), Raúl José Alcázar Olán (PHD).*

Link: Read Full Publication

Abstract:

Emotional problems among adolescents and young people in Puebla, which existed before the COVID-19 health crisis, have been exacerbated due to the prolonged period of confinement since early 2020. This study aims to identify and mitigate the negative emotions experienced by many young individuals. Drawing on extensive research on emotions and survey responses from over 2,500 participants regarding emotional changes during the pandemic, this paper formulates a public policy proposal for the state of Puebla. The following summary outlines the key aspects of this proposal.

Emotions and the Federal and State Government:

Even before the pandemic, both federal and state governments had incorporated the adolescent and young populations into their laws, plans, and programs. However, it's worth noting that emotional health, in most cases, was not explicitly mentioned, with more emphasis placed on physical and reproductive health, as well as addiction prevention. Since the onset of the pandemic, various programs targeting youth have been introduced at both government levels, encompassing areas like mental health. Nonetheless, there is a growing need to intensify these efforts, particularly in light of the

substantial emotional distress that is significantly impacting the daily lives of young individuals.

Psychological Research on Emotions:

Formal research studies in psychology have revealed that the most effective method for teaching adolescents and young people to regulate their emotions involves exercises that include practice when the emotions are actually experienced. This approach is supported by the understanding that the retention of emotional regulation skills is closely tied to the emotional state in which the training is received.

Pandemic Impact: A Field Study on Emotions and Daily Activities:

This study conducted an investigation involving a sample of 2,587 adolescents and young adults from 32 municipalities in the State of Puebla. The selected municipalities represented a mix of poor and vulnerable areas as well as non-poor and non-vulnerable areas, as classified by CONEVAL in 2015. The study aimed to measure different emotions and activities among participants and compare their frequencies at two distinct time points: before and during the pandemic.

The findings reveal the extent of the damage caused by confinement and subsequent social isolation. More than half of the adolescents and young adults in the State of Puebla reported experiencing feelings of stress, worry, nervousness, sadness, emotional distance from others, irritability, bad moods, low spirits, and a reduced enjoyment of their relationships with others. Additionally, a significant portion acknowledged an increase in electronic device usage and staying up later than before, primarily attributed to these extended device usage patterns.

Public Policy Proposal for Addressing Emotional Problems:

To address these emotional challenges, this report presents a public policy proposal grounded in evidence-based psychology. The proposal encompasses four primary objectives: 1) Implement targeted interventions to help adolescents and young people reduce negative emotions exacerbated by the pandemic. 2) Raise awareness of emotional health among youth through the dissemination of scientifically supported information and materials. 3) Promote responsible and healthy electronic device usage, particularly at night, through psychoeducation. 4) Enhance the involvement of government agencies, specifically by increasing the presence of mental health professionals in schools, and advocate for an amendment to the Youth Law for the State of Puebla to incorporate an article focused on emotional health.

Keywords: Emotional health, adolescents, young adults, COVID-19 pandemic, public policy, psychological research, emotional distress, psychoeducation, mental health professionals, Puebla, youth law.

Gender Differences in Emotional Facial Recognition and Empathic Responses Among Individuals with Varying Levels of Empathy

ISSN: 2644-0903 (Journal)

Author: *Abuatzin-González Alma Lidia*

Link: Read Full Publication

Abstract:

This study aimed to explore the behavioral and physiological differences in emotional facial recognition between individuals with high and low levels of empathy, taking into account gender as a potential influencing factor. A total of 64 undergraduate students aged 18 to 30 participated, with equal gender representation, divided into high empathy (GA-E) and low empathy (GB-E) groups, each comprising 16 men and 16 women. Participants were exposed to dynamic stimuli featuring four basic emotional facial expressions, and their ocular fixations were tracked to analyze visual scanning patterns.

Additional assessments included participants' levels of alexithymia and their affective states. Notably, there were no significant differences in the accuracy of emotional facial recognition between the empathy groups. However, the high empathy group (GA-E) demonstrated higher scores in emotional congruence and empathic responses compared to the low empathy group (GB-E). Participants with low empathy exhibited a negative correlation with elevated alexithymia traits, which hindered their ability to evoke empathic responses. This finding suggests that low empathy may impact the quality of social interactions. Regarding psychophysiological data, both men and women exhibited more fixations on the eye region than the mouth and nose. Women with high empathy showed increased fixation time on the eyes, specifically in response to neutral stimuli and joy.

Ultimately, this study supports the hypothesis that empathy level and gender do not significantly influence emotional facial recognition accuracy. However, high empathy appears to enhance emotional congruence and empathic responses to dynamic emotional stimuli, while low empathy is associated with traits of alexithymia, potentially affecting empathic engagement. Different visual scanning strategies were observed, although these patterns did not seem to interfere with behavioral empathic responses.

Keywords: empathy, emotional facial recognition, dynamic stimuli, eye tracking, gender differences, alexithymia, affective states.

Yoga as a Complementary Therapy for Stress Management: A Comprehensive Exploration

ISSN: 2644-0903 (Journal)

Author: *María Silvia Eugenia Guerrero Herrera*

Link: Read Full Publication

Abstract:

This research delves into the multifaceted issue of stress, its assessment, and therapeutic options, with a primary focus on the practice of yoga. It offers a comprehensive understanding of stress, encompassing its biological, sociological, and psychological dimensions, recognizing it as a prevalent affliction in modern societies often referred to as the “disease of the century.” The study elucidates how chronic stress can manifest in various forms, including anxiety, depression, neurosis, addiction, and psychosomatic behaviors.

Conventional treatments within the field of psychology, such as behavior therapies, systematic desensitization, self-regulation, and cognitive-behavioral techniques, are explored for their role in stress management and mitigation. Special emphasis is placed on yoga as an alternative therapeutic approach. The investigation commences with an exploration of yoga’s definition, historical roots, underlying principles, and associated benefits.

The study delves into the practice of yoga, dissecting its components, including breathwork, its anatomical and physiological aspects, and its categorization as a foundational element of yoga practice. The therapeutic effects of yoga, encompassing postures, relaxation techniques, meditation, and their physiological and psychological advantages, are expounded upon. Furthermore, the intricate mind-body relationship, as scrutinized by eminent psychological researchers, is discussed.

To empirically evaluate the impact of yoga practice on stress, an

experiment is conducted, utilizing questionnaires administered before and after the intervention. Statistical analysis, including mean values and correlation coefficients, is employed to assess the observed changes in stress levels.

Keywords: stress, yoga, complementary therapy, stress management, psychological well-being, mind-body relationship.

Cognitive-Behavioral Psychotherapeutic Program for Fostering Self-Care Behaviors in Individuals with Type 1 Diabetes

ISSN: 2644-0903 (Journal)

Author: *Jessica Patricia Campoya Chacón*

Link: [Read Full Publication](#)

Abstract:

This case study explores a cognitive-behavioral psychotherapeutic intervention designed to promote self-care behaviors in an individual diagnosed with Type 1 Diabetes Mellitus, ultimately leading to the attainment of normalized glucose levels. The study encompasses eight therapeutic sessions, each characterized by specific objectives and assessments.

In the initial three sessions, a psychoeducational interview is conducted to gain insight into the patient's execution of diabetes-related self-care routines. These sessions involve inquiries into irrational beliefs, automatic thoughts, and cognitive distortions potentially influencing the management of the disease. Various assessment tools, including the Gordon Personality Profile-Inventory, Beck Anxiety Inventory, and the Koch Tree Test on multiple occasions, are employed throughout the intervention.

The therapeutic process is initiated based on the collected data and patient information. Notably, the patient is equipped with three glucose sensors from the Freestyle Libre® system. The historical data reveals the patient's average glucose levels (HbA1c) to be alarmingly high at 11.5%. Encouragingly, evaluative assessments indicate a remarkable 7.5% reduction in HbA1c levels during the intervention.

This study's outcomes underscore the significance of psychological interventions in the diagnosis, treatment, and crisis management phases of diabetes. Such interventions bring about favorable changes in patients, resulting in improved glucose control and overall

well-being. The study highlights the unexplored potential of psychology in the realm of diabetes care.

Keywords: cognitive-behavioral therapy, psychotherapeutic intervention, self-care behaviors, Type 1 Diabetes Mellitus, glucose control, psychological well-being.

