Handbook T-XXIV

CIERMMI Women in Science

Research and social entrepreneurship

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Handbooks

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ECORFAN CIERMMI Women in Science
Research and social entrepreneurship

Volumen XXIV

The Handbook will offer volumes of selected contributions from researchers who contribute to the scientific dissemination activity of the Colegio de Ingenieros en Energías Renovables de Querétaro A.C in areas of Research and social entrepreneurship. In addition to having a full evaluation, in the hands of the coordinators of the Colegio de Ingenieros en Energías Renovables de Querétaro A.C, quality and punctuality in its chapters, each individual contribution was refereed to international standards [V|LEX, RESEARCH GATE, MENDELEY, GOOGLE SCHOLAR and REDIB], the Handbook thus proposes to the academic community, recent reports on new developments in the most interesting and promising areas of Research and social entrepreneurship.

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Research and social entrepreneurship

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Preface

This volume brings together a series of papers that explore and intertwine scientific research and social entrepreneurship. This compendium of chapters focuses on providing relevant knowledge to address challenges in current technology, culture, education and the economy.

Each chapter offers a critical overview including analysis of digital campaigns against cyber-cosmos, interpretation of the modern cartoon, and application of learning theories in undergraduate physics education. These investigations not only examine social and cultural phenomena, but also advocate for change in educational and business practices.

Among the chapters highlighted are the analysis of social networks in digital campaigns such as #detengoelcyberbullying, which addresses the impact of this issue in university society; the hermeneutic analysis of the witch in modern visual narratives, revealing how traditions and modernity intertwine; and a review of learning theories applied to physics, which seeks to improve effectiveness in higher education in Mexico. In addition, the volume presents case studies that include intellectual biographies of Latin American female academics, the exploration of the aesthetic phenomenon of kawaii, and the design of educational courses in normal schools.

This volume also explores the challenges of social responsibility in entrepreneurship, strategic management in MSMEs, and the accommodation needs of small miscellaneous businesses. Finally, an analysis of the composition of clusters in the United States during the Great Recession offers a perspective on regional resilience and economic adaptation. Taken together, these chapters highlight the transformative potential of research and social innovation as tools to address the demands of development and social responsibility in local and global contexts.

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Content

Page

1 **Social media analysis in digital campaigns: #Istop #cyberbullying** 1-10
Urbina-Nájera, Argelia Berenice, Martínez-Mirón, Erika Annabel, Juárez-Gutiérrez, Rossana Enith and Sánchez-Román, Guillermina

2 **Intertwined modernities: the figure of the witch in the comic Rumbo a las Ánimas (2021)** 11-29
Castelli-Olvera, Sarahi Isuki & Castelli-Olvera, Azul Kikey

3 **Review of learning theories applied to physics subject at university level** 30-40
Beltran-Zhizhko, Gali Aleksandra, Garcia-Arambula, Cintia Germania, Zhizhko, Elena Anatolievna and Guerrero-Rodríguez, Rebeca

4 **Intellectual biography of Latin American academics II** 41-61
Arteaga-Castillo, Belinda, Santillán-Nieto, Marcela, Alvarado-Sánchez, Martina and Vélez-Castillo, Raquel de Jesús

5 **Exploring the Kawaii Phenomenon: A study for its classification** 62-74
Martínez-Ramírez, Frida Paola, Rodríguez-Gutiérrez, Susana, Landeros-Lorenzana, Karina Hildelisa and Hernández-Torres, Ervey Leonel

6 **Design of an optional course for the training of educators in Zacatecan Normal Schools** 75-87
Alvarado-Sánchez, Martina

7 **The challenge of entrepreneurs facing corporate social responsibility in the southern zone of Tamaulipas** 88-97
González-Duran, Nora Hilda, Guzmán-García, Juan Carlos and Guzmán-Obando, Javier

8 **Strategic management in the development of MSMEs in the municipality of Progreso from Obregón, Hidalgo** 98-110
Trejo-Encarnación, Patricia, Hernández-Gómez, Diana Aguilar-Reyna, Verónica and Bartolo-De La Cruz, Marisol

9 **Validation, reliability and application of a survey to identify the accommodation needs of small and medium miscellaneous** 111-119
Aguilar-Aguilar, Verónica & Hernández-González, Salvador

10 **Cluster composition and regional resilience: The case of the U.S. in the Great Recession** 120-136
Zárate-Mirón, Viviana Elizabeth & Moreno-Serrano, Rosina

Social media analysis in digital campaigns: #Istop #cyberbullying

Análisis de redes sociales en campañas digitales: #detengo el #cyberbullying

Urbina-Nájera, Argelia Berenice*[a], Martínez-Mirón, Erika Annabel[b], Juárez-Gutiérrez, Rossana Enith[c] and Sánchez-Román, Guillermina[d]

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Key Handbooks

This research proposing knowledge about cyberbullying and its consequences through the campaign #stop #cyberbullying at #university has contributed significantly in several key aspects related to the generation of Science and Technology: This campaign promises to be the beginning of the prevention of this crime by educating the student community about the negative consequences of cyberbullying, it fosters a culture of respect and empathy online. Another aspect to consider is that the awareness-raising promoted by these campaigns seeks to influence the adoption of institutional policies within universities to prevent and address cases of cyberbullying. It will also urge state institutions to strengthen and implement public policies for the benefit of the student society that are being affected, as well as identify digital strategies that increase the effectiveness of anti-cyberbullying campaigns. Additionally, it will highlight how social networks can be effective tools to raise awareness of issues of general interest and be used to create support networks for victims of cybercrime. The proposed campaign can significantly contribute to the generation of universal knowledge by listing ways how to confront and prevent this growing digital pandemic from the following aspects: Conducting a cultural and social contextualization on understanding how cyberbullying manifests and is perceived within the specific cultural and social context of Mexico. This includes factors such as cultural norms, social dynamics, and power structures that may influence the prevalence and response to cyberbullying. Education and prevention through collaboration with cyberbullying campaigns to investigate the effectiveness of educational and preventive strategies. This includes assessing which methods are most effective in raising community awareness, encouraging responsible digital behaviors, and empowering individuals to take action against cyberbullying. A national and international collaboration between academic institutions, research centers, businesses, and the government is considered, to leverage efforts and maximize the impact of research and development activities. Researching the impact of public policies and legislation on the prevention and management of cyberbullying is crucial. This involves studying how existing laws are implemented and whether they are effective in protecting victims and holding perpetrators accountable. Follow-up strategies: To analyze what the impact of the campaign has been, not only in terms of information but possibly to consider modifications in students' behavior. Considering the growing use of social networks, emphasized by the COVID-19 pandemic, we have sought to take advantage of these media to promote information with a social focus in favor of the prevention of health issues. In particular, we investigated previous campaigns on cyberbullying in universities and, found that this work is a pioneer with its campaign #Ihave #cyberbullying at #university and promises to be a starting point to prevent this crime, as well as to denounce it and learn about its consequences for the victims of those who suffer from it. It is important to continue to raise awareness of this problem, to raise awareness in society, and to seek to eradicate it.

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Abstract

In this paper, we present the results of the campaign #detengo el #cyberbullying en la #universidad to generate knowledge about the issue and its consequences when a person suffers it, as well as the ways to report it. A methodology based on the analysis of social network metrics was applied. The social network used for the campaign was X because it is among the ten most used in Mexico. The results show that videos cause a more significant number of impressions and that 100% of the people who interacted with the campaign content do not know how to report cyberbullying. Likewise, there was no evidence of the generation of knowledge or awareness, so it is not possible to say if this campaign prevented or reduced this crime. However, it has been a favorable means to inform people about the issue. In this sense, we seek to implement strategies to estimate whether this campaign can generate knowledge to change behavior to prevent, reduce, eradicate, or encourage reporting it

Social media analysis in digital campaigns: #istop #cyberbullying

Aims	Methodology	Contribution
Raise awareness about cyberbullying and its consequences when a person suffers from it, as well as ways to report it	A methodology based on the analysis of social network metrics was applied. The social network used for the campaign was X because it is among the ten most used in Mexico	Through the campaign #IsStop #cyberbullying at #university, it was possible to identify that social networks are a means to promote knowledge about the prevention of this crime, as well as its psychological consequences for the person who suffers it. Also, a detailed list of the actions promoted in universities, and state and national programs to prevent this crime is provided. Finally, guidelines were given so that victims of cyberbullying can report it.

Cyberbullying, Social media Campaigns, Social media

Resumen

En este trabajo se presentan los resultados de la campaña #detengo el #cyberbullying en la #universidad con el fin de generar conocimiento sobre el tema y sus consecuencias que derivan cuando una persona lo padece, así como las formas para denunciarlo. Se aplicó una metodología basada en el análisis de métricas de redes sociales. La red social empleada para la campaña fue X debido a que se ocupa entre las 10 más utilizadas en México. Los resultados muestran que los videos causan mayor número de impresiones y que el 100% de las personas que interactuaron con el contenido de la campaña no sabe cómo realizar una denuncia sobre acoso cibernético. Así mismo, no se logró tener evidencia de la generación de conocimiento o conciencia por lo que no se puede asegurar si esta campaña pudo prevenir o disminuir este delito, aunque si ha sido un medio favorecedor para informar sobre el tema. En este sentido, se busca implementar estrategias para poder estimar si esta campaña puede generar conocimiento, cambiar la conducta para prevenir, disminuir, erradicarlo o favorecer la denuncia

Análisis de redes sociales en campañas digitales: #detengo el #cyberbullying

Objetivos	Metodología	Contribución
Concientizar sobre el ciberacoso y sus consecuencias cuando una persona lo sufre, así como sobre las formas de denunciarlo.	Se aplicó una metodología basada en el análisis de métricas de redes sociales. La red social utilizada para la campaña fue X por encontrarse entre las diez más utilizadas en México	A través de la campaña #IsStop #cyberbullying en la #universidad, se logró identificar que las redes sociales son un medio para promover el conocimiento sobre la prevención de este delito, así como sus consecuencias psicológicas para quien lo padece. Asimismo, se detallan las acciones que se promueven en las universidades y los programas estatales y nacionales para prevenir este delito. Por último, se dan pautas para que las víctimas de ciberacoso puedan denunciarlo.

Acoso cibernético, campaña en redes sociales, redes sociales

Introduction

Today's society is technologically advanced and absorbed in digital communication; it also becomes popular more frequently thanks to social networks that are a means to share, create, and disseminate content, including connecting with people on the other side of the world. According to DataReportal (2023), in 2023, 46.4% of users are women, while 53.6% are men over the age of 18 who on average spend more than two hours interacting on social networks, with Facebook being the most popular network used, followed by Youtube and Whatsapp. In this sense, due to the time invested in their interaction, social networks are a risky medium as they can damage reputation (abuse and cyberbullying), fraud, and identity theft, among others. MOCIBA (2023) reports that in Mexico, the number of internet users who are victims of cyberbullying decreased significantly, from 21.7% in 2021 to 20.8% in 2022. However, global figures (Bullying without Borders, 2023) report that 5 out of 10 adults suffer cyberbullying on one of the four social networks (Facebook, Twitter, Instagram, or WhatsApp) with Spain topping the list, followed by Mexico, the United States of America and Argentina.

In this way, cyberbullying is considered a form of violence through the use of the internet or various existing digital media characterized by the sending of intimidating, threatening messages (Government of Mexico, 2023), (UNICEF, 2023), publishing or sharing negative, harmful, humiliating, shameful, false or cruel content about a person, in some cases being illegal or criminal (US Government, 2021), (UNAM, 2022), (UNAM, 2022), causing shame, anger, anxiety, stress, worry, loss of interest in what they normally used to do with pleasure, tiredness, anxiety, anxiety, stress, worry, loss of interest in what they normally used to do, and loss of interest in what they used to do with pleasure (UNAM, 2022). (UNAM, 2022), causing shame, anger, anxiety, stress, worry, loss of interest in what they normally used to do with pleasure, emotional and physical exhaustion, and in extreme cases even suicide (UNICEF, 2023) (Larzabal-Fernández, Ramos-Noboa, and Hong, 2019) (Alonso and Romero, 2020). So far, no information has been found regarding the number of suicides globally or nationally as a consequence of cyberbullying. However, it is important to prevent and eradicate it or to raise awareness of the consequences and how to report it to prevent someone else from experiencing it.

In this sense, this study aims to carry out a digital campaign on social networks to raise awareness of the consequences suffered by a person experiencing cyberbullying, as well as to report it or prevent it. To find out the impact of social networks as a means to carry out campaigns that generate knowledge on issues related to prevention, the Scopus (2023) and Scholar academic databases have been used to find the most cited articles from 2018 to 2023 with the search ‘Social Media Campaigns to prevention’ in Spanish and English. These are considered according to the highest number of citations (324 citations) to the lowest number (21 citations). For their description, they were grouped by type of campaign: Disease prevention, health care, suicide prevention, or mental health and vaccination, where the authors, the year of publication or period, and the number of citations are presented respectively.

To examine the influence of social networks on public health protection or disease prevention (particularly during the COVID-19 pandemic), various authors such as Al-Dmour, Masa'deh, Salman, Abu Hashesh, and Al-Dmour (2020); Li and Liu (2020), Ali, et al. (2020), collected data through questionnaires on Facebook, Instagram, Twitter, Youtube, and Whatsapp, sampled 2,555, 802, 6,602, users of such networks, respectively. They used structural equation modeling, descriptive statistics, Pearson correlations, and multiple hierarchical regressions to analyze and verify the study variables. They found that social media advertising campaigns are an effective data collection strategy and a potential means of protecting public health against pandemic diseases, as well as raising awareness and promoting healthy behaviors.

Social media campaigns to prevent suicide are gaining ground as a means to inform, reduce, or diminish suicide. Pirkis, et al. (2019) present a review of 20 articles on the impact of social media on preventing suicide and found that some campaigns could drive help-seeking, although they did not obtain statistical evidence to assess the impact on the final behavioral outcome of suicides. However, they state that there are strong suggestions that campaigns could achieve positive anti-suicide outcomes. Meanwhile, Latta, Meena, Pravitha, Dasgupta, and Chaturvedi (2020) analyzed the impact of mental health promotion campaigns (Suicide prevention, smoking cessation #Iquitobacco and #Migrainethepainfultruth) on Facebook and Instagram over 5 months.

They calculated descriptive statistics such as frequency and proportions for the number of 'likes' and 'shares'. The results showed that all three campaigns were liked by 200 people, of which 9 people shared the posts and 20 people visited the mental health education page, increasing the number of followers from 200 to 3000, thus affirming that social media campaigns are an effective tool to reach more people in a short time and are a growing trend in mental health awareness.

Similarly, Robinson, et al. (2018) initiated the #chatsafe campaign with a systematic grey literature search of 173 articles, as a result, they designed a 284-item questionnaire that identifies strategies to help young people talk safely about suicide on social media; subsequently, Thorn, et al. (2020) continued the #chatsafe campaign which was distributed via email and Facebook for 12 weeks with material distributed three times a week to directly selected 17-25-year-olds. Participants report feeling able to identify and support others who may be at risk of suicide, this finding implies that Facebook is an effective medium and potential tool for mentoring young people on this issue, while La Sala et al. (2021) assert that the #chatsafe campaign is acceptable, safe and feasible, and appeared to improve aspects of online behavior, with participants reporting that they were less likely to share suicide-related content. Finally, Booth RG (2018) used Twitter (in 2023 renamed X) to disseminate the @Bell_LetsTalk campaign among 10-24-year-olds during 2006-2015 measuring with interrupted time series using autoregressive integrated moving average modeling, found that the use of this social network was temporally associated with an increase in outpatient mental health service utilization for both men and women, especially notable in women accessing primary health care services.

Social media campaigns for health care address food waste (Närvänen, Mesiranta, Maija Sutinen, Mattila, 2018), health behaviors (Sun-Wook and Yeunjae, 2018; Patel, et al (2018), Krudati, et al (2021), Ghahramani, et al (2022)), cancer prevention (Sarkar U, Le GM, Lyles CR, Ramo D, Linos E, Bibbins-Domingo K 2018), prevention and management of non-communicable diseases Shariful, (2019), support groups to prevent smoking (Hamadi, 2018). These studies mention the use of Facebook, YouTube, Twitter, and Instagram as the main social networks and to a lesser extent WhatsApp, all with a positive effect on the implementation of healthcare campaigns on various topics. It is also argued that these platforms are powerful tools to inform more people more quickly, although there is a risk of misinformation, lack of confidentiality, data monitoring and regulation, commercial interests, equity of access, and lack of standards. They also suggest that the use of other social networks such as Snapchat could be explored.

Finally, Pedersen, et al. (2020) and Loft, et al. (2020) launched a campaign on Facebook to promote vaccination against Human Papillomavirus (HPV), they made 84 posts, obtaining an average of 127 comments per post. They used the Heart-Brain strategy. After analyzing the posts and the sentiment of the comments they found that personal stories generated higher engagement rates and more positive dialogues compared to objective posts, so they concluded that personal stories are effective in creating positive dialogues on FB and that the strategy used favored the success of the campaign.

Consequently, it can be summarised that the use of social networks for the implementation of campaigns on health-related issues is favorable to informing or raising awareness about an event such as suicide, where campaigns on health care take great relevance. In the search for information, we did not find any study that addresses the issue of cyberbullying, which opens the opportunity for this study and the success of digital campaigns.

Methodology

This section describes the process to be executed based on four sources describing how to perform social network metrics analysis over the last decade.

Box 1

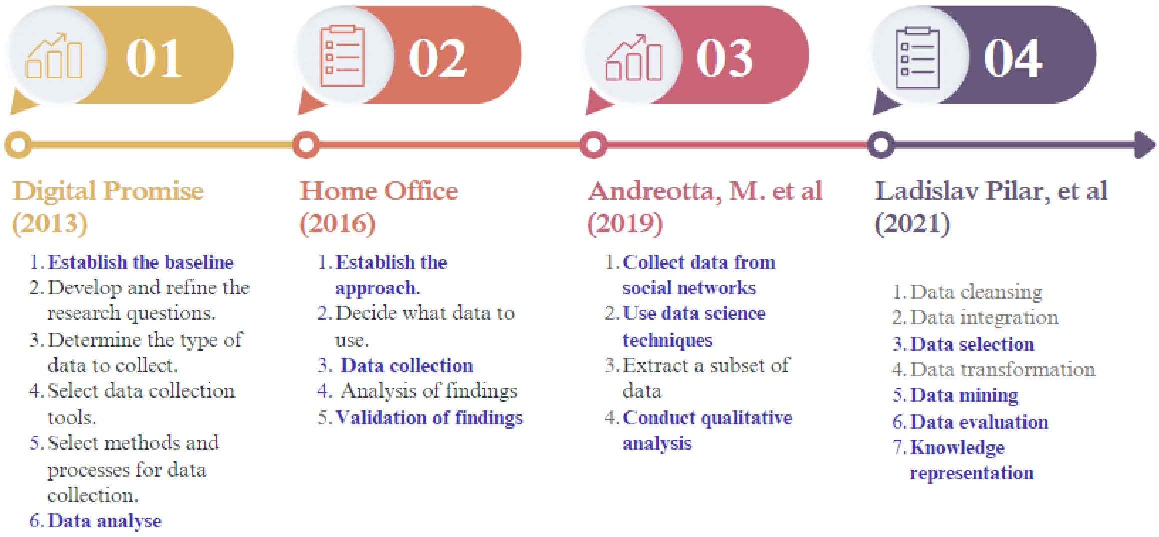

Figure 1

Sources underpinning the process applied in the research

Source: Author made on canva

Figure 1 shows that over the years the analysis of social network metrics has been done from different angles, the aim is to rescue the phases (marked in blue) in accordance to add them to the process of this research. It is noted that Digital Promise (2013) and Home Office (2016) have three phases in common to consider: 1) Establishing the focus and base network, 2) Deciding on the data to use and the research questions, and 3) Analysis of the findings. However, Andreotta (2019) and Ladislav (2021) include intermediate phases that enrich the analysis of social network metrics, such as: 4) Using data science techniques and 5) Knowledge representation. Thus, the process applied in this research is shown in Figure 2.

Box 2

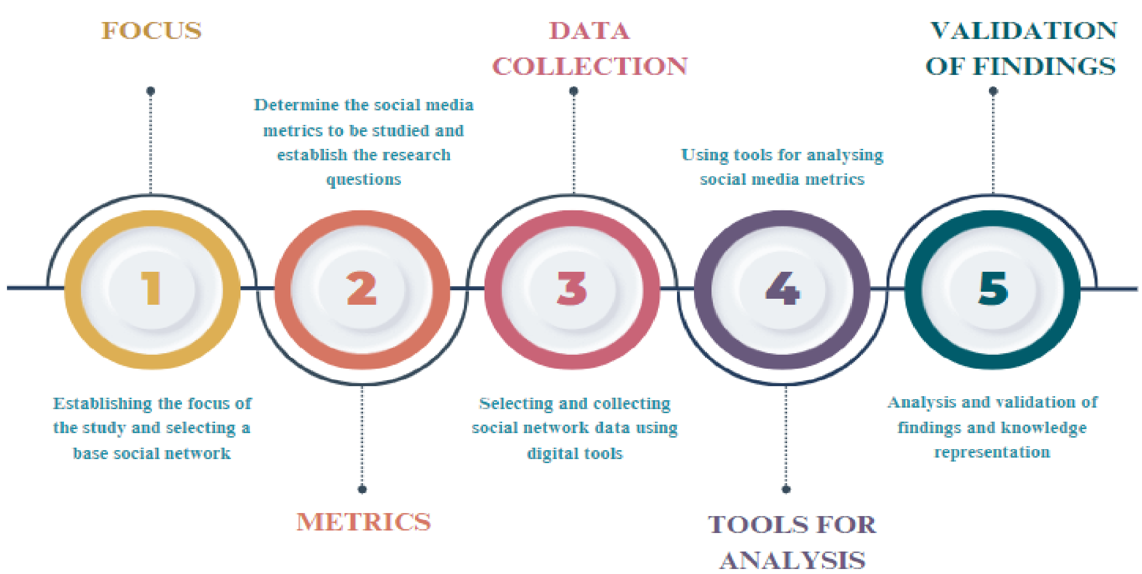

Figure 2

Process implemented for the investigation

Source: Author made on canva

The following is a description of each of the phases that comprise the process shown in Figure 2.

Approach. This phase consists of establishing the focus and a base social network. This research focuses on informing, preventing, decreasing, or even eliminating cyberbullying through a digital campaign on social networks lasting four months (September-January). The selected social networks are Facebook, Instagram, TikTok, and Twitter (from 2023 called X), since according to Statista (2023) they are among the 10 most used social networks among people aged 16-64.

Metrics. Establish the metrics to be used and define the research questions. The metrics to count are, among others: likes, repins, quotes, comments, impressions, interactions, extensions of details, new followers, and profile views, and for videos are: unique plays, plays, and audience retention

Data collection. The selection of the data corresponds to all the metrics previously identified, and, the way to collect it is through the indicators of the social network account of each of the researchers involved in this study (4 people), using an individual emptying in a spreadsheet.

Tools for analysis. In this phase, we chose to analyze and represent the information in a spreadsheet.

Validation of findings. This phase presents the analysis of the digital social media campaign from a statistical approach. The validation of findings, as well as the representation of knowledge, will be done using graphs as a data dashboard.

Results

As relevant data was obtained in the search for related work, it was found that the duration of the campaigns ranges from 12 weeks (Thorn, et al., 2020) to years (Booth RG, 2018). The social networks commonly used for such campaigns are Facebook, Twitter, YouTube, and Instagram. In this study, we present the results obtained from the campaign '#stop #Cyberbullying at #university' promoted on X, TikTok, Instagram, and Facebook for four months, with five publications: three infographics and two videos. The impact is shown in Figure 3.

Box 3

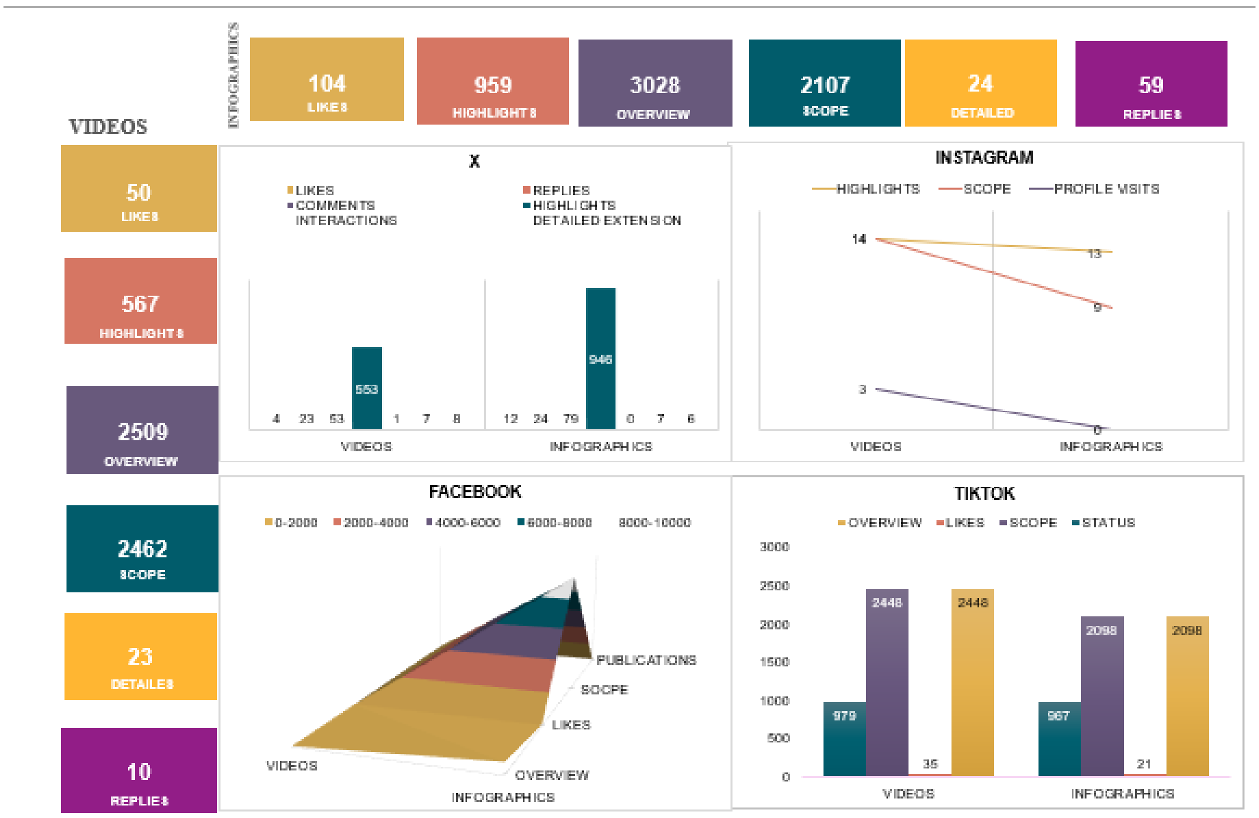

Figure 3

Dashboard of the digital campaign #Istop #cyberbullying in #university

Source: Author made based on own data collection

It is important to note that the distribution of the content was done once every eight days, about the second video there was a difference of 20 days between the last publication of the first video. The content was interspersed between infographics and videos. At the time of sharing, a question was asked: Do you know how to file a complaint when you have been a victim of cyberbullying? To which 100% of people answered No, which gives a guideline to continue with this campaign to strengthen the content by informing on how to file a complaint and which authorities to approach to receive guidance or even psychological support.

On the other hand, Figure 3 shows that, in the case of X, infographics (946) had more impressions than videos (553). On Instagram, impressions were practically equal in both cases, videos (14) and infographics (13). On TikTok, videos had higher views, reach, and, status (2,448; 2,448 and 979, respectively) than infographics (2,098; 2,098 and 967, respectively). Finally, on Facebook, infographics had a reach of 9466 views against 14 for videos.

Compared to related works, the impact of a social media campaign is measured in terms of impressions, which might seem promising, with the results obtained on Facebook and TikTok as a way to raise awareness on the issue of cyberbullying, ways to prevent it, and, how to report it in case of experiencing it. However, there is not enough evidence to validate the creation of awareness or decrease of this type of violence among people who interacted with the content, so it is intended to reinforce this campaign with more multimedia content, measurement extended to six or eight months, as well as to create tools such as questionnaires to assess the knowledge that has been acquired on the prevention, eradication or reporting of this crime.

Conclusions

The COVID-19 pandemic is believed to have encouraged the use of technologies that were not normally part of routine communication and contact. The use of social media has increased dramatically since 2020, with only 6% of the world's population not yet using some form of social media. Because of this, marketing campaigns of all kinds have grown in popularity and revenue. However, they have also been given a social use for health prevention as described above, claiming that they are a tool to prevent, reduce, raise awareness, or inform about health care issues. As previously mentioned, no digital campaign on the prevention of cyberbullying was found. That is why the campaign #Ihave #cyberbullying at #university promises to be the beginning of the prevention of this crime, as well as the generation of knowledge of the consequences for those who suffer it and the ways to report it, i.e., it is a motivation to prevent more people from provoking this crime. Although there is still work to be done to strengthen this campaign and reach more users, it is important to highlight the fact that, step by step, the importance of the issue has been made known to avoid it or to report it if someone experiences it. However, one of the limitations that were found to carrying out the campaign was that despite being paid in X it was not disseminated as expected so the recommendation is to use other media to create this type of campaign such as YouTube, TikTok, and, Instagram that by the nature of the public to which the campaign is directed could favor its dissemination and thus achieve the expected impact in reducing this type of actions.

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no financial interests or personal relationships that could have influenced this book.

Authors' contributions

Urbina-Nájera, Argelia Berenice: Contributes with the project idea, visualizes the data in the dashboard, disseminates content in social media, collects information for the state of the art, analyses the results, and drafts the article.

Martínez-Mirón, Erika-Annabel: Disseminates content on social media, and contributes to the drafting of conclusions and identification of keywords.

Juárez-Gutiérrez, Rossana Enith: Disseminates content on social media, verifies the format of citations and references.

Sánchez-Román, Guillermina: Disseminates the campaign on social media, and contributes to filling out forms and templates.

Availability of data and materials

The data are available on the social networks of each of the authors: @ArgeBereUrbina, @guidvi, @Pasion_estadis,
https://www.facebook.com/profile.php?id=100013777576202,
https://www.facebook.com/pasion.estadistica/?locale=es_LA,
https://www.facebook.com/erika.mtz.m/

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Background

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Discussion

It is worth mentioning that no digital campaign on cyberbullying prevention was found. That is why the campaign #Istop #cyberbullying at #university promises to be the start of the prevention of this crime, as well as generating awareness of who suffers from it and how to report it.

Intertwined modernities: the figure of the witch in the comic Rumbo a las Ánimas (2021)

Modernidades entrelazadas: la figura de la bruja en la historieta Rumbo a las Ánimas (2021)

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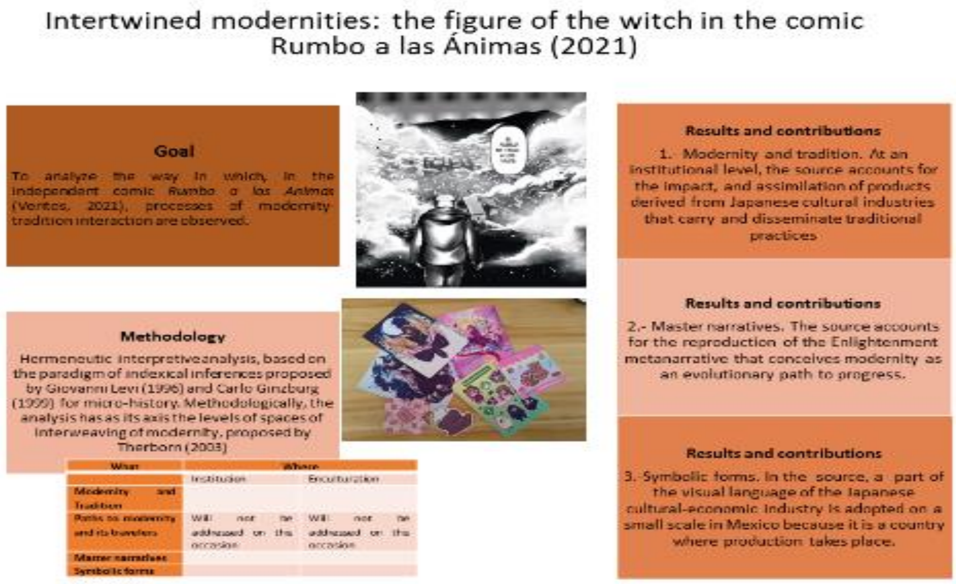
Abstract

In this work, we aim to analyze the way in which, in the comic *Rumbo a las Ánimas*, processes of modernity-tradition interaction are observed, where the latter is presented from the re-situation of its elements in the narrative structure. Methodologically and epistemically, we support this work with a hermeneutic interpretive analysis, based on the paradigm of indicative inferences proposed by Giovanni Levi (1996) and Carlo Ginzburg (1999) for microhistory. This work has as its axis the levels of spaces of interweaving of modernity, proposed by Therborn, (2003), of which we return to three: the dimension of modernity and tradition, master narratives and symbolic forms. We provide a case study, which examines both in content and context, the way in which a contemporary media accounts for multiple, complex and intertwined contextual modernities, observed in relation to the reiteration of narratives and the re situation of institutionalized and enculturalized traditional elements.