Extreme Poverty Among the Elderly as an Actor-Network: Older Adults, Public Space, and Homelessness in Puebla City

ISSN: 2644-0903 (Journal)

Author: *Ana Patricia Huerta Jiménez*

Link: Read Full Publication

Abstract:

In Mexico, addressing the challenges of aging and ensuring decent living conditions for the elderly is a complex issue, despite the implementation of public policies by the National Institute for Older Adults (INAPAM). This research delves into the circumstances of extreme poverty experienced by some older adults in Puebla City's downtown Historic Center. Drawing on concepts from Actor-Network Theory, a quasi-ethnographic approach was employed to uncover elements within the network that contribute to the situation faced by these individuals.

The study reveals that extreme poverty among the elderly is marked by widespread exclusion, encompassing exclusion from opportunities for development, personal freedom, employment, and family support. It underscores the necessity of aligning institutional plans with the lived experiences of the elderly population, translating policy intentions into tangible actions.

Keywords: extreme poverty, elderly, Actor-Network Theory, homelessness, Puebla City, public policies.

Activism and Compassion: The Impact of Compassion Experience on Human Rights Defenders

ISSN: 2644-0903 (Journal)

Author: *María Fernanda Quezada Mosqueda*

Link: Read Full Publication

Abstract:

This research aimed to investigate the impact of experiencing compassion on activists advocating for human rights in the city of Puebla, particularly in managing and transforming their emotional distress. To achieve this, a 16-hour workshop was designed and implemented to strengthen the experience of compassion. This strengthening encompassed two main aspects: (1) fostering the components of the compassion process proposed by Clara Strauss et al. (2016), including recognizing suffering, understanding its universality in the human experience, emotional resonance, tolerance of uncomfortable emotions arising in response to the suffering person, maintaining an open and accepting attitude, and generating motivation to alleviate suffering, and (2) expanding the circle of compassion recipients to include not only beneficiaries of their cause but also themselves (self-compassion) and individuals with whom they encounter difficulties (compassion towards “difficult people”).

A qualitative methodology based on the narrative approach was employed, utilizing in-depth and semi-structured interviews to delve into participants’ vivid experiences during the process and the meanings they attributed to it from their unique perspectives. Subsequently, narrative analysis was conducted on the narratives expressed in the interviews and during the workshop sessions.

The results indicate that one of the primary effects of strengthened compassion, when directed towards the beneficiaries of the cause, is the mitigation of practices associated with pathological

altruism. Such practices often lead to discomfort and can result in partial or complete disengagement from activism. Thus, by effectively managing the emotional toll of witnessing human rights violations and nurturing a sense of closeness and empathy with the individuals they advocate for, compassion can contribute to the sustainability of activism.

Furthermore, self-compassion yields a wide array of psychological benefits for human rights activists in coping with and transforming their discomfort. These include liberation from over-identifying with painful experiences, acceptance of such experiences, recognition of one's own needs, heightened awareness of discomfort, a sense of belonging to a larger cause, improved receptivity to compassion from others, and motivation free from self-criticism. It also fosters feelings of warmth, tranquility, inner strength, and self-reliance.

Lastly, the dimension of "compassion towards difficult people" revealed that humanization through an understanding of fundamental needs and aspirations (such as happiness and freedom from discomfort) plays a pivotal role in managing and transforming the discomfort experienced by human rights activists. This approach alleviates and prevents the suffering of isolation.

In conclusion, compassion, when integrated into the framework of human rights advocacy, can enhance the sustainability of activism by providing valuable tools for managing emotional distress and fostering connections with others and oneself. Therefore, compassion serves not only as a crucial mechanism in affect regulation, as predominantly studied in psychological science, but also as a vital political tool contributing to the development of citizenship and social justice. It promotes the construction of a society that champions the rights and dignity of all individuals, based on a foundation of respect for human rights.

Keywords: compassion, human rights defenders, emotional distress, self-compassion, social justice, activism.

The Psychotherapeutic Process and Deep Natural Breathing: A Case Study on Overcoming Phobias

ISSN: 2644-0903 (Journal)

99

Author: *Luis Ivan Crespo Cruz*

Link: Read Full Publication

Abstract:

In Mexico, specific phobia disorders are alarmingly common, with thousands of individuals grappling with intense and irrational fears that disrupt their daily lives and overall well-being. This thesis presents a case study focusing on a woman diagnosed with myrmecophobia, a specific phobia related to ants. Through a series of nine psychotherapeutic sessions, this study showcases the successful elimination of the phobia and the subsequent alleviation of associated symptoms.

Data collection for the case study relied on multiple instruments, including observation, interviews, and the Koch Tree Test. Additionally, this research introduces and demonstrates the Deep Natural Breathing Technique, which played a pivotal role throughout the psychotherapy process.

The overarching objective of this research was to examine the impact of deep natural breathing in psychotherapeutic work, as evidenced by the psychotherapy sessions conducted. While various techniques and medications are available to manage phobia-related symptoms, some can be invasive and uncomfortable for individuals. In this study, the Deep Natural Breathing Technique is presented as a non-invasive and effective approach for controlling and ultimately eliminating phobic symptoms.

The results stemming from the psychotherapeutic intervention

demonstrate promising outcomes associated with the proposed breathing technique. This work aims to offer an alternative method that has exhibited positive results, thereby expanding the array of options available to promote health and well-being during psychotherapy sessions and enhance the overall effectiveness of psychotherapeutic interventions.

Keywords: psychotherapy, myrmecophobia, specific phobia, deep natural breathing, well-being, mental health.

Psychological Impact of COVID-19 on Survivors: Symptoms and Psychological Effects - A Technical Report

ISBN: N/A

Authors:

Elizabeth Bautista Rodriguez, Nadia Yanet Cortés-Álvarez, César Rubén Vuelvas-Olmos, Thelma Gonzalez Lopez, Narciso Morales Lopez, Cesar Flores De Los Angeles, Nancy Bibiana Perez Silva, Hector Alberto Aguirre Alarcon, Veronica Reyes Meza, Valeria Magali Rocha Rocha, Maria De Lourdes Reyes Vergara, Saul Rios Bernaldez, Jorge Escobedo Straffon, Laura Contreras Mioni, Luz Antonia Chavez Elorza.

Link: [Read Full Publication](#)

Abstract:

The COVID-19 pandemic, a global public health emergency, has led to profound economic, educational, and social repercussions. While the physical implications of the virus are well-documented, its toll on mental health is increasingly evident. However, most studies have focused on the general population's response to lockdown measures or the effects on healthcare workers, leaving a gap in understanding the psychological impact on individuals diagnosed with or recovering from COVID-19.

This study assesses anxiety, depression, stress, and psychological distress levels in 189 individuals currently battling or in recovery from COVID-19. Diagnostic instruments were administered virtually, with participants receiving immediate results and access to psychological support. Findings revealed that 16.4% of participants experienced moderate stress, 31.2% reported mild to moderate depression, and 22.2% exhibited moderate post-traumatic stress symptoms (psychological distress). Additionally, 8.5% of participants reported severe post-traumatic stress, indicating the need for

immediate mental health intervention in 40% of the sample.

Gender disparities emerged, with women scoring significantly higher in anxiety than men. Marital status played a role, as single individuals exhibited significantly higher levels of anxiety, depression, and psychological distress compared to their married counterparts. Participants with pets reported higher anxiety levels than those without. However, no significant differences were observed in relation to age, household size, or the presence of children.

Correlations between mood scores and reported symptoms highlighted several symptoms that positively correlated with higher depression, anxiety, and stress levels, including dry or irritated eyes, feelings of unwellness without a clear illness, appetite changes, and increased pain intensity. Importantly, participants reported persistent symptoms, albeit at reduced frequencies, after recovering from COVID-19.

These findings underscore the necessity of comprehensive health interventions, including mental health support, to enhance living conditions and mitigate the risk of psychiatric and physical disorders during and after COVID-19 recovery.

Keywords: COVID-19, SARS-CoV-2, anxiety, depression, stress, psychological impact.

Humanities

Humanidades

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The Persistence of Nahua Place Names and Anthroponyms in Cuautlancingo

ISSN: 2644-0903 (Journal)

Author: *Irma Xóchitl Cuauhtémoc Xicoténcatl*

Link: Read Full Publication

Abstract:

A unique characteristic of localities in the Puebla-Tlaxcala valley is the enduring presence of toponyms (place names) and anthroponyms (personal names) in the Nahuatl language. Of particular interest are those localities that, despite their proximity to the city of Puebla, have transitioned from rural populations to urban centers while retaining strong elements of cultural identity and roots.