Interweaving, Narratives, Modernity

Resumen

Metodológica y epistémicamente, sustentamos este trabajo con un análisis interpretativo hermenéutico, basado en el paradigma de inferencias indiciales de Giovanni Levi (1996) y Carlo Ginzburg (1999) para la microhistoria. Este trabajo tiene como eje los niveles de espacios de entrelazamiento de la modernidad, propuestos por Therborn, (2003), de los cuales volvemos a tres: la dimensión de la modernidad y la tradición, las narrativas maestras y las formas simbólicas. Proporcionamos un estudio de caso, que examina tanto en contenido como en contexto, la forma en que los medios contemporáneos dan cuenta de modernidades contextuales múltiples, complejas y entrelazadas, observadas en relación con la reiteración de narrativas y la re-situación de elementos tradicionales institucionalizados y enculturalizados.

Entrelazadas, Narrativas, Modernidad

Introduction

The main axis that governs the complexity of the comic strip and its adjacent phenomena analyzed here are the various manifested ways of modernities, intertwined in the comic *Rumbo a las Ánimas* (2021). This association of modernities and their manifestation in comics have been little studied, so in a general revision we find two main research approaches: the forms of manifestation of modernity in comic narratives on the one hand (González Martínez, 2020), (Pedraza Velázquez, 2023); and how its consumption and production accounted for the diverse forms of modernity in Mexico, in particular, and in Ibero-America (Merino, 2003), (Chávez, 2007). However, given the complexity of phenomena that imply a reading on modernity and comics, it is necessary to carry out studies that examine the processes in which modernities manifest themselves at a structural and content level, in an interdependent manner. This study is the first approach to a comprehensive way of examining how a source accounts for the various ways modernities knitted in cultural products.

The above leads us to ask ourselves in what way the comic Rumbo a las ánimas (2021) can give us an account of the intertwined modernities, in an era in which tradition and postmodernity navigate alongside them. In response to the above, we propose that the independent comic Rumbo a las Ánimas (2021), created and published in Mexico by Verónica Jiménez Romero (Veritos), as a cultural product, accounts for multiple contextual, complex, and intertwined modernities, observed in relation with the reiteration of narratives and the re-situation of traditional institutionalized and uncultured elements.

We base the above on the following premises: first, in terms of the convergences and mixtures of the modern and the traditional, the comic presents two interrelated processes: at an institutional level, it presents the impact of the Japanese cultural industries that carry and disseminate their traditional imaginaries, which generates productive consumption in Mexican cultural production. In this sense, Mexican authors like Veritos take up, rescue, and disseminate Mexican tradition mixed with modern problems. In addition to the above, at a main narrative level, Rumbo a las ánimas (2021) takes up the common modern narratives that assign to tradition the ideas of a sclerotic past, where poverty and ignorance predominate; in opposition to modernity, characterized by emancipation, progress, and success.

Finally, this work accounts for processes of diffusion and appropriation of symbolic forms in two dimensions: on the one hand, local Mexican creators adopt the visual language of the Japanese cultural-economic industry on a small scale, observing processes of structural hybridization. On the other hand, the work situates elements from different folklores, such as the image of the witch, which mixes concepts of the Mexican witch with the iconography of the Japanese *onryo.*

Methodology

Epistemologically, we support this work with a hermeneutic interpretive analysis, based on the paradigm of indexical inferences proposed by Giovanni Levi (1996) and Carlo Ginzburg (1999) for micro-history, from which we will identify details in the graph and narrative of the source, that leads us to inferences linked to material, historical and structural aspects of the context of creation and the specific production process of the source analyzed. Methodologically, the analysis has as its axis the levels of spaces of interweaving of modernity, proposed by (Therborn, 2003), of which we return to three: the dimension of modernity and tradition, main narratives, and symbolic forms; which will allow us to examine in several dimensions the forms of adaptation and sociocultural assimilation of Japanese manga into Mexican comics. Theoretically, we rely on the proposal of intertwined modernities by Göran Therborn (2003), for whom Latin America is more than one type of modernity that acts and intertwines in space and time at various levels, ranging from institutional structure.

We revisit the proposals of Caler Cañadas (2021), Cruzado Rodríguez (2009), Martínez Gonzáles (2011), García Baeza (2023), and Carranza (2017) in relation to the traditional characteristics of the witch, her attributes, and the myths associated with her in Mexico.

To identify the elements of Japanese *onryo*, we follow the proposal of Castro Rodríguez (2009), who proposes a series of attributes that identify j-horror. Adhering to this line, for the characteristics of Japanese cultural industries, we follow the proposals of Santiago Iglesias (2013), Roumaniere and Matsuna (2019).

Our primary sources are the print and digital editions of *Rumbo a las Ánimas* (2021), as well as conversations with the author. Then, sources with audiovisual resources and a bibliography on the topic. The analysis is divided into four sections: in the first section, we present the synopsis of the work, the syntax of the actions of the actants, its format, and publication characteristics as part of the analysis. In the second section, we develop the initial, argumentative premise, in which we account for the intertwining processes of modernity and tradition, which occur at the source in the institutional requirement and at the individual actant level. The third section examines how, at a historical level, Rumbo a las ánimas (2021) reproduces modern narratives that polarize tradition-modernity, assigning negative characteristics to the first and improving properties to the second. The fourth section develops the premise that accounts for the dissemination and appropriation of symbolic forms through comics, mainly in two dimensions; structural and individual.

Analysis

History and format of *Rumbo a las ánimas*

Rumbo a las ánimas (2021) is a Mexican comic published by graphic designer Verónica Jiménez (Veritos), who created the story for the Pixelatl[1] 2021 contest. The comic has two publication formats: digital and printed. Webtoon published the format in digital; a digital comic publishing platform, created in 2005 by the South Korean company Naver Corporation; This project, published in black and white, had over six episodes.

The printed version is a standalone publication consisting of 92 black and white pages with a color cover; printed on coated paper and measures 13.4x13.4 centimeters. The line had a very marked influence on Japanese graphics, so the characters were designed with a high level of simplicity, marked expressiveness in the face and eyes, as well as the use of kinetic lines to express mobility and emphasize certain scenes. Besides the above, the story and the characters move from a relatively naturalistic graphic, in contrast to scenes, the characters, drawn in a super-deformed style for the scenes in which Rosario fantasizes about her ideal life. The handling of vignettes is variable depending on the point of view of the character presented. When the author gives us Rosario's vision of the world, the vignettes and balloons appear saturated, the presented characters in their super-deformed[2] version, and there is a large amount of text outside the balloons since this perspective is marked by the imagination of the girl, so these external texts represent thought processes and introspection **(Fig 1)**

Box 1

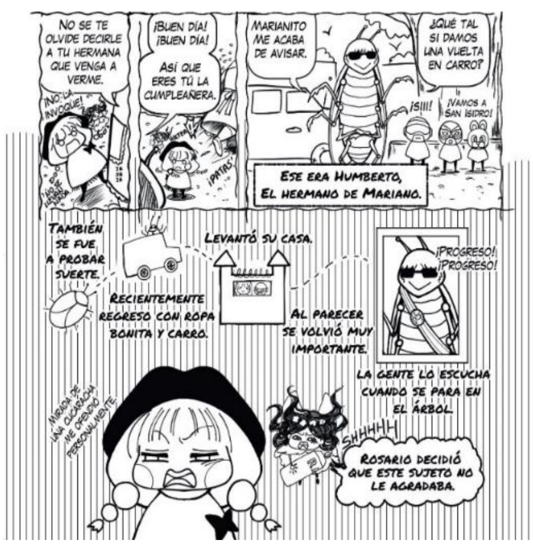


Figure 1

Rosario's vision of the world

Source (*Jiménez, 2021*)

[1] Pixelatl is an association dedicated to promoting the creation and dissemination of graphic and audiovisual content and narratives, its purpose is to promote and encourage national creation to achieve both local and international dissemination. The above is based on the creation and management of "training, promotion, and international linkage strategies for Mexican creators" (Staff Pixelatl, 2012)

[2] "Super-deformed, a.k.a. SD or Chibi, is a specific style of Japanese manga and anime that exaggerates characters to appear cute and funny. As shown in Figure 2, the SD characters are usually drawn or designed in distorted body proportions to resemble small babies, typically with chubby bodies, stubby limbs, and oversized heads" (Liang-Tsen, Sheng-Jie, Chun-Kai y Bing-Yu , 2012, p. 2067)

When the point of view changes to the narrator, the number of panels, as balloons, is reduced. There is less visual and written saturation and even pages in which the image occupies the entire panel **(Fig 2).** Another type of manga and comic resources present in this comic are onomatopoeias to imitate sounds and visualized metaphors to complete the character's moods.

Box 2

Figure 1

Vignette composition

Source (*Jiménez, 2021*)

Rumbo a las Ánimas, the protagonist is Rosario, an eleven-year-old girl who lives in the town of Las Ánimas, located on what was the old cemetery of the neighboring town called San Isidro. In her initial situation of the story, she endeavors to reunite with her family, since she and her sister are orphans; the above is observed in the constant dreams and projections that she has about having an ideal family where she has not experienced the death of her parents. Besides the above, the girl uses various spells to try to attract back her family and the people she has lost. Rosario's transformation occurs when she escapes with the witch, she considers her godmother since the town is being taken over by drug trafficking and the population intends to flee.

When arguing with her sister, Rosario asks for help from the witch and flees with her. The last situation ends in improvement for Rosario, as she returns to help her sister, and in the end, they both leave the town.

First intertwining space: Modernities and traditions

In this section, we maintain that the comic *Rumbo a las Ánimas* (2021) accounts for the convergences and mixtures of the modern and the traditional, based on two interrelated processes: at an institutional level, it represents the impact of the Japanese cultural industries that they carry and spread their traditional imaginaries, that generates productive consumption in the design of local comics. In this sense, Mexican authors like Veritos take up, rescue, and disseminate Mexican tradition mixed with modern problems.

Rumbo a las Ánimas, is understood in its various dimensions of understanding, as a cultural product, as material, thematic, and contextual level, diverse dimensions of modernities are intertwined, as proposed by Göran Therborn (2003), for whom modernity does not It is conceived as no chronological period or institutional form, but rather as the coexistence and interweaving of diverse modernities in conjunction with the traditional forms that survive.

Most generally, there are the constitutive entanglements of modernity and some tradition, coming out of the infinitely variable incompleteness of every modern rupture with the past, and out of the plasticity of most traditions. Secondly, there are the geo-historical entanglements, of the very different but significantly interacting and mutually influencing socio-political roads to and through modernity (Therborn, 2003, p. 4)

In his proposal, Therborn (2003) distinguishes three forms of the interweaving of modernities: space, perspectives, and processes and their effects. In this work, for reasons of space, we will only address the first, space, which implies two more dimensions: what and where. For what, we distinguish four dimensions: Modernity and tradition, paths towards modernity and its travelers[3], main narratives, and symbolic forms. Related to where two more levels are distinguished: the institution and enculturation.

The scheme would look like this:

Box 3

Table 1

Entanglement spaces

What	Where	
	Institution	**Enculturation**
Modernity and Tradition		
Paths to modernity and its travelers	Will not be addressed on this occasion	Will not be addressed on this occasion
Master narratives		
Symbolic forms		

Source: (Therborn, 2003)

Rumbo a las Ánimas, presents processes of cultural enrichment derived from contact between the products of the Japanese cultural industries and Mexican graphic production. We have a source in which the intertwining of modernity and tradition occurs at an institutional level with the impact of Japanese cultural industries that carry and disseminate their traditional imaginaries in the different parts of the world where they are consumed. Mexican authors observe enculturation[4] such as Veritos carry out productive consumption by resuming, rescuing, and disseminating Mexican tradition mixed with modern problems.

Manga is the way Japanese comics are known; It is characterized by being ´a visual form of narrative storytelling that employs the power of the line to 'draw' the reader into the story´ (Coolidge Rousmaniere and Matsuba, 2019, p. 20). A merchandised formula called media mix consists of a chain of commercial products: manga, anime, video games, and merchandising; However, its phenomenon has expanded so much that it also includes fashion, street art, graffiti, and digital media, "It is a multi-billion pound industry, one that is super fueled by its reader and viewers" (Coolidge Rousmaniere and Matsuba, 2019, p.20). Manga has many genres and formats, the most general include graphics printed in black and white, published in newspapers, magazine compendiums, individual books, and even cell phones (Coolidge Rousmaniere and Matsuba, 2019). As a product related to manga, the video game

…come to the fore in the 1970's in Japan. It combines manga and anime active player participation and is becoming the fastest-growing segmentof the manga related industries. New tecnologies and media mix are blurring the boundaries bentween these three forms and will only help to facilitate they popularity in the resto of thr world (Coolidge Rousmaniere y Matsuba, 2019, p. 33).

Nevertheless, beyond the economic and international political impact of these products, as visual narrative forms, manga and its related producers are carriers and drivers of the dissemination of Japanese imaginaries[5] of all kinds, among which the magical religious mythological ones stand out; as stated by Baraka Thomas (2012) when he states that "…these highly influential media, which are popular domestically and internationally, as vehicles for the dissemination and adulteration of existing religious vocabulary and imagery, as inspirations for the creation of innovative ritual practices and as stimuli for the formation of novel religious movements" (p. 2)

[3] This dimension will not be addressed in this analysis because of space issues, and because it is not of interest on this occasion for the source analyzed.

[4] These "…are "cognitive" processes in which individuals in a human group, through social interaction with their peers and with the material environment, manage to develop skills and abilities, learn knowledge, norms and values, and create worldviews that generate individual and collective identities" (Monterroza-Ríos, 2023 p. 216)

[5] "…an imaginary is the set of collective representations of the past, which are characterized by their invented nature. In this way, social imaginaries are those global representations that govern identification systems and social unity" (Cano Vargas, 2011, p. 140)

In its plots, manga spreads diverse types of imaginary and cultural elements; among them, what Thomas (2012) calls vernacular religion, which implies translating concepts into categories that, at a collective level, are usually intelligible and meaningful.

Vernacular religion is thus simultaneously reflexive of and formative for Japanese culture, providing a 'store house' of religious concepts on which various entertainers have drawn throughout history in the deployment of religious terms and iconography on the part of lay authors in the process of creating stories. The term therefore indicate the deployment of religious terms and iconography on part of lay authors and artist to capture and entertain audiences as much as it indicate 'clerics' uses of vernacular language o translate doctrine (Thomas, 2012, p. 14)

Japanese manga, and its related products, have imported its commercial formula, format, type of graphics, narrative, and sociocultural and religious imaginaries, thereby introducing improved ways of producing, circulating, and consuming in Mexico that are mixed with the local ones. Unlike the Japanese cultural industries, among manga is inserted; Mexican comics are currently more linked to self-publishing or printing by independent publishers since it is not an international economic sector as large as the Japanese one.

The movement of the author's comic and the Mexican graphic novel (1994 to date) is possible thanks to the development of the Internet and digital tools. Its development lowers production costs and reduces the workload that, while maintaining a clear semi-artisanal essence, benefits from computers.

There is no longer a massive comic industry, but a marginal activity. The comic remains such as language, so a new generation of authors dedicated to renewing it continues its relationship with capital more flexibly, without the support of industrial investors, but with self-managed projects where new goods are introduced. Cultural, the graphic novel, as well as alternative forms of production and markets. There is a significant change in the subsumption of labor to capital: cartoonists do not sell their labor force or creative works, but get by on their own. They try to ensure that the profit is essential for them, although a part corresponds to the distribution channels they use (Enciso González and Espinosa Lucas, 2021, p. 140)

For local creators, the internet has provided varied and accessible forms of production; However, there is a lack of cohesion in the medium and an axis that allows them to organize together, "I feel that although there are now more media in which artists disseminate their work, we are getting lost, specially because we do not have these places where to congregate and make our work known, especially to an audience that is eager to see what has been created in Mexico" (Jiménez, 2024). The above is added to the lack of guidance and specialized information so that authors can better market their products,

More than support... I feel there is no place or we do not know how to look for it. For example, there are calls every year, and there are scholarships despite the rest. Where do they exhibit their creations? There are book fairs but what print run could you take? Carrying fanart of the fashionable series is not the same as carrying something of yours that many times you don't even know how to sell, traveling to all the book fairs in the country, having the capital to invest in all of it and trusting that you will sell everything and return without charge home, the truth is very complex (Jiménez, 2024).

In this panorama, rich in creations and authors, but in the process of organizing its creative community, the influence of manga and its related products are inserted; its particular forms blended with the local, and from these fresh forms derive *Rumbo a las ánimas*, a comic gives an interpretation of the author's enculturation processes and corresponding productive consumption.[6] On the material level, *Rumbo a las Ánimas*, is a symbolic form that carries elements of very varied traditions, so, like any product, it contributes to two cultural processes: stability and preservation, and growth and change (Kroeber, 1963). We observe the stability in cultural persistence, which occurs from cultural attachment and assimilation transmitted to history, where the magical elements of witchcraft and traditional wisdom are mixed with additional aspects of external cultures. The latter allows us to observe how cultural production goes through processes of change and growth from the introduction of new cultural features, such as the elements of manga, which reach Mexico through diffusion, as external cultural dispersion (Kroeber, 1963), and that generated changes not only on a collective standard but on a personal level,

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[6] "It is not a mere consumption, but the ´beneficiary adds something of his own in the same mode of consumption" (Calabrese, 1999, p. 51)

CLAMP is definitely my primary inspiration, although Saint Seiya (Knights of the Zodiac) existed long before and influenced my drawing. It was the day that my dad suddenly gave me a few-page magazine comic on which the cartoon was based, that enthralled me and I said "I want to do this." Of course, I was struck by the anime boom in Mexico so there was endless inspiration, there were also Mexican comics that were not the ´Capulinita´ that I saw at one of my mom's friends' place or those ´Cowboy Book´ magazines or the ´pícaras´ that were in beauty salons; they were slightly based on Japanese manga and comics, but with plots from here, it made me realized that ´this could be achieved´ in Mexico. Of course, there are many other influences when I create a comic; and suddenly, I appreciate old films, things that I have heard or read about (Jiménez, 2020).

This testimony by Verónica Jiménez, speaking of the influence of the Japanese collective CLAMP, gives a record of the individual processes of the actor, who exercises his agency by taking up local, traditional, and contemporary elements, which he mixes with the new themes and formats introduced by manga. This narration makes conspicuous how modernities intertwine with tradition, both at the structural-institutional level and at the author's enculturation processes.

Second space of interweaving: Master narratives

In this section, we maintain that at a historical level, *Rumbo a las Ánimas* (2021) reproduces the stereotypical narratives that assign to tradition the ideas of a sclerotic past, where poverty and ignorance predominate; in opposition to modernity, characterized by emancipation, progress and success. According to Therborn (2003), at least four master narratives can be identified, each of which accounts for a variant of the modern conception of time.[7] Of them, two are depicted in this comic, of which we can give portrayal on pages 10 and 65 of the comic. The first master narrative referred to in this comic, is found on page 10 **(Fig. 3),** five vignettes form it. Since it is Rosario's childhood vision, we observe the first two vignettes, placed in the upper left corner, in which Humberto, with the figure of an anthropomorphic cockroach[8] expresses: "Tales of uncultured people! The fog is by the river!" (Jiménez, 2021, p. 10).

In the third vignette, which is located just below the first, we can see a detail of Humberto's eye, who is wearing dark glasses, while he continues: "There are no witches, no goblins, no souls that go out to grieve in the dark evening" The fourth vignette takes up the entire page since the others are small and overlap; in it, we see a detail of Humberto's hand, which points out the trajectory of a plane in the sky; He says: "Look! That's progress! And I'll bring it to the people! They will no longer want to live in the dark hiding at night. We will have services and internet, you will see!" In that same vignette, the cartridge states the following: "Humberto would open opportunities in the town." Meanwhile, the last vignette is situated in the lower right corner, and presents the back of Rosario, who looks at the plane next to the small figure of her godmother, who in her imagination resembles a fairy, she says: "A plane of San Isidro!" (Jiménez, 2021, p. 10).

Box 4

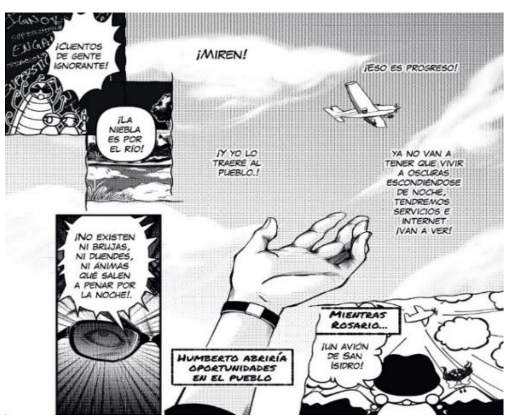

Figure 3

Second master narrative

[7] Narrative 1. History is comprehended as heteronomy and oppression, while the future, and therefore modernity, will be emancipation and liberation. Master narrative 2 associates the past with stagnation, ignorance, and deprivation, as opposed to progress, evolution, and growth. Master narrative 3 recognizes the difference in ancient preconditions but associates modernity with victory. The latest master narrative links tradition with the sclerotic past, and modernity with vitality, creativity, and a new community (Therborn, 2003).
[8] In the story, the girl has an open aversion to this guy, who is the older brother of her friend Mariano, and who returned to the town with a new truck after having gone to try his luck outside the town.

The page described above presents us with the echo of main narrative number two, which understands tradition and the past as poverty, stagnation, and ignorance, and modernity as progress, evolution, and growth, so this narrative "has guided cumulative conceptions of knowledge, economic practices and policies, and individual life-course strivings" (Therborn, 2003). This narrative develops visually and at the level of the story from the first pages, with the contrasting representation of the town of *Las Ánimas*, founded on the cemetery of the township of San Isidro, and the vision of modernity ideally proposed by Humberto, for whom people´s isolation, can be read as a synonym for *backwardness and ignorance.*

The second master narrative, present in the comic, could be decoded high clearly on page 65 **(Fig. 4),** six vignettes compose the page mentioned. In the first vignette, we see a detail of the barrel of a gun that Humberto carries and threatens Ruth, Rosario's sister, with it. In the second one, we see a medium close-up of Humberto, who threatens Ruth while shouting: "You will make my bosses subjugate us all! I told you they were peaceful people! I do not know what I would have told them if they had listened to you!" The third vignette presents another medium close-up of Ruth, holding a shotgun while saying: "Stand back and let me do my thing!" These cartridges are 'cured'.

They are not for you!"The fourth and fifth bullets are small and located at the bottom right of the page. In them, we see two approaches against Humberto's gun and his mouth. He expresses: "'cured'? For the witch? Girl, those things do not exist! They are superstitious! Fantasies!" The last vignette presents a scenic viewpoint of the town, while Humberto continues: "Does not anyone understand what I want to do with this town? Should we live like Aboriginals to preserve customs that no longer serve? To be a tourist attraction out there in the world?" (Jiménez, 2021, p. 65)

Box 5

Figure 4

Second master narrative

Source (*Jiménez, 2021*)

This page accounts for narrative four, which overlaps the second one; Here, we observe that in the story, the plot development occurs because Humberto wants, with his means, to bring modernity to the town, since he considers that the witch and the supernatural creatures that the townspeople talk about, are a product of ignorance and superstition. Tradition is considered as that sclerotic past. It is the past; the past that prevents a new community (Therborn, 2003)

The fourth one also derives from late l9th century Europe and America, but has been less expressed in political and economic forms. Rather, it is the worldview of modernism as a cultural ideology, of artistic vanguardism, and of fashion. Part of it is modernist art´s claim to "epiphany" (Joyce), to making manifest something of vital significance which is otherwise inaccessible. Part of it is also a vitalistic or imaginative opposition to mechanical progress, and a search for a post-traditional community (Therborn, 2003, p. 10)

These two forms of narratives present visions of the world based on contradictory, opposite binary models, where time is progressive and tradition, and modernity, are exclusive: "Modernity has represented a dream, a hope that has brought together many modes of say the contemporary, the immediate or the recent. Also, the good and the valuable, in comparison with the backward, with the ancient or out of fashion" (Briceño-León, 2020, p. 27). We are facing with master narratives, which reiterate the approaches of modernity as a unique and universal model, in which

If you follow that path, at the end of the route, you can overcome the "backwardness" that non-modern countries found themselves in and find well-being. Modernity becomes the stereotype of the 'good society', which has achieved wealth and freedom, and from there, a new dichotomy emerges, in which the modern is the antithesis of rural society, poverty, and backwardness. Subsequently, this dichotomy is expanded, and modernity homologizes with the idea of progress and development, therefore the notion of non-modern constitutes backwardness and underdevelopment (Briceño-León, 2020, p. 32)

Third intertwining space: Symbolic forms

In this section, we maintain that this work embodies traditional folkloric elements in two symbolic dimensions at an institutional level; it accounts for processes of structural hybridization where the visual language of the Japanese cultural-economic industry is adopted on a small scale by local Mexican creators; while on the alternative hand, the work re-situates elements from different folklores, such as the image of the witch, which mixes concepts of the Mexican witch with the cinematographic iconography of japanese *onryo*.

In the first illustration, we observe that this graphic production is the by-product of constructive consumption carried out by the author, where the result of reception materializes in creative products that take up only a part of the elements of the Japanese cultural industries. The latter is especially noticeable in the illustrations of the story, as we can see in on page 20 of the comic **(Fig. 5),** where we see an image that can be seen, literally, in two senses: upright or upside down; Depending on the positioning orientation, the image presents a perspective of reality in the comic: right is the image of Rosario's world, upside down in the "real world." The image occupies the entire page, but five more additional scenarios are superimposed on it.

Read straight, the illustration is performed in negative and represents, with a perspective of a vanishing point in the center, Rosario's house, in the background of everything among the mountains. It stands out because the mountains are black, the house is white, the fog comes out of it, and in the sky, the stars and a crescent moon with a human face are drawn. Read backward, you can see a more naturalistic image of the town, with a tree in the center of what appears to be the square and the houses in the background. Superimposed on this dual image, we have five more vignettes: the first one in the upper right corner presents a close-up of the lake and its forested background. The second and third vignettes, placed in the middle of the page and in the lower right corner, zoom in on search posters for missing people. The fourth vignette presents the detail of bare feet walking the streets between which said posters are lying down. The last vignette shows a small dog lying in a corner of the street. The text on the page says: "The fog descends... people disappear. Fear emerges" (Jiménez, 2021, p. 20)

The image described in the previous paragraph makes us present the 4 fundamental achievements of the manga, cited by McCloud: the overcoming of infantilism with the foreword of adult themes (Santiago Iglesias, 2013), which we observe in the processes of childhood psychological dissociation experienced Rosario, besides the disappearance of people in a town taken over by drug trafficking. The second characteristic achievement of the manga, which Figure 5 shows, is the use of the manga's sign system, as is the case of the *super-deformed* drawings when Rosario imagines, as well as the simplified drawings with high expressiveness that are observed throughout the comic, and particularly in the type of fog that comes from Rosario's house and diffuses throughout the image, giving it a sense of mobility. The third and fourth achievements refer to the predominance of the image over the text, and the art of the pause (Santiago Iglesias, 2013);

The latter one defined as the play with the emptiness characteristic of the manga language, in which the emptiness itself and the simultaneous representation of the same action from several points of view instead of a rapid sequence determine the development of the narrative (Santiago Iglesias, 2013, p.139)

The correlation between word-image and emptiness is pretty clear in the analyzed image since minimal narrative cartridges and large dark areas that are observed, which not only refer to the midnight but to the voids left by the missing people. As in the manga, in this comic, silence is highly significant. But it is not only the visual language and the structure of *manga*, which is creatively taken up by local authors: with Veritos, we observe productive and creative processes of adaptation of the media mix strategy typical of manga, which

Designates the strategy or set of actions through which stories can reach a specific audience. Usually, within the framework of the Japanese cultural industry, this set of actions includes adaptation between languages, with manga and television (anime) being the principal media used for dissemination that includes the most diverse media (Hernández Pérez, 2017, p. 53)

The rich creative panorama of mexican comics does not move here at an industrial level, much less with the international dimensions of Japanese manga. What we analyze here are personal processes where authors carry out their independent publications, investing their capital in them. Veritos is an author who complements her work with other products printed with her designs: handkerchiefs, bags, cards with illustrations of her characters **(**Fig. 5**),** stickers, and agendas, among others.[9] The latter gives us an account of an economic process in which the author adapts the media mix strategy, to her possibilities and in her context, with the adaptation of her illustrations and characters to various *merchandising* formats, intending to reach a broader audience and to increase your sales options.

Box 6

Figure 5

Veritos's merchandising

Source (*Jiménez, 2021*)

We observe the above at the institutional and structural level; because at the individual level, the processes of enculturation lead to deeper processes of cultural hybridization, which we find in the symbolic forms materialized in the narrative. In a particular way, the author uses, on the one hand, mythical magical popular knowledge, as part of the traditional elements persistent in her work. On the other hand, there is a presentation of problems of violence and organized crime, which threatens the town and mix with the supernatural environment.

Given that *Rumbo a las Ánimas* is a story very rich in traditional magical references, we will address only two in this section: the representation of sympathetic magic through the voodoo-type dolls that Rosario makes, and the image of the witch, which due to its graphic qualities mixes with the representation of the japanese *onryo.*

We understand sympathetic magic as defined by López Riadura (2019), who, following James Frazer, identifies two epistemological criteria for approaching magic: the principle of sympathy, and homeopathic illusion, being the first of our engagement, because it is caused by the idea: "like produces like or effects resemble their causes" (p. 1). Homeopathic magic, for its part, states that "things that were once in contact act on each other at a distance, even after all physical contact has been separated", which he called "contagious or contaminating magic" (Frazer, citado por López Riadura, 2019, p. 1)

[9] See
https://www.facebook.com/veritoinfinity

Rumbo a las Ánimas, begins with the direct detail of both types of magic, when on the first page, it shows us an image that occupies the entire zone; in it, we see a group of dolls made with socks and stuffed with beans. Each doll has its respective name embroidered. In each of the four corners of the page, there are drawings of hands. The two at the top, suggest to be from a young woman and are entangled in a kind of ribbon. The female hand in the lower corner holds scissors that are about to cut the ribbon. The hand in the lower right corner is from a man, and we can assume that he is an older adult given the representation of the wrinkled skin. This hand is holding a letter. The dialogue that characterizes the image says the subsequent: “Tie the thread three times and untie again. Do it again and tie tightly three more times. What wish will be fulfilled today? I want a big and loving family”(Jiménez, 2021, p. 2) (**Fig.6**)

Box 7

Figure 6

Sympathetic magic

Source (*Jiménez, 2021*)

The previous image shows the magical ritual that Rosario plays, all the time, over history, to attract her perfect family, which makes up for all her losses: her dead parents, her friend who had to migrate to improve their living conditions, and even the grandfather who dies throughout the narrative.

This ritual includes the making of dolls, made with her socks and stuffed with beans, that represent each member of her family that she wants to rejoin. She ties them with a ribbon to call them. Taking into account, on the one hand, ´the principle of similarity´, and, on the alternative hand, the contaminating magic, which acts at a distance.

Despite the fact that they are better known as voodoo dolls, anthropomorphic objects used to affect an enemy from a distance are not exclusive to this religion, they were and continue to be used practically all over the world. Even a few years ago, they became fashionable as toys or decorations on keychains, necklaces, earrings, notebooks, and a long etcetera.

These figures, made with the most diverse materials - lead, wax, cloth, wood, stones - are used to harm the victim and to dominate their willpower, especially for amorous objectives (López Ridaura, 2021, p. 2)

In this analyzed source, sympathetic and homeopathic magic are presented without significant alteration, directly taken from popular culture and tradition. These are forms transmitted by comics, which serve as a vernacular medium for a narrative impregnated with magical-religious characters.

They are iconoclastic representations, illustrated by their adaptation to the media. Therefore, this language “molds existing information and imagery to suit their narrative needs” (Thomas, 2012, p. 15).

In spite of the fact that the spells performed by Rosario adapt to the narrative without major alteration of the concept of reality, the same does not happen with the image of the witch, who is identified as the girl's godmother. The witch does present graphic and thematic mixtures that bring japanese tradition into dialogue with mexican tradition, since visually its representation dialogues mostly with the iconography of *J-horror* and japanese *onryo*. The iconography of this figure is highly varied since we can see her as a kind of a small fairy with flowers on her head, who flies next to Rosario (this is how the girl sees the witch); He also has a full owl form, as well as a version in which he takes the form of the bird and possesses his human head. Finally, there is his human version, in which only the top part of his shoulders is visible, the rest is black fog.