One such example is the town of Cuautlancingo in the eponymous municipality within the state of Puebla. Although the native Nahuatl language has largely disappeared from this town, recent developments indicate a process of reevaluation. Expressions that have survived linguistic decline have emerged as catalysts for the exploration and preservation of the Nahuatl language.

This research explores the connection between the persistence of Nahua place names and anthroponyms and factors of identity, belonging, and affiliation. While these factors are not the sole determinants behind the endurance of Nahua place names and anthroponyms, they appear to play a fundamental role in the language's revaluation.

The primary objective of this study is to investigate whether Nahua place names and anthroponyms, specifically Nahua surnames within the population and property names in the locality, serve as identity markers that can facilitate the revaluation and subsequent revitalization of the Nahuatl language.

To achieve these objectives, a triangulation of quantitative meth-

ods (analysis of lists and questionnaires) and qualitative methods (participant observation and in-depth interviews) is proposed. These methods aim to uncover the factors that either promote or hinder the appreciation of place and personal names in the Nahuatl language in the town of Cuautlancingo. Ultimately, this research seeks to lay the foundation for future initiatives focused on revaluing the native language.

Keywords: Nahua place names, anthroponyms, Nahuatl language, identity, linguistic preservation, Cuautlancingo.

Note: Footnotes found in the original Spanish abstract have been integrated for better flow, and reference to annexes has been omitted for brevity.

Socio-cultural Transformations in San Sebastián de Alcomunga, Puebla, due to Interstate Migration

ISSN: 2644-0903 (Journal)

Author: *Ilse Elizabeth Rojas Flores*

Link: Read Full Publication

Abstract:

This thesis, titled “We Do Not Want to Get Close to the City,” authored by Ilse Elizabeth Rojas Flores, represents the culmination of an anthropological investigation. Its primary aim is to elucidate the prominent socio-cultural changes that have unfolded within a community nestled in the Sierra Negra de Puebla. These transformations have arisen as a consequence of the intricate dynamics associated with interstate migration, which this region has been grappling with for over three decades.

Furthermore, the thesis sheds light on the development of a migratory circuit, a phenomenon that stems from the historical challenges confronted by both the nation and the local region. This migration circuit has come into being as a response to these enduring issues, shaping the socio-cultural landscape of San Sebastián de Alcomunga, Puebla.

Keywords: Socio-cultural changes, internal migration, hybridization, transculturation, spatial mobility.

Deciphering Photographic Narratives in the Surrealist Works of Erik Johansson

ISSN: 2644-0903 (Journal)

107

Author: *Tania Guadalupe Vargas Nasal*

Link: Read Full Publication

Abstract:

Photographs possess narrative qualities that can be unraveled by dissecting and scrutinizing each constituent element, serving as the central focus of this thesis. The following investigation meticulously analyzes the narrative attributes inherent in the surrealism works of Erick Johansson. To attain this objective, an exploration of crucial facets such as photographic discourse and aesthetics was undertaken, with the surrealist movement and its foremost proponents providing the backdrop for this research. As an integral part of the theoretical framework, distinct categories were formulated to facilitate the analytical process. These categories are rooted in the elements of photographic discourse, encompassing iconographic aspects, rhetorical elements, metaphors, metonymy, synecdoche, antithesis, ellipsis, hyperbole, semiotic components, and dream elements.

Subsequently, a selection of five works by Erick Johansson was subjected to in-depth analysis using the aforementioned categories. The outcomes of this thesis illuminate the profound capacity of a photograph to convey a narrative. In the realm of surreal photography, the objective extends beyond mere storytelling; it beckons the viewer to embark on a journey through imaginative realms that challenge their perception of the world.

Keywords: Photographic discourse, surrealism, narrative analysis, Erik Johansson, visual storytelling.

Matthew Lipman's Philosophy for Children in the Context of Contemporary Mexican Education

ISSN: 2644-0903 (Journal)

Author: *Rosalinda Pérez Meléndez*

Link: Read Full Publication

Abstract:

This thesis delves into the pressing issue of education in contemporary Mexico, a context deeply marked by various forms of violence and the pervasive influence of systems such as capitalism, neoliberalism, and globalization. These power structures have significantly impacted the quality of education in the country.

On one hand, there exists a need for a reevaluation of the educational landscape. On the other hand, we find the Philosophy for Children movement and the Research Community of Matthew Lipman. Lipman, an American philosopher, expressed his concerns about higher education in the 1970s, particularly the stifling environment students faced due to repression. He identified philosophy as a discipline capable of fostering independent thinking and self-development, inviting contemplation on topics such as God, the good, death, being, and more. Lipman's approach shattered traditional paradigms by introducing philosophy to children. This program has gradually expanded, with workshops and even attempts to incorporate it into educational programs by Mexico's Secretariat of Public Education (SEP).

While the collaboration between education and philosophy has made tentative strides, both have untapped potential, especially philosophy's role in education. In a society grappling with escalating violence and diminishing values, where self-reflection and consideration for others are often overlooked, Mexican educational plans have leaned heavily toward technical skills, neglecting the develop-

ment of the self and its full potential. This thesis also underscores the need to defend Mexican philosophy, a tradition often distorted even within the philosophical community itself.

Keywords: philosophy, education, Mexican philosophy, technique, Philosophy for Children, Research Community, values, being, quality, neoliberalism, capitalism, globalization, violence.

Agroecology Versus Conventional Agricultural Production Processes: A Case Study of the Vicente Guerrero Group

ISSN: 2644-0903 (Journal)

Author: *Ana María Caso Cueva*

Link: [Read Full Publication](#)

Abstract:

This thesis takes an anthropological perspective to explore agroecology as a comprehensive alternative to the agro-industrial production model. It focuses on the Vicente Guerrero group, an agricultural organization that practices agroecology in their community. This group not only engages in sustainable farming practices but also participates in the farmer-to-farmer movement, sharing their traditional knowledge and experiences with farmers from other communities. This approach goes beyond agricultural production and encompasses ecological, economic, social, and cultural dimensions. It emphasizes the importance of customs, traditions, the relationship between society and nature, worldview, and farmer identity within the context of agroecology. This research highlights that agroecology is not just a farming system but a holistic approach that revitalizes social and cultural aspects of farming communities.

Keywords: Agroecology, conventional agriculture, sustainability, farmer-to-farmer movement, cultural preservation, community identity.

Considerations on Community in the Thought of Jean-Luc Nancy in the Context of Contemporary Violence

ISSN: 2644-0903 (Journal)

111

Author: *Óscar Moisés Romero Castro*

Link: [Read Full Publication](#)

Abstract:

This research delves into the concepts of violence and community as expounded by the contemporary philosopher Jean-Luc Nancy. It engages in philosophical reflection to explore whether the context of violence holds any potential for the emergence of community or a sense of being-in-common. The study acknowledges that violence typically occurs when one human inflicts harm upon another. This raises the question: Can a sense of community be fostered in an environment plagued by violence? To address this question, the research draws upon contemporary philosophy to examine the historical conception of community as a construct that often resulted in the elimination of other cultures, collectives, or individuals. Violence, rooted in the denial of plurality and the uniqueness shared by all individuals, compels us to reevaluate what binds us together in modern societies. In doing so, we contemplate our connections with others, ultimately revealing the inherently relational nature of humanity.

Keywords: Community, violence, Jean-Luc Nancy, contemporary philosophy, plurality, relationality.

Public Policies Regarding Historical Heritage in Puebla: Examining Atlixco as a Cultural Landscape in the Pueblos Mágicos Program (2002-2015)

ISSN: 2644-0903 (Journal)

Author: *Andrea Guevara Gonzalez*

Link: [Read Full Publication](#)

Abstract:

The Pueblos Mágicos (Magical Towns) program is guided by national legislation, regulations, and a standardized strategy. It also emphasizes the involvement of various social sectors in the preservation and management of heritage. The program aims to create strong identity connections with heritage, fostering a moral commitment to its protection and dissemination.

This research explores the Pueblos Mágicos program, which designates certain towns based on institutional criteria to recognize their cultural and historical richness, symbolically legitimizing them as tourist destinations. This recognition is intended to promote economic development by leveraging both tangible and intangible heritage, leading to job creation and an improved quality of life for residents.

However, it emphasizes that historical heritage should not be perceived as having inherent “magic.” Instead, it advocates for valuing heritage from a historical perspective. Culture, traditions, built environments, and natural heritage are viewed as products of societal practices and creations governed by accepted rules, often of symbolic or ritual significance. These practices aim to convey specific values or social norms and contribute to the continuity and preservation of

the past, thereby shaping the identity of the people inhabiting these Pueblos Mágicos.

Keywords: Public policies, historical heritage, Pueblos Mágicos program, cultural landscape, identity, societal practices, preservation, continuity.

The Industrial Legacy of Zacatlán: Centennial Clocks and the San José Tlalixtlipla Ironworks (1918-1986).

ISSN: 2644-0903 (Journal)

Author: *Enrique Hernández Carrasco*

Link: Read Full Publication

Abstract:

Clocks are ubiquitous machines in the daily lives of people, often taken for granted. However, their significant role in regulating daily activities became evident in cities during the Industrial Revolution. The development of railways, the rise of industrial enterprises, and rapid urbanization all underscored the importance of timekeeping.

This phenomenon extended to Mexico, particularly in the state of Puebla, where a family business specializing in mass-produced clocks emerged. In 1909, Alberto Olvera Hernández conceived the idea of constructing a large-scale clock to help his laborers keep track of their tasks based on the time of day. Little did he know that this initial clock, completed in 1912, would eventually lead to the establishment of Relojes Centenario, a company that has been manufacturing clocks for a century.

This research delves into the multifaceted aspects that contributed to the company's formation. It begins by reflecting on the significance of clocks and time in daily life, followed by an examination of the role of industrialization in societal progress. Finally, it provides a case study focused on Zacatlán and its industrial heritage, with a particular emphasis on the San José Tlalixtlipla ironworks and the parent company of the watch industry, Relojes Centenario.

Keywords: Industrial heritage, Zacatlán, Centennial Clocks, San José Tlalixtlipla Ironworks, Relojes Centenario, industrialization, timekeeping, social development.

The Hispanic American Insurgents' Community and Their Relationship with British Society During the Independence of New Spain

ISSN: 2644-0903 (Journal)

Author: *Paula Elena Slim Tecuanhuey*

Link: [Read Full Publication](#)

Abstract:

This research aims to investigate the activities of New Spanish agents within the Hispanic American community residing in London during the era of Latin American independence movements. The primary focus of this community was to propagate the ideals of independence, with the goal of garnering economic and military support from British society and the government to aid the emancipation of Spanish America. The Hispanic American Community in London effectively established a network of influence that interconnected with various commercial, social, and political networks to advance the cause of emancipation. One notable outcome of these activities was the financial support provided to the expeditions led by Xavier Mina and Fray Servando Teresa de Mier in 1816, specifically concerning New Spain.

This research adopts a network theory methodology to analyze the connections between British power networks and the Hispanic American Community. It places particular emphasis on the activities of key figures within the community, such as the Fagoaga family, Fray Servando Teresa de Mier, and Xavier Mina, as well as their roles in planning the expeditions. The study examines publications authored by Mier and other actors in London, as well as the proclamations issued by Xavier Mina during his expedition. Additionally,

it investigates the role of the liberal newspaper, the Morning Chronicle, as a significant source for promoting emancipatory ideals.

Keywords: Network, power, ideals, Hispanic America, community, expedition, emancipation, conspiracy.

Social Sciences

Ciencias Sociales

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Estimation of Retirement Age in Mexico Using an Interval Regression Model for Censored Data

ISSN: 2644-0903 (Journal)

Author: *Ayslyn Guadalupe Bolaños Vázquez*

Link: [Read Full Publication](#)

Abstract:

The determination of the retirement age in Mexico has become increasingly uncertain, with limited literature available on the subject. To address this issue and obtain meaningful insights, mathematical methods that offer high probabilities of effectiveness are often employed. The decision to retire from the labor market carries significant implications for several reasons:

It impacts the overall labor force participation rate.

It influences economic outcomes, including the Gross Domestic Product (GDP).

It affects income distribution as individuals transition out of the workforce, leading to fluctuations in consumption and savings.

Given the importance of this topic, it is crucial to expand the existing body of literature. In this research, we employ a regression method specifically designed for censored data known as “interval regression.” This method considers both an individual’s age and their circumstances related to exiting the labor force as key factors in the analysis.

Building on this foundation, our work seeks to characterize the data gathered by the National Survey of Occupation and Employment, particularly focusing on data from the year 2014. The primary objective is to provide a comprehensive understanding of the retirement patterns in Mexico. Ultimately, this research aims to offer a more

accurate estimation of when individuals in Mexico typically discontinue their job search and cease earning income from work, signifying a period when they have no intention of returning to the workforce.

Keywords: Retirement age, labor force, interval regression, censored data, economic outcomes, income distribution.

Puebla Migration Yearbook 2020-2021

ISBN: 978-607-8839-07-0

121

Authors: *José Manuel Préstamo, Monica Flores.*

Link: Read Full Publication

Abstract:

Migration plays a pivotal role in shaping our region, with significant impacts and implications for development. Historic migrations have laid the foundation of our cultures, contributing new ideas and enriching the character of our binational region. It is therefore a collective responsibility to protect and celebrate the lives of the millions of migrants who play a vital role in enhancing our nation's diversity and prosperity.

However, the ongoing global health crisis has exacerbated the challenges faced by migrant communities, leading to deteriorating living conditions. The COVID-19 pandemic has triggered multi-dimensional crises, profoundly affecting the well-being of migrant communities from Puebla residing in the United States.

This yearbook presents an analysis of the current circumstances confronting Puebla's migrant communities in the United States. It sheds light on the challenges they encounter in their host country, highlighting the heightened vulnerabilities they face in areas such as education, nutrition, economics, and social well-being due to the COVID-19 pandemic.

Keywords: Puebla migration, COVID-19 health crisis, Mexico-United States.

Reflections on Online University Education: Student Voices

ISSN: 2644-0903 online

Authors: *Yulia Solovieva, Paulina Alvaréz, Carol Vega, Miriam Vázquez, Luis Quintanar.*

Link: [Read Full Publication](#)

Abstract:

The sudden shift to online education in response to the pandemic has brought about unexpected consequences, particularly in how students experience and perceive this new learning modality. This article aims to provide an analysis of reflections shared by university students regarding their own experiences with the teaching and learning process during the pandemic.

The study focused on 50 undergraduate psychology students who were interviewed interactively online. The findings of this research predominantly reflect negative sentiments among students regarding online education. The article discusses the possibility of implementing methodological changes in higher education and emphasizes the crucial role of maintaining direct and positive communication between teachers and students in the online learning environment.

Keywords: Online education, pandemic, teaching and learning, student experiences, communication.

Margination and Poverty as Causes of International Migration: The Case of the Mixteca Region of Puebla

ISSN: 2644-0903 (Journal)

Author: *Norma Fernanda Rivera Guerra*

Link: [Read Full Publication](#)

Abstract:

This research focuses on conducting a case study in the Mixteca region of Puebla to examine the factors contributing to international migration in the majority of its municipalities. The study reveals that the primary drivers of migration are the high levels of poverty and marginalization experienced in these communities. As a result, the study underscores the importance of developing new strategies for the local population to address these issues. Migration, it argues, cannot serve as a comprehensive solution to the problems of poverty and marginalization. Instead, it functions as an outlet for millions of people worldwide who are seeking improved well-being prospects, even if it means a decline in their quality of life and, in some cases, risking their lives. The research concludes by highlighting international migration as an urgent issue that must be addressed on both international and national economic agendas.

Keywords: Margination, poverty, international migration, Mixteca region, well-being, development strategies.

Irruption as Subversion: Mazatec Women at the Todos Santos Festival

ISSN: 2644-0903 (Journal)

Author: *Angela Nanni Alvarez*

Link: Read Full Publication

Abstract:

This document presents an ethnographic study of Mazatec women from the San José community in the Sierra Negra region of Puebla, Mexico. These women actively participate in a traditionally male-dominated ritual, the huehuentones dance, during the Todos Santos festival, challenging gender norms prevalent in their daily lives. This research investigates the process of female subjectivity by examining three critical phases: the acquisition of gender-specific roles through learning and labor division, the dynamics of marriage and nuclear family formation, and the complexities of conjugal life marked by coercion.

By juxtaposing these everyday situations with the narrative surrounding the Todos Santos festival and huehuentones dance, we explore how women engage actively in questioning, discussing, contesting, and subverting traditional gender roles. Our objective is to analyze how Mazatec women organize and participate in the dance as a means of challenging gender-based subjectivity imposed by their daily lives.