Box 8

Figure 7

Anthropomorphic version of the witch

Source (*Jiménez, 2021*)

Page 67 gives us a very complete representation of the anthropomorphic version of the witch **(Fig. 7);** It is composed of four vignettes: in the first we observe a kind of shadow in the sky, the second vignette shows us that said shadow is taking on the contours of a woman; In the third there is a close-up of part of the witch's face: covered with her long black hair, you can see her nose and the sharp teeth in her mouth. In the main image, which occupies the entire page and on which the other vignettes described above are superimposed, we see Humberto holding Rosario while he shoots the witch, who hovers over him, her face can be distinguished, partially covered because of his long black hair, large darkened eyes, frowning face, a barely suggested nose and a huge mouth with large fangs. The rest of her body is indistinguishable, as it is covered in long hair and black mist. The dialogue that accompanies the scene is the following:

> Humberto: Stay there! Do not move! I will shoot!
> Witch: Boy, in the town, I am the one in charge.
> Humberto: Impossible! It does not exist!
> Witch: Skeptics. I love them! (Jiménez, 2021, p. 67)

In the story, this entity is not a human woman who has powers, as marked by mexican oral tradition. It is more like a kind of evil entity, which, however, can materialize and end up devouring Humberto while letting Rosario and her sister flee. Its iconography and characteristics resemble a type of Japanese *yūrei* [10] called *onryo*, which has become popular in horror films in the same country: straight black hair on the face, wild eyes, a bloody mouth with fangs, the *onryo* is characterized by

> …the permanent search for revenge for the wrong done to them in life; however, they usually continue their destructive work even after their perpetrators have died or received punishment, regardless of who the misfortune befalls. This type of ghosts originally had great importance for the propagation of Buddhist doctrine, since they embodied souls possessed by some type of passion (love, love, jealousy, etc.) (Requena Hidalgo, 2009, p. 111)

[10] In Japan, the Yūrei "…are not spirits, but wills trapped between these two spheres (the world of the living and the world of spirits) by a desire for revenge that gives them materiality" (Castro Rodríguez, 2009, p. 358). These beings are ghosts who died a violent death, they usually wander around the world, characterized dressed in white, with a scarf tied to their forehead, and they usually wear their hair long and loose (Requena Hidalgo, 2009, p. 157)

The iconography of the *yūrei*, and the *onryo*, links the distressing experience of the other to the body, so that the different parts of the body become a material manifestation of the malignant characterization of the represented entity (Castro Rodríguez, 2009); In this type of case, elements such as hair and eyes become a body extension, since.

This evil is expressed with different resources, such as blank eyes (the absence of gaze and consequently failure to empathize with another) and, of course, hair that set like a curtain, covers precisely the face, the only aspect of the body that embodies the dimension of the person, their individuality (Castro Rodríguez, 2009, p. 363)

The witch from *Rumbo a las Ánimas* presents precisely the same iconography of onryo in *J-horror*: the eyes are bulging, the iris, the pupil, and the sclera are blackened and integrated into one, the straight, black hair on the face and mouth with enormous fangs make this representation of the witch a terrible being. On the contrary, its animal version is of an owl. In this way, the witch can absolutely turn into an animal, although sometimes she possesses her head **(Fig, 8).** This image of the witch alludes directly to Mexican oral tradition, which can take various forms: an owl, a turkey, or indeed, a ball of fire.

Box 9

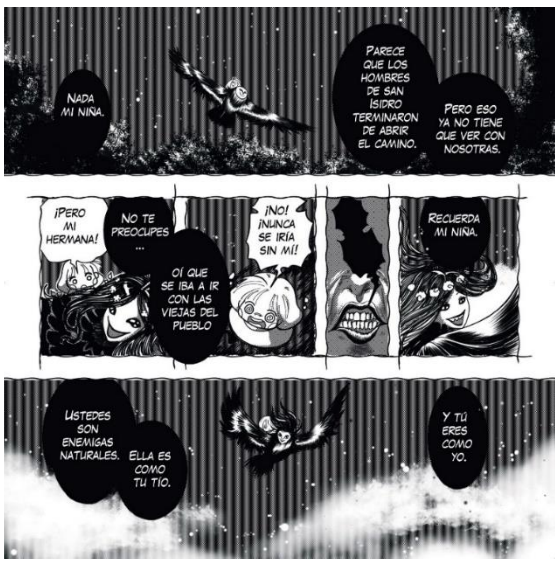

Figure 8

Animal version of the witch

Source (*Jiménez, 2021*)

The witches of the old world take flight mounted on broomsticks previously anointed in children's grease. Our witches transfigure themselves like turkeys to take flight. Thus, they 'unscrew' their legs by prodigious means and change them into animal limbs; They perfect their action by placing wings instead of hands and beaks (Rivera Domíguez, 2000, p. 60)

The witch from Rumbo a las Ánimas presents precisely the same iconography of onryo in J-horror: the eyes are bulging, the iris, the pupil, and the sclera are blackened and integrated into one, the straight, black hair on the face and mouth with enormous fangs make this representation of the witch a terrible being. On the contrary, its animal version is of an owl. In this way, the witch can absolutely turn into an animal, although sometimes she possesses her head (Fig, 8). This image of the witch alludes directly to Mexican oral tradition, which can take various forms: an owl, a turkey, or indeed, a ball of fire.

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This popular version of the witch in Mexico is due to a mix between the european tradition that arrived with the conquest, and the pre-hispanic "magicians'" among whom López Austin identifies the owl-man, linked to the fatal and Mictlan (López Austin cited by Rivera Domíguez, 2000), and the witch mometzcopinqui, with the ability to transform into a turkey, a totola or a ball of fire (Rivera Domíguez, 2009). The witch of Mexican folklore maintains these characteristics of said pre-hispanic entity,

…The witches observe the children whose blood they crave, and then, at night, they approach the stove, remove their legs and eyes, and place them on one side of it. They immediately evaporate under the appearance of a fireball that crosses the sky. They enter the house and suck the blood of their victims, either from the nape of the neck or from the end of the head. The child weakens and dies (Galinier, 2010, p. 261)

The witch in our source is detached in several aspects from her references: she does not take the form of a turkey, but that of an owl. We never see her turn into a ball of fire, and there are no indications that relate her to an ordinary woman who has powers, but somewhat to a supernatural entity more similar to a ghost whose gift, however, seems to be something you are born with, what is senses when he tells Rosario: "Remember my girl, you are natural enemies. She is like your uncle. And you are like me. Those people have nothing to do with you, they do not understand you. Listen well, you have very important things to do, you are my successor" (Jiménez, 2021, p. 62). Finally, she also moves away from the permanent revengeful natural character of Onryo, by sparing the life of Rosario's sister and opening a way for both of them to escape from the town.

Results

Up to this point, we have examined the traditional magical references of the source, though it makes explicit contemporary problems, such as the theme of the town being taken over by drug trafficking; since within the story, Humberto intends to let organized crime enter and in this way bring modernity to it. Besides the mentioned before, the story tells us about the constant disappearances of people, the fear of people who try to escape from the town before they are taken prisoners, and eventually, the intervention of the army, who rescues them.

Corporations of neoliberal capitalism systematically besieged the territoriality, natural resources, and physical and cultural integrity of indigenous people in Latin America, among which drug trafficking occurred. Faced with widespread unemployment in the rural world, the debacle of the countryside caused in part by free trade agreements that benefit the United States and condemn peasants to misery and exodus, many communities are penetrated by organized crime to force them to poppy or marijuana cultivation, and Indigenous youth are enrolled by the cartels (López y Rivas Pacheco, 2010).

This situation is widely represented in history, where the township of *Las Ánimas* is located in a hidden point that allows drug trafficking to operate with problems, which results in the disappearances of citizens, and the fear that the town will be invaded by them, as Jiménez (2024) expresses it

Las Ánimas was the pantheon, the place furthest from the main town, close to a tunnel that connects them with the highways but it remains a hidden place, conducive to the infringements of Narco, who initially enters as this figure savior and acts under the protection of the community but in reality they are waiting to involve them as labor there are levels and Humberto and his family would be the highest in the hierarchy, as you can see, their house is under construction and has the comforts of modern life while the rest are stuck in the past.

The previous problem gives meaning, and mobility and triggers the transformation in history, while mixing with the sacred world of magic, where the witch and the dead wander in Las Ánimas. In this way, we observe the adaptation of symbolic forms,[11] among which written and visual language is situated, based on the interaction between cultural elements from different traditions. The source gives an account of Latin American mestizo modernity, not only at the level of history but in its very materiality from which it gives indications of how the processes of production and circulation adapt from one place to another.

[11] For John B Thompson, all culture is empowered by symbolic forms, which are ´significant actions, objects and expressions of various types - about the specific and socially structured and historical contexts and processes, in which, through which, they produce, transmit and receive such symbolic forms´ (Thompson, 2002, p. 203). Symbolic forms have five aspects: intentional, conventional, structural, referential, and contextual.

At the level of content, we observe in the narrative the game between the sacred and the profane, where the limits of both worlds are lost, an aspect already debated by Néstor García Canclini (2009), for whom a characteristic of Latin American postmodernism, It is precisely that point where tradition converges with modernity, “postmodernity is not a stage or trend that would replace the modern world, but a way of problematizing the equivocal links that it created with the traditions that it wanted to exclude or overcome to establish itself” (p. 23). Beyond the term postmodern or not, his proposal breaks with the idea of modernity as a progressive path of improvement; an aspect in which Canclini coincides with the mestizo modernity proposed by Briceño-León (2020).

We observe, then, allusions to modernity in two crucial dimensions:

1. Narrative. In this sense, the story, through its characters and dialogues, reiterates the main narrative in which modernity is acknowledged as this dream or hope of improvement compared to the ossified past; Humberto intends to bring progress to the people, whom he conceives to be plagued by ignorance and myths, although in history the supernatural world is intermixed with the profane. In this reiterated master narrative,

...if you follow that path, at the end of the route, you can overcome the 'backwardness' in which non-modern countries found themselves and find well-being. Modernity becomes the stereotype of the good society, in which wealth and freedom have been achieved, and from it, a new dichotomy emerges, in which the modern is the antithesis of rural freedom, poverty, and delay (Briceño-León, 2020, p. 32)

2. Structural. The source, its production process, circulation, and the same mixture of its symbolic forms at a content level account for this mestizo modernity proposed by Briceño-León (2020).

Latin American modernity cannot be explained with the simple and binary categories of backwardness and progress, tradition, or modernity, which much of sociological theory has used. Latin America offers a singularity that is the result of a mixture repeated over time of different influences and resistances, external consumption, and internal reworkings, which have caused a mixture, a new social dimension, fulfill of overlaps and asynchronies, which is necessary to review and rebuild permanently (Briceño-León, 2020, p. 27).

From this point, while indeed the story, the characters reiterate an evolutionary main narrative, their daily environment shows them the opposite since they live in a town with dissolved boundaries between the magical and the profane. Beyond the story as such, the author's production processes give us a slight vision of the intertwined mestizo modernities in which local creators live, consume imported products, rework their creative processes, socialize, enrich, create, and recreate from the broadest and most structural, collective level, to the subjective tier. This last level is where individual particularities provide rich details that give Mexican graphic production its specific character from the processes of cultural and temporal mixtures. This analysis is a superficial version of the complex and profound aspects that can be inferred from material and symbolic characteristics of a graphic font, created in a specific time and space.

Conclusions

In this work, we start from the argument that the independent comic *Rumbo a las Ánimas* (Jiménez Romero, 2021), as a cultural product, accounts for multiple contextual, complex, and intertwined modernities, observed about the reiteration of narratives and the re- situation of institutionalized and enculturated traditional elements.

We carried out an analysis of the material conditions of production of the source, the reasons for the author's creation, as well as the processes of mixing and hybridization of symbolic forms at the level of structure, history, and iconography, which led us to identify the various spaces entanglement complexes:

1. Modernity and tradition. At an institutional level, the source accounts for the impact, and assimilation of products derived from Japanese cultural industries that carry and disseminate traditional practices, which generates productive consumption in Mexican cultural production. At the level of the actors, we observe that the production of Mexican authors adapts various aspects of the tradition of Japanese comics while taking up, rescuing, and disseminating Mexican tradition, mixed with modern problems.

2. Master narratives. At this level of interweaving, the story told by the source accounts for the reproduction of the Enlightenment metanarrative that conceives modernity as an evolutionary path to progress. At a subjective level, the acculturation process of the actors is observed in the adaptation of stories from traditional oral culture to history, as is the case of allusion to magical practices and traditional narratives, such as allusion to magical practices and figures.

3. Symbolic forms. Finally, at this stage, at a structural level, we can infer through the source studied that part of the visual language of the Japanese cultural-economic industry is adopted on a small scale in Mexico because it is a country where production takes place. Independently, since the big industry no longer exists for comics. On an individual level, Jiménez's work (2021) adapts, mixes, and reinterprets traditions as symbolic forms, and mixes them with Japanese cultural aspects, which creates a hybrid product with great cultural richness in various dimensions.

In conclusion: The analysis developed in the previous pages presents a brief vision of how this comic, inserted and created in specific historical conditions, accounts, through details, for processes of production, circulation, and consumption, which make visible the complexity of modernity, which in Latin America, and particularly in Mexico, can take very varied, and even divergent, forms.

Declarations

Conflict of interest

The authors of this work declare that they have no conflict of interest. We have no known competing financial interests or personal relationships that could have influenced this chapter.

Author contribution

Castelli-Olvera, Sarahi Isuki: Original idea, access to primary sources, methodological, theoretical and interpretive contribution.
Castelli-Olvera, Azul Kikey: Theoretical and interpretive contribution

Availability of data and materials

The source analyzed in these pages is available on the *Webtoon* platform and can be accessed for free.

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Review of learning theories applied to physics subject at university level

Revisión de las teorías del aprendizaje aplicadas a la asignatura de física en el nivel universitario

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Abstract

This chapter explores various learning theories, from behaviorism to constructivism, and their application in teaching classical physics at the university level. The analysis highlights the transition from behaviorist theories, which focus on observable behavior changes and often lead to rote learning, to cognitive and constructivist theories like Ausubel's, which emphasize meaningful learning through reflection, understanding, and active knowledge construction. Ausubel underscores the importance of linking new content with students' prior knowledge for substantive learning. The chapter argues that addressing learning difficulties in physics requires instruction based on conceptual analysis and hierarchical knowledge organization. It critiques the prevailing behavioral approach in Mexican education and advocates for a shift towards meaningful learning strategies that foster active student participation and deeper understanding, ultimately enhancing instructional effectiveness in physics and other disciplines.

Review of Learning Theories Applied to Physics subject at University Level

OBJECTIVES	METHODOLOGY	CONTRIBUTION
To describe the main features of learning theories, from behavioral to constructivism theories, and their application to the teaching-learning process of natural sciences at the university level, specifically in the subject of classical physics.	A qualitative research was performed, with the use of a documentary analysis technique.	The main contribution of this research is in the analysis of the main learning theories, from the Behavioral theories to the Significant Learning Theory, focusing on how they apply to the physics subject for university level students in Mexico.

Learning theories, Physics subject, University Level

Abstract

Este capítulo explora varias teorías del aprendizaje, desde el conductismo hasta el constructivismo, y su aplicación en la enseñanza de la física clásica a nivel universitario. El análisis destaca la transición desde las teorías conductistas, que se centran en cambios de comportamiento observables y que a menudo conducen al aprendizaje memorístico, hacia teorías cognitivas y constructivistas como la de Ausubel, que enfatizan el aprendizaje significativo a través de la reflexión, la comprensión y la construcción activa del conocimiento. Ausubel subraya la importancia de vincular el nuevo contenido con el conocimiento previo de los estudiantes para un aprendizaje significativo. El capítulo sostiene que abordar las dificultades de aprendizaje en física requiere una instrucción basada en el análisis conceptual y la organización jerárquica del conocimiento. Se critica el enfoque conductual predominante en la educación mexicana y se aboga por un cambio hacia estrategias de aprendizaje significativo que fomenten la participación activa de los estudiantes y una comprensión más profunda, mejorando en última instancia la efectividad de la instrucción de física clásica y otras disciplinas.

Revisión De Teorías Del Aprendizaje Aplicadas A La Física A Nivel Universitario

OBJETIVOS	METODOLOGÍA	CONTRIBUCIÓN
Describir las principales características de las teorías del aprendizaje, desde las teorías conductistas hasta las constructivistas, y su aplicación al proceso de enseñanza-aprendizaje de las ciencias naturales en el nivel universitario, específicamente en la asignatura de física clásica.	Se realizó una investigación cualitativa, con el uso de una técnica de análisis documental.	El principal aporte de esta investigación está en el análisis de las principales teorías del aprendizaje, desde las teorías conductuales hasta la teoría del aprendizaje significativo, enfocándose en cómo se aplican a la asignatura de física para estudiantes de nivel universitario en México.

Teorías del aprendizaje, Física, Nivel universitario

Introduction

Physics is an essential prerequisite for any Engineering Program. This science explains and predicts physical phenomena, thus establishing the foundations for its engineering applications. Within a first physics course in Engineering faculties, the aim is to develop in the student the ability to analyze any mechanical situation presented in a logical and simple way, applying well-assimilated basic principles in its resolution. As a consequence, teaching and learning classical physics must be oriented towards the understanding and application of its fundamental principles. In Engineering, the methodology and content must be considered from the perspective of the engineer, that is, as an applied science.

To achieve the fundamental purpose of a university-level classical physics course, it is considered necessary to focus attention on interpreting results and not so much on the mathematical part (García et al., 2003); to promote practical work (Celemín & Covián, 2003); to avoid solving stereotyped problems by only applying mathematical formulas; to recognize the particular characteristics of the students: their way of learning, previous ideas, ways of reasoning, their interests and attitudes; and to consider the context of what is taught and its relationships with other disciplines (Solbes et al., 1994).

Learning physics at various education levels, from secondary school, pre-university and university, is a difficult process for a considerable number of students. When learning is difficult it is attributed to different factors: the lack of understanding of concepts that are a prerequisite in a first university course of this science, the conflict between common sense knowledge and scientific knowledge, poor preparation in mathematics, the complexity of the conceptual structure of physics, the use of inadequate teaching materials, the inadequacies of the proposed learning environments, among others (Jaque, 1995).

In other research it has been seen that the main training insufficiencies of students in physics include: problems of understanding and long-term learning (Bandiera et al., 1995; Salinas et al., 1996), erroneous preconceptions (Mora & Herrera, 2009; Pedraza & Sánchez, 2011), inappropriate study strategies to solve problems (Maloney, 1994; Guisasola et al., 2003), application of solutions learned by rote, without considering their relevance (Gil & De Guzmán, 1993). Traditional teaching of physics has not managed to eliminate the aforementioned problems, so it is necessary to make modifications in the strategies used to motivate the students and obtain significant learning.

In this research, elements of learning theories (behaviorist, cognitive and constructivist) are analyzed, and several authors are cited who support the idea of learning based on understanding, as opposed to rote learning, as an essential means to achieve the main objective of a classical physics course. Learning theories have a descriptive character and, consequently, emphasize the aspects of learning where the protagonist is the student. To achieve true learning, it is necessary to relate the teacher's teaching strategies with the student's prior knowledge and present new information in a coherent and consistent way. In this way, significant learning can occur, that is, long-term learning (Ausubel, 2000). The concepts of behaviorism, cognitivism, constructivism, as well as Ausubel's theory of meaningful learning, which constitute the theoretical basis of this research work, are presented below.

Behavioral learning theories

It has been observed that the approach from behavioral theories permeates the Mexican educational system (with some exceptions) to this day, therefore it is important to analyze the main features of behavioral theories in order to find a way to promote the transition from behaviorism to meaningful learning in contemporary Mexican education.

Behavioral theories consider learning as a change in the frequency of occurrence of a behavior (response), especially as a function of environmental changes (stimuli). The most prominent theorists of behavioral learning are Pavlov, Watson, Thorndike and Skinner, among others.

In these theories, it is stated that learning consists on the formation of associations between stimuli and responses. Theorists of these currents maintain that the explanation of learning does not need to include thoughts and feelings. For educational practice, this implies that teachers must arrange the environment so that students respond appropriately to stimuli (Schunk, 1997).

Regarding the factors that influence learning, behavioral theories emphasize the role of the environment, that is, the arrangement and presentation of stimuli, as well as the way of reinforcing responses, and assign little importance to differences between students.

This approach is limited to the study of observable and measurable behavior. It does not consider anything that happens in the subject's mind during learning. In practice, it stimulates purely rote learning, without meanings, in the short term, which serves to reproduce predetermined responses.

This type of learning, known as mechanical learning, is currently very common in Mexican professional education, in particular, in the teaching of physics. Students simply memorize formulas, definitions and correct answers to mechanically reproduce them in tests (Moreira, 2014)

Cognitive learning theories

Learning in cognitive theory must be meaningful and requires reflection, understanding and construction of meaning. Moreover, the student's mind is not a “flat structure” on which representations of things are printed, it is an active and transformative multidimensional structure that produces ideas and theories from their previous experience and their action on them. The characteristics of the cognitive theory are expressed below (Flórez Ochoa, 1999):

- Regarding the perception of the object of study, it needs to be explored within its natural context without uprooting it from its organic relationships with the surrounding world.
- The organization of knowledge must be presented as a “whole”, which indicates that knowledge must be shown from the simple to the complex.
- Understanding meaningful learning is essential. Rote teaching or mechanical learning should not be applied.
- Meaningful learning requires confirmation, cognitive feedback that allows errors to be corrected and deviations adjusted through debate and peer discussion.
- The evaluation of significant learning is contemplated on a permanent basis to provide feedback to the learning process.

The contribution of cognitive theory to the design of models, based on the use of computers, lies in the analysis of the activities that the student must perform. Hence, in the designs of computerized instructional materials, learning elements such as the coding and representation of knowledge, storage and retrieval of information, as well as the incorporation and integration of new knowledge with previous knowledge are included.

Constructivist learning theories

This theory maintains that knowledge is not discovered, it is constructed: the student constructs his knowledge based on his own way of being, thinking and interpreting the information. From this perspective, the student is someone who actively participates in his own learning process and not someone who passively receives knowledge from the environment.

Constructivism has received contributions from important authors, among whom are Piaget, Vygotsky, Ausubel and Bruner. Although the theories of these authors are situated in different frameworks, they share the principle of the importance of the student's constructive activity in achieving learning outcomes.

Constructivism is postulated as a paradigm where teaching and learning processes are conceived through dynamic, collaborative, and interactive work by the teacher, the student, the context, the environment, and the socio-cultural environment in which individuals develop.

According to Carretero (1993), constructivism “affirms that knowledge of all things is a mental process of the individual that develops according to interaction with the environment. And this knowledge is a construction of the human being” (Carretero, 1993, page 26). Constructivism therefore allows us to understand that human beings have the ability to create their own learning from external stimuli.

The constructivist conception of school learning is based on the idea that the purpose of education provided in educational institutions is to promote the processes of personal growth of the student within the framework of the culture of the group to which he belongs. Coll (1988) mentions that these learning will occur satisfactorily if specific help is provided through the student's participation in intentional and planned activities to promote constructivist mental activity. The purpose of the teacher's intervention is for the student to develop on his own the ability to achieve significant learning in almost any situation or circumstance, which is known as learning to learn.

The construction of school knowledge is an elaboration process, since the student selects, organizes and transforms information from different sources, establishing relationships between this content and their previous ideas. Consequently, learning content means that the student attributes a meaning to it, builds a mental representation with the help of images or words, or creates a certain mental model to explain the said knowledge (Díaz Barriga & Hernández, 2002).

Regarding the teaching-learning of classical physics, Hierrezuelo and Montero (1989) mention that the constructivist theory as such is not recommended in the teaching of physics, since according to this theory the cognitive structure of every person is the result of a series of physical experiences and social and emotional relationships, and these conceptions of the world based on common sense do not always coincide with scientific reality and make learning difficult, generating erroneous “preconceptions” in the student.

Ausubel’s Meaningful Learning Theory

David Ausubel (1918-2008) in 1963 mentioned “of all the factors that influence learning, the most important is what the student already knows.” That is, you learn from what you know. However, in teaching this principle is often ignored.

The Meaningful Learning Theory is one of the psychological and learning theories that explains how cognition is produced and how it is facilitated. Ausubel is the creator of this theory, which focuses his interest on knowing and explaining the conditions and properties of learning, to relate them to effective ways of intentionally causing stable cognitive changes in the learner. Therefore, it addresses issues such as (Ausubel, 1976, page 23):

a) To discover the nature of the aspects of the learning process that affect, in the student, the acquisition and long-term retention of organized bodies of knowledge;
b) To develop the capabilities to learn and solve problems;
c) To find out what cognitive and personality characteristics of the student and what interpersonal and social aspects of the learning environment affect the results of learning a given subject of study, the motivation to learn and the characteristic ways of assimilating the content, and
d) To determine the most effective ways of organizing and presenting study materials in order to motivate and deliberately direct learning towards specific goals.

The scope of application of the theory of meaningful learning, by claiming to be a realistic and scientifically viable theory of school learning, is the learning and teaching of any organized body of knowledge, that is, the different scientific disciplines that make up the school curriculum (Rodríguez Palmero et al., 2008).

The essential concept of meaningful learning constitutes a key piece in educational psychology, since currently there is an excess of information necessary to process and understand. According to Ausubel (1963), meaningful learning is the process through which new knowledge is related in a non-arbitrary and substantive way to the cognitive structure of the person who learns.

The two basic characteristics of meaningful learning are non-arbitrariness and substantivity. The first refers to the relationship between potentially significant material and the student's prior knowledge. That is, this relationship is not with any aspect of the cognitive structure but with relevant knowledge, which Ausubel calls subsumers (Moreira, 1997).

The cognitive interaction between new and previous knowledge is the key characteristic of meaningful learning: the fact that the learner has ideas, concepts and relevant propositions that are clear and available, allows the incorporation, understanding and fixation of new knowledge, which remains "anchored" to prior knowledge.

The characteristic of substantivity means that what is important is the content and substance of the new knowledge that is acquired, not the precise words used to express those new ideas. Meaningfully learning a certain concept or proposition does not depend on the vocabulary used to express its meaning (Moreira, 1997).

When the subject does not have adequate prior knowledge to give meaning to new knowledge and/or when he does not present a predisposition to learning, this knowledge is stored in the cognitive structure in a purely memoristic way, without meaning, without the ability to explain, without understanding (Moreira, 2014). This type of learning is called mechanical and the difference with meaningful learning is in the relationship with the cognitive structure: non-arbitrary and substantive versus arbitrary and literal.

School learning situations can be categorized in four types: by rote reception, by meaningful reception, by rote discovery and by meaningful discovery. These types of learning are part of a continuum and they can all be carried out in the classroom, taking into account their relevance based on educational goals (Díaz-Barriga and Hernández, 2002).

For example, in the preschool age, the acquisition of concepts and propositions is carried out mainly by discovery; during middle and higher education, students reach more abstract thinking that allows them to correctly handle verbal propositions and take advantage of the large amount of existing scientific knowledge, so they do not need to discover everything they should learn from the school curriculum.

Now, it is evident that meaningful learning is more important and desirable than rote learning in academic situations, since it allows students to acquire large amounts of integrated, coherent, stable and meaningful knowledge.

To achieve meaningful learning, it is essential, first of all, that the learner manifests a willingness to meaningfully relate the new educational content of the curriculum to his previous cognitive structure. On the other hand, the material that is presented to the student must be potentially significant, which requires from it to have logical meaning and that it can be related to the cognitive structure of the learner in a non-arbitrary and substantive way, and also that there are adequate subsumers that allow interaction with new information (Moreira, 1997).

Meaningful learning also implies an affective part, without which it cannot be achieved: if the student does not have the intention of establishing substantive and non-arbitrary relationships between his cognitive structure and the new educational material, then meaningful learning does not occur, even if there are adequate and relevant subsumers, and the material is logically significant (Ausubel, 1976; Moreira, 1997).

Ausubel differentiates three types of meaningful learning with respect to the learned object: representational, conceptual and propositional. Representational learning is the most basic and refers to learning the meaning of individual symbols, usually words, or what they represent (Ausubel, 1963). This learning is repetitive and by discovery; it occurs mainly in childhood and is representative in nature.

Conceptual learning is a special case of representational learning; it has a symbolic function that derives from the equivalence relationship established between the symbol and the common attributes of different examples of the referent, therefore, it has a unitary meaning. The Ausubelian process of concept formation occurs as new meanings are added to the same symbols and the defining attributes of the concepts in the strict sense are delimited (Rodríguez Palmero et al., 2008).

Once the conceptual principles are already in the cognitive structure, learning is carried out by incorporating new information, using the concepts already learned as “anchors”. Propositional learning refers to the assimilation of ideas or concepts expressed by groups of words that are combined into propositions. This type of learning handles a compound meaning. The goal of propositional learning is the assignment of meanings to ideas expressed verbally with concepts. For example, to understand physical laws, it is necessary to significantly learn the concepts they mention, but learning them is not enough to understand and apply them properly (Moreira, 1997; Rodríguez Palmero et al., 2008).

If the hierarchical organization of the cognitive structure is considered, in terms of the level of abstraction, generality and inclusiveness of its contents, meaningful learning can be subordinate, superordinate or combinatorial.

Subordinate learning occurs when a relationship of subordination of new content is generated with others already present in the cognitive structure, which act as subsumers by being more abstract, general and inclusive. An example in the field of physics is the concept of physical field: if this concept is understood, the meaning of “pressure field”, “temperature field” or “energy field” can be derived, which will act as examples of the same. Another meaning may also be correlated for the concept “field”, such as, for example, “electric field”, defining its own characteristics (Moreira, 2000). This type of learning is the most common and can be derivative or correlative.

Superordinate learning, less common than the previous one, occurs when the person learns a new idea that can subordinate others that already exist in their mind by being more general or abstract. This type is very important in the formation of concepts and in the unification of apparently unrelated propositions (Ausubel, 1963).

Finally, in combinatorial learning none of the aforementioned relationships occur, but rather connections are established with content available in the cognitive structure but in a general way (Moreira, 1997). Ausubel (1963) mentions that inclusive and broadly explanatory generalizations such as the mass/energy relationship, heat/volume, supply/demand, need this type of learning.

According to Ausubel's Theory (1976), a potentially significant new concept or idea is assimilated to a relevant subsumer that is modified due to this assimilative interaction, becoming a more explanatory and enriched one. Potentially significant material, in turn, is modified to become psychologically significant.

The role of language as a facilitator is evident in both meaningful receptive and discovery-based learning, given that it allows concepts or propositions to be manipulated more easily and is essential in the functioning of thought. If adequate language is not acquired from the beginning, the subsequent development of cognitive abilities is limited and subsequent cognitive performance is difficult (Rodríguez Palmero et al., 2008).

Ausubel's original theory is a classroom learning theory, as it explicitly presents instructional guidelines, principles and strategies that can be put into practice relatively easily.

To facilitate meaningful learning, it is essential to carry out a prior analysis of what is intended to be taught, since not everything found in textbooks and other educational materials in the curriculum is important. Furthermore, the order of the main concepts must be appropriate to facilitate their relationship with the student's prior knowledge. This critical analysis must be carried out focusing on the student, so that the content not only has good logical, chronological and epistemological organization, but also that learning it is psychologically possible (Moreira, 1997).

To plan and program teaching, Ausubel (2000) proposes starting from two principles: the principle of progressive differentiation and the principle of integrative reconciliation. The first establishes that the most general and inclusive ideas of a discipline must be presented first and then progressively differentiated, with their most specific details and data. The second principle indicates that teaching should also explore the relationships between concepts or propositions, point out similarities and differences, and reconcile discrepancies. This last principle is very important in learning physics, since its concepts are closely related to each other (Chrobak; Moreira, 1997).

Another important aspect is to know the student's previous ideas, and that they are clear, stable, differentiated and specifically relevant; with the purpose of serving as support for new knowledge.

There is a difficult problem when the student relates new knowledge with previous ideas derived from his common sense, especially in physics subjects. The student has, prior to his instruction, a belief system based on his common sense about the physical world, which he has constructed through daily experience of it. Most of these beliefs are not compatible with the accepted concepts of this science and limit the student's scientific perception.

Likewise, the presence of alternative propositions, which are false relationships between concepts but that students perceive as true, is a problem in science learning (Chrobak).

Shuell (cited in Díaz Barriga & Hernández, 2002) mentions that meaningful learning occurs in a series of phases, which are progressively more complex and deeper. He then distinguishes three phases of meaningful learning: initial phase, intermediate phase and terminal phase. Learning should be seen as a continuum, where the transition between phases is gradual rather than immediate and there may even be overlapping phases.