Drawing on open interviews, life stories, participant observation, and relevant literature, this study offers insights into the complex interplay between daily gender subjectivation processes and women's opportunities for self-determination, highlighting the role of exceptional circumstances in reshaping gender dynamics.

Keywords: Mazatec women, Todos Santos festival, huehuentones dance, gender roles, subjectivity, subversion, gender norms, female empowerment.

Technical and Social Feasibility Analysis of Adventure Tourism in Three Communities in the Municipality of Zoquiapan, Puebla

ISSN: 2644-0903 (Journal)

125

Author: *Isabel García Hernández*

Link: Read Full Publication

Abstract:

This publication discusses the feasibility of adventure tourism in the municipality of Zoquiapan, Puebla, emphasizing the importance of conducting a feasibility study before implementing such tourism activities. Adventure tourism has the potential to stimulate local economic development but can also have negative impacts on culture and biodiversity. In Zoquiapan, tourism activity has been promoted, often by individuals from outside the municipality, leading to tensions within the local community.

To address these issues, the author conducted a study to assess both the technical and social feasibility of adventure tourism in the municipality, focusing on three specific communities: Arenal, Tahícan, and Zoquiapan. The central research question was whether these communities possessed the necessary elements to support adventure tourism development. The research objective was to analyze the technical and social viability of adventure tourism in these communities.

The study utilized a mixed-methods approach, incorporating both qualitative and quantitative data collection methods. The research findings revealed the tourism potential and viable activities in each community:

Zoquiapan: Spelunking (caving).

El Arenal: Canyoning, camping, and spelunking (caving).

Tahican: Canyoning, camping, and cycling.

However, the study also identified various challenges and problems that need to be addressed to ensure the successful development of tourism in these communities.

Keywords: Adventure tourism, feasibility analysis, local development, community tourism, tourism potential, challenges, municipality of Zoquiapan, Puebla.

Relationship Between the Local Community of Zoquiapan, Puebla, and Its Visitors: A Perspective from Social Exchange Theory

ISSN: 2644-0903 (Journal)

Author: *Margarita Tirado Bautista*

Link: Read Full Publication

Abstract:

The Social Exchange Theory serves as a fundamental framework for comprehending the exchange of resources within social interactions and relationships among individuals and groups. Rooted in the concept that social behavior involves the exchange of tangible or intangible resources, this theory, as conceptualized by Homans (1961), underpins the exploration in this study.

This investigation aims to shed light on the nature of the relationship between the local community and visitors to Zoquiapan, a municipality situated in the northeastern Sierra of the State of Puebla, renowned for its abundant biodiversity and captivating landscapes. The primary focus is to examine the trust factor within the context of social exchange, emphasizing the reciprocal interactions between the local residents and visiting individuals. Furthermore, this study delves into the perspectives of the local community regarding their interactions with visitors, aiming to discern whether a sustained cost-benefit dynamic exists and to ascertain the durability of these relationships within the framework of balanced social exchange and trust.

Zoquiapan's unique geographical location and rich natural and cultural assets render it an ideal candidate for tourism development,

offering the potential to enhance social and economic well-being while preserving and respecting the natural and cultural heritage of the region.

Keywords: Social Exchange Theory, community-visitor relationship, trust, cost-benefit analysis, Zoquiapan, Puebla, tourism, natural and cultural resources.

Tourism Planning in the Vicinity of Pozas La Junta and El Diablo, in Zozocolco de Hidalgo, Veracruz.

ISSN: 2644-0903 (Journal)

Author: *Sandy Chino Palomino*

Link: Read Full Publication

Abstract:

Tourism is widely recognized today as a catalyst for development and inclusive community engagement. Therefore, effective tourism planning is essential to address any issues that may arise in the absence of intervention. Achieving balanced and sustainable tourism planning requires a strong foundation in the social and cultural aspects of the community, as well as a deep understanding of the geographical context in which tourism activities take place.

To create a comprehensive representation of the territories involved and to ensure the inclusion and empowerment of marginalized populations, spatial decision-making tools accessible to all stakeholders interested in improving their environment without harming it are needed. Public Participation Geographic Information Systems (PPSIG) possess unique characteristics that make them valuable in this context. They are interdisciplinary, integrating community development aspects, social theories, and participatory research methods. Moreover, they enable the inclusion of segments of society that have traditionally been marginalized.

This study focuses on Zozocolco Hidalgo, Veracruz, a town designated as a “Pueblo Mágico” (magical town) due to its abundance of natural and cultural resources suitable for tourism. However, the study notes that public participation has not been adequately considered to enhance tourism development in accordance with the specific characteristics of the local territory. To address this gap, the

research applies Geographic Information Systems with Public Participation to facilitate community engagement and informed decision-making for sustainable tourism planning.

Keywords: Tourism planning, public participation, Geographic Information Systems, community development, Zozocolco de Hidalgo, Veracruz, sustainable tourism.

Shared Custody in Mexico: An Analysis from the Perspective of the Best Interests of the Child and Comparative Law with Spain and Chile

ISSN: 2644-0903 (Journal)

Author: *Harumi Fernanda Carranza Magallanes*

Link: Read Full Publication

Abstract:

This study delves into the vulnerable position of minors during parental separations or breakups, shedding light on an often overlooked and defenseless segment of the population. While national and international norms emphasize “the best interest of the child,” the practical application of these principles often places the rights of parents above those of the child. Therefore, there is a pressing need for specific regulations that prioritize the rights and well-being of minors involved in separation, divorce, or any legal proceedings related to guardianship and custody.

To address this issue, the research proposes the creation of a Protocol of Judicial Action that outlines guidelines to be followed before, during, and after the determination of guardianship and custody arrangements. The ultimate goal is to ensure that the best interests of the child are upheld and protected throughout the legal process.

Keywords: Shared custody, best interests of the child, comparative law, Mexico, Spain, Chile, Protocol of Judicial Action, guardianship, custody.

Afro-Mexican Voices: Visibility and Recognition

ISSN: 2644-0903 (Journal)

Author: *Cynthia Jasmine Lopez Najera*

Link: Read Full Publication

Abstract:

Mexican identity has traditionally been characterized by a blend of mixed races, primarily indigenous and white. However, in the contemporary landscape of social movements, Afro-Mexican identity has emerged as a significant phenomenon, marked by activism, politics, and a quest for recognition. Over the past two decades, individuals of African descent in Mexico have actively engaged in social demands, advocating for their rights and recognition from the state.

This study delves into the voices and experiences of various actors within the Afro-Mexican movement who are working towards social and constitutional recognition. Their activism is rooted in a historical context, driven by a desire for legal inclusion and a collective memory of past struggles against discrimination. Through an analysis of identity, recognition, and visibility, this research explores concepts such as whiteness, pigmentocracy, racism, and classism, shedding light on the complex social dynamics surrounding the Afro-Mexican movement. Ultimately, this study contributes to a deeper understanding of the Afro-Mexican experience as an integral part of Mexico's diverse identity.

Keywords: identity, Afro-Mexican, recognition, visibility, activism.

Television Consumption in the Municipality of Puebla and Its Influence on Political Culture

ISSN: 2644-0903 (Journal)

Author: *Mary Kriss Parra Górriz*

Link: Read Full Publication

Abstract:

Political culture plays a crucial role in the functioning of a political regime, particularly in a democratic context. It shapes how citizens engage with political processes and institutions, affecting both the input and output of political demands. This study hypothesizes that certain elements of political culture influence television consumption patterns, and conversely, television consumption, whether public or private, impacts the political culture of citizens.

Conducting a statistical study in the municipality of Puebla, Mexico, with a 95% confidence level and a margin of error of $\pm 5\%$, the research identifies custom, knowledge (the desire for information), beliefs, and political socialization as the key components of political culture that affect television consumption. The findings indicate that individuals who exclusively watch public television tend to exhibit a subject-participant political culture. Similarly, those with access to private (subscription-based) television services also exhibit this culture but tend to identify more channels for participation and perceive greater opportunities for influencing public decisions.

Keywords: Political culture, public opinion, political socialization, television's relationship with political culture, television and democracy.

Disciplinary Scientific Literacy Practices: Electronics in Networked Environments

ISSN: 2644-0903 (Journal)

Author: *Rocío Brambila Limón*

Link: [Read Full Publication](#)

Abstract:

This thesis delves into the examination of academic production processes within a community of practice at the National Institute of Astrophysics, Optics, and Electronics, situated within an international disciplinary network. The study draws from neo-institutionalism and new literacy studies, employing a theoretical framework rooted in Ph.D. studies. It employs several key categories for analysis, including scientific roles, the role of technology in scientific reading and writing, the purpose and utility of scientific writing, enculturation, collaboration, and uncertainty in the communication process.