Methodology

The research was done with a qualitative approach, using a documentary analysis technique, through a process of searching, organizing and analyzing information regarding the learning theories that can be applied to the teaching and learning of physics at a university level.

Results

Behavioral learning theories do not seek to comprehend the mental processes within the learner's brain. Instead, they focus solely on observable behaviors and reactions. Consequently, they promote rote learning, which lacks depth and meaning, and is often short-term, designed to produce predetermined responses. In the cognitive theory learning must be meaningful and requires reflection, understanding and construction of meaning.

Constructivism is presented as a paradigm where teaching and learning are viewed through dynamic, collaborative, and interactive activities among participants of the process. This approach asserts that students build knowledge based on their unique ways of being, thinking, and interpreting information.

The Theory of Meaningful Learning has significant psychological and pedagogical implications, addressing classroom dynamics and proposing programmatic principles to organize teaching through a conceptual analysis of curricular content, rather than relying on linear and simplistic approaches.
An ideal instruction method of physics involves structuring the teaching of topics around their conceptual framework, as physics is a science with a clearly defined conceptual structure.

Conclusions

A physics course is a basic requirement for any university engineering student. However, this discipline becomes difficult to understand for many of them. It can be stated that many of the students' learning difficulties are due to problems with the instructional model. These problems arise when models do not take learning principles into account or are not based on students' prior knowledge.

Behavioral learning theories do not aim to understand what happens in the learner's brain, but only analyze observable behaviors and responses, which is why they stimulate in practice purely rote learning, without meaning and short term, which serves to reproduce default answers. This leads to mechanical learning, very common today in Mexican professional education, and in particular, in the teaching of physics. Students simply memorize formulas, definitions, and correct answers to mechanically reproduce them on exams.

On the other hand, learning in cognitive theory must be meaningful and requires reflection, understanding and construction of meaning. In this theory, the student's mind is considered to be an active and transformative multidimensional structure, which produces ideas from its previous experience and also acts on these ideas.

Constructivism is postulated as a paradigm where teaching and learning processes are conceived through dynamic, collaborative, and interactive work by the individuals who participate in it. This approach maintains that the student constructs knowledge based on his own way of being, thinking and interpreting the information. From this perspective, the student is a responsible being who actively participates in his learning process and not someone who passively receives knowledge from the environment.

Any attempt to improve the efficiency of the instructional process of the classical physics subject must be based on a learning theory that emphasizes the role that concepts and their interrelationships play in the meaningful learning process. An instruction based on the organization of the conceptual structure of physics topics is what is considered ideal, as this is a science with a well-defined conceptual structure (Chrobak).

We consider that the Theory of Meaningful Learning is a solid and current theory, which is apparently simple, but of great strength, since it provides all the components that make it possible for the student to assign significance to what he learns. However, many of these elements have not been correctly understood by teachers.

As already mentioned, to achieve meaningful learning it is necessary to have several factors: the student's predisposition to learn, the appropriate subsumers in his cognitive structure, logically meaningful material, verbal communication and a personal interaction with the new content and the person who transmits it.

The Theory of Meaningful Learning has important psychological and pedagogical implications, as it deals with what happens in the classroom and postulates programmatic principles to organize teaching based on a conceptual analysis of the curricular content, far from linear and simplistic approaches. This theory is an explanatory reference of great potential and validity that provides references on essential aspects of cognitive development in the classroom, and specifically in the subject of classical physics at a pre-university and university level.

As recommendations for future research, new tendencies regarding learning techniques for physics involve the implementation of new information and communication technologies such as in mobile learning (m-learning), active learning techniques like problem based learning and interactive simulation-based learning, the use of artificial intelligence and virtual reality (Roslina et al., 2022; Lai & Cheong, 2022; Banda & Nzabahimana, 2023; Domenichini et al., 2024; Gumisirizah et al., 2024).

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence in this chapter.

Author contribution

Beltran-Zhizhko, Gali Aleksandra: Contributed to the research idea, the research method, the technique and the writing of the chapter.

Garcia-Arambula, Cintia Germania: Contributed to the research technique and the writing of the chapter.

Zhizhko, Elena Anatolievna: Contributed to the research idea, the research method and the revision of the chapter.

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Intellectual biography of Latin American academics II

Biografía intelectual de académicas Latinoamericanas II

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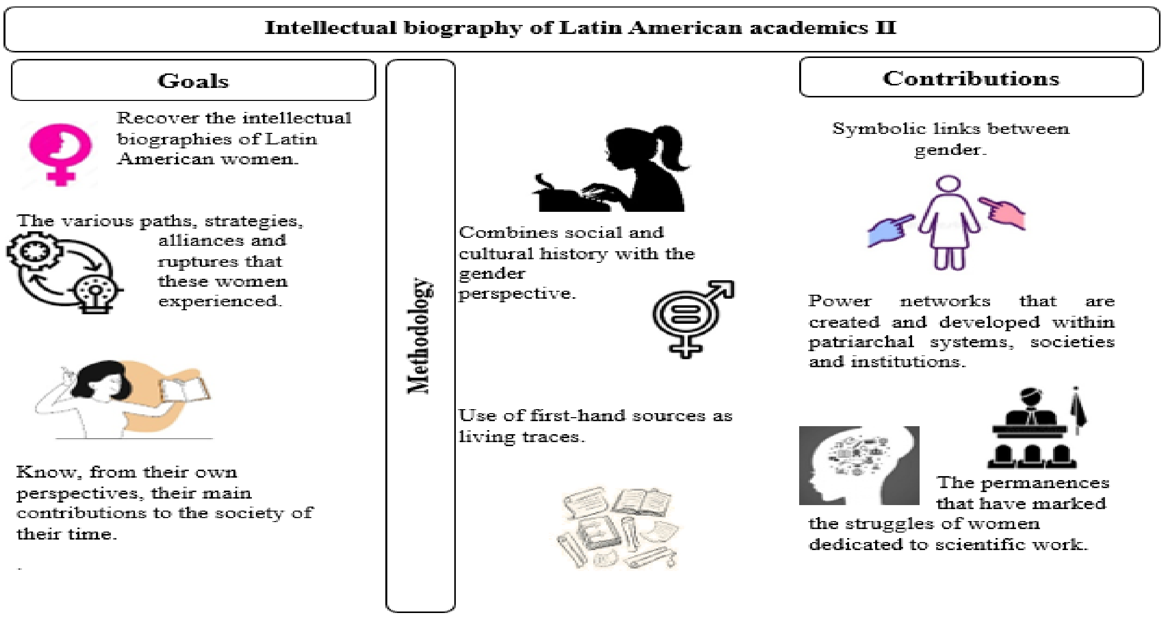
Abstract

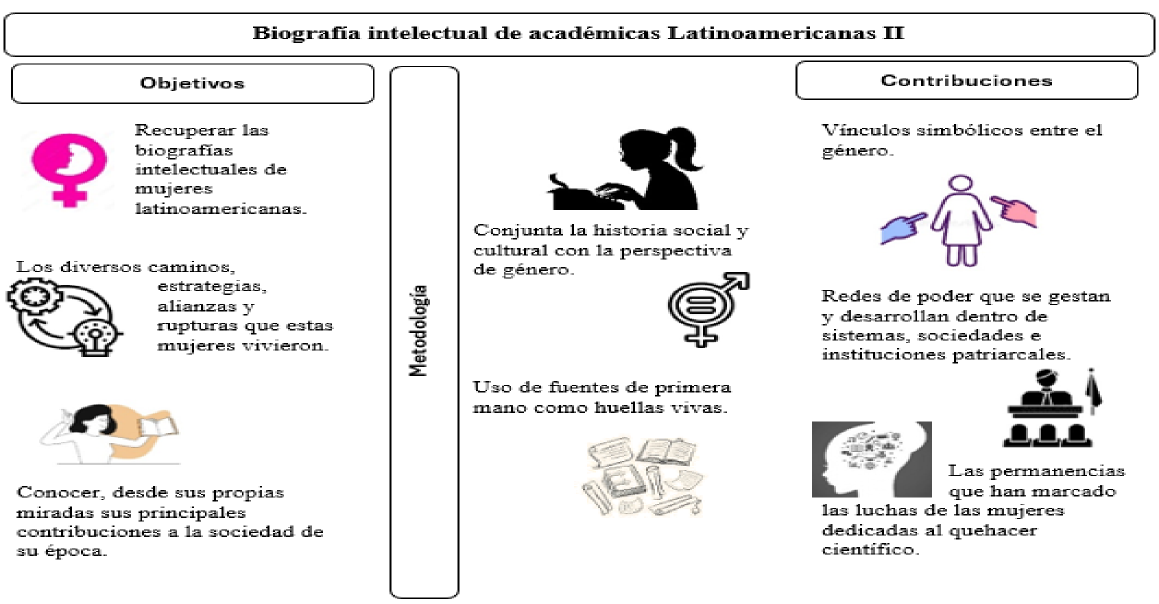
The text we present here constitutes a second partial report of the research *Women in Science: intellectual biographies of Latin American academics*, which aims to decipher the women who, from the scientific field, influence the development of knowledge. But how to identify the protagonists of these narratives? How to approach them? How to account for the plots they built to be what they decided to be? To answer these questions, mere descriptions of their lives are not enough, it is necessary to contact the deepest levels of their subjectivities that explain their uncertainties but also their certainties, their ruptures, and alliances as well as their most intimate convictions that led them to struggle against the current to carry out vigorous projects that impacted their time and context, sowing deep footprints that are worth recognizing and valuing. Under this logic, it is important to recognize, in dialogue with their intellectual biographies, their voices, their desires, their strength and their legacy. The starting point is to work on a methodology from a multidisciplinary perspective that combines social and cultural history with the gender perspective and intellectual biography. The objective is to show empowered women in the field of science.



Women, Gender, Intellectual biographies

Resumen

El texto que aquí damos a conocer constituye un segundo informe parcial de la investigación *Mujeres en la Ciencia: biografías intelectuales de académicas latinoamericanas*, misma que se propone descifrar a las mujeres que, desde el ámbito científico, inciden en el desarrollo del conocimiento. Pero ¿Cómo identificar a las protagonistas de estas narrativas?, ¿Cómo acercarnos a ellas?, ¿Cómo dar cuenta de las tramas que construyeron para ser lo que decidieron ser? Para responder a estas preguntas, no bastan las meras descripciones de sus vidas se requiere contactar con los niveles más profundos de sus subjetividades que nos expliquen sus incertidumbres, pero también sus certezas, sus rupturas y alianzas, así como sus más íntimas convicciones que les llevaron a bregar a contracorriente para llevar a cabo vigorosos proyectos que impactaron su tiempo y su contexto sembrando profundas huellas que vale la pena reconocer y valorar. Bajo esta lógica, importa reconocer, en diálogo con sus biografías intelectuales sus voces, sus deseos, su fuerza y su legado. Se parte de trabajar una metodología desde la perspectiva multidisciplinaria que conjunta la historia social y cultural con la perspectiva de género y la biografía intelectual. El objetivo es develar a mujeres empoderadas en el campo de la ciencia.



Mujeres, Género, Biografías intelectuales

From the vantage point of theory: the intellectual biographies of Latin American academics and the links between history and memory

"Imagine that the mirror becomes soft like gauze, and we can pass through it.
Wow, how curious, I'd say it's turning into some kind of fog!
It will be very easy to cross it…"
Lewis Caroll Alice Through the Looking Glass

In this text we propose to elucidate, based on a theoretical debate, the closeness and distance between some central categories of contemporary historiography. Namely, those that distinguish the History of Memory and the paradigms, such as social history and cultural history, that call us to read the school from various epistemic and methodological postures.

In this line of knowledge, in the first section, we will return to Marc Bloch, Agustín Escolano, and Elizabeth Jelin as main authors, who allow us to define the core categories of a debate that since postmodernism - and beyond it - has been sustained to differentiate and, in some cases, raise seemingly insurmountable barriers between these perspectives.

Fortunately, lucid, and balanced voices have realized the profound interrelation that connects these ways of "making history" and, above all, to highlight the virtuous equation that results from the conjunction of these views, from the creative and permanent dialogues that include more rather than exclude and they converge rather than move away.

Like the metaphor of Alice Through the Looking Glass, it is not only about building bridges and breaking down barriers but also about recognizing the multiple possibilities that arise when Alice manages to penetrate that other parallel, mysterious, and distant world that is hidden inside the mirror. Profane universe, full of barely hinted at dream images in which Alice sees her own world but inverted. Game of perspectives that lead us to assume that history and memory are parts of the same complex explanatory equation about societies "in time."

The second section addresses social history and the ethnographic shift articulated to cultural history.

In it, the metaphor of the three school cultures - which Agustín Escolano proposes to us - constitutes the methodological tool that allows us to understand the meaning of objects, times, and the empirical dimensions of education as a symbolic universe that we can only decipher if we allow ourselves to fascinate by its unknown and at the same time familiar contents.

Once again, it is about establishing closeness and contacts between these perspectives, carrying out a dialogic exercise that allows us to use various epistemological tools, sources, and interpretive keys to understand the educational contexts, practices, representations, and narratives with increasing depth. Components that constitute the indexical keys of the school, the classrooms, its objects, its actors, and its practices.

History and memory: a necessary and inclusive dialogue to understand the past/present of education as well as its possible futures

Behind the sensitive features of the landscape, the tools, or the machines.
Behind the apparently coldest writings and the apparently most distant institutions …
Wherever he smells human flesh, the historian knows that his prey is.
Marc Bloch

Almost a hundred years ago, Marc Bloch, with a premonitory look, announced the changes that history was going to experience throughout the 20th century. According to him, the nineteenth-century logic that tried to find the great general laws that determined the meaning of social transformations and tried to control them by paying attention to them was exhausted. In this context, Marxism, and positivism, declared adversaries, drew on this same "universal" assumption.

The 20th century, a short century according to Eric Hobsawm (2003), indeed transformed that powerful worldview of which sediments and records still remain. As Tomás Kuhn (1962) states, when the edifice of known science collapses, a crisis of paradigms occurs. The exit - which includes false doors and labyrinths with no alternative - can be reached if one renounces the most expensive certainties, placing oneself far from the irrefutable to arrive at the territory - always unstable and terrifying, but at the same time seductive - of the unknown.

The generations that have preceded us... in the last decades of the 19th century and even the first of the 20th... considered that there can be no authentic knowledge that cannot lead to certainties formulated under the guise of imperiously universal laws through irrefutable demonstrations...

Now, our mental atmosphere is no longer the same... the certain has been replaced by the infinitely probable, the rigorously measurable by the notion of the eternal relativity of measurement. Today we accept making certainty and universalism a matter of degrees... (Bloch, M., 1978, p. 19)

But even situated in the terrain of uncertainty, the task of the historian is to unite the world of the living with that of the dead... (p. 40) and with that of those who have not yet been born, we would add. And how can we do it if those who preceded us, especially those who lived in remote times that we did not know, are no longer among us? The answer: Resorting to testimonies that are made of traces and records that we cannot always identify at a glance... As Bloch points out:

Documents do not emerge here and there... their presence and absence in this or that archive... in a library, on the ground, depend on human causes that do not escape analysis and the problems posed by their transmission, far from having the scope of a technical exercise, they touch upon the most intimate part of the past because what is at stake is nothing less than the passage of memory through generations... (Bloch, 1978, p. 62).

And despite having the sources, we must interrogate them, stripping ourselves... as far as possible, of our naivety. What it is about is subjecting the memories, the vestiges, the icons, the narratives to the “examining” doubt, the critical judgment that allows us to elucidate between the lie and the truth, the false and the authentic.

Suspicious of the veracity of the testimonies and comparing what some remember without hesitation and categorically affirm with what is assumed to be true... and also with what others have forgotten. And this combination of screams and silences are the records that the historian sniffs out not only to discover the deception but also its motives... "thus searching behind the imposture for the impostor, that is, in accordance with the very motto of history, for the man" (Bloch, M. 1978, p. 75) Despite the risks involved in this task, words are worth more than silence, memory than forgetting. For this reason, those who practice the profession of historian strive to make their sources speak, to give the word back to their witnesses, since only in this way will they be able to understand them.

Given that individual memory can be slippery and full of traps, it must be placed in the context in which one dialogues with others. Those others who can also constitute an us and in that scenario the testimony, the trace, the record, "becomes the mirror in which the collective consciousness contemplates its own features... The source and the context is the relationship that constitutes the key element to its validation…” (Bloch, 1978, p. 85)

That is to say, the exercise that Bloch proposes is complex, in that it involves… “interrogating languages about customs and tools about workers… [to] descend to the deepest levels in the analysis of social reality… and human beings in their own time, we would add” (Bloch, 1978, p. 49)

Now, when Bloch talks about memory and history, he is not talking about synonyms but about two different categories whose meanings and with them their differences and particularities are important to consider. If we start from the paradigm constructed by Marc Bloch, history is the science of men in time. Its subject matter is the human essence and how it has transformed or remained through eras and time horizons associated with spaces, territories and/or landscapes that give them meaning. But above all, the human element as experiences, emotions, and narratives that explain the processes as a result of the life lived by men and women in their daily lives.

And, also returning to this author, the job of historian involves taking charge of these vestiges of the past in the present to make them visible, validate them, explain their relationship, and try to build possible future scenarios with these tools.

But, when we talk about memory, what do we mean? What elements does memory contain so to speak? What is its substance? And what role does it play in the historian's workshop?

As we already saw, according to Bloch history and memory are different but close categories and for historians' memory is the raw material from which the historian builds inferences and possible interpretations about the past/present/future. Interpretations subjected to analysis from theoretical panoptic typical of historiography. That is, in light of the theory.

For Agustín Escolano, memory constitutes: The structuring ethos from which human beings open ourselves to the world of life... a value that allows us to not advance blindly [Zambrano dixit]... although it must often be done by writing and erasing, as is done in games of sand, the contents of memories, or also by traveling through the chimerical museum of inconstant forms that Jorge Luis Borges alluded to when referring to the versatility and volubility of the mnemonic. (Escolano, 2011, pp. 11 – 12)

Following this author, human beings who were born in the post-war period are torn between submission to *the spasm of the present* and *the hermeneutical condemnation*. The *spasm of the present* refers to a predominance of presentist thinking that resolves human life in the here and now, which implicitly entails an invitation to forgetfulness and a trivialization of the past. For its part, *hermeneutical condemnation* has to do with the subjective exercise of permanently carrying out the resignification of the interpreted world in which we are born (Rilke, R., in Escolano 2011). This exercise, which is also a challenge whose resolution is not guaranteed in advance, is supported by.

Two cultural heritages: one that is brought to us by tradition... that kind of collective memory attached to the reflected factual history that classical hermeneutics spoke of; another, which is configured at the level of subjectivation in the memory of each personal biography. With both we weave the fabric of the hermeneutical response to the interpretive condemnation, and in both of them the contents of memory play an essential role. (Escolano, 2011, p. 12)

And since it always returns, as Escolano (1997) indicates, it is worth reflecting on this category. Although there are many authors who have contributed elements to conceptualize memory and its behaviors, we are interested in returning to Elizabeth Jelin's approaches since she has built two central equations: on the one hand, the relationship between memory and the sociocultural and, on the other, the intimate and indissoluble relationship between history and memory.

Following this line, the author states: "Addressing memory involves referring to memories and forgetfulness, narratives and acts, silences, and gestures. There is knowledge at stake, but there are also emotions. And there are also gaps and fractures" (Jelín, 1998, p. 17).

Next, he points out that the axes involved in the analysis of memory are:

- The subject that remembers and forgets with respect to which it is feasible to ask: Is it a particular subject or a collective? Who are your interlocutors and in what identity terms do you relate to them?
- The second analytical line refers to the contents:

> The question of what is remembered and what is forgotten. Direct personal experiences, with all the mediations and mechanisms of social ties, of the manifest and the latent or invisible, of the conscious and the unconscious. And also, knowledge, beliefs, behavioral patterns, feelings, and emotions that are transmitted and received in social interaction, in socialization processes, in the cultural practices of a group. (Jelín, 1998, p. 18)

And the third axis has to do with how and when it is remembered and forgotten? In this regard, Jelín points out that the past is remembered or forgotten based on subjective and/or intersubjective triggers that frequently involve scenarios, interactions or dynamics that allow us to remember. Next to these "pivots" there are other memory activation keys that can have an "expressive or performative character, and where rituals and the mythical occupy a privileged place" (Jelin, 1998, op.cit.).

In this sense, according to Jelin, the existence of archives, documentation centers or digital repositories does not guarantee the subjective or collective evocation of certain social processes. But from our point of view, they do allow those interested to preserve and open the possibility of consulting and exploring the traces and records of the past.

Warning that these traces “do not constitute «memory» unless they are evoked and placed in a framework that gives them meaning. A second question linked to forgetting arises here: how to overcome difficulties and access these traces. The task is then to reveal, to bring to light what is hidden, «to cross the wall that separates us from those traces»” (Ricoeur in Jerlin, 1999, p. 105).

Faced with forgetting as a content of memory, whether socially or subjectively induced, often due to political causes or produced voluntarily and even unconsciously, reactions are generated that can be related to the fear of the destruction of the past and the consequent “urgency” of conservation and accumulation. This results in a kind of compulsion, an obsession with remembering and creating public monuments that preserve collective memory.

From our perspective, monumental, heroic history, the “Master Story of Life” fulfills this function. This view is categorically refuted by the paradox of the monument transfigured into ruins, like those inherited by the fascist regimes in Europe and those that we see re-emerging in our days through peremptory vestiges of papier-mâché that display on their walls electronic games that recreate the imaginaries. of power over collective pasts that do not fully admit their vigorous diversity.

On this nodal point Jerlín maintains:

> The task of historians is not simply the "reconstruction" of what «really» happened, but... includes subjective dimensions of social agents and interpretive processes, construction and selection of «data» and choice of narrative strategies by the researchers…
>
> In short, there is no single way to approach the relationship between history and memory... Without a doubt, memory is not identical to history. Memory is a crucial source for history, even (and especially) in its distortions, displacements, and denials, which raise enigmas and questions open to investigation. In this sense, memory functions as a stimulus in the elaboration of the historical research agenda. For its part, history allows us to question and critically test the contents of the memories, and this helps in the task of narrating and transmitting critically established and proven memories. In the tension between one and the other is where the most suggestive, creative, and productive questions for inquiry and reflection are posed… (Jerlin, 1999, pp. 75-78)

How to read the history of education from a cultural perspective? The contributions of the ethnographic turn

Agustín Escolano recalls: “Mnemosyne, from whom Clío was born, was for the Greeks the mother of the muses, a nourishing source of inspiration. And Cicero associated the exercise of memory with the virtue of prudence, even considering the art of memory as one of the essential parts of rhetoric, which precisely fulfilled the role of what Inventio created…” (Escolano, 2003, p. 15).

Agreeing with Jelin, Escolano assures that memory involves the creation of representations from which we appropriate them. That is to say, scenarios, icons, sounds, breaths, and contexts are remembered. Not stark contents located in a vacuum.

In this sense, the historian of education: “constructs a kind of cognitive theater that, as in the elaborations of the linguistic turn, can be organized into a text that produces meaning and significance by itself” (Escolano, Op. Cit.)

In the face of this theater, we must remain vigilant so that representations of the past do not acquire a farcical meaning, becoming mere simulacra, empty props at the service of power in which masks replace reality.

The culture of the school is a recently opened chapter in the scenarios of the history of education. If we consider that the functions of the school are and were - above all - socialization and control and that teaching focuses on tutoring, instructing and urging others to assume the pedagogical ethos valid at a given historical moment (Escolano 2011). Then, the culture of the school "Refers to the set of narratives, norms that define the contents of teaching, the behaviors and worldviews to be instilled" (Julia, in: Escolano 2003, p. 17).

For Antonio Viñao, school culture materializes in “the ways of thinking and acting that provide strategies and guidelines to organize and lead the class, interact with classmates and other members of the educational community and integrate into the daily life of the school.” (Viñao, 1998, pp. 168 – 169) In short, school culture refers to school contexts (historically situated); its props that include narratives and practices, norms and management processes of teaching, knowledge, and power distribution mechanisms; the schools, the classrooms, their tools, and instruments among which the textbook has a predominant place; present actors such as teachers and students but also absent ones such as managers, members of private education, publishing houses, religious organizations, etc.

And it is there that properly anthropological perspectives dialogue and converge with those of social history in the historiographic attempt to understand our educational history as a complex framework that links desire with memory, memory with oblivion, objectivity with its representations, what is narrated with what is actually lived.

And it is here at this confluence, at this magical moment in which the surface of the mirror is transmuted to allow Alice to pass through it to arrive at the dream world of a dream realized, in which the women of our biographies can see themselves and find themselves - like Alice - in the “mirror house” where they and their dreams, their struggles and their achievements acquire the concretion of memory and historical narrative.

Brief methodological approaches

The key questions that guide the research are the following:

What are the contextual and subjective conditions that committed our biographies to an intellectual and academic project that had a relevant influence on their lives? What are the emblematic moments that they identify and refer to in the narratives of their own lives? What do these women appeal to and how do they express it?

Which were the projects that these women were able to develop and at what moments in their lives, in which institutions and from which alliances, dialogues and strategies did they do it?

From the perspective of these women, what are their main contributions?

Under this logic we plan as a ***General Objective*****:**

Recover the intellectual biographies of Latin American women and learn, through them, the various paths, strategies, alliances, and ruptures that these women lived, faced, and rehearsed to develop the academic projects that guided their lives.

And as ***Specific Objectives:***

- Explain the contextual and subjective conditions that committed our biographeds to intellectual and academic projects that guided their lives.
- Recover the main projects that they developed and place them in their vital contexts.
- Know, from their own perspectives, their main contributions to the society of their time.
- Women in Science: intellectual biographies.

We wish to emphasize that all research, based on the biographical genre, is qualitative and is based on conducting in-depth interviews and/or searching public and private historical archives from primary sources that will be analyzed from a historiographical perspective. The published works of the women who are considered in this project will also be worked on.

It is necessary to emphasize that they will always be interlocutors of the researchers and will contribute permanently to our work, thus allowing the significant interweaving of various types of sources with a dialogue that allows us to clarify and deepen the biographical work, breaking into the midst of silence, prohibition, and obscurantism to walk joyfully at their side to make a path by walking, as the poet once sang...

This is how when writing a biography what it is about is placing the life of a woman in a time period and explaining, from the history of gender, that includes not only her sexual preference but also the various marks such as ethnicity, social class, religious option or political positions that influence their choices, their struggles and their priority projects, in this case intellectual and academic.

In this sense, we care to identify the ways in which the biographed women have "played their cards" -so to speak- in a patriarchal, hierarchical, exclusive, and authoritarian society, such as the Mexican one, to define their projects and develop them even when the "the tide is high, and the boat is fragile." The voices that we recover show us that, in many cases, an attempt has been made to explain women, their circumstances and their struggles from gender to open spaces for their participation and to activate their presence in spheres, such as the world of work, academy or the streets, that were for a long time forbidden to them.

We think about the medium-term juncture because it is from there that we will historically reconstruct the biographies of the women who constitute our objects of study. Reading history from that perspective, returning to contemporary debates focused on gender that will lead to problematization not only of the times in which our women lived but also of their worldview and practices.

Furthermore, starting from the dichotomy as a metaphor, we can point out that the possible identity resolutions that women confront are played out between the essentialism of “the feminine” and the relativism of the validity of everything and nothing, passing through the structuring denial of class, ethnicity, mother tongue, religion, and sexual preference. As Lazreg (1990) points out, the recognition of differences must include categories such as class, race, religion, color, etc. Recognition cannot transform differences into mere divisions.

Another of the risks involved in the identification of differences is the potential reduction of the capacities to understand ourselves as a collective that is also united by deep ties and similarities that frequently place us, despite everything, on the same battlefront. A contradiction is knotted at the center of anthropological practice. On the one hand, the aim is to understand, appreciate and interpret cultural particularities in their own terms; in this mission, ethnographic case studies have been central. The second mission is generalization, the discovery of similarities over diversity and thus developing cross-cultural explanations... (Sacks, 1989).

Now, the visibility of these symbolic links between gender and other identity traces deserves our reflection. In that sense, another element that we wish to mention here has to do with the inclusion of the public and private; body and representation; rationality-affectiveness and other dichotomies that have boxed women into stereotypes that reinforce, reproduce, legitimize gender domination, but also ethnic discrimination and class exploitation. In short, it is about elucidating the complex power networks that are created and developed within patriarchal – colonialist – capitalist systems, societies and institutions that still call us to criticism and rebellion.

In this sense, it is proposed to take intersubjectivity into account as an alternative to include otherness, thus avoiding the objectification and victimization of the other. One observation that we can make from these stories has to do with the tendency of feminisms to erase the already classic borders of national states to arrive at global and in a certain sense internationalist perspective, perhaps because gender identity is more powerful than national identity.

In the complex equations organized from theory to explain the changes and permanencies that have marked the struggles of women dedicated to scientific work, it is necessary to account for the march towards diversity, multiculturalism and the inclusion of elements linked to ethnic and class origins that constitute today, part of the initial route that leads to a holistic reading of the identities assumed by the various groups of women.

Lucrecia

1. Initial words

In this chapter, as we already pointed out, we will address the biography of Professor Lucrecia Janqui Guzmán and the context in which she developed. To carry out this exercise, we follow the proposal of historian Eric Hobsbawm who points out that placing a biography in a historical context implies capturing an era and, from it, making visible the complex networks that intertwine the life lived by a subject with the historical moment. in which his biography develops.

From the perspective of this author, that life lived, those experiences that impact the biography of human beings are modulated by “a deeper system in which the framework of an individual's life, the time in which it develops and the analysis of these two circumstances, contribute to shaping a comprehensive view from history that... turns out to be independent of both” (Hobsbawm, 2003, p. 11).

In this sense, for Hobsbawm, biography is not the illustration of an era from the subjectivity of an individual nor the more or less systematic record of his memories. It is about the organized memory of a life based on the structural conditions that surround it and one of those conditions is, without a doubt, the historical moment. In other words, and as this author points out, “the life itinerary of a human being... possibly could not have taken place in another time {and I would add, nor in another space}” (Ibidem).

Beyond this position, we recognize that individual and collective memory also play a role in the reconstruction of a biography, which is an articulating element that allows us to build a narrative that collects the traces of different events in our subjectivity to generate a commonality, a symbolic language that allows us to share with others the experiences of the life lived. In this exercise, history has a dialogic place since it orders and systematizes what we have experienced, the spaces through which we have traveled in a given time, the feelings we have experienced, the perceptions-representations that we remember, and the series of records generated throughout this transit. These records constitute the traces of the human that - paraphrasing Marc Bloch - those who make history interpret to give meaning to the past and its relationships with the present (Bloch, 1976).

Seen in this way, the historically situated biography allows us to see, as in a game of mirrors, the period in which the human life develops in time. Of course, a biography is not written detailing the entire life of the biographed, but rather those passages, events, and circumstances that he or she recognizes as relevant, like the perennial traces that cannot be erased, that “marked his or her life” and gave it deep meanings... indelible ones, it is often said.

In intellectual biographies these traces are associated with “their ideas, positions and acts but it is not a forensic discourse” (Ibid, p. 10) because these live and remain as elements of their worldview and social practice. Furthermore, we would add, they are collective and are part of the history of an us that identifies and recognizes itself in them. Such is the case of some Latin American academic women.

Now, in the case of Lucrecia Janqui, we think about her participation in the field of science from an epistemological perspective radically different from the “classical” views deeply linked to Western thought. In the case of Lucrecia, science is done when social reality is discussed to transform it in a profound way. The criticism, the creative power, the vital commitment to the radical position that also implies personal sacrifice for the sake of achieving a fair and egalitarian reality to which Peruvians had the right. From this aspiration, emerges the revolutionary epistemology that Lucrecia shares with Others and that is born from dialogue with Others.

At the root of these readings was the recognition of the ancestral voices of the Inca, of Tupac Amarú, the hero who traced the path to freedom with his own blood.

The science that our biographed put into practice is not carried out in the manner of “a scientist” within an isolated space or in solitude because, as we already pointed out, it has to do with collective efforts and a permanent praxis that forces her to be in permanent interaction with its context.

Finally, we wish to emphasize that, when she talks about her profession as a teacher, she refers with a certain naiveté to the possibility of educating to transform existing social conditions.

2. The context: Peru at the end of the 20th century.

In the second half of the 20th century, the countries of Central and South America experienced political processes that marked their contemporary history because in many of them violent coups d'état were carried out that further fractured the weak and unstable democracies that for many years, characterized these nations within which, Perú was no exception.

The second effect that the cancellation of these formal routes brought was the opening to other alternatives to access power, among which the armed means from the armed forces and from the guerrilla war, tried by radicalized actors often labeled as “terrorists” stood out.
Not for nothing, in the report of the Truth and Reconciliation Commission on the situation in Peru in the period from 1980 to 2000, it is noted:

“The internal armed conflict experienced by Peru between 1980 and 2000 has been the longest, the one with the most extensive impact on the national territory and the one with the highest human and economic costs in our entire republican history. The number of deaths caused by this confrontation far exceeds the figures of human losses suffered in the war of independence and the war with Chile - the largest conflicts in which the nation has been involved" (CVR, 2003).

Coups d'état, guerrilla movements and social conflict caused by the misery of many and the opulence of a few eroded daily life in Peru. An example will serve to illustrate this phenomenon: the shortage of educational services that operated to the detriment of those who aspired to study and attend school, especially the middle classes who saw academic training as a means to achieve upward social mobility.

In the work: *The Long Night of Peruvian Education*, three moments in the financing of education in Peru are identified. A first period is one of expansion in spending, which coincides with a general growth in state action from the 1950s to the beginning of the 1970s. At this stage, a large expansion in enrollment can be observed. This expansion opens up opportunities for post-primary studies. In the case of Secondary school, this level is changed in a structural way, because previously, Secondary school was particularly limited to a small elite in the country.

A second period of between three and four decades (1970 - 2000) was characterized by meager public financing, coinciding with a profound national crisis that implied the exacerbation of social inequalities, the development of guerrilla movements in rural and urban areas and the increase in state violence.

Finally, for the 21st century, “a period of recovery in the levels of public investment per student, which begins in the middle of the first decade of this century and is associated with the economic expansion that was experienced at that time” (Mendizábal, Twanama and Castro, 2018, p. 1)

If we consider that Lucrecia was born in 1959, we can infer that she experienced a favorable moment at the beginning of her schooling that allowed her to study without problems up to Secondary school. However, the advantages of this moment would lose force when Lucrecia entered Secondary school and this fact would seriously limit her aspirations when the time came to choose a career.

The key questions that Lucrecia asked herself then involved two axes: the socioeconomic and the political. Under this logic, she had to answer these questions: Which institution should she enter considering the family's economic possibilities? And what profession should she choose if what she wanted was to contribute to the profound transformation of social reality?

Initially she leaned towards psychology but to study this career she had to move to Lima and live there, which meant paying for food, housing, and local transportation in addition to the expenses of school life. Impossible for her family to support at that time.

Debating with her older brother who was also her mentor and a convinced leftist militant, Lucrecia decides to study education at the National University of San Antonio Abad del Cusco (UNSAAC). «Mama Llaqtap San Antonio Abad Yachay Sunturnin”, In Quechua.... This University is a public institution, the fourth oldest university in Peru and the fifth oldest in Latin America.

The words his brother says when advising him about this professional option are key. On the one hand, there is the pragmatic view, you will be able to get a job and with that resource you can do what you want. Metaphorically speaking, what her brother offers her are the wings to fly that young Lucrecia requires to achieve her dreams. No more no less.

But perhaps, the other part of the argument that her brother elaborates is the most vigorous because it marks a path for life, since he maintains: "That career will allow you to transform reality" and this statement moves Lucrecia's place in the world and places it on the path of rebellion.

Under this logic, Lucrecia enrolls in the San Antonio Abad University of Cuzco as a student. But what are the birthmarks of this institution? Let this story be told by the own voices of those who are part of this institution:

Our University was created with the name of Royal University of San Antonio Abad by the Brief of Election of Pope Innocent XII, given in Rome, Santa Maria Maggiore on March 1, 1692. From its beginnings it was authorized to grant the degrees of Bachelor, Licentiate, Master, and Doctor. The papal document was ratified by King Charles II, through a Royal Decree called exequatur, given in Madrid on June 1, 1692.

It has been the alma mater of two Presidents of the Republic of Peru, José Luis Bustamante y Rivero, who was also president of the International Court of Justice; and Valentín Paniagua Corazao. Likewise, it was the educational center in which Francisco Xavier de Luna Pizarro, President of the First Constituent Congress of Peru, and manager of the first constitution of the Republic of Peru, was trained. https://www.unsaac.edu.pe/historia/

To add reflections of great historical value that also point out the future commitments of San Antonio University, we will return to the speech of Dr. Eleazar Crusinta Ugarte, current Rector of the University:

This institution has a well-deserved place in the historic capital of Peru, cultural heritage of humanity, in its more than three hundred years of institutional life it has forged top-level professionals over time, always being at the forefront of every important event, Their participation was always significant, especially when they had to fight for humanity, freedom and social development. We can mention the great participation that the Antonians had in the libertarian process today on the way to the Bicentennial of Peruvian Independence, we quote the Angulo brothers who forged a clearly nationalist uprising that is considered a true independence struggle from the heart of America, the QOSQO

San Antonio was the center of great changes and contributions to university consciousness, here the fight for university reform was forged, it was the nucleus and focus of free university thought, here the original idea of university co-government germinated and laid the foundations of university autonomy; Our San Antonio is great for its achievements in knowledge, science, technology, art and culture, traced paths that our ancestors bequeathed to us, paths along which we have to continue walking. https://www.unsaac.edu.pe/quienes-somos/

Once she decided that she would pursue a career in teaching, Lucrecia would opt for the specialty of Natural Sciences, which included the disciplines of Biology, Physics and Chemistry. Upon completing her studies, she would work in a secondary school in her homeland (1985 – 1986), rehearsing in the classrooms the epistemological proposal that would allow her to rehearse the first answers to the key question that made her a teacher: Can society be transformed through education?

From her practice with adolescents, he can formulate the following hypothesis: “It is possible if we try to shape and not just educate, if critical thinking and reflective analysis are put into play to explain reality.” From there, Lucrecia admits that the acquisition of basic skills that will bring her students closer to the scientific spirit and fascination with new knowledge are relevant results of this experience.

In 1987, having made some savings, she moved to Lima where she was hired at the San Luis School located in the district of the same name inhabited by a middle-class population.

In 1989 she moved to the upper-middle class Salamanca District where she was hired at a "concerted" school as private institutions run by religious congregations that were financed with private resources and public funds were then called.

During those years, Lucrecia was able to confirm that the levels of economic inequality are even higher, and that misery is concentrated in the indigenous population that migrates from the mountains to the capital of Peru in search of work and better living conditions. In Lima, the former capital of the Viceroyalty of Peru, racism, classism, and discrimination against women are also more visible.

Paradoxically, it was in Lima where Lucrecia would take note that in the capital various trade union movements were developing with much greater vigor, among which the Single Union of Education Workers to which she belonged and in which she would actively participate stood out.

It was there where she also met - through some of their direct actions - Sendero Luminoso and the Tupac Amarú Revolutionary Movement (MRTA).
It would be precisely in 1989 when Lucrecia would join, at the invitation of a colleague and friend, the MRTA as a supporter.

3. From theory to practice: The Tupac Amarú Revolutionary Movement (MRTA).

MRTA Anthem: https://vozrebelde.noblogs.org/

Although from her childhood Lucrecia approached left-wing thought and commitment to social transformation, through the conversations, attitudes, and political practices of her family, throughout her secondary and professional training her convictions were strengthened as she joined various study circles and student organizations. In them she collectively analyzed the literature and the Marxist postulates that allowed her to explain the realities of Peru at the end of the 20th century.

These exercises were frequently linked to the literature of José María Arguedas (1911 – 1969) and with the historical vision of José Carlos Mariátegui (1894 – 1930), vigorous pens that gave meaning to the "Deep Rivers" and the ancestral figure of the Inca in the history of Peru in the 20th century. But, without a doubt, it was the figure of Tupac Amarú, the most powerful ancestral voice that marked Lucrecia's life when she joined the MRTA at the age of 31 and already being a teacher with three years of teaching experience at the invitation of a colleague with whom she shared a similar story, both of life and struggle.

The MRTA was born in 1980 as a result of achieving the unification of various leftist currents with which the MRTA identified itself in doctrinal terms, even though it recognized differences with these organizations because, as it stated in its programmatic documents: "No leftist man is our enemy."

> In this regard, the MRTA points out: "The set of documents discussed in committees and approved in plenary sessions at the Unitary Conference of the PSR-ML-MIR-EM in June 1980 were collected in the form of a brochure and were published under the name OUR POSITION. in July 1981" https://cedema.org/digital_items/1584

In its founding documents, the MRTA is defined as: "the embryo of the construction of the Party of the Peruvian Revolution; It is the political-military organization of the working class, the peasantry and all the exploited and oppressed of our country, whose ideology is Marxism-Leninism."

And it proposes as the objectives of the organization: "to fight to overthrow bourgeois power and the establishment of a popular power, which will lead us towards a free homeland, a society without exploiters, where justice, solidarity, freedom and human well-being prevail: Socialism."

To this end, it is proposed to constitute: "a vanguard, political and military detachment, capable of leading the revolutionary war of the people, as the only way to combat the unjust economic-social order and to build a new one that is at the service of the causes of the poor."

Despite this “formal” birth, on January 22, 1984, MRTA would receive its baptism of fire with the attack on the Villa El Salvador Civil Guard barracks, when after 35 minutes of crossfire, the combatants would withdraw from the place.

After that, the MRTA would proceed to carry out armed assaults on museums and on the ancient Inca heart of Cusco where the legitimate guardians of Peru were preserved. Characters linked to the “repressive forces of the State such as the army and the police or to the predominant economic model that was already neoliberalism” were also targets of the movement (De la Serna, 2023).

According to this same author, one of the most spectacular actions that MRTA carries out in this context is the 1984 assault on the historical museum of Tluarra located in the historical residence of José de San Martín from where they took the original flag of proclamation of the independence.

Along these same lines, the MRTA tries to establish a military base in Cusco, the cradle of Peru and the site where the rebellion of Tupac Amarú, considered the last Inca, took place. In that place Tupac Amarú was beheaded in 1592.

The result of this attempt was the imprisonment of 10 members of the movement in December 1984. Towards the end of that same year and until 1987, the MRTA experienced relevant episodes that put it on the front line of the media in Peru and the world. Opportunities that MRTA took advantage of to emphasize its closeness from Sendero Luminoso and to the historical roots of Peru.

It was in 1987 that the military truce between the MRTA and the government of Alan García would culminate, whose first presidential term lasted from July 28, 1985, to July 28, 1990.

At the end of the truce, a repressive stage began that would worsen during the mandate of Alberto Fujimori, President of Peru from July 28, 1990, to November 21, 2000 (Contreras and Zuloaga, 2014).

Precisely in this context, the arrest of the MRTA leadership would take place, among whom Víctor Polay Campos, Lucero Cumpa and Néstor Cerpa stand out, as well as a growing number of guerrillas and increasing casualties in different combats and even in everyday life scenarios.

hunt for MRTA militants had begun. Faced with this, the hard wing of the organization would take control, which is observed in the actions themselves, no longer oriented as in the past towards the vindication of their historical identity but rather towards the murder of figures linked to the most repressive face of the regime.

It was at this complex moment that Lucrecia Janqui, our biographed, would decide to join the MRTA in 1989, as we already noted.

As a supporter of the organization, Lucrecia would acquire several responsibilities that she would fully fulfill. Among the tasks that would have to be carried out, the following stand out: attendance to periodic meetings of the organization as well as to cultural events promoted by it.

And those with the greatest risk because they involved clandestinity: keeping printed propaganda at home, carrying out flyer distribution in public spaces and, in addition, posting posters on the walls of the districts assigned to her.

The costs of these last interventions became evident when, at the beginning of January 1990, Lucrecia was arrested when, before leaving for her town to enjoy the school holidays (January-March), she posted posters on the walls calling on the population to join the MRTA.

Immediately, Lucrecia was held responsible for storing subversive material in her apartment and was later transferred to the aforementioned “Miguel Castro y Castro” penitentiary center where she was subjected to various tortures, many of which, according to the testimonies collected, had “woman's body” as they were intended for female prisoners identified with the different guerrilla movements that were acting at that time in Peru and other South American countries whose regimes were organized in "Operation Condor."

4. A tunnel open to life

Among the prisoners, those who had participated in the guerrillas that we have already mentioned, were separated, and occupied various spaces in Canto Grande, but not all of them were isolated. Many of them maintained regular communication that produced unexpected alliances and, in the long run, a true saga that led to an escape that turned out to be epic.

The prisoners of the MRTA and some of the Shining Path were taken to the "Miguel Castro y Castro" prison, inaugurated on January 15, 1986, better known as Canto Grande due to its location. This was a "modern" and maximum-security prison; it was also located on the outskirts of Lima and had modern technology to monitor the interior of the prison.

Despite these material conditions, from the first day they set foot in prison, the members of the MRTA began to formulate plans to build an escape route for their coreligionists, several of whom had already been victims of acts of repression by the government of Alan García that included torture and illegal detentions. Furthermore, they had witnessed real massacres that ended the lives of many of their companions.

In a certain sense, they were survivors who were considering the "after" of Canto Grande and that included their liberation. Everyone was busy with that, and they were not alone because there were local and international networks willing to support them. One of these networks was that of the Tupamaro prisoners of Uruguayan origin with whom they had established a close relationship in Canto Grande. This had helped Polay, the leader of the MRTA, to establish contact with the Tupamaro leader Raúl Sendic who had lived one of the most successful experiences in this regard by organizing the escape of 100 prisoners that, at the time, deserved all the attention of the press. (Thorndike, 1991, p.51)

Under this logic, and with the conviction that liberation was possible, the political prisoners discovered that the wastewater pipes connected to all the cell blocks and… they began to dig a tunnel.

"Shortly after being transferred…, the Tupamaros began to dig from the underground duct to which the prison drains reached. They had advanced fifty meters and were approaching the outer wall when they were betrayed" (Thorndike, 1991, p.51)

On July 17, 1987, the 20-meter-long tunnel was discovered, which stopped the plans and meant that, as Polay stated: "Breaking with the tradition of tunnels, built from inside the prison outwards, this one would have to be "from the outside towards the inside" (De la Serna, 2023, p.209)

Furthermore, the new tunnel had to reach its destination, there was no room for more mistakes. They counted on the fact that with the help of a professor from the University of Engineering and members of the National Federation of Miners, they had perfected their measurements and had drawn up plans "from a drawing of the ventilation system and, upon request of the moles, short tools were prepared in a foundry, like the "goat's legs" used by thieves, pointed at one end and shovel-shaped at the other, so that they could simultaneously be used for chipping and digging," (Thorndike, 1991, p.63)

Finally, almost three years after the first attempt, on July 9, 1990, at 3:45 in the morning, the work known today as "The Polay Tunnel" was completed. The tunnel measured 332 meters long, half a meter high and 1 meter wide. Books, revolutionary symbols of the MRTA, and even in one of them, a shower for whoever required it had been installed on several landings.

From the beginning they planned to buy a piece of land next to the prison so that a couple of young militants, who would pretend to be spoused could live there and keep an eye on the work, but actually, the first couple was replaced by another when the work had not yet begun. The full details - although not exactly coincident - of the tasks involved in the construction of the tunnel are narrated by Guillermo Thorndike and Miguel De la Serna, both cited in this text.

Eight women (one of them who had just given birth and the other with a back injury) and 40 men escaped through the tunnel. All of them, once outside, would be supported by their coreligionists and taken to various destinations. Lucrecia Janqui flew out of Peru without money in her saddlebags but with firm convictions, she retraced the paths of her future.

5. The life lived: Lucrecia in her own words

"I was born in 1959 in Andahuaylas, a town in the Andean region of Apurimac, Peru, a place located between two worlds. One, the indigenous, the one from the Deep Rivers, invisible but resistant that always refused to die and the other, the mestizo, at that time strongly impacted by the modernizing dreams of the post-war that allowed the Empire to flood our lands with its promises of economic growth, development and equality but which, in the long run, only brought with it marginalization, poverty and merciless and opulent wealth."

Andahuaylas, is located in the Peruvian Andean region of Apurimac. Andahuaylas is located in the Chumbao River valley at 3500m above sea level. The area is well known for being a region of the Chankas, the Quechua people eternal enemy of the Incas, so that the Quechua spoken in that region is known as: Quechua Chanka.

Andahuaylas also carries with it the enormous legacy of being the homeland of the great writer and ethnologist: José María Arguedas, author of the work "Los Ríos Profundos (1958)", in which he makes a profound reflection on the Peruvian identity consciousness. He knew from within the two worlds, that of the mestizos in the gamonal system and that of the original Andean peoples; also experiencing discrimination on both sides firsthand, but always assuming to take the side of the oppressed; All of this is reflected in his works, flooded with magical realism and at the same time with a very close and bloody description of the social reality of Peru.

Box 1

Figure 1
Map of Peru and its regions

Source. https://www.google.com › maps

For Lucrecia, being from Andahuaylas, the land of Arguedas, and like him, being a bilingual Spanish and Quechua speaker as well as being the daughter of a Quechua and a mestiza, grants her the possibility and privilege of swimming between those two waters and being able to know both worlds and from that symbolic place, she writes:

"I am mestiza, I was born in the mountains of Peru. My father was indigenous, my mother was mestiza; I lived my childhood in the countryside, my miscegenation is not only ideological, but also of experiences and learning, of the vision of life, of the world vision, of culture.

I was born in the city of Andahuaylas, but at that time the town had about 5,000 or 6,000 inhabitants; I remember very well that we had a house there and on weekends we went to the farm, to the field, to the farmhouse very close to the field. On the farm you have a country house, you have the animals, the crops, the garden, and a whole world of great cultural wealth full of sounds, colors, symbolic presences that overwhelmed you from the first moment you entered the farm.

Usually, we went there on weekends. My father would take us to the farm to help with field chores and to spend the day there. The most pleasant memories of my childhood were spending time together with the country kids with whom, depending on the time of the year, we would eat capulines (black Mexican or South American cherry type of fruit). Most of our neighbors were kids of the age of our older siblings that were going to plant vegetables, to remove weed, and other chores suitable for them.

Although they included me in the work that was required, I participated more as a game because I am the seventh of nine siblings, too small and not very strong to participate seriously as they did.

But I had my own alternatives since my mother is a merchant and I was always very attached to her. At the farm, the janitors who took care of the house cared for me very much and pampered me a lot. For them I was "the Lucre girl" and they treated me very affectionately. That same affection was expressed to me by the people around me.

I started school when I was four years old, I remember that my grandmother took me, that memory has marked me because it was very solemn and for me very significant because I was leaving my early childhood behind, and I was beginning a very long path that had to do with learning, what the world was like.

I went to a private nun's school for the first year of primary school. It must be said that in my town, attending that institution gave you a kind of prestige. However, that school was closed as a result of the coup d'état that shook Peru at the end of 1960, so I returned to the public school and in public school I continued my studies until university where I completed my education career, as a secondary education teacher. And with an eye on the present, Lucrecia shares with us the Ayni pacha and its invaluable meaning:

Times of Solidarity - Ayni pacha

I started the month of January 2020, with my return trip from Peru to Madrid. And during these six months I have not stopped traveling; the entire south of my country, crossing Chile and part of Argentina, all the way to Buenos Aires. With greater impact in these months declared as: "time of the global pandemic" COV-19, I have had to travel through Germany, where I arrived with the smells of hyacinths and when I was able to say goodbye, all the roses were already in bloom. Everywhere I have gone, I met people, families, and friends of friends; with whom we have put into practice the value of Ayni; Without this practice it would not have been possible to return to my home in Madrid.

In the name of gratitude, I write these lines to give a face to *Ayni*, which is a Quechua concept of the Andean worldview, it denotes several meanings related to the Allin Kawsay of the Ayllu (the good living of the community). One of them, the best known and most practiced, is the correspondence or reciprocity of daily life, according to Professor Edwin Benites of the José María Arguedas National University of Andahuaylas.

Nicolás Pauccar; who belongs to the Qero nation, and I also highlight that he is the first Qero who learned to read and write in Spanish in the 21st century; for whom Ayni is sharing not only what you have, but also what you are; Likewise, living in Ainy means generating balance in the environments where the person lives; whether family, community, social and natural, with the purpose of harmonizing chaos through attitude.

This concept can also be considered as one of the pillar codes of ethics of the Andean peoples as is the case of Peru. The practice of this ancestral value is still sustained today, in the relationships of good coexistence; transmitted orally from generation to generation.

In the region where I come from, Andahuaylas – Apurímac; where 60% speak Quechua, different ethical practices such as Ayni are still maintained…*kay kausaypachapiqa tukuymi aynillan*…My mother taught me this message; with her practice of generosity with her entire family and close people from my town; What it means is that, in this life, everything is a sharing, a loan and an act of solidarity. It is worth saying that ayni in its essence must be understood as a selfless, voluntary, and philanthropic attitude that leads to the general well-being of the community or the common good.

Ayni becomes relevant in these times of health crisis around the world that have revealed the human values and anti-values. Here I will focus on the practice of Ainy as a human value; because it is not an exclusive practice of the Andean peoples; it is the practice of all humanity when it finds itself in any situation of crisis and prosperity.

At a macro or global level, the solidarity of thousands of Cuban doctors, who have traveled to care for people who were victims of Cov-19 from Italy in Europe to Mexico in Latin America and other nations located in various latitudes worldwide, is internationally recognized. Germany, that has been able to control the virus, has not motivated its doctors to be present in other countries, not even in Italy.

For me it is an act of justice, to express my gratitude or the anchota SulpayKi- (I am deeply grateful, in Quechua) giving my testimony, in this way as an understanding and practice of life, from the simplicity, anonymity and generosity of many people who know that sustaining friendship, empathy as part of human relationships, involves recognizing each other face to face as equals. Also, my gratitude goes to my family, who always embodies this human value, reaching out to me at different times in my life.

In these times of crisis, it is pertinent to recognize the existence of Ainy as a concept and practice. In this regard, I wish to emphasize that Ainy has different forms of practice such as the *Aynillapaq*, which is a way of borrowing, everything is borrowed from life, the non-existence of exclusively private property, but rather that life, Pachamama, gives us on loan everything one needs to live.

So, throughout this time of pandemic I reflected deeply on this concept and its various ways of putting it into practice not only in my country because, as a concept, it exists in all the languages and civilizations of this now globalized world.

The response to every act of solidarity and Ayni is THANK YOU. There is also the concept and gesture of gratitude in all languages and civilizations, in this process of exchange of material and immaterial goods.

These days it is important for me to express that gratitude through words, for all the people with whom I have shared the path of life, the CCapaq Ñan (in Quechua). Sometimes words cannot express the depth of my feeling of gratitude, which encompasses my best wishes, my recognition and appreciation of this gesture of welcome in the family home, the food, the coexistence, the accompaniment, the affection, the compassion and so many human gestures that make us more similar than different.

If I had to make a list of all the people who have expressed solidarity, or Ainy, with me in these times, someone could be left out, due to my fragile memory; so I don't want to make the mistake of failing to name someone who surely had some gesture of solidarity with me.

For this reason, I write in the name of gratitude, so that we include each person who has welcomed, in different ways, a refugee from COV-19. Likewise, anyone who has had to live, and continues to live, the experience of being a refugee anywhere in the world, without being able to return to their home, which they miss so much. In this idea, I have seen on television and social networks that many people have returned home in different ways, by bicycle, probably even walking.

Life or *Kausay,* does not leave any person helpless or unprotected if they practice ayni or solidarity with any other person and with Pachamama, known also as Mother Nature. There is so much evidence that speaks to us and asks us to show life in harmony or balance to sustain all forms of life on this earth that is our only home for now; as long as we don't have a travel ticket to Mars or any other planet."

Conclusions

This intellectual biography of Lucrecia Janqui, mestiza, Quechua speaker, inhabitant of the highlands of Peru, university professor, insurrectionist and in her youth a member of the MRTA armed forces, confronts us with several ruptures worth emphasizing.

The first is the one that has to do with her origins as a member of a middle class that is recognized not only by the place it occupies in production but by its access to education and a certain belonging to institutions and cultural circuits that involve intense dialogues from which worldviews, projects and commitments are built - not always conscious - with the historical future of Peru.

From what Lucrecia narrates, in the house of her early childhood (the farm) where she spent many weekends, there was a habitat where animals were raised, she spent time with workers, and received an education close to the rural and indigenous world. which, in the long run, would form part of the complex identity in which Lucre recognizes itself.
The second question refers to the need to transform the material and social reality in accordance with the principles declared by the MRTA to which we have already referred before.

This commitment, which would imply in the long run a transition towards armed militancy, also had a bearing on Lucrecia's training and professional practice since she constructs an epistemological perspective that breaks with Western schemes of science, scientific work, and teaching. in the classrooms. This rupture transforms scientific and pedagogical work into a true praxis in which doubt, criticism and creation matter as much or more than certainty, repetition, or the mere description of reality. In other words, it is a position that implies, in addition to a worldview, a praxis that attempts to be consistent. For a conceptual development of these terms, consult:

- https://www.filosofia.org/urss/dfsm1965.htm
- https://www.filosofia.org/urss/ddf1984.htm
- https://www.filosofia.org/urss/dmf1971.htm

Under this logic, we must note that when we refer to this woman's relationship with science, we start from a vision of science that constitutes a counterpoint with respect to the paradigms of Western science in which many of us have been trained and also in relation to representations about “doing science” and “being scientific.”

In this way, Lucrecia's biography confronts us with many of the nests of comfort that we have assumed even when symbolically they are masculine, patriarchal universes and have resisted the equal participation of women in "the sacred precincts of knowledge.”, as stated in the literature located in the gender perspective that we cite here as well as the one that, for reasons of space, we have omitted.

By returning to Lucrecia's story, we do not do so with an exemplary spirit as does the “Historia Maestra de Vida” (Chinchilla, 2020) but rather to show, from other panopticons, these women who contributed - from their own perspectives - to deconstructing a world distant from the “Place of the Inca”, deaf to the voices of the Deep Rivers of Arguedas and the history built from the often denied pasts of the conquered.

We are convinced that, when history is written in woman’s key code, faces change, militancy is transformed to give birth to vigorous analysis in which criticism and creativity go hand in hand.

We close this section with the statement of two pending tasks: The one that has to do with recovering and making audible the testimonies that show that torture has a woman's body and the one that allows the life testimonies of these women to be conveyed through social networks. these women who, as we have tried to show, from various positions have "done science."

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

Authors' Contribution

Arteaga-Castillo, Belinda: Contributed to the project idea, research methodology and technique. She provided Lucrecia's contact, the interview and the analysis of the interview, as well as writing the article.

Santillán-Nieto, Marcela: Carried out the systematisation of the background for the state of the art and methodology. She supported the design of the interview, as well as writing the article.

Alvarado-Sánchez, Martina: Contributed to the research design, application and interpretation of the interview, as well as writing the article.

Vélez-Castillo, Raquel de Jesús: Contributed to the research design, application and interpretation of the interview, as well as writing the article.

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Abbreviations

MRTA	Movimiento Revolucionario Tupac Amarú

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Exploring the Kawaii Phenomenon: A study for its classification

Exploración del Fenómeno Kawaii: Un estudio para su clasificación

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A comprehensive model for the analysis and study of the kawaii phenomenon. Kawaii, multidisciplinary topics, culture, and the history of kawaii. The categorization of the kawaii phenomenon is an invaluable tool for its study in academic contexts.

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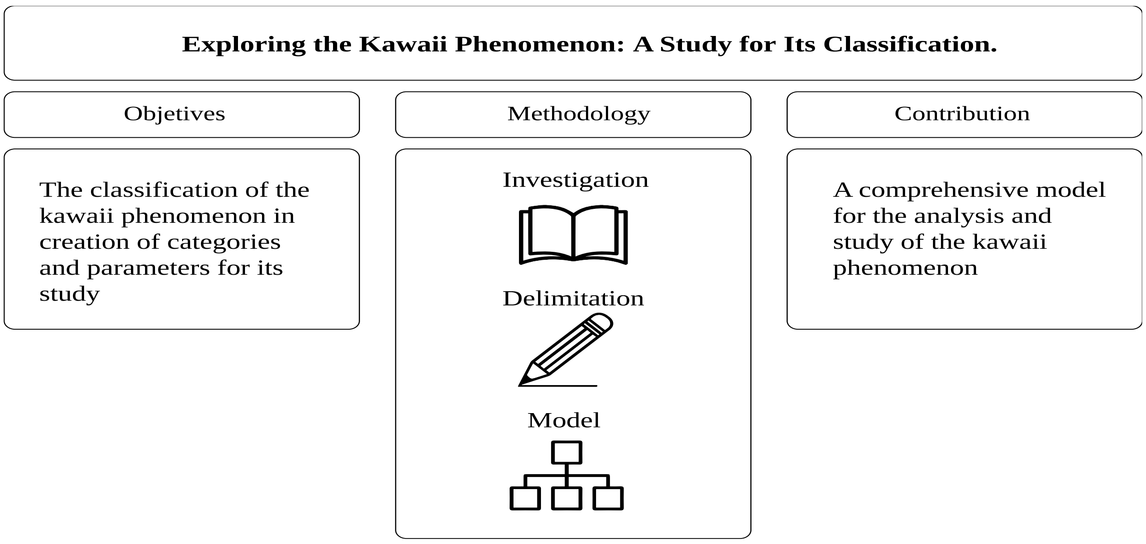
Abstract

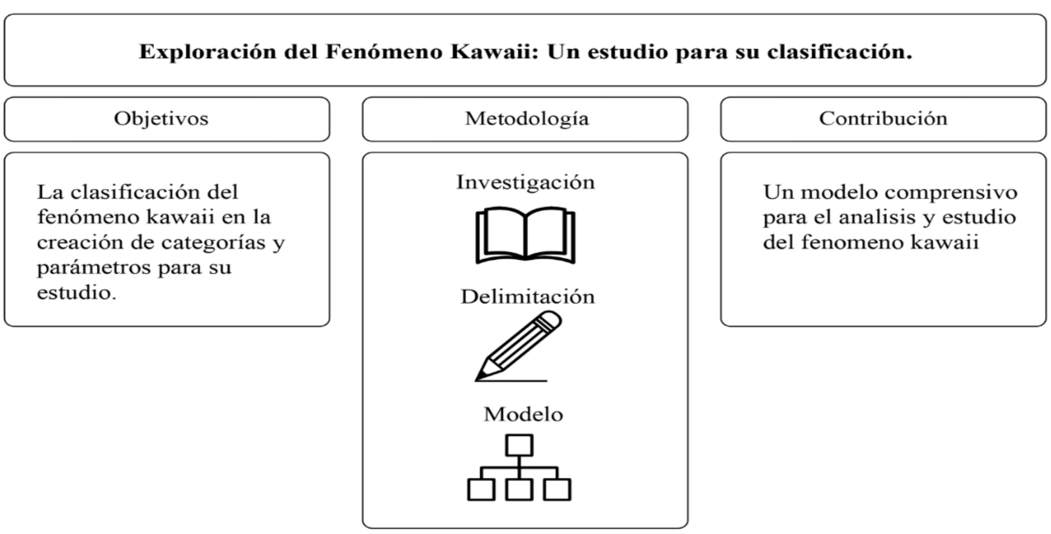
This article aims to offer a comprehensive view of the kawaii phenomenon by exploring its dimensions. Consequently, providing a conceptual framework to understand and analyze this significant aspect of contemporary culture. Through a multidisciplinary approach, we seek to unravel the complexities of kawaii and its impact on diverse areas, from visual arts to popular culture, through fashion, graphic design, and social dynamics. The starting point for this exploration is the Kawaii Classification model proposed by Marcus, A., Kurosu, M., Ma, X., & Hashizume, A. (2017), the starting point for the organization and categorization of the elements that make up the kawaii phenomenon. However, this article introduces a different and comprehensive version of said model, including a new dimension: the Graphic Kawaii. This new category is incorporated to reflect the evolution and expansion of kawaii in the visual field, recognizing its growing influence in graphic design, illustration, and other forms of visual expression. Which have contributed to popularizing and adapting this aesthetic locally and globally.



Kawaii, Dimensions, Model

Resumen

Este artículo tiene como objetivo ofrecer una visión integral del fenómeno kawaii, explorando sus diversas dimensiones y proporcionando un marco conceptual para comprender y analizar este aspecto significativo de la cultura contemporánea. A través de un enfoque multidisciplinario, se busca desentrañar las complejidades del kawaii y su impacto en diferentes ámbitos de la sociedad, desde las artes visuales hasta la cultura popular, pasando por la moda, el diseño gráfico, y las dinámicas sociales. El punto de partida para esta exploración es el modelo de Clasificación Kawaii propuesto por Marcus, A., Kurosu, M., Ma, X., & Hashizume, A. (2017), el punti inicial para la organizacion y categorizacion de los elementos que conforman al fenomeno kawaii. No obstante, este artículo introduce una versión diferente de dicho modelo, incluyendo una nueva dimensión: el Kawaii Gráfico. Esta nueva categoría se incorpora para reflejar la evolución y expansión del kawaii en el ámbito visual. Reconociendo su influencia en el diseño gráfico, ilustración, y otras formas de expresión visual, que han contribuido a la popularizacion de esta estética en contextos locales como globales.