The research utilizes a qualitative methodology, with a focus on a group of nine electronics researchers and their academic advisor, who has been fostering collaborative publication within the group for a quarter-century. The study incorporates in-depth interviews and bibliometric measurements of their research productivity. The primary findings reveal that the group predominantly publishes in English, with an annual publication rate per researcher exceeding that of their peers in the same discipline in Mexico, averaging 7.2 (when including conference papers) and 3.7 (considering only articles in specialized journals). Collaborative efforts in publishing contribute to their recognition in a highly competitive disciplinary field.

Ultimately, the study's findings present a collaborative learning model that surpasses national standards within the discipline in terms of scientific production and the number of doctoral gradu-

ates. This model has the potential to elevate scientific literacy levels within the Science and Technology sector in Mexico, provided it is applied across various disciplines and academic institutions.

Keywords: Scientific literacy, academic production, interdisciplinary collaboration, international collaboration, scientific communication.

Negative Electoral Campaigns: A Comparative Analysis of Audiovisual Strategies in the United States and Mexico

ISSN: 2644-0903 (Journal)

Author: *David Melgarejo Calva*

Link: Read Full Publication

Abstract:

This study conducts a comparative analysis of negative political advertising during the 2012 electoral campaigns in Mexico and the United States. The comparison is based on the content analysis of official television advertisements from both countries.

By examining how political advertising adapts within broadcasting systems characterized by distinct features, this international comparison aims to shed light on the differences and similarities in audiovisual strategies employed in negative electoral campaigns. The study ultimately draws key conclusions from this comparative analysis.

Keywords: Negative political advertising, electoral campaigns, content analysis, international comparison, audiovisual strategies.

The Unconstitutionality of Section V of Article 256 of the National Code of Criminal Procedures: Impunity and Opportunity Criteria

ISSN: 2644-0903 (Journal)

Author: *Cristina Liliana Quia Carrillo*

Link: [Read Full Publication](#)

Abstract:

This study delves into the constitutional implications surrounding Section V, Article 256 of the National Code of Criminal Procedures (CNPP) in Mexico. The CNPP, established in response to the constitutional reform in Public Security and criminal justice in 2008, introduces criteria of opportunity for the non-prosecution of criminal action by the Public Ministry. Of particular concern is one such criterion within Section V, which seemingly legitimizes impunity by allowing the Public Ministry to refrain from prosecuting individuals when they provide crucial and effective information leading to the investigation of a more severe crime than the one they are charged with and willingly appear in court.

This investigation explores the conflict between CNPP, a secondary legal framework, and the Political Constitution of the United Mexican States (CPEUM), the supreme law of the land. Through a deductive approach, we analyze these legal regulations, revealing an apparent constitutional incongruity. Furthermore, an inductive method is employed to demonstrate the specific unconstitutionality of Section V, Article 256 of the CNPP. This unconstitutionality arises from its contradiction with Section I, Section A, Article 20 of the CPEUM, emphasizing that secondary laws should not supersede the provisions of the superior Mexican legal framework.

This research underscores the significance of addressing the poten-

tial implications of CNPP on the principle of ensuring that the guilty do not escape justice, as mandated by the Mexican Supreme Law. It contributes to the ongoing discourse on the Mexican criminal justice system's effectiveness and its adherence to constitutional principles.

Keywords: Constitutional Reform, Criminal Justice, Impunity, Mexican Supreme Law, National Code of Criminal Procedures, Opportunity Criteria, Secondary Legal Framework.

Geographical Profiling of Homicides in the City of Puebla (1990-2010)

ISSN: 2644-0903 (Journal)

139

Author: *Israel Salomón Huerta Manzano*

Link: Read Full Publication

Abstract:

This research, focuses on geographical profiling of homicides in the City of Puebla, Mexico, between 1990 and 2010. Drawing on situational theories of Environmental Criminology, the study aims to determine the “journey to the crime,” specifically the average distance criminals travel from their routine activities to the location where the homicide occurs.

The Manhattan Method is employed to calculate the average distance for different key displacements, including the distance from the offender’s residence to the crime scene, the distance from the victim’s residence to the crime scene, and the distance from the offender’s residence to the victim’s residence. The analysis covers 80 cases of male penitentiary inmates convicted of intentional homicide during the specified timeframe, resulting in a total of 240 routes examined.

The study reveals that, in most cases, both the distance from the offender’s residence to the crime scene and the distance from the victim’s residence to the crime scene did not exceed 2 kilometers, with 1,924 km and 1,807 km, respectively. However, the distance from the offender’s residence to the victim’s residence was notably higher, reaching 2,847 km, indicating a longer journey.

Key findings indicate that 75% of all journeys analyzed involved distances of less than 2 kilometers between the offender’s residence and the homicide location.

Keywords: Geographical profiling, journey to crime, Manhattan Method, homicide, criminological profiling, criminological mapping.

The Role of Criminology in the Implementation of a Court for the Treatment of Addictions in Puebla

ISSN: 2644-0903 (Journal)

Author: *Cindy Stephannie Cetz Moreno*

Link: Read Full Publication

Abstract:

This research project focuses on the analysis of the implementation of a Court for the Treatment of Addictions in the state of Puebla, Mexico. The study aims to highlight the areas where criminology can play a significant role in the functioning of such courts. These specialized courts represent an innovative approach to tertiary prevention by providing an alternative to incarceration for individuals whose criminal behavior is rooted in substance abuse.

The research proposal encompasses the development of a treatment plan, emphasizing the inclusion of criminology professionals in the various stages of its implementation.

Keywords: Criminology, Court for the Treatment of Addictions, substance abuse, tertiary prevention, alternative measures to incarceration.

Government Communication and Exclusion: Women in the Multimodal Discourse of the Federal Government

ISSN: 2644-0903 (Journal)

Author: *Veronica Lestrade Castillo*

Link: Read Full Publication

Abstract:

This research addresses the issue of women's exclusion within the multimodal communication program of the Federal Government. It centers on the "Inclusive Mexico" axis of the National Development Plan under the government of Enrique Peña Nieto, which aimed to create equal opportunities for all segments of the population. The study seeks to understand how government communication during policy and program dissemination contributes to the exclusion of certain discursive representations of women within the context of human rights and freedoms.

The research employs a qualitative methodology to explore how government communication can lead to the exclusion of women through the discursive representations it propagates. Multimodal Discourse Analysis is used to interpret the phenomena observed in the collected data, which is analyzed through an inductive approach.

The findings of this investigation suggest that the communication strategy employed by the government of Enrique Peña Nieto was influenced by heteronormative thinking. It reflects a heteronormative hegemonic discursive representation of women. The study concludes that the government's efforts to build consensus were based on heteronormative hegemonic representations, framed within a paternalistic image of the federal government.

Keywords: Government communication, exclusion, women, multimodal discourse, heteronormativity, human rights.

Nut Festival: A Proposal to Promote Rural Tourism in the Auxiliary Board of Xonocuautila, Tlatlauquitepec, Puebla

ISSN: 2644-0903 (Journal)

Author: *Marisol Mestiza Guerrero*

Link: Read Full Publication

Abstract:

This document presents the proposal for the Nut Festival, which aims to address a specific problem and opportunity in the Auxiliary Board of Xonocuautila, located within the municipality of Tlatlauquitepec, Puebla. Before delving into the proposal, the document provides relevant information about the community. It establishes a theoretical framework that supports the core idea, drawing from concepts such as domestic unit reproduction, rural tourism, event tourism, and festivals.

The methodology employed in this research involved identifying key stakeholders in the Auxiliary Board and gathering their opinions on the Nut Festival proposal through interviews. Additionally, the document outlines the profile of rural tourists who would be the target audience for the festival.

The gathered information was analyzed and classified to create the Nut Festival proposal. The methodology follows the guidelines established by CONACULTA (National Council for Culture and Arts) to develop cultural projects. The proposal not only includes the festival concept but also provides a schematic representation of the festival and outlines the initial steps required for planning and implementation.

Designing this proposal is essential as it lays out critical considerations and the necessary steps for executing the Nut Festival.