Kawaii, Dimensiones, Modelo

Introduction

This document aims to thoroughly examine the cultural and aesthetic phenomenon known as kawaii. Which has transcended its Japanese origins to become a global trend characterized by exponential growth and diffusion in recent years.

From an aesthetic perspective, the concept of kawaii is reflected in a wide range of fields, including fashion, illustration, product design, and many other creative areas.
On the other hand, the cultural aspect of the term "kawaii" is examined, tracing its history and evolution to Japan's historical events, from its origins during the Taisho Era (1912-1926) to its contemporary application and influence on global popular culture.

Researcher Kazuma Yamane defines the concept of kawaii as: "Something childlike; it celebrates sweet, adorable, innocent, pure, simple, genuine, gentle, vulnerable, weak, and inexperienced social behaviour and physical appearances" (Yamane, 1990, as cited in Kinsella, 1995). This definition highlights the necessity of considering both aesthetic and social aspects to completely understand the kawaii concept, as its essence and origin are deeply intertwined with Japanese culture and history.

To date, academic research on the kawaii phenomenon has focused on exploring its psychological and cultural dimensions. For example: analysing both the influence of its neotenous characteristics on consumers and the everyday use of the term.

Therefore, this document proposes a new framework for the classification of the kawaii phenomenon. Contemplating the central dimensions necessary for its academic understanding, the objective of this research is the construction of a comprehensive perspective of this phenomenon.

Focusing on the study of the characteristics and dimensions found in the kawaii aesthetics, which have been lacking in previous studies.

1. The Kawaii Term

The term *kawaii* has evolved into a far-reaching cultural phenomenon, transcending the borders of its Japanese origin to gain a significant presence in Western culture. This concept, which at first might seem simple, has proven to be much deeper and more complex, influencing various areas of contemporary life, from fashion and design to social dynamics and consumption.

Although the most common translation of kawaii in Western languages is "cute" or "adorable," it is essential to delve deeper into its meaning to fully understand this term.

According to the Oxford Dictionary, the term kawaii is defined as "Cute, esp. in a manner considered characteristic of Japanese popular culture; charming, darling; ostentatiously adorable." (Kawaii, Adj. & N. Meanings, Etymology And More | Oxford English Dictionary, n.d.). This definition emphasizes the idea that kawaii not only refers to an aesthetic quality of cuteness but also embodies behavior and cultural expression intrinsically linked to Japanese popular culture. This suggests that perceptions of what is "cute" or "adorable" may vary significantly between Japan and the West, where what is considered kawaii in Japan could be perceived as ostentatious in other contexts. Nonetheless, it is important to highlight that all the adjectives used to describe kawaii in this definition carry a positive connotation.

Furthermore, to gain a deeper understanding of *kawaii,* it is crucial to consider the opinions of artists who have been influential in this domain. A prominent example is Takashi Murakami, known for coining the artistic term 'superflat.' According to Steinberg (2002), superflat is described as "A doorway into the consideration of the issues of national aesthetics, genealogies of anime […] and ideas to contemporary commodity culture, digital culture and postsubjectifying semiotics." (p.88).

Murakami describes the kawaii phenomenon as follows: "Kawaii (cute) culture has become a living entity that pervades everything. With a population heedless of the cost of embracing immaturity, the nation is in the throes of a dilemma: a preoccupation with anti-aging may conquer not only the human heart, but also the body." (Takashi Murakami Flower Parent And Child, n.d.)

From Murakami's perspective, kawaii has become an integral part of Japanese society, while also being a sign of immaturity and an obstacle to personal development. According to him, this obsession with kawaii not only affects physical appearance but also the personality and mindset of individuals, prioritizing "cuteness" above all else. This critical viewpoint broadens the understanding of kawaii, highlighting the less positive aspects of this cultural phenomenon, making it a more complex and multifaceted subject of study.

On the other hand, there is the definition offered by artist Sebastian Masuda, recognized as one of the leading figures in kawaii culture. Masuda has been instrumental in the global diffusion of this aesthetic through projects such as his restaurant KAWAII MONSTER CAFÉ and the art direction of music video PONPONPON by Kyary Pamyu Pamyu. (Profile Sebastian Masuda, 2022).

Masuda approaches kawaii from a different perspective: "The loveliness or cuteness of small things? Kitschy, colorful, childlike design or fashion? In common usage, the word kawaii might refer to these representations. However, what underlies kawaii goes beyond its aesthetic, or fashion, and stems from a strong sense of individual spirit that involves questioning social norms and embracing a philosophy of cherishing what one loves.” (Yes, KAWAII Is Art - Artist Statement, n.d.)

In contrast to Murakami, Masuda sees kawaii as a movement that transcends aesthetics, allowing individuals to question social norms and foster personal development through the appreciation of what they love. This love and liberation are expressed through "cute" elements in design and fashion.

Considering these definitions, this document adopts the interpretation of kawaii proposed by Kinsella (1995), who describes it as "sweet, adorable, innocent, pure, simple, genuine, gentle, vulnerable, weak and inexperienced social behavior and physical appearances” (p.220). Kinsella’s description aligns most closely with the themes discussed in this analysis, providing an appropriate framework for the discussion.

2. Kawaii in the World

The concept of kawaii has become a central element in Japan's global image, projecting a sense of approachability and friendliness to the world. This perception has been cemented through the popularization of various forms of Japanese pop culture, including anime, as well as the international recognition of iconic brands such as Nintendo, Honda, and Studio Ghibli. Iconic characters such as Hello Kitty, Doraemon, Pikachu, and Sailor Moon have been instrumental in generating both global recognition and considerable economic value for Japan. According to Bîrlea (2023) “The rapid acceptance of Japanese cute or kawaii culture can be attributed to its cultural significance in Japan, its emotional appeal, its unique style, the influence of Japanese popular culture, the role of social media and the internet, commercialization efforts, and the engagement of subcultural communities.” (p.323). These factors have allowed kawaii to transcend cultural borders, establishing itself as a global phenomenon.

Among the characters that have managed to capture the essence of kawaii, both in terms of adorable design and commercial relevance, Hello Kitty, created by the Sanrio brand, stands out. This character not only appeals to consumers with charming designs and the ability to stay up to date with contemporary trends but also presents himself as friendly and approachable, establishing emotional bonds with his audience.

Hello Kitty's impact has reached significant proportions, as demonstrated by a study conducted by Statista in 2021. The study establishes the Hello Kitty brand as the second highest-grossing media franchise, accumulating a total of $84.5 billion around the world since its creation in 1974 (Buchholz, K., 2021). This financial success underlines the lasting influence of Hello Kitty and, by extension, the Sanrio brand as one of the leading exponents of the kawaii style in the West.

Kawaii characters, like Hello Kitty, are designed to generate empathy and establish emotional ties with people, becoming tools of comfort and social interaction. These characters not only entertain but also create emotional bonds between the brand's fans, functioning as symbols of connection and emotional support.

Lieber-Milo (2021) states that “Kawaii commodities appeal due to their perceived vulnerability, they can function powerfully in helping their owners deal with social interaction, stress, and anxiety.” (p.759)

This ability of kawaii characters to provide emotional comfort and security reinforces their cultural and commercial value, further consolidating Hello Kitty and Sanrio's position on the global landscape.

However, the influence of kawaii is not limited only to commercial and branding aspects; his impact has spread deeply into popular culture, especially the visual arts, where he has left an indelible mark. This influence is particularly evident in the field of animation, where iconic series such as Sailor Moon and Astroboy. Notably shaping the aesthetics of productions outside of Japan and establishing a visual style that has resonated internationally.

The kawaii style, characterized by its focus on the adorable, the colorful, and the emotionally engaging, has permeated various forms of global entertainment. A contemporary example of this influence can be seen in the Cartoon Network series We Baby Bears (2022). This production, clearly inspired by kawaii aesthetics, adopts an animation style that emphasizes cuteness and simplicity, central characteristics of kawaii.

In addition to animation, the influence of kawaii extends to other areas of pop culture, including fashion, graphic design, and even music. In fashion, styles like Lolita and Decora have emerged as direct manifestations of kawaii, combining colorful clothing and playful accessories to create looks that challenge conventional norms of beauty and style. In graphic design, kawaii is reflected in the preference for rounded fonts, pastel color palettes, and the representation of anthropomorphic characters.

The kawaii aesthetic has transcended its Japanese roots to become a global force within pop culture. Its ability to adapt and be reinterpreted in different cultural contexts underlines its relevance.

Methodology

Kawaii classification model

To establish a strong theoretical framework for studying the kawaii phenomenon, it is necessary to develop specific analysis categories. To determine and establish the categories integral to this study, we will use the model created by Marcus et al. (2017) as a starting point.

Box 1

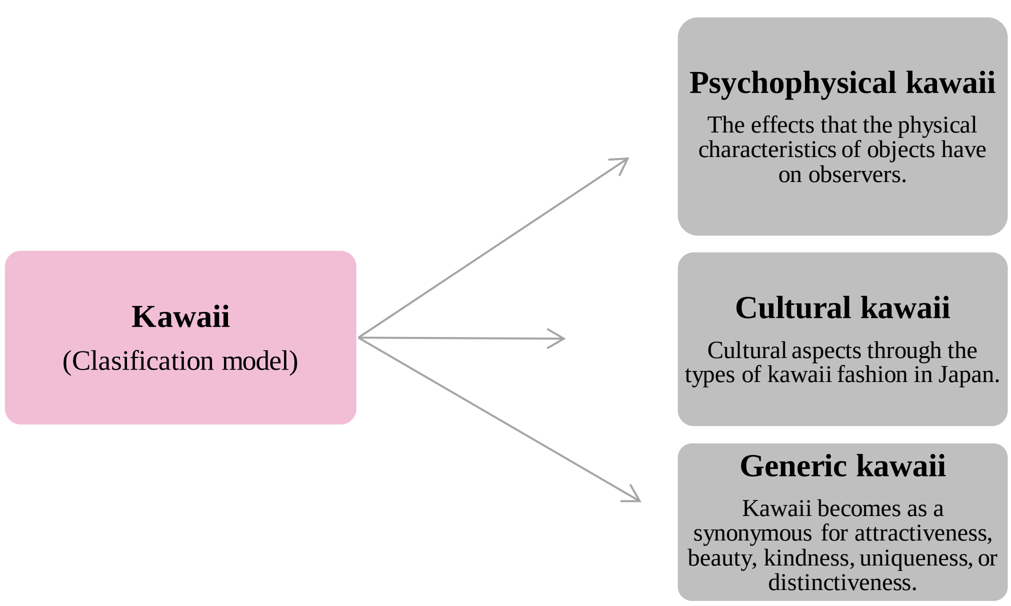


Figure 1

Kawaii Classification Model

Source [Own elaboration, adapted from Marcus, A., Kurosu, M., Ma, X. & Hashizume, A., 2017].

Considering this multifaceted nature Marcus et al. (2017) proposes a classification model that divides kawaii into three categories: 1) Psychophysical kawaii, 2) Cultural kawaii, and 3) Generic kawaii.

The first category, *Psychophysical kawaii*, refers to the effects that the physical characteristics of objects, such as shape, size, length, color, and texture, have on observers. The field of psychophysics explores the relationships between the physical attributes of stimuli and the resulting psychological impressions, sensations, or perceptions.

Marcus et al. (2017) mentions that one of the earliest approaches to understanding cuteness and its psychophysical effects is Konrad Lorenz's Baby Schema (1943). Lorenz's considered cuteness as a biological response triggered by nurturing and protective behaviors toward infants. Such response was motivated by specific physical traits, such as the size and placement of the eyes, large heads, and high foreheads. (p.43)

Second category in Marcus et al.'s (2017) model is Cultural kawaii, which focuses on the cultural aspects of kawaii in Japan. This includes various kawaii subcultures among young women, such as Gals, Lolitas, Yume Kawaii, Kimo-Kawaii, Gro-Kawaii, Ero-Kawaii, and Busu-Kawaii, typically identified as fashion styles or behavioral patterns.

The final category, Generic kawaii, addresses the broader trend among young women and some men, where kawaii becomes synonymous with attractiveness, beauty, kindness, uniqueness, or distinctiveness. It is used as a safe and versatile term to describe fashion, makeup, personality, and other attributes.

This model and its considered categories, set a comprehensive approach for the design of a a new model. This approach will consider new aspects of the phenomenon, including the aesthetic, which is important for defining and delimiting the visual characteristics found in *kawaii*.

Categories for a new Kawaii Classification Model

With the purpose of establishing a solid theoretical framework that allows a deep analysis of the kawaii phenomenon, a new classification model was designed. This model seeks to identify and delimit the key aspects that define kawaii, thus facilitating its systematic study and integration into academic research.

The concept of kawaii can be studied across various disciplines, including history, psychology, and aesthetics, each offering unique insights into its significance and impact. Historically, kawaii has deep roots in Japanese culture, while psychologically, it can be analyzed through its effects on observers. Aesthetically, it is characterized by distinct visual identifiers.

The classifications considered for this model are determined by three distinctive categories identified through a literature review:

1) Graphic Kawaii
2) Psychophysical Kawaii
3) Cultural Kawaii

Graphic Kawaii

"Graphic kawaii" is understood as all those visual elements that transmit this aesthetic through their visual message. To analyze this phenomenon systematically, four key categories and their respective dimensions have been defined that address the factors that influence its aesthetics. These dimensions consider the aspects that contribute to the recognition of this aesthetic, characterized by sweetness, adorableness, and charm.

Context

Aesthetics are products of the environment in which they are created, deeply connected to society and their surroundings. They are shaped by the social context, which often reflects cultural, historical, and social norms.

Understanding the context in which these styles emerge allows viewers to appreciate their cultural background and fosters empathy towards them, as it better explains the challenges, problems, and advantages they face.

Formal Representation

According to Guzmán (2016), formal representation refers to "Those visual and physical aspects that allow for an exact identification of their identity and descriptive particularities" (p. 103). These elements are fundamental to the visual identity, providing a clear means of recognition.

Each of these aspects uniquely contributes to the image, creating a combination that distinguishes them from others and allows for the identification of the style.

As indicated by Jaramillo (2024) the kawaii prototypical features found specifically in characters are small and soft, with child-like features such as big heads, large eyes, and round bodies.

Psychological Representation

Guzmán (2016) defines psychological representation as "the set of attitudes, behaviors, response patterns, and feelings that affect how they are perceived by the world around them" (p. 103). This complex interaction between the internal psychological elements and their interactions with the world emphasizes the impact of the attitudes, behaviors, and feelings that viewers perceive in them.

Psychophysical Effect

As mentioned earlier, Marcus et al. (2016) defines this concept as the effects that the physical characteristics of objects—such as shape, size, length, color, and texture—have on observers, in conjunction with the psychological representation of the characters.

Box 2

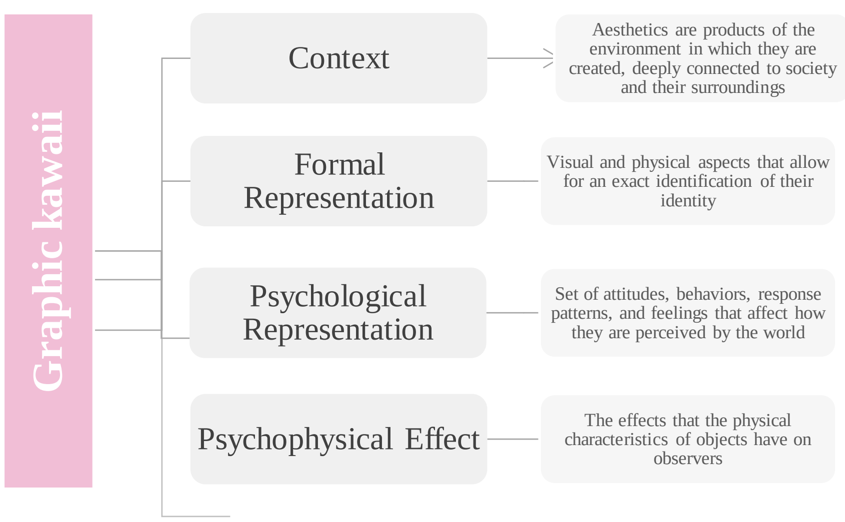


Figure 2

Graphic Kawaii Diagram

Source [Own elaboration, 2024]

These dimensions can be effectively applied to the analysis of a wide variety of cultural and aesthetic manifestations within the kawaii phenomenon. Specifically, this analytical framework is useful for examining the characterization of iconic characters such as Hello Kitty or Rilakkuma, the creation and design of advertising mascots, as well as the various styles of kawaii fashion.

Within these styles, such distinctive subcultures are included as Lolita, Gyaru, Decora, and Fairy Kei, among others. Each of these styles represents a unique interpretation of kawaii, with its own aesthetic norms and cultural signifiers, underscoring the need for a systematic approach to its study.

Psychophysical Kawaii

As mentioned above, this category refers to the effects that the physical characteristics of objects exert on observers, focusing on the reactions that arise when interacting with kawaii objects. An emblematic example is the Sanrio character *Gudetama*, an anthropomorphized apathetic egg whose only desire is to rest and sleep. This character was created with the purpose of evoking empathetic feelings in consumers, reflecting the desire to rest and escape from responsibilities, just as *Gudetama* does.

The kawaii characters are designed to create bonds of friendship and familiarity with observers, fostering empathy through common and shared situations. These characters not only seek to be visually attractive but are also designed to establish an emotional connection with the audience, achieving this goal through their distinctive physical features.

These physical characteristics have been the subject of study by various researchers. A prominent example is the "Baby Schema" scheme proposed by Konrad Lorenz in 1943, which attributes cuteness reactions to a biological protective response towards babies, or in this case, towards characters with neotenic traits.

This schema was later debated by Nenkov, G. Y. & Scott, M. L. (2014), who introduced the concept of "Whimsical Cuteness," where cuteness was associated with playfulness, indulgent behavior, and gratification, rather than the nurturing and moderate behaviors linked to the Baby Schema (pp. 326-341).

Additionally, Nittono (2016) defines kawaii as the affective feelings an individual has toward an object, driven by the desire to approach and remain close to it. These feelings are not directly associated with protection and care but are motivated by the simple desire to be near and engage with the object (pp. 79-98).

These are the psychophysical effects that will be considered for the design of the model.

Box 3

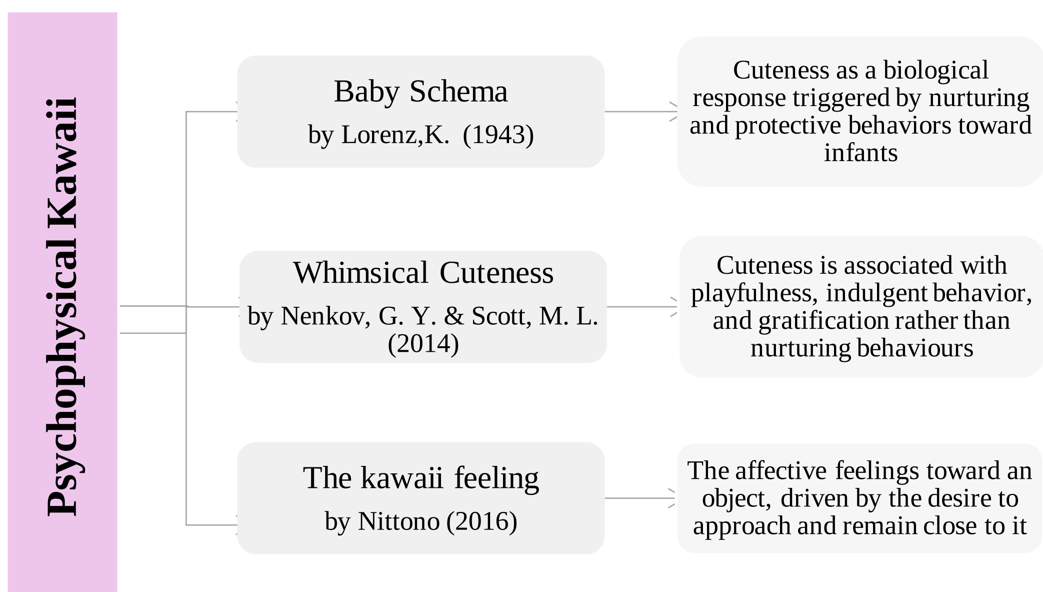


Figure 3

Psychophysical Kawaii Diagram

Source [Own elaboration, 2024]

Cultural Kawaii

This category will address the history of kawaii aesthetics, from its linguistic origins to the contemporary meaning of the word. Likewise, its graphic evolution over time will be considered, including the artistic movements and relevant characters that have influenced its development. Any element that has been key to the formation of kawaii, both in its graphic dimension and in its social impact, will be assigned to this dimension.

This document will not go into detail into each aspect since the objective is the creation of the categories and parameters of each one. However, it is considered pertinent to continue the in-depth study of the cultural categories of kawaii in future research, given its impact and relevance in the contemporary context.

The kawaii term

The aspects included in this section are those related to the linguistic evolution of the word kawaii. Koma (2013) postulates that the first historical record of the word kawaii written as kawai dates back to the Heian era in the book “Makura-(no)-Soushi” (The Pillow Book) by the poet and writer Sei-shonagon in section 155, where the word “Utsukushi” which translates as “Cute”, which can also mean beautiful, someone who is innocent, infant, pure and someone who needs the protection of an adult. (p.105-107)

The first concepts of kawaii can be found in dictionaries from the Taishō era (1912-1926) until 1945, under the terms "kao hayushi" or "kawahayushi" ("blushing face"). These terms were used to describe the feeling of shame that can be experienced, physically manifested in the inability to look another person in the eye due to a guilty conscience. Later, after World War II the term evolved, from which the word "kawaii" used today is derived. (Bîrlea, 2021)

History

In this dimension, the historical development of the kawaii phenomenon in Japan, its historical relevance and the relevant events or movements that gave rise to the creation of kawaii are contemplated.

As noted by Marcus et al. (2017), during the Taisho Era (1912-1926) various cultural movements emerged in Japan, strongly influenced by European and American Japanism and Orientalism that had developed during the Edo Era (1603-1868).

These influences inspired illustrators outside Japan, as was the case with Rose O'Neill, creator of the popular Kewpie doll, which became the mascot of the Japanese mayonnaise brand of the same name. Kewpie's image managed to transcend the brand's advertising confines, fusing elements of American culture with Japanese culture.

Kinsella (1995) notes that the modern concept of kawaii began to take shape in the early 1970s, with the emergence of the writing style "Marui ji" (rounded writing), "koneko ji" (kitty writing), or "burikko ji" (simulated children's writing) (pp. 222-224).

This type of writing gave rise to the current kawaii phenomenon, which emerged in the 1970s. Like Marui ji writing, it can be interpreted as a form of rebellion against conventional gender roles imposed on women, such as responsibility. for the care of the home and children. This resistance to social norms was commonly expressed by young women through their style of dress and lifestyle, which deviated from the conventions of the time. (Lieber-Milo & Nittono, 2018)

Key representatives

Among the key representatives of the kawaii phenomenon, the illustrator Rune Naito, pioneer of this aesthetic, stands out. Through his illustrations, which feature women with big eyes and vibrant colours, Naito made a clear distinction between the concept of "utsukushii" (beautiful, splendid, pure), which represented the ideal of traditional beauty, and the "kawaii", which he expressed in his works as something cute, adorable, playful, and dreamy.

Bîrlea (2021) states that “Through his vision and creations, the artist managed to remove the preconceptions related to this style, and most importantly, the word “kawaii” and related expressions no longer had negative connotations.” (p.96)

Another fundamental character in the global dissemination of kawaii aesthetics is the aforementioned artist Sebastian Masuda, whose work has been crucial for its recognition through his clothing brand 6%DOKIDOKI and his artistic installations.

It is also essential to highlight the role of Hello Kitty in kawaii culture. This character that looks like a white cat with a red bow has become one of the most recognized symbols worldwide. Hello Kitty has transcended her status as a simple character to become a personality with collaborations with internationally renowned brands such as Adidas and McDonald's.

Hello Kitty's popularity has paved the way for other characters with kawaii characteristics, such as those created by Sanrio and San-X, to make a significant impact on popular culture.

Box 4

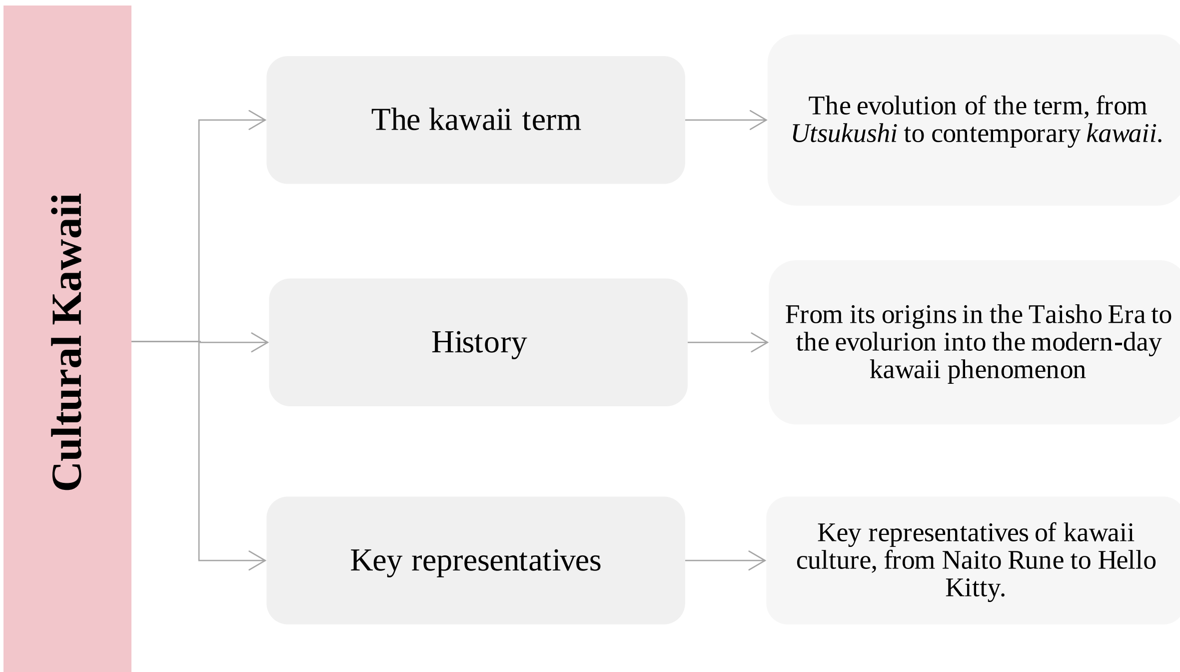


Figure 4

Cultural Kawaii Diagram

Source [Own elaboration, 2024]

With the identification and delimitation of the categories and dimensions of each of them, it is possible to establish a solid base on which to build the model. Hence ensuring that the objects of study can be seen in a coherent and orderly manner.

Results

The Super Kawaii Model

The model, made up of the three previously proposed classifications, offers a more complete and structured vision of the phenomenon under study, encompassing both subjective and objective characteristics that contribute to the global understanding of the kawaii.

By representing the objects of study through these classification categories, it facilitates the understanding of the different areas covered by the phenomenon, which in turn allows its application in a variety of research scenarios.

This structuring provides a valuable tool to analyze the phenomenon more deeply and coherently in different academic contexts.

Box 5

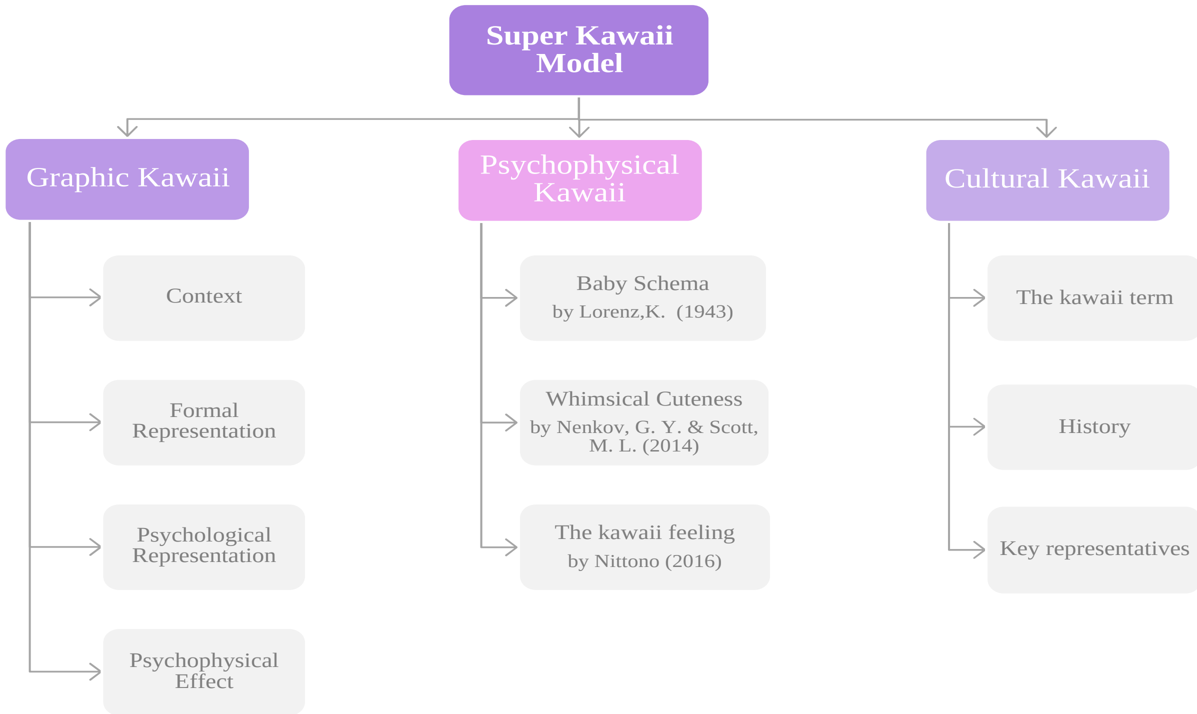


Figure 5

Super Kawaii Model

Source [Own elaboration, 2024]

Conclusions

The categorization of the kawaii phenomenon is an invaluable tool for its study in academic contexts. By breaking down kawaii into clearly defined dimensions, such as those proposed in this chapter, a structured analysis of its various manifestations can be carried out. This approach not only allows for a deeper understanding of kawaii as a cultural and aesthetic phenomenon but also opens the door to its exploration in a wide range of academic disciplines.

The proposed classification model offers a conceptual framework that can be applied in studies of visual culture, graphic design, communication, and sociology, among others. Likewise, this model is not static; It has the potential to be developed and adapted as the kawaii phenomenon continues to evolve or new dimensions are contemplated. With the globalization of visual cultures, kawaii will continue to transform, and its categorization must reflect these changes.

As a final point, the current design of the Super Kawaii model allows for further in-depth exploration of each dimension. For example, the graphic kawaii dimension can be expanded by incorporating key visual identifiers inherent to the aesthetic, such as simplified forms, pastel color schemes, and exaggerated proportions. This can be achieved through a comprehensive study of the various visual media in which kawaii is expressed, including character design, fashion, product design, and music, among others.

Additionally, the cultural dimension of kawaii warrants further investigation, particularly through a thorough historical analysis. A proposed timeline, organized by significant events that have influenced or reshaped the phenomenon, could provide a more structured understanding of the kawaii cultural evolution.

In conclusion, the categorization of the kawaii phenomenon not only provides a framework for its analysis but also acts as a starting point for future research in an increasingly visually oriented world.

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence in this chapter.

Author contribution

Martinez-Ramirez, Frida Paola: Contributed with project idea, selection and delimitation of study objects, research method, idea and design of the model and writing of the document.

Rodríguez-Gutiérrez, Susana: Contributed with project idea, delimitation and selection of study objects, research method, the design of the model and writing of the document.

Landeros-Lorenzana, Karina Hildelisa: Contributed to the project idea, the study objetcs, the antecedents and research method.

Hernandez-Torres, Ervey: Contributed with project idea and delimitation of study objects.

Availability of data and materials

The data used for this investigation was obtained from various online platforms that provide access to scientific publications.

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Design of an optional course for the training of educators in Zacatecan Normal Schools

Diseño de un curso optativo para la formación de educadores en Escuelas Normales Zacatecanas

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Area: Social Sciences
Field: Education Sciences
Discipline: Education
Subdiscipline: Comparative Education

Key Handbooks

Present some theoretical-methodological elements for the generation of knowledge around the design of courses in the field of curricular and disciplinary design, as well as the importance of a well-defined project and a precise contextual diagnosis for a more accurate elaboration around the impact. of operationalization in the training of human resources. Elucidate some methodological strategies in the collection of information, systematization and implementation of investigative tools. The study provides common epistemological elements in any discipline that must be considered for the design of a higher level course. Likewise, it accounts for the importance of starting from a contextual diagnosis and social demands, in order to better construct higher level courses that contribute to professional training to graduate competent professionals in the workplace. The theoretical-methodological elements based on which the optional course was developed are revealed, as well as the research project that guided the work, in which the construction of a general overview of what teacher training and training entails was essential. particularly in the field of normal courses as state formation, likewise the theoretical-methodological elements that were followed throughout the research are elucidated, in that same sense the impact on professional training is realized when considering the diagnosis of demand where to direct the construction of the course in question for the training of human resources in order to impact their professional practice and achieve a better graduation profile. The demand diagnosis indicated where to direct the construction of the course in question for the training of human resources in order to impact their professional practice and achieve a better graduation profile.

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Handbook shelf URL: https://www.ecorfan.org/handbooks.php

Abstract

The work reports on a research experience in the design of the optional course in the initial training of teachers of the Degrees in Preschool Education and Primary Education, the case of Zacatecas of the 2012 plan. The work was guided by the questions: what are the real needs that normal students in training face and what type of course is necessary to design to meet such needs in order to contribute to better professional performance and real impact in basic education classrooms in the State of Zacatecas? The methodology was qualitative with a random sample of a focus group, interviews were applied, among other techniques that allowed the course to be built, the theoretical support was centered on Díaz Barriga, among other theorists in the field of curriculum and education. The results allowed us to identify the relevance and significance of the course that was finally designed and implemented in four Normal Schools in the State of Zacatecas.

Goals	Methodology	Contributions
Present a research experience around current debates about the relevance and viability of the design of elective courses at the higher level. Elucidate the investigative process in the design of the course for teacher training in Zacatecas normal schools Reveal the theoretical-methodological elements for the design of a higher level course	A qualitative and exploratory methodology was followed. Tools were used to collect ethnographic information, such as oral and written interviews. Review of specialized literature on the discipline and curricular design The processing of data from the discussion of theoretical debates to determine the type of course to be designed and continue with the systematization and development of the optional course	The generation of theoretical debates to determine the viability and relevance of the type of curricular design to be developed Elucidate the conditions that teacher educators face with the implementation of curricular reforms in Mexican normal schools. Present the importance of looking at basic education teachers about the real conditions in their professional performance to take them into account for the design of curricular reforms and impact towards a true transformation in the educational field.

Curriculum, Teacher training, Learning environments, Multigrade schools

Resumen

El trabajo da cuenta de una experiencia de investigación en el diseño del curso optativo en la formación inicial de docentes de las Licenciaturas en Educación Preescolar y Educación Primaria, el caso de Zacatecas del plan 2012. El trabajo estuvo guiado por las preguntas ¿cuáles son las necesidades reales a las que se enfrentan los estudiantes normalistas en formación y qué tipo de curso es necesario diseñar para atender tales necesidades en pro de coadyuvar a un mejor desempeño profesional e impacto real en las aulas de educación básica en el Estado de Zacatecas? La metodología fue de tipo cualitativo con una muestra aleatoria de un grupo focal, se aplicaron entrevistas, entre otras técnicas que permitieron construir el curso, el sustento teórico estuvo centrado en Díaz Barriga, entre otros teóricos del campo del curriculum y la educación. Los resultados permitieron identificar la relevancia y trascendencia del curso que finalmente se diseñó e implementó en cuatro Escuelas Normales del Estado de Zacatecas.

Objetivos	Metodología	Contribuciones
Presentar una experiencia de investigación en torno a los debates actuales sobre la pertinencia y viabilidad del diseño de cursos optativos en el nivel superior. Dilucidar el proceso investigativo en el diseño del curso para la formación docente en las escuelas normales zacatecas Develar los elementos teóricos-metodológicos para el diseño de un curso de nivel superior	Se siguió un metodología de tipo cualitativo y de exploración Se utilizaron herramientas para la recabación de información de tipo etnográfico como fueron aplicación de entrevistas orales y escritas. Revisión de literatura especializada sobre la disciplina y diseño curricular El procesamiento de dio a partir de la discusión de debates teóricos para determinar el tipo curso a diseñar y proseguir con la sistematización y elaboración del curso optativo	La generación de debates teóricos para determinar la viabilidad y pertinencia del tipo de diseño curricular a elaborar Dilucidar las condiciones a los que se enfrentan los formadores de docentes con la implementación de reformas curriculares en las escuelas normales mexicanas Presentar la importancia de voltear a ver a los profesores de educación básica en torno a las condiciones reales en su desempeño profesional para tomarlos en cuenta para el diseño de reformas curriculares e impactar hacia una verdadera transformación en el campo educativo

Curriculum, Formación docente, Ambientes de aprendizaje, Escuelas multigrado

Introduction

Mexican normal schools face a complicated situation, in accordance with the recommendations of the Organization for Economic Cooperation and Development (OECD), basic education teachers are asked to be true education professionals, as they are a fundamental piece for the achievement of the educational quality that Mexican society demands for the 21st century. The training of teachers, from the promotion to higher level in 1984, with the subsequent reforms (1997 and 1999), and with the implementation of the 2011 classroom test, changes perspective because the teachers who work in the Normalist classrooms must participate in the design of the courses that will make up the curricular framework.

These tasks began in 2009, teacher trainers have the possibility of proposing where to direct the training of education professionals. In 2010, learning communities were formed, these would allow the design of the study plan and the subject programs that will make up the curricular framework for the Bachelor's Degree in Preschool Education and the Bachelor's Degree in Primary Education. With the implementation of the 2012 curriculum, it is demanded that the teacher trainers of these institutions have disciplinary, contextual, curricular, didactic, pedagogical mastery and knowledge of the learning subject.

In addition, they are asked to venture into the field of research, which will enable the generation of knowledge and the opening of lines of research.

Therefore, it is important to modify the institutional culture of being subordinated to the central part, it is necessary for normal schools to be generators of new knowledge, to propose actions for the training of their students in accordance with local, regional, national and international needs. in order to contribute to the educational quality of its graduates.

In the normal schools of the state of Zacatecas, spaces for reflection, analysis, debate, new aspects to be addressed, which encourage the generation of lines of research, have been produced. For example, knowledge has been produced around the teaching of mathematics, history , Spanish and, in particular, what refers to the professional practices carried out by normalista students in basic education, where they work in their insertion into social service starting in the fifth semester.

The four normal schools: Benemérita “Manuel Ávila Camcho” of the city of Zacatecas; “Matías Ramos Santos”, from Loreto; Experimental “Salvador Varela”, from Juchipila; Rural “Rafael Ramírez”, from Nieves, together with the Department of Normal Education, in 2013, formed a team to address local needs through the development of a research project that would allow assessing the relevance of the development of a course that would belong to the optional courses of the 2012 curriculum, which would really support the training of students, mainly in the degrees in Preschool Education and Primary Education.

Debates were held about the relevance and viability of the type of course that would support the intended intention, a reunion with history was necessary, the role that normal schools have played in the training of new generations, a diagnosis was made that gave an account of the real conditions that those of us who work in normal schools face and what our students face in real working conditions, in order to know what type of course would be the most appropriate for the initial training of teachers that would really impact the communities where they work. It was decided to work on a course that would provide training around the design of planning in multigrade schools.

The question that guided the research was: what are the real needs faced by normal students in training and what type of course needs to be designed to meet needs in order to contribute to better professional performance and real impact in the classrooms. of basic education in the state of Zacatecas? From this central questioning, the following unknowns arose: what does the student face in order to perform adequately in the exercise of teaching with basic education students? What theoretical-methodological elements are necessary in the initial training process to achieve the graduation profile of the normal students and be reflected in their teaching performance? In addition, bibliography on curricular design was searched, among other issues that will enable a well-founded design, it was determined to follow a methodology for collecting information, designing interviews , selection of a focus group, among other actions.

The purpose of this writing is to briefly present the research carried out for the development of the optional course of the 2012 curriculum for Zacatecan normal schools entitled “Learning environments in multigrade schools for preschool and primary school.” First, the general overview of the importance of normal schools in the formation of the national educational system is stated, the immediate antecedents of what we today know as unitary and/or multigrade schools in the Mexican territory; Research is presented that is part of the state of the art built as part of the research around the designed course; The formation of the State Commission, the starting point of the investigation, is described; The results and findings that determined the design of the course are presented, as well as its relevance; It closes with reflections on the process carried out, emphasizing the importance in the training of students.

Retrospective look at Mexican normal schools

Education is a discipline that must constantly be reconsidered in order to improve in its field of action. Mexico, with all the ups and downs in the formation of the national educational system, has gone through adverse situations that are key to understanding its current situation, the reason for the creation of normal schools and the training of teachers to attend basic education schools, as well as as the professional performance of new teachers, graduates of these institutions.

To understand the present through the past, the past through the present, as March Bloch states, it is necessary to carry out a complex task, hence retrospective can reveal long and short-term processes in the configuration of the being and understand the subject in the time. Education in Mexico dates back to the times of the creation of the Nation-State, this implied freedom in instruction, Lucas Alamán was one of the main actors in proposing that instruction was the main weapon to achieve freedom and independence of the State Spanish, pointed out that political and social equality was elementary education, so it was necessary to be governed by a well-defined teaching plan.

For his part, José María Luis Mora will argue that the education of young people was necessary for the country to consolidate itself as a true nation, therefore, it was necessary for there to be institutions where the basis was the education of individuals. The idea was to achieve a consolidated nation state, both characters had the same purpose, which is why their proposals are relevant within the history of education in Mexico. In the independent period and in the colony there were schools that allowed the advancement of individuals; This is how the Lancasterian School emerged in the 20s of the 19th century. Zacatecas was one of the pioneer states with the School of the Constitution, its creation was decreed in 1825, although it functioned formally until 1826. For several years, there they were trained and formed preceptors[12] to meet the demand that existed in the state and, above all, to support the task of educating the population to read and write.

With the transformation of the Lancastrian schools, normal schools were created in the Porfiriato “converting a teaching trend into a state profession” (Arnaut, 1998, p. 20). Previously, there were teachers called Lancastrian empirics who served as preceptors, the training was training and not training for educational professionals. (Alvarado Sánchez, Martina, 2012), at the end of the 19th century teacher training as it is currently known begins, with the introduction of the modernizing pedagogy of Rébsamen and Enriqqe Laubscher.

Rébsamen was a promoter and creator of other normal institutions in the country, this period is known as the modern school in the training of teachers, he was a pedagogue who promoted a new pedagogy, his participation in this transformation led him to travel in 1887 through Guanajuato, Chihuahua, Puebla, Veracruz, State of Mexico and other states; This made possible the reform of Lancastrian institutions into true training centers; The pedagogical courses were the structuring axis of the training of the normalistas, although there were weaknesses in the programs, it was due to the urgency of meeting the demand for teachers that were needed, they entered more into the empirical, it should not be forgotten that at that time I had the idea that they were not training scientists, but rather teachers.

[12] At that time, the type of training was not conceived as it is today. Debate has been generated about whether it was training or training. In that period there was a need to train personnel to meet the needs that society demanded, hence some authors conceive that it was not until the end of the 19th century, with the creation of the Modern School of Rébsamen, when it is considered that a true teacher training.

This is how the National School of Teachers was born in Mexico City in 1890. Its purpose was to serve pedagogical reform, as it was "one of the institutional means to centralize and standardize teaching" (Arnaut p. 19) and update the schools. that in the states they could cover with what was entrusted by the educating state, that only with refresher courses were they empirically training the teachers in service. In Coahuila, the Mixed Normal School was created in 1894, in Hidalgo, on November 14, 1898, it was established the training of teachers at both the elementary and higher primary levels. Colima also began to train teachers and not only trained them through courses by founding a Normal School for teachers in 1917, there they worked with the modernizing pedagogy implemented by Rébsamen.

Over the years, these institutions underwent reforms that marked the course of Mexican normalism. Before and after the Revolution, the teaching profession was a fundamental piece in the social, cultural and economic transformations of the country. With the creation of the Ministry of Public Education, nationalist and patriotic education is promoted, normal schools are transformed to contribute to the improvement of the national and educational project created by José Vasconcelos his educational crusade project was presented in 1920 to Congress, there was talk of the creation of a Secretariat of Public Education, which laid the foundations of the Mexican educational system, although some point out that this was not so original, since in the National Congresses of Instruction of 1889-1890-91 there was already talk of the need for such a commission.(Meneses 1911-1934). With the federalization of education, one of the important points was the centralization of normal education as a strategy to build the national basic education system, as stipulated in the third constitutional article

In this type of institutions, an attempt was made to establish mixed or co-educational education, achieving this with the creation of rural schools. By those years, attention to communities with a small population was already visible, which later led to the opening of multigrade schools in the country. . For example, by 1825, in Zacatecas, with the decree of the governing body, a Lancastrian school opened in 1826 attracted young people who wanted to participate in the progress of the state. This type of education had the purpose of contributing directly to the improvement of education locally. In 1832 a constitution was decreed, in chapter four, article seven, section two, it talks about equal rights to be governed, governed and judged, as well as aspects for the improvement of the state in all its aspects, specifically educational. Also during this period, popular education is promoted in which the preceptor will work with students of different ages, especially in some communities.

A promoter of education in Zacatecas was Francisco García Salinas, he supported the growth in the construction of rural elementary schools, this contributed to the literacy of the population; By the 70s of that same century, Trinidad García de la Cadena and Aréchiga also promoted elementary education. María del Refugio Magallanes (2010) mentions that there was a Patriotic School for the marginalized, its objectives were well-defined social and political, including being a hospice-school-workshop, providing education and technical training for work to reduce poverty. According to Magallanes, this liberal project was ambitious because it laid the foundations for the boys' hospice and later the girls' hospice to function. These spaces worked on the educational literacy of Zacatecan society and are antecedents to the topic of this research.

At the end of the 19th century, regarding the creation of schools, it was considered important to promote in primary schools, as well as in normal schools, everything related to the Lancastrian system, emphasis was placed on the creation of schools for girls and mixed schools, as well as The need for teacher training with a well-founded general culture requires each of the conditions in which the different parties find themselves in the field of elementary education, as well as the most pressing needs for them, which is why it proposes that it is necessary to manage resources to achieve better performance in this field (Pedrosa 1890). It was necessary to install primary and secondary schools to teach literacy to the population of Zacatecas, with emphasis on rural environments. In 1888, the Public Instruction Law was presented, prepared by José E. Pedrosa, it spoke about the need to create establishments to provide elementary and higher education for the young people of the state, and mentioned the functions of the operation. of the normal schools for men and women and the Institute of Sciences as a higher level institution. These were some bases of the local educational system and served as a means of ideological and political control by the State, paraphrasing Beatriz Calvo, understanding political control as the ability of the State and the country's hegemonic groups to convert human and material resources into power resources, in this case teachers, as key resources in the reproduction of ideology, clarifying that both the creation and the modification of the normal ones have not been due to social needs per se, but rather based on the political needs of the elite in power (Calvo P. Beatriz 1989 p-3-15).

The founding of a Normal School of Mutual Education was to "form a teacher skilled in the art of teaching" (Ramos D. Roberto 1992, p. 12) The changes were made with the intention of improving the quality and performance of the teachers who served the rural population. The teachers who entered these normalist spaces as trainers had a defined program and initiated, with Rafael Ramírez, the promotion of the Mexican rural school and cultural missions. to serve communities with a small population and this gave rise to what we know today as the National Council for Educational Development (CONAFE), who began to establish multigrade work at the national level.

Rural education in Mexico and Zacatecas, prelude to multigrade schools

With the arrival of Lázaro Cárdenas to the presidency, the modification of the third constitutional article regarding socialist education, and with the "prohibition of churches and priests from actively participating in primary, secondary, normal education and that for workers and peasants, also added two new doctrinal components; rely on scientific progress and international solidarity." (Ornelas, 1995, p. 68-69) an environment of intolerance was created, the majority of the population did not agree with the educational reform, businessmen and wealthy people were against their children living together and having an education. equal to that of the poor.

The rural teachers continued to be harassed, there were murders because some people did not accept socialist education. In Zacatecas, between 1934-1940, during the government of Matías Ramos, 124 schools were built and 74 were remodeled, whose buildings were already in poor condition. The salaries of the local teachers were increased, in 1934 the old Escuela Normal de la Constitución was closed. Instead, the Bimbaletes Rural School (San Marcos) was founded, it was moved from Río Grande to Loreto, Zacatecas. (Alvarado Sánchez, Martina. 2012). At the end of Matías Ramos' mandate, according to Jesús Flores Olague (1995), there were 624 educational establishments attended by around 4,000 students. These advances were consolidated in 1940 and contributed to laying the foundations for the National Unity project, applied by President Manuel Ávila Camacho (1940-1946).

In the sixties, the Eleven-Year Plan emerged to improve the national educational system, based on basic education and with the promotion of teacher training. Illiteracy was reduced to 28% of the population. (Sandoval C. Salvador 2009) The construction of schools was promoted with federal support through the Administrative Committee of the Federal School Construction Program (CAPFCE), school breakfasts were implemented and free textbooks were distributed, mainly to schools located in rural communities.

The cultural missions in Zacatecas were carried out based on a detailed study of the geography of the region, customs and occupations, school and population census, as well as a detailed description of the population that lived in the places where the activities would be carried out. The government in power was concerned about the preparation of those who carried out this work, so an analysis was carried out of the school program (philosophical and psychological aspect), school organization, natural method of teacher Luz Vera for teaching reading and adult writing: as well as the differences that existed between the different projects and centers of interest. (Ortega Mares, 2006, p, 105).

In these social institutes there were no problems that prevented the good performance of the missions, except for that of Juchipila, due to the Cristero movement that existed in that region. In Zacatecas, the two normal schools, La Constitución and the rural one of Bimbaletes, were transcendent in the training of teachers. With the passage of time, the normal schools have set the course in the formation of the educational system, in later years the "Rafael Ramírez Castañeda" Experimental School, in Nieves, and the "Salvador Varela Reséndiz" Experimental Normal School, in Juchipila, were founded.

In the formation of the normal education system, curricular reforms have occurred in accordance with both national and local needs, which have implied the involvement of the teacher trainers of these training institutions. In the forties of the 20th century, at the congress held in 1944 in Saltillo, Coahuila, the training of teachers was outlined with new vigor because the curricular reforms were established by regulations, thus the reforms of the years 1972 can also be traced. 1975, 1984, 1997, 1999. In the case of teachers who will work at the preschool and primary education level, the reform that is the object of study in this work appears in 2012.

I. Formation of the state team for the design of the optional course

With the implementation of the 2012 reform in normal schools, situations were faced that disrupted nodal points in the organization that had been experienced for decades within these training spaces. At the beginning, it did not have the best conditions for its application. The infrastructure, the lack of information, the lack of certainty of state and school authorities regarding the legal situation, the curricular and even the needs for the application in the institutions regarding training and teacher qualification, are some circumstances that led to a start dubious and taxing like other reforms implemented. For this reason, it was not well received by the teaching staff, who compared the same process from the beginning with the study plans of '97 and '99 for degrees in primary and preschool education.

During 2013, the Department of Normal Education called on the normal schools to form a team to attend to the training path of elective courses. The state and educational authorities, with the direct participation of the person who would coordinate the team, explored the options to make direct invitations, one for each teacher training institution, a team that grew when seeing the need for degrees in preschool education and education to be represented. primary.

The team was formed as follows: Bachelor's degree in Preschool Education, one from BENMAC and another from the “Rafael Ramírez Castañeda” Experimental Normal School; from the Bachelor's degree in primary education, one from the BENMAC degree, one from the “Rafael Ramírez Castañeda” Experimental Normal School, one from the “Salvador Varela Reséndiz” Experimental Normal School, and another from the “Gral. Matías Ramos Santos”; In addition, a state coordinator was appointed.

Teachers of the degree in Preschool Education joined the state team, the formation of institutional teams was analyzed and managed, which would be coordinated by the members of the state team. Although the project generated doubts in the directors of the institutions, they agreed to develop it, generating appointments to carry out, at first, the institutional diagnostic actions. The state team was made up of 7 members and around 12 more in the teacher training institutions in the state of Zacatecas.

To make decisions and make arrangements with the school and educational authorities, it was necessary to understand the Path of Optional courses, identify that in agreement 649 by which the Curriculum for the training of Teachers in Primary Education is established, there are three purposes of the path: to provide complementary spaces of emphasis to the central training paths, to address specific aspects of training that respond to the demands of the contexts in which the student will carry out the teaching profession and to respond to the professional expectations of normal school students (Official Gazette of the Federation, 2012), an aspect also present in the case of the degree in preschool education.

The task was complex because meeting the students' expectations was a challenge, if we add to this the demands of the context, which in current times have grown and not in the didactic or pedagogical field, but in the transformation of socio-educational contexts. . For this reason, the scope of the state commission and the institutional commissions were discussed, where the following challenges were identified, among others:

- The institutional support of the teacher training schools for the members of both commissions so that they were recognized in the workload, in addition to generating conditions for the collection of information, its analysis and, where appropriate, its dissemination.

- The establishment of goals and a project that integrates them. With the clear mandate of completing at least one optional program that would meet the needs of the four teacher training institutions in the state of Zacatecas, a project had to be established that would guide the work that would be the basis for carrying out the necessary procedures in the state and with institutional authorities.

- Recognizing that each teacher can, from his or her perspective or experience, propose the topics that he or she considers priority for the development of optional courses, the responsibility should be assumed to identify at the local and state level, those that are truly susceptible to being so, which support the students. teachers in initial training who were close to graduating from normal schools.

- Recognize the areas of opportunity and strengths of the state team. There are no experts in curriculum design and there are few who carried out research on a daily basis in their professional work.

- Exposure to criticism. As mentioned, the state team arose from the same teaching staff of the state's normal schools and the experience in designing courses was limited; it was easy for the other state teacher trainers and even educational authorities not to be certain that what was undertaken was successful.

- Assume that the curriculum continued to be assimilated by the teacher trainers, including the state team itself, so it was necessary to investigate and understand the curricular framework, searching for the nascent experience of the teachers who had been working with the different courses, in addition of the team's own exploration of what were the real needs to be met and paying for initial teacher training attached to said needs.

As a whole, the challenges required a first step, the analysis of the Academic Guidelines for the selection and design of elective courses. It was seen that the optional courses "are theoretical-practical training experiences that will allow the student to orient themselves towards a general or specific area of teaching practice, learn about or delve into various approaches to it or, in some particular aspect of the field of professional work." (DGESPE, 2012). The courses must be designed in and for teachers in training, they must not address interests that are outside this context.

It was also emphasized that "optional courses are not remedial courses, intended to alleviate insufficiency or deficiencies in the student's previous training" (DGESPE, 2012). Understanding that it cannot be a course that emanates from the imagination, need, curiosity or taste of a teacher or team of teachers, it was necessary to attend to the work context and focus attention on teachers in initial training, without forgetting that it must be analyzed under the observance of the study plan of each degree. In such a way that not You could begin by designing a course without identifying the different areas of opportunity in the state's normal schools.

Methodology

A research project was developed that included, at first, the diagnosis of training needs of the 2012 plan in the degrees in preschool and primary education, the central purpose of what is presented here as part of the research. They define five objectives, the information gathering technique, the work plan, the times for its completion, among other elements.

To establish the times, the multiple commitments of each member in their workplace were mentioned and when as a team they planned, it was done as if it were the only occupation they had, facing a workload once they reached the schools. Even with that problem, the actions, activities and responsibilities to make them as close to their purpose as possible were carried out in the way they were planned. When new proposals or modifications to existing ones arose, they were always put to the team's consideration in a face-to-face meeting; if applicable, they were presented to the educational and school authorities for validation.

13 actions were planned and executed: presentation of the project to educational and school authorities, specification of the technique and design of instruments (focal interviews, questionnaires, among others), piloting of instruments, application of the instruments already piloted, transcription of the interviews carried out by each institutional team, writing of the institutional diagnoses, meeting of the state team to review the institutional diagnoses, analysis of the information collected, writing of the state report, presentation of the state diagnosis to the General Directorate of Higher Education for Education Professionals (DGESPE), analysis of the final report, course design and application of training proposals. Each action, with the respective activities, which totaled 27, defining those responsible, whether collective, in teams or individuals.

The information gathering was carried out when the project was agreed upon and approved. To process the information, it was agreed that in all institutions it would be collected with the same technique and instrument, selecting the focus group for this purpose.

This technique is flexible in terms of the number of participants, in-depth information can be collected, exploring the whys and hows of the opinions and actions of the participants, in addition to being noble in the interaction between the participants when generating information. This being very significant for this step, each institution would seek to invite educational agents who did not necessarily know each other but had in common the desire to support the normal school.

Assessing the opinion of the different educational actors in order to recognize the training needs of the 2012 curriculum was the objective of the focus groups for the four normal schools in the state. It was defined that three would be invited to participate in the information gathering, determining to build a profile of each educational agent so that, through a random sample of those who fit the profile, the corresponding invitations could be made. The agents and profiles are as follows:

- Normal school student. Outstanding for his academic performance, mainly in the degree, with ease of speech, skilled at speaking in font od a group and at the time he was studying the third semester of the 2012 study plan.
- Basic education Teaeher. Have been a 7th and 8th semester tutor for at least one school year, have between 5 and 10 years of service, academic recognition in your workplace and in your work as a tutor in support of the Normal School, preferably with master¨s or doctoral studies.
- Teacher Trainer at the Normal School. At least five years of experience in teacher training, who at the time was coordinating at least 9one cours in the third or fifth semester, that is, working with the 2012 curriculum, critical and purposeful regading the work carried out at the School Normal.

A first focus group was held per institution to pilot the guiding questions and enable the state team as moderators, as not all of them had experience in this technique and it was decided that in all cases they would be the ones to assume this responsibility, as they were the ones who participated in the construction. of the questions and thereby rescue the required information. When detecting in the piloting that many answers to the questions arose, some questions were adapted, the possibility was opened for the institutional teams to join the information gathering; for example, in the report, audio recorder, video or any instrument that would allow the greatest possible amount of information to be recovered and always thinking about the way to process it to have the most complete information possible and this would allow us to be clear about the type of optional course that it was necessary to include. The questions were the following:

1. What are the strengths of teaching practice?
2. What are the areas of opportunity in teaching?
3. What professional skills does a teacher need to have to teach in different social contexts?
4. How does or how does the curriculum in which you were trained or are you training contribute to shaping professional competencies?
5. What teaching experiences contribute significantly to professional training?
6. How can we promote the training of a teacher who responds to the current needs of basic education?
7. What proposals are viable to strengthen teacher training from Normal School

The qualification of the interviewers was pertinent to foster trust among the participants. Interest and respect for the contributions of each participant were sought; if there was no opinion on a specific topic, that element was also important for the purpose of the focus group. Participants were free to make more than one intervention per question, which allowed for expanded information, yielding broader elements in terms of investigating feasible topics for the design of optional courses.

The dialogues between the three participating educational agents were fluid. Each question triggered several interventions, not in the style of speech, but dialogues and even anecdotes. At no time did the teachers in initial training feel inhibited by those in basic education or by their own normal teachers; they were clear, precise and explained the areas of opportunity that needed to be addressed.

The data obtained in the application of the instruments allowed us to direct our gaze towards the design of the most relevant courses in the initial training of future teachers of the normal schools of the state of Zacatecas, determining that it would be that of attention to multigrade schools, due to because this would contribute to having the didactic, pedagogical, and disciplinary domain in the design of learning situations in real conditions in the broader contexts of the Zacatecan territory such as unitary and multigrade schools for both preschool and primary education. Based on the data collected and the delimitation of which course to design, the historiography of the object of study is reviewed; some of the research that was part of that search is presented here.

II. Studies on work in multigrade schools

Based on the historical journey of the origin of normal schools in Mexico and Zacatecas, their importance and significance in the formation of the educational system; As well as with the information collected regarding the type of elective course to be designed, one of the needs in unitary and multigrade schools to serve the rural population was considered pertinent to investigate the studies that account for it.

Eduardo Weis, in his article “The situation of multigrade teaching in Mexico” investigates what unitary and two-teaching schools are and have been, mainly in Oaxaca and Guerrero, where the type of strategies that teachers use within schools are revealed. classrooms to meet the educational needs of their students. The research focuses on the 1992-1993, 1993-1994 school cycles in 10 schools with multigrade work in 16 cases. The analysis approach consisted of three moments, which made it possible to contrast and make a comparative study, the observation was made in daily practices, limitations were detected, educational policies and their impact on the institutions where this modality operates were revealed.

The research methodology was qualitative; it was necessary to form monitoring teams for permanent stays and visits that were carried out for two consecutive years; interview and observation guides, recording them, field notes on events and chance encounters; transcription of school documents and parts of students' notebooks. They subsequently prepared the records, using the triangulation of information and observations, and also participated in the first analyzes and partial writings for the evaluation report, so that the relationship between the observed data and its interpretation could be taken care of.

This revealed the reality of work in schools, whose aspects allowed an analysis to be carried out that showed the variations in the organization within multigrade classrooms, the management of content, among others that make visible the importance of the training of teachers. To work in this type of classroom, teachers must have conceptual, disciplinary, curricular and contextual mastery that allows them to work on diversity with students of different ages.

According to the three modalities indicated in the study, these were considered to design the optional course, these were: "The teaching of reading-writing, mathematics and science" aspects that contributed to the reflection on the recovery of the rural, since the professional performance of basic education teachers focuses more on this field of action, particularly the case of Zacatecas.

Other points that were recovered from Weis' study were how, for teachers who work in this type of schools, attention to two or more grades is complicated, because this has prevented the good achievement of this type of schools, there are teachers who distribute the work quickly, without paying attention to each of the subjects who learn, while others do take into account diversity and provide equity in attention so that the expected learning of each student is achieved. Other aspects that helped to define where to propose learning environments is that some teachers are concerned with designing level activities, while others focus on designing routine plans without a didactic and pedagogical sense, consequently, the purposes of the lesson are not achieved. student learning.

What Miller and Shaw state is also recovered, that teachers bring together children of different ages for teamwork, a situation that helps develop activities in the multigrade classroom in daily school life, an aspect that helps teachers. to focus their teaching task, select key or basic content for their teaching, although on some occasions this prevents good development of the class, because teachers do not have disciplinary, curricular or strategy control to achieve better learning in their students. Also, following these theorists, it is agreed that educational policies are not congruent with school needs because they do not have suitable materials to facilitate children's self-learning and they do not have the necessary training to advise learning.

Based on these experiences, it was thought that future graduates of this type of institution would be able to design “projects of change that only become effective if they are built in parallel from below and integrate moments of “collegiality” and “learning organizations.” (See Hargreaves, 1996; Fullan and Stiegelbauer, 1997).

The work of the National Council for Educational Development was considered because it is the body that has given attention to this type of small populations and with good results, because it has materials and guidance for those who are qualified to attend these types of schools.

Other studies were valued, such as the 2005 multigrade proposal, which allowed us to review its design and carry out an analysis to understand and understand the operationalization that has been carried out in several classrooms in the Zacatecan context. In addition to other works such as that of Martha G. Romero Salcedo and Martha A. Gallardo, entitled "The planning of multigrade teaching in primary education: An approach to its current situation in schools in Veracruz", which focuses on the elements referring to teaching planning, through an approach to the classrooms.

Another document consulted was that of the Rural Research Network, it gives an account of nodal points of the situation that exists at the national level in attention to the problem of education, percentages are stated as follows: "56% of preschool schools , 59% of primary schools and 57% of secondary schools in Mexico are located in rural communities (INEE, 2015). In national and international standardized assessments (Excale, Enlace, Planea, PISA, Terce) the results are lower in students who attend rural schools. School infrastructure, provision of teaching materials, school management and pedagogical support are weak in rural schools (Ezpeleta and Weiss, 2000; Rosas, 2003; Fuenlabrada and Weiss, 2006; SEP, 2006; Juárez, 2013; Taboada 2014) ". Furthermore, it is stated that training must be comprehensive so that it allows or enables efficient work in multigrade classrooms, both in rural, urban or peripheral areas. These studies and the information collected in the focus group helped define the design of the course.

Results

Overview of the design of the course "planning learning environments for multigrade groups"

For the design of the course, the prepared diagnosis was considered, as well as the theoretical-methodological review to follow that would allow defining the purpose, competencies, contributions to the graduation profile, among other fundamental elements that met the needs required in each of the normal schools. where it would be implemented.

The initial course states that it aims to "strengthen the professional competencies of the Educational Planning, Curricular Adaptation and Learning Environments courses; as well as being linked to the Teaching Work and Innovation course."

The first two purposes generate study possibilities on basic notions of didactic planning that, articulated with the courses of the preparation path for teaching, contribute to consolidating the competencies to plan the generation of learning environments with knowledge of increasing complexity by training field. and/or family of knowledge in which students are intended to analyze, reflect, discuss and, above all, experiment with intervention proposals that contribute to developing skills and abilities around how to work with both a unitary and multigrade group.