The sampled population generally agrees that hosting such an event could benefit the community by promoting local products, highlighting the community's unique characteristics, and facilitating various rural tourism activities.

Keywords: Community events, alternative tourism, product diversification, promotion of tourism activities, community perception.

Right to Prior, Free and Informed Consultation as a Mechanism for the Protection of Territory in the Northeastern Sierra of the State of Puebla: Case of the Hydroelectric Project in Tuxtla, Zapotitlán de Méndez, Puebla. 2008-2019

ISSN: 2644-0903 (Journal)

Author: *Ambrosio Juárez Esteban*

Link: [Read Full Publication](#)

Abstract:

The international recognition of the right to consultation, as enshrined in the Convention 169 for Indigenous and Tribal Peoples in independent countries, underscores the importance of prior, free, and informed consent on matters impacting society, particularly as a collective human right of indigenous peoples and communities, including those in Mexico. However, the understanding and application of this right have lacked specificity. Since 2008, indigenous communities in the Sierra Norte of the State of Puebla have engaged in a steadfast defense of their territory, prompted by concerns surrounding the implementation of hydroelectric projects.

This document presents the outcomes of an investigation that scrutinizes and elucidates the international and national theoretical and regulatory framework governing the right to prior, free, and informed consultation. It then contrasts these legal aspects with their real-world implications within the social, cultural, and political milieu, focusing on the case study of the Tuxtla community in Zapotitlán de Méndez, Puebla. This Totonac community is situated in the Northeastern Sierra of the State of Puebla.

A qualitative methodology was developed to gather information

aimed at achieving the research objectives, including the identification of key leaders within the Tuxtla community to gather testimonies regarding the community's situation. Based on the findings of this investigation, several recommendations are provided, grounded in the perspective of Human Rights, as the right to consultation is fundamentally established.

Keywords: Right to free, prior and informed consultation; indigenous peoples and communities; Convention 169; hydroelectric projects; international and national regulatory framework.

Analysis of Correspondence in Public Policies for the Treatment of Unaccompanied Migrant Children in the North American Migration-Land Transit Block

ISSN: 2644-0903 (Journal)

Author: *Mayra Gabriela Aguila Núñez*

Link: Read Full Publication

Abstract:

Research on child migration is relatively recent, both because of the breadth of the debate and the conceptualization of the subjects, and because of the intensification of the phenomenon. In the field of research, this phenomenon is still considered a field to be explored, exposed and proposed in any of its variables or study approaches. Although there are various researchers, schools and authors who study the phenomenon, it is necessary to point out that migration is not just one type, nor does it affect a single sector that can be defined in the same subject and therefore it is not enough to address the issue from a general standpoint.

The hypothesis of this work states that there must be correspondence in the general and particular objectives and the operating rules that make up the public policies of the countries belonging to the North American land-migration transit block, made up of Mexico, Guatemala, El Salvador and Honduras, because only in this way can the integrity and respect for the human rights of migrant children be guaranteed and safeguarded.

Given the above, this investigation aims to demonstrate and evaluate the actions carried out by the corresponding authorities, through policies, programs and legislation to safeguard the integrity of unaccompanied migrant minors, since, once the children arrive in our country, the problem is not only a matter of care and repa-

triation, but they face new risks outside the scope of current public policies, such as drug trafficking, organized crime, human trafficking and organ trafficking.

In conclusion, this research will provide the reader with the necessary tools to know the gaps in the correspondence of the policies to combat and address child migration in our country and in our state, promoting, from this, proposals for forceful and focused actions according to the real needs posed by the accumulated frequency system in our country, expressed in different states of the republic that serve as crossing points in the migratory cycle or concentration points due to the presence of shelters and service centers.

Keywords: Child migration, public policies, North American transit block, human rights, unaccompanied minors, migration flows, policy alignment.

Sociolinguistic Contributions for the Design and Contents of Didactic Materials in an Intercultural-Bilingual Curriculum: Educational Praxis in a Primary School in the Municipality of Puebla

ISSN: 2644-0903 (Journal)

Author: *Liliana Alonso Silva*

Link: Read Full Publication

Abstract:

Mexico, as a multicultural nation, faces the imperative task of reshaping its educational strategies to nurture citizens capable of embracing and respecting the cultural diversity that defines their environment. The discourse on intercultural education was integrated into the National Development Plans around 2000, coinciding with the recognition of education as a pivotal agent for instigating transformative change at social, cultural, and healthcare levels.

According to the 2010 Population and Housing Census, Mexico is home to 15.7 million individuals who identify as indigenous, with Puebla housing 10 of the country's 68 linguistic groups (INALI, 2010). However, data from the National Commission for the Development of Indigenous Peoples (CDI) in 2011 categorizes Puebla as a Type 4 city, characterized by low ethnic diversity and the dominance of a single language, Nahuatl. Consequently, educational plans are formulated and executed with a focus on Spanish-Nahuatl bilingualism. This standardized approach overlooks the unique needs of students and imposes cultural assimilation without considering their diverse life experiences, including linguistic proficiency, family backgrounds, migration histories, and work experiences.

The Emiliano Zapata Bilingual Primary School, situated on the outskirts of Puebla city, northwest of the Central de Abastos (wholesale supply center), caters primarily to indigenous migrant children

from Tlaxcala, Oaxaca, and Veracruz (Martínez, 2008). Although it operates as part of a Nahuatl-Spanish bilingual program, students speak various indigenous languages, and some may have limited knowledge of Nahuatl. Consequently, the acquisition of micro skills and knowledge during basic education poses significant challenges, often leading to high dropout rates. This research delves into the factors contributing to this educational underperformance, particularly within the aforementioned primary school. Despite the assumption by teachers that students born in this geographical region consider Spanish as their mother tongue, most of them are, in fact, Mazatec speakers originating from Oaxaca.

This study unveils the misalignment between the objectives and targets outlined in Mexico's Bilingual Intercultural Education programs (2000-2018) and the daily educational practices at Emiliano Zapata Elementary School in San José los Cerritos, Puebla. Employing a qualitative and ethnographic methodology, the research proposes curricular adjustments with linguistic significance aimed at fostering diversity and proposes collaborative, inclusive solutions and materials tailored to the intercultural context.

Keywords: Sociolinguistics, intercultural-bilingual curriculum, indigenous education, educational praxis, linguistic diversity, cultural assimilation, didactic materials.

Citizen Participation within the Cycle of Migration Public Policies at the Local Level: Case Study of Cuautlancingo Municipality, Puebla

ISSN: 2644-0903 (Journal)

Author: *Yessika Mabel Cepeda Arellano.*

Link: [Read Full Publication](#)

Abstract:

This research project delves into the vital significance of integrating civil society into the formulation of public policies, employing precise mechanisms that facilitate citizen participation. This integration is crucial as it empowers individuals who possess an in-depth understanding of the contexts that public policies seek to impact. It acknowledges that governments may not always have the requisite expertise in all facets of administrative management.

This situation is particularly pronounced in the realm of migration, where collaborative participation between the government and citizens forms the foundation for identifying the social and economic complexities inherent to migratory phenomena. The study examines public policies implemented by both federal and state governments during recent administrations. It offers insights into the current migration landscape within Cuautlancingo Municipality, Puebla, shedding light on actions undertaken in a region that, while not traditionally considered a high-migration area, is experiencing a gradual rise in its migrant population and the inflow of remittances.

Keywords: Public Policies, Citizen Participation, Migration, Cuautlancingo Municipality, Puebla.

Engineering

Ingenierías

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Cavity Quantum Electrodynamics on a Cross Cavity

ISSN: 2644-0903 (Journal)

Author: *Julio César García Melgarejo*

Link: [Read Full Publication](#)

Abstract:

The interaction between matter and the electromagnetic field is one of the most important problems in quantum optics, holding significance across both fundamental principles and technological applications. At the heart of describing such interactions lies the Jaynes-Cummings Model (JCM), which specifically addresses the interaction between matter and the electromagnetic field within a perfect one-dimensional cavity. The JCM has served as the cornerstone of cavity quantum electrodynamics (CQED) research for several decades, playing a pivotal role in advancing our understanding of quantum phenomena.

Quantum optics has demonstrated that even the simplest problems can reveal entirely new quantum behaviors. For example, a quantum description of the beam splitter has illuminated phenomena that lack classical analogues. This underscores the lesson that a novel perspective on well-established concepts can expose previously unexplored facets of quantum mechanics. This insight raises intriguing inquiries about the extensively studied JCM. Could the introduction of new geometries unveil novel quantum phenomena?

In this thesis, we introduce a novel geometric configuration into the traditional one-dimensional matter-field interaction model. This additional degree of freedom, represented by a second arm perpendicular to the existing one, gives rise to fresh CQED phenomena. Among these phenomena, we observe collapses and revivals that occur in scenarios not accounted for within the confines of the one-dimensional JCM.

This research opens new avenues for exploring quantum phenomena within the framework of CQED, offering insights that extend our comprehension of matter-field interactions in quantum optics.

Keywords: Quantum optics, Cavity Quantum Electrodynamics, Jaynes-Cummings Model, Matter-field interaction, Cross cavity, Quantum phenomena, Quantum mechanics, Geometric configuration, Collapses and revivals, Novel quantum nature.

Information System for Crop Selection in the Northeastern Region of the State of Puebla

ISSN: 2644-0903 (Journal)

Author: *Josue Eduardo Paqui Martinez*

Link: Read Full Publication

Abstract:

The agricultural sector plays a vital role in global food production. However, the selection of suitable crop varieties for cultivation is often done empirically, resulting in unpredictable outcomes that may not benefit farmers. To address this challenge and align with the strategic objectives outlined in the 2013-2018 National Development Plan, as set forth by the United Nations Food and Agriculture Organization (FAO), this research focuses on enhancing the supply of agricultural goods and services.

This study leverages data provided by SAGARPA (the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food) concerning the primary crops in the northeastern region of the State of Puebla. It employs various machine learning algorithms, specifically decision trees using Weka 3.8 and R 3.4.2 software, complemented by principal component analysis (PCA) to analyze crop behavior in relation to their characteristics.

The resulting “Information System for Crop Selection in the Northeastern Region of the State of Puebla,” developed by Josue Eduardo Paqui Martínez, is an expert system (ES) that utilizes real-time data and environmental variables to predict suitable crop types based on prevalent environmental conditions in a selected area. Field tests were conducted to validate the algorithmic outcomes, and

the system exhibited a positive impact on the crop recommendations it provided. Notably, one of the recommended options was peas, a crop underutilized in the region due to limited awareness of its potential and market opportunities.

The implementation of this software offers the potential for collaboration and support within the agricultural sector, fostering regional development and economic growth. It optimizes farmers' resource allocation, thereby increasing the likelihood of successful harvests.

Keywords: Information system, Crop selection, Agricultural sector, Machine learning algorithms, Decision trees, Principal component analysis, Expert system, Environmental variables, Northeastern region, State of Puebla, Crop prediction, Peas, Economic growth.

Recurrent Neural Networks Applied to Speech Recognition and Machine Translation from Spanish to Japanese

ISSN: 2644-0903 (Journal)

Author: *Máximo Enrique Pacheco Martínez*

Link: Read Full Publication

Abstract:

Neural networks have gained widespread adoption in various domains of artificial intelligence, including pattern recognition, classification, image analysis, speech recognition, and machine translation, among others. Their popularity can be attributed to their structural simplicity and versatility in tackling diverse problem sets. Among neural network architectures, Recurrent Neural Networks (RNNs) have proven invaluable for modeling sequential data such as speech and text.

This thesis delves into the theoretical underpinnings of Recurrent Neural Networks to provide a comprehensive understanding of their composition and implementation, without relying on specialized libraries like Tensorflow, Keras, or CNTK. The focus then shifts to their application in the domains of voice recognition and machine translation. Notably, this research introduces a novel training approach based on Genetic Algorithms, which departs from the gradient-based methods conventionally employed in neural network training. While Genetic Algorithms can indeed be applied to train neural networks, this thesis also addresses the need for certain modifications and considerations to ensure the feasibility and efficacy of this training approach, as substantiated through empirical tests.

Keywords: Recurrent Neural Networks, Speech Recognition, Machine Translation, Genetic Algorithms, Neural Network Training, Sequence Modeling, Artificial Intelligence.

Comparative Analysis of Communication Practices in Family-Owned Micro, Small, and Medium Enterprises (MSMEs) in Puebla

ISSN: 2644-0903 (Journal)

Author: *Montserrat Sánchez Moreno*

Link: Read Full Publication

Abstract:

This project conducts a comparative analysis of communication practices in various family-owned businesses in Puebla, with the aim of proposing improved communication practices that can enhance their operations. The study selected a convenience sample consisting of Hotel Colonial de Puebla, SA de CV, Colegio Nacional AC, Carnitas Ely, Hotel Gilfer, and Comercializadora de Mármoles Pasdur SA de CV. A diagnostic assessment was carried out using the Hexag-ON framework, developed by Daniel Scheinsohn, which encompasses six activators: corporate personality, corporate identity, corporate culture, institutional link, communication, and image. This framework provides a systematic view of internal communication practices.

Employees of these five service-based companies were surveyed using a questionnaire, and their responses were analyzed. The analysis involved a descriptive examination of each business unit, a comparative assessment of results across the dimensions, and a detailed analysis of individual questions within each dimension. By conducting this analysis, insights into the current state of internal communication and its impact on employee performance were gained, leading to the identification of areas for improvement and the development

of recommendations and proposals to strengthen communication practices in these MSMEs.

Keywords: Family-Owned Businesses, Micro, Small, and Medium Enterprises (MSMEs), Internal Communication, Hexag-ON Framework, Organizational Communication, Performance Enhancement, Puebla.

Leveraging Digital Communication for Knowledge Management: A Lean Manufacturing-Driven Proposal

ISSN: 2644-0903 (Journal)

Author(s): *María Guadalupe Yumbe Carranza.*

Link: Read Full Publication

Abstract:

In a global context, the management of knowledge and its effective dissemination hold significant importance for organizations. However, in the case of personnel engaged in industrial transformation activities, such as operators, there has been limited research and proposals focusing on harnessing their experiential knowledge to create intellectual capital. Additionally, despite organizations embracing digital environments through automation, many fail to explore new applications that comprehensively enhance their operations.

This research project addresses the knowledge management of operational personnel, specifically operators, by integrating digital communication and innovative technologies. It further aligns this approach with the principles of Lean Manufacturing, offering a multidisciplinary proposal. The study employed quantitative research methods with an exploratory scope and non-experimental design. A measurement instrument based on three primary variables—Knowledge Management, Continuous Improvement (within Lean Manufacturing), and Web 2.0 Tools—was developed. Data was collected through self-administered surveys and analyzed using hypothesis testing to compare two population groups: operators and experts.

The key findings indicate that the knowledge management process among operational personnel does not encompass all four forms of knowledge conversion. However, Lean Manufacturing methodologies are integrated into their activities, particularly through continuous improvement and collaborative team formation. Despite a

mutual understanding and application of Lean Manufacturing concepts, communication practices within these groups have not fully reached optimum productivity levels. Nevertheless, both operators and experts acknowledge the innovativeness of skills developed through the use of new technologies and Web 2.0 tools.

These findings suggest an opportunity to manage operational knowledge effectively by integrating digital communication and Web 2.0 tools into the strategies of manufacturing industries, specifically within production area improvement teams. This research presents a proposal for the adoption of these tools in line with Lean Manufacturing principles, emphasizing collaborative work as a central operational component. This integrated approach not only enhances operational knowledge management but also contributes to improved communication productivity.

Keywords: Knowledge Management, Digital Communication, Continuous Improvement, Productive Communication, Lean Manufacturing, Web 2.0 Tools.

Agroecological Strategies for the Management of *Sitophilus zeamais* in Stored Corn in Tlacotepec de Benito Juárez, Puebla

ISSN: 2644-0903 (Journal)

Author: *Areli Idalia Matías Oregán*

Link: Read Full Publication

Abstract:

This research aimed to assess the impact of incorporating CaO (quicklime), *Beauveria bassiana*, *Ricinus communis*, modified atmosphere storage, and airtight storage on the incidence and damage caused by *Sitophilus zeamais* in stored corn in Tlacotepec de Benito Juárez, Puebla. The study was conducted in a concrete block warehouse, simulating common post-harvest practices. Over 247 days, grain temperature and humidity were monitored, and parameters such as the number of adult *S. zeamais* individuals, damaged grains, and the percentage of damage in stored grains were determined across 72 samples. Significantly positive effects ($P < 0.05$) were observed in treatments involving quicklime and airtight storage. These treatments present promising alternatives for grain storage and preservation.

Keywords: agroecology, physical control, chemical control, corn damage, maize weevil.