Other fundamental elements are to contribute to the development and strengthening of both generic and professional skills, which were designed to develop:

- Designs teaching plans, applying its pedagogical and disciplinary knowledge to respon to the needs of the context within the framework of the basic education study plan and programs.
- Critically applies the basic education study plan and programs to achieve educational purposes and contribute to the full development of the abilities of school-level students.
- Designs significant teaching situations according to the curricular organization an the pedagogical approaches of the current educational plan and programs.
- Prepares projects that articulate various disciplinary fields to develop integrated knowledge in students.
- Provides and regulates inclusive learning spaces for all students, in order to promote coexistence, respect and acceptance.
- Acts appropriately in the face of the diversity of situations that arise in professional practice.

After determining the purposes and competencies, it was decided to approach the course with two units, which were focused on addressing the areas of opportunity present in the information collected and that would help professional performance for the sake of educational improvement in the training of children in basic education. Strategies to be followed were proposed to open the way for each of the teachers who teach the course to have the curricular flexibility to develop the pertinent knowledge in the initial training process of the future novice teacher.

The first unit allows to open the debate about what it implies to plan a learning environment in a multigrade group where the contextual characteristics are considered in the development of professional practice, for this, the need for a theoretical review of the elements required for the design of a planning focused on real conditions from the beginning of the course of increasing complexity is proposed, to begin with the design of a planning project that allows to operationalize it and then analyze the results to help the rethinking of the proposed strategies.

The second unit seeks that future teachers have the necessary elements for the design and application of didactic situations and innovation projects in multigrade groups, where students experience the scenario of what this implies in professional practices in real conditions.

After determining the purposes and competencies, it was decided to approach the course with two units, which were focused on addressing the areas of opportunity present in the information collected and that would help professional performance for the sake of educational improvement in the training of students. boys and girls in basic education. Strategies were proposed to follow to provide the opportunity for each of the teachers who teach the course to have the curricular flexibility so that the relevant knowledge is developed in the initial training process of the future new teacher.

The first unit allows opening the debate about what it means to plan a learning environment in a multigrade group where the contextual characteristics are considered in the development of professional practice, for this the need for a theoretical review of the elements that are considered is raised. require the design of planning focused on real conditions based on knowledge of increasing complexity, so that we begin with the design of a planning project that allows it to be operationalized and then analyze the results that help to rethink the proposed strategies.

The second unit seeks to ensure that future teachers have the necessary elements for the design and application of teaching situations and innovation projects in multigrade groups, where students experience the scenario of what this implies in professional practices in real conditions.

One of the fundamental elements with which the course closes are the evaluation strategies to follow because it makes it possible to account for the level of achievement, see strengths and weaknesses and this pays for the course by contributing to a graduation profile in order to help a graduate. Of normals as an education professional seeking to strengthen the educational quality that is required in the field of teaching-learning from an early age and in general in the improvement of basic education, in which graduates of normals perform. Zacatecas.

Conclusions

The research process and the design of the optional course was a learning experience that involved having theoretical-methodological elements that will help define where to direct our gaze and seek research strategies that would allow the recovery of the feelings of those who lived and are living the training process and what they face in their socio-labor context in order to meet the real needs of society.

Being in constant dialogue, discussion, analysis and reflection of what the process entailed was enriching, it helped to determine purposes, competencies, learning units, contents, teaching-learning strategies, resources, evaluation strategies to contribute as a team of trainers to an initial training process attached to diversity and inclusion in which students could achieve a better graduation profile in order to contribute to the quality of education.

The strategies implemented, the design of the project, the instruments that were applied for the collection of information, as well as the interpretation, analysis and reflection of the sources were fundamental to bringing the intended goal to fruition.

What is presented here is a brief outline of what the design of the course involved and the different vicissitudes we face as teacher trainers in the Zacatecas normal schools. This is a work experience that we believe is important to reveal and that now, With the new reform of normal schools called the co-design of the 2022 plan, it is necessary that its design starts from precise diagnoses that imply a concise theoretical-methodological review. The work is open for discussion.

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The challenge of entrepreneurs facing corporate social responsibility in the southern zone of Tamaulipas

El reto de los emprendedores ante la responsabilidad social empresarial en la zona sur de Tamaulipas

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Abstract

We have heard of the word entrepreneur; it is usually understood to be a creator or founder of something new related to a novel product acting individually or with a group of friends or also called partners. Normally the entrepreneur occupies positions in business projects in which he is responsible for directing and organizing their birth and subsequently their operation. In this way, risks are assumed, mostly in the financial or economic aspect. One of the many challenges of the entrepreneur is corporate social responsibility since in these times it becomes more important. In this research that has been carried out in the South Zone of Tamaulipas on entrepreneurs we realize that the majority of them face the problem on the preparation of products with reference to the requirements that must be met to avoid causing damage to the environment in the preparation or presentation of said product and thus contribute to or have social responsibility before the final consumer.

Entrepreneur, Social Responsibility, Product

Resumen

Hemos escuchado hablar de que la palabra emprendedor se suele entender que es un creador o fundador de algo nuevo relacionado con un producto novedoso, actuando de manera individual o con un grupo de amigos, también llamados socios. Normalmente el emprendedor ocupa posiciones en los proyectos empresariales en los que se encarga de dirigir y organizar su nacimiento y posteriormente su funcionamiento. De esa manera se asumen riesgos, en la mayor parte en el aspecto financiero o económico. Uno de los tantos retos del emprendedor es la responsabilidad social empresarial, ya que en estos tiempos cobra mayor importancia. En esta investigación que se ha realizado en la Zona Sur de Tamaulipas, sobre los emprendedores, nos damos cuenta que la mayoría de ellos se enfrentan con la problemática sobre la preparación de los productos con referente a los requisitos que se deben de cumplir para no ocasionar daño en el medio ambiente, en la elaboración o presentación de dicho producto y así contribuir o tener responsabilidad social ante el consumidor final.

Emprendedor, Responsabilidad Social, Productos

Background

Nowadays, entrepreneurs in the southern area of Tamaulipas have proposed not only to start with a dream or an idea of setting up a business, but they are also concerned about the effects that they can have on society, from the perspective of the environment; this means how far their social responsibility as a company or entrepreneur would go, the duty to be and to know the guidelines that are attached to their company to comply with it and not to damage the environment.

This leads you to take measures from the beginning of your business of what you can offer with your services or products and what damage it would cause. There are several damages that can be caused consciously or unconsciously, from visual noise, litter, sick buildings, etc. Entrepreneurs nowadays are influenced by or involved with globalisation, since for them in this world we live in is accelerated and changing, this challenge they face with respect to technology that evolves quickly to economic changes and that they must be prepared because if not their business disappears, since in experience it is known that in Mexico the life of a business is crucial the first 5 years, if it is not prepared it dies or you close the business (Alfa Mexico, n.d.). According to data on business units in the state of Tamaulipas there are 132,950 (INEGI, 2021) where only 10% growth has occurred in the southern area of Tamaulipas with respect to entrepreneurs. This growth was with the pandemic year, as many of them were creative in bringing their products to the consumer's home and giving themselves the opportunity for a new way of doing business.

Another form of support for entrepreneurs in the southern zone of Tamaulipas is the programme of the Ministry of Economic Development called "Made in Tamaulipas", which consists of giving economic support to new entrepreneurs to generate business and in this way allow the state of Tamaulipas to grow. Other programmes to support and generate economic spillover in Tamaulipas were implementing the #creerenvictoria was promoted in August 2023 for young entrepreneurs where they were given support for business development and implement opportunities for micro-enterprises to strengthen their finances,

The National Chamber of Commerce, Services and Tourism of Tampico was founded on October 21, 1909, under the Law of Chambers of Commerce of June 12, 1908. 69 presidents have led the Board of Directors throughout 108 years of history, from the founder Don Ricardo Everbusch, to the current C.P. Evaristo Guitron Moreno; who with special dedication to be worthy representatives of Organised Commerce have worked hard so that CANACO is always at the forefront in its promotional actions for a better Tampico as it is the city that impacts more in the southern zone of Tamaulipas.

The National Chamber of Commerce (CANACO) Tampico, is an association of companies and entrepreneurs that subsists thanks to the monthly contributions of each of the partners who belong to the chamber and through which the association provides services to its members, ranging from consulting to hiring employees for these companies.

In the National Chamber of Commerce, they are committed to continuous improvement, so they work to provide quality services, as well as a broad representation through membership to promote the activities of the trade, services and tourism sector; promoting the development of companies, according to the applicable regulations, capturing, understanding and satisfying the needs and expectations of their clients, as well as stakeholders; with a focus on processes, through the implementation of a Quality Management System based on the ISO 9001 standard (CANACO, 2019); giving the opportunity that in 2020 the group of Young Entrepreneurs will be formally created.

The research is carried out with young people from the National Chamber of Commerce of Tampico who are leaders in the process of business development, who work in different sectors; they support each other by generating business roundtables to get to know each other and develop different social activities that contribute to society. Other commitments they have are with the environment, they recognise the importance of encouraging young people to take care of the planet, as their activities reinforce social awareness for future generations.

Box 1

Figure 1

Young Entrepreneurs

Source: Photo taken by Canaco Tampico.

One of the activities carried out in collaboration with the Autonomous University of Tamaulipas, in the Faculty of Engineering Tampico, specifically in the Business Engineering degree, is to evaluate the projects of students in their final semesters who are about to graduate to see their feasibility, as well as to motivate students to make socially responsible products for the care of the planet, from the packaging, the development of the content of the product, investment, etc. This type of work developed by the Young Entrepreneurs of Canaco Tampico is through the agreement that exists with the University with Dual Education programmes.

Box 2

Figure 2

Taken at the Social Projects exhibition event of the Business Engineering students with Young Entrepreneurs (evaluating).

Problematic

The problem in this research is that the entrepreneur is not really prepared from a business perspective, since, when they decide to start a business, neither the entrepreneur nor their employees have management training nor are they prepared in environmental issues; This leads us to make mistakes from an economic and marketing point of view, and when making decisions, they start to make mistakes.

If we refer to the issue of corporate social responsibility, it is the last point in which they get involved, as they focus first on the product or service they offer to reach the consumer, make themselves known, and then on the part where they have an impact as a company (Barrera, 2021). Entrepreneurs are young people whose idea of setting up a business is based on needs that they see around them from their acquaintances and they think about providing a solution to these needs.

Theoretical approach

To talk about entrepreneurship is to form ideas, which, in turn, unfold talents that allow us to have or implement competitive advantages that are necessary in a company, so that measures can be established where teamwork or individual work has positive results that benefit and provide opportunities (Rodriguez, 2011).

When the word entrepreneur is used, it refers to someone who is risky, daring and sometimes even thought to be crazy, but it is simply someone who takes economic, financial and social risks and breaks with paradigms (Golan, 2022). Some authors who have defined the entrepreneur tell us or frame that, within occupations, entrepreneurship is instituted and as part of the work of the entrepreneur, it is corporate social responsibility that is responsible for the creation of professional advantage, adopting it as an instrument that allows the maximisation of strategic, labour and economic assets that they may have (Del Valle, 2017).

As stated by Alcaraz, R. (2011), the entrepreneur is characterised by their ability to create and innovate, i.e. they go out of habit and do different things to improve what already exists. In which, of course, and with these capacities, they seek to acquire an adequate use of the resources that are available. At the same time and to establish the development of entrepreneurship and help in the function of organisations, according to (Hernández, 2017), it is necessary to apply actions, where aspects such as increase, create, reduce and eliminate are fundamental, and that at the time of implementing this process is seen with a perspective that generates a new value curve, for the organisation and those who work in it. For entrepreneurship to be continuous and progressive and to fulfil its function within the organisation, it is inevitable to identify an entrepreneur, not only with these characteristics, but also how they are used to their maximum advantage.

Talking about entrepreneurship, with respect to social responsibility, are very strong concepts and when combined they can be powerful and have a great impact on society as they go hand in hand to make a social conscience, day by day we live a constant evolution and it is important to recognize the role of an entrepreneur, we know that many Latin countries are in economic growth as Mexico, Peru, Colombia, Chile, Argentina have experienced very similar situations in the commercial sphere. In the Peruvian context, entrepreneurs and companies play a role in creating positive change with respect to social responsibility; in the article by Córdova, F. (2023), he mentions the relationship between entrepreneurship and social responsibility, shades highlighted profiles, examines the advantages of addressing both areas and presents success stories at the national level in Peru.

In the previous paragraph I mentioned that Peru is a country very similar to Mexico both in its economy and in its business behaviour.
Success Stories in Peru:

"In Peru, there have been numerous success stories that combine entrepreneurship and social responsibility. For example, 'EcoInca' is a company that produces and markets organic products while empowering local indigenous communities, promoting sustainability and social inclusion. Another case is 'Algramo', a startup that offers bulk commodities, reducing the use of packaging and promoting the circular economy."

Socially responsible entrepreneurship is a powerful tool to drive change in Peru. Entrepreneurs who care about the well-being of society and the environment have the ability to create innovative and sustainable solutions. When analysing this type of entrepreneurship that has taken place in Peru, we look at Canaco Tampico's entrepreneurial partner and see that they have very similar ideals regarding environmental care that they consider taking into account for their business, such as green products or green seals to raise awareness among consumers. This could be an advantage in the market.

The transformative power of socially responsible entrepreneurship knows no limits. Now more than ever, it is essential to encourage and support those who work hard to combine business success with a positive impact on society. In Peru, this combination is generating real and lasting change, paving the way for a more just and sustainable future.

Sustainable entrepreneurship for economic development is seen as a set of creative actions that are directed towards improving a critical situation or building something new, regardless of the resources available in the environment. The creative actions that lead to entrepreneurship depend exclusively on human capital, which is responsible for projecting strategic ideas capable of transforming situations that alter the proper functioning of business initiatives (Hernández, 2017).

Entrepreneurship to serve

Many entrepreneurs think of a project or company only to make money. And earning money is essential, but being in a project only for the money that can be earned seems to us to be asking very little of life. You don't have to choose between earning money and doing what you like; you can do both at the same time; and the smartest thing to do is to choose both. Others think about a project or a company and simply concentrate on what they feel like doing and forget the economic factor. You know what happens, because it happens to about 85 per cent of entrepreneurial projects before they are five years old: they fail. We believe that focusing only on the economic aspect is a mistake, just as we believe that forgetting the economic aspect is a beginner's mistake that is very costly.

The question you can ask yourself before starting a business is why you are starting a business. Be careful, because the question is not ‘why are you doing it’, but ‘what for’. The question is different and, therefore, the answer will also be different. If you know what you are doing it for, your chances of success soar (Konfio, 2021).

In the magazine Entrepreneursship (2021), in one of its articles, carried out at the Anáhuac University in Mexico City, they comment that ‘The future of Mexico is not in the big companies, but in the thousands of small and medium-sized companies that every year venture to compete in this agitated and difficult market’. One of the questions we would ask ourselves or as many of those in business ask themselves is: Did you know that in Mexico there are 4 million 230 thousand SMEs, which contribute about 52% of the national GDP? Even more incredible is that 33% of these companies are created by entrepreneurs between 25 and 34 years old. Becoming a successful entrepreneur is still a difficult task, and although the country's economic landscape is changing, it is increasingly favouring young people. To succeed in business, an entrepreneur must have certain qualities that make him or her stand out, such as passion, determination and leadership. One of the commitments that the Autonomous University of the State of Tamaulipas has in coordination with the Canaco Tampico is to promote Dual Education, where students interact with private companies to put their knowledge into practice with the objective of developing entrepreneurship in them.

Development

The objective of the research is to understand the challenge faced by entrepreneurs in terms of corporate social responsibility in the development of their products and labels in order to make them known to consumers.

The methodology used is a conclusive market research, which, when this type of research is used, allows us to know the needs of the client or subject to be investigated by means of statistics and allows us to make decisions immediately, we collected the information through a survey applied to entrepreneurs in the southern area of Tamaulipas, taking a sample of 332 entrepreneurs randomly selected from the database of the National Chamber of Commerce and Tourism Services of Tampico, this is done because the non-probabilistic method is used for random samples and thus, the analysis is fast; This type of sampling is by convenience as it depends on the experience and judgement of the researcher and allows us to make quick and quantitative decisions for the analysis of the results.

The steps that were followed during the market research for the development are as follows:

1. Establishment of the Need/Development of the Research Objective.
2. Research Design/Data Sources.
3. Data Base Analysis (Canaco Tampico) - Sample
4. Development of the Measurement Instrument (Survey)
5. Data Processing (Excel)
6. Data Analysis

Analysis of Results

After having collected the information through an instrument, the analysis of the results of this research is as follows:

In this graph we can observe the orientation of the entrepreneurs regarding their object within the market. 33% of them are dedicated to the distribution of consumer products.

Box 3

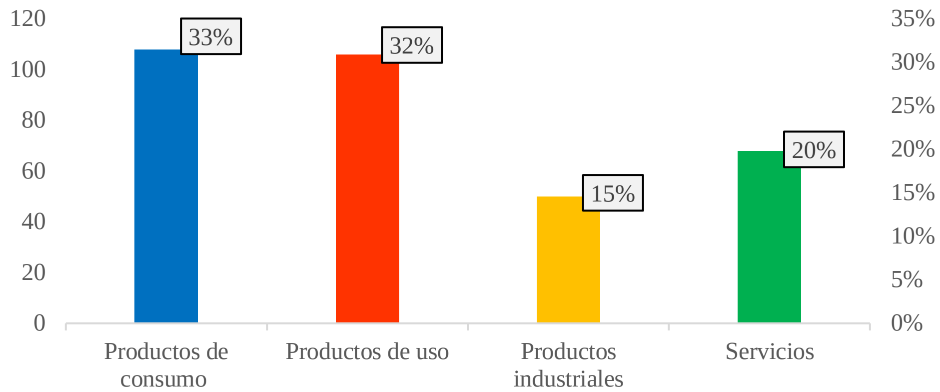

Figure 3

Distribution of consumer products

Source: Own elaboration

Box 4

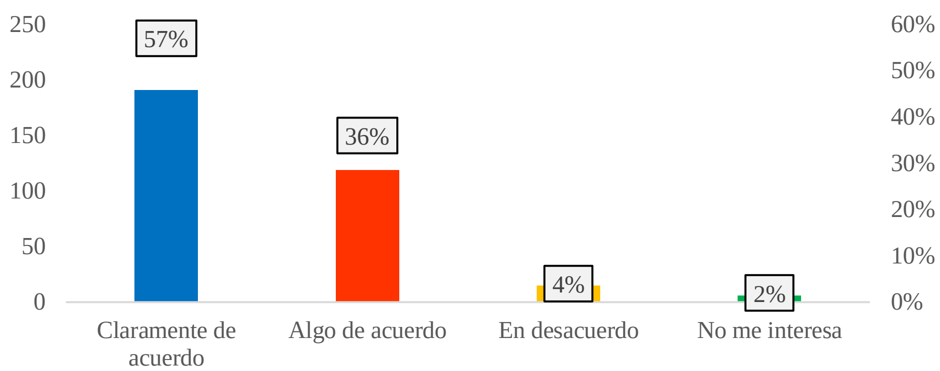

Figure 4

Importance of Corporate Social Responsibility

Source: Own elaboration

Of the entrepreneurs surveyed, 57% believe that corporate social responsibility with the products and/or services they offer is of the utmost importance. This indicates that environmental issues are important for the entrepreneur.

Box 5

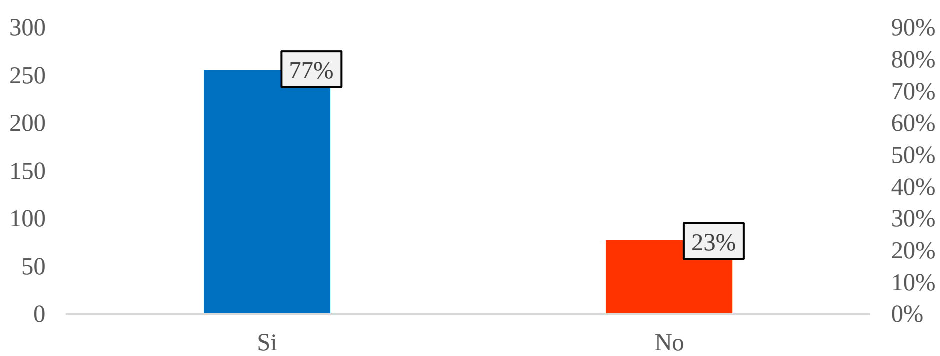

Figure 5

Socially responsible company

Source: Own elaboration

77% of entrepreneurs consider that their company or business is socially responsible.

Box 6

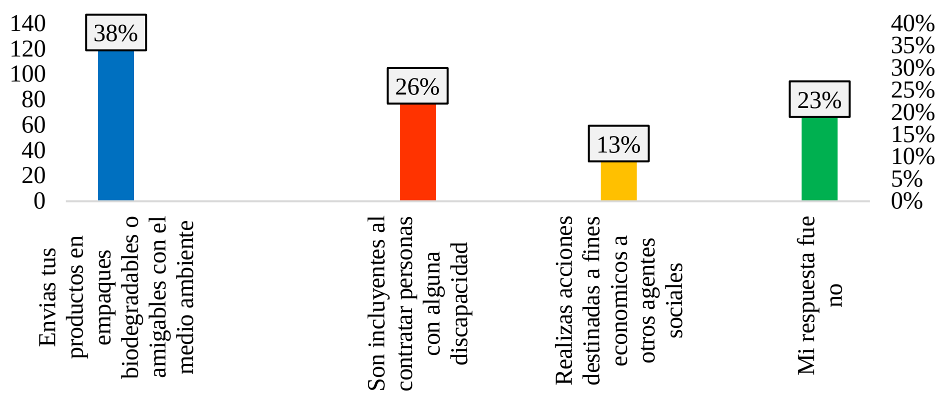

Figure 6

Activities to be a Socially Responsible Company

Source: Own elaboration

In the previous graph, they were asked if their company was socially responsible, in which their answer was yes, and we were interested in the activities they carried out in view of this commitment, and 38% of them told us that they focus on biodegradable product packaging.

Box 5

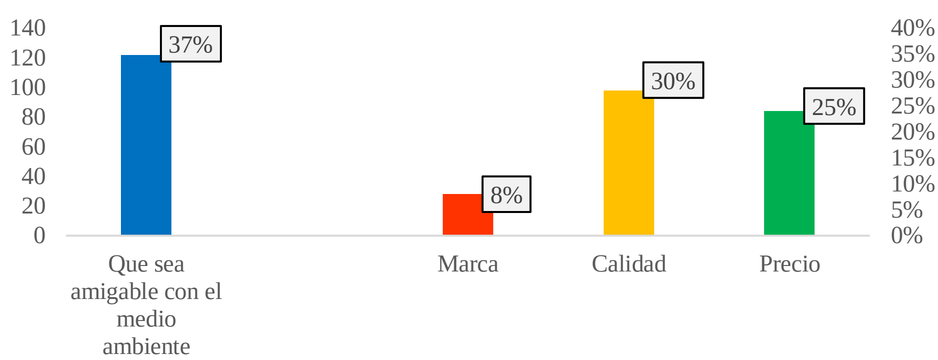

Figure 5

Material used for the elaboration of the packaging of their product

Source: Own elaboration

This graph shows that 37% of the entrepreneurs seek to ensure that the materials they use for their products are friendly, and also that they are of high quality, which go hand in hand with meeting the expectations of their consumers.

Box 6

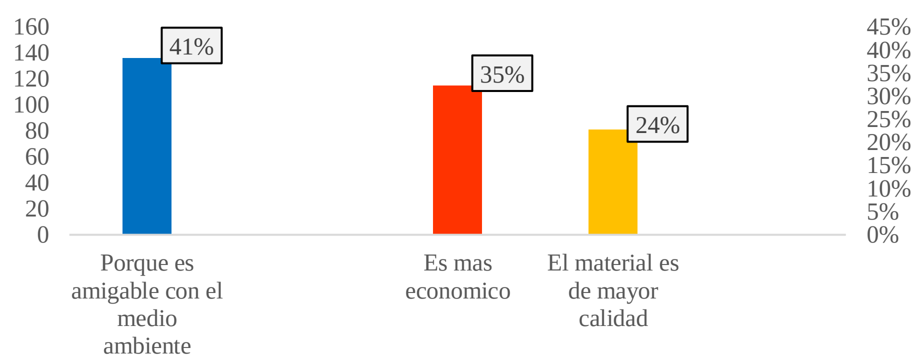

Figure 6

Product differentiation from competitors

Source: Own elaboration

Forty-one percent of the entrepreneurs say that their consumers prefer their products because they are environmentally friendly, and 35% consider them to be economical.

This last graph shows the perception that the entrepreneur has of his business in the eyes of consumers, and how they identify him socially in contrast to his competitors.

Box 7

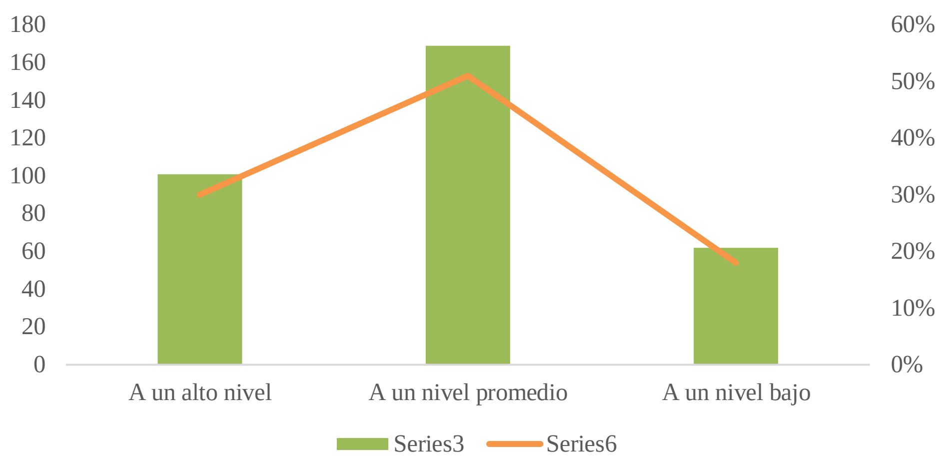

Figure 7

Entrepreneur's perception of his competition

Source: Own elaboration

As we can see in this graph, the entrepreneur considers that he is at an average level; this tells us that he has to look for a more outstanding differentiation from his competitors so that his consumers do not have the opportunity to consider his competitor.

Conclusions

According to the results obtained, we can see that the entrepreneurs face difficult situations from the economic-financial aspect; it is not only thinking or having an idea to carry out the business, but also the commitments they have in the care of the environment, as well as making their consumers aware of the green products or the social responsibility they have as a company, we know that on this subject there is very little preparation for them as it is often handled as if it were a fashion to talk about this subject. But in conclusion and according to the results of the analysis carried out 77% consider that their company if it is socially responsible or at least complies with that responsibility, this is carried through their products taking care of the packaging so that it is biodegradable or does not pollute so much in the environment.

Recommendations

The recommendations given at the end of this research and presenting the results to the young entrepreneurs associated in Canaco Tampico were as follows:

1. To carry out an analysis of the current situation with regard to their products that do comply with Corporate Social Responsibility with respect to having environmentally friendly products.
2. Training of staff on the issue and its importance.
3. Participation in updating events in relation to the use of technology, as nowadays they are immersed in this environment and it is evolving by leaps and bounds every day (Córdova, 2023).
4. The Young Entrepreneur should keep in touch with the Chamber, as one of its main functions is to keep up to date on Social, Financial, Economic, Political, Fiscal, etc. issues.

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Strategic management in the development of MSMEs in the municipality of Progreso from Obregón, Hidalgo

La gestión estratégica en el desarrollo de las Mipymes del municipio de Progreso desde Obregón, Hidalgo

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Key Handbooks

This research provides knowledge for the generation of Science and Technology and fulfills priority objectives 1 to strengthen the link between HEIs and MSMEs in the municipality of Progreso de Obregón, Hidalgo with the purpose of solving local problems and contributing to social well-being. of the municipality. In addition, it allows guaranteeing universal access to Scientific, Technological and Humanistic knowledge to benefit MSMEs in this region. On the other hand, take advantage of and reuse the data and information from this research for the development of public policies for the benefit of the population. The key aspects of this research are applicable to generate universal knowledge transfer and consolidate coordination with the scientific, public, private and social sectors to solve priority problems from the local, state, national and international levels. The conclusion of this work is that despite public policies, there is a gender gap, and in the structure of MSMEs, 90% are family members and their initial capital is contributed by family members, derived from the lack of financial inclusion.

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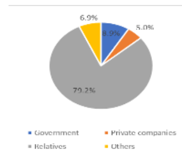
Abstract

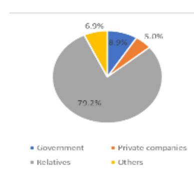
Decision making in Micro, Small and Medium Enterprises is generally based on the experience of the business owner, therefore, the objective of the research is to analyze strategic management in the development of MSMEs in the municipality of Progreso de Obregón, Hidalgo. The methodology is a mixed approach, with a descriptive design, to analyze what a phenomenon and its components are like and how they manifest. A representative sample of 297 MSMEs in Progreso de Obregón was determined. The main results obtained are that: 63% of the municipality's businesses are informal, likewise 71.4% report having strategic management that helps face the challenges of the environment and be able to adapt to changes; On the other hand, 70.3% do not have process diagrams, it is also observed that 69.3% of the company's administration falls entirely on the owner, 25.7% on a family member and 5% on third parties. It is concluded that there is a window of opportunity to improve the strategic management of the business units since the majority have basic and upper secondary education, so it is inferred that by increasing their level of financial education they can enhance their strategic management, which contributes to the achievement of organizational objectives.

“Strategic management in the development of MSMEs in the municipality of Progreso from Obregón, Hidalgo”		
Objectives	**Metholology**	**Contribution**
Research is to analyze the strategic management in the development of MSMEs in the municipality of Progreso de Obregón, Hidalgo. 	 $$n = \frac{N * Za^2 * P * Q}{e2 * (N-1) + Za^2 * P * Q}$$ Of which 1302 are dedicated to the most representative economic sectors (Commerce, services and industry).	 The researcher suggests that they be linked; higher education institutions, government and the owners of MSMEs to carry out training, courses, workshops. etc

Financing sources, Strategic Management, MSMEs, Progreso de Obregón

Resumen

La toma de decisiones en Micro, Pequeñas y Medianas empresas generalmente se basa en la experiencia del propietario del negocio, por ello, el objetivo de la investigación es analizar la gestión estratégica en el desarrollo de las Mipymes en el municipio de Progreso de Obregón, Hidalgo. La metodología es de enfoque mixto, con diseño exploratorio y descriptivo, para analizar cómo es y cómo se manifiesta un fenómeno y sus componentes. Se determinó una muestra representativa de 297 Mipymes en Progreso de Obregón. Los principales resultados obtenidos son que: el 63% de los comercios del municipio se encuentran en la informalidad, de igual manera el 71.4% refiere contar con una gestión estratégica que ayude hacer frente a los desafíos del entorno y poder adaptarse a los cambios; por otra parte, el 70.3 % no cuenta con diagramas de procesos, además se observa, que el 69.3% de la administración de la empresa cae totalmente en el propietario, 25.7% en algún familiar socio y con un 5% a terceras personas. Se concluye, que existe una ventana de oportunidad para mejorar la gestión estratégica de las unidades de negocio toda vez que la mayoría tiene educación básica y media superior por lo que se infiere que al aumentar su nivel de educación financiera puede potencializar su gestión estratégica lo que coadyuva en el logro de los objetivos organizaciones.

“La gestión estratégica en el desarrollo de las Mipymes del municipio de Progreso desde Obregón, Hidalgo”.		
Objectives	**Metholology**	**Contribution**
Analizar la gestión estratégica en el desarrollo de las MIPYMES en el municipio de Progreso de Obregón, Hidalgo. 	 $$n = \frac{N * Za^2 * P * Q}{e2 * (N-1) + Za^2 * P * Q}$$ De los cuales 1302 están dedicados a los sectores económicos más representativos (Comercio, servicios e industria).	 El investigador sugiere que estén vinculados; instituciones de educación superior, gobierno y los dueños de las MIPYMES para realizar capacitaciones, cursos, talleres. etc.

Fuentes de financiamiento, Gestión Estratégica, Mipymes, Progreso de Obregón

Introduction

The development of small and medium-sized enterprises (SMEs) is a priority for policy makers throughout Latin America and the Caribbean. SMEs make up 99.5% of the region's companies (almost 9 out of 10 are microenterprises) and generate 60% of formal productive employment. However, although it is considered normal for SMEs to have lower productivity levels than large companies, Latin American SMEs have a particularly significant productivity gap, as they are responsible for only a quarter of the total value of the region's production (OECD, 2019).

Strategic management in MSMEs is a fundamental aspect that is configured in a fundamental dimension for them to achieve success; that is why this research with the contributions of the owners of the business units of the municipality of Progreso de Obregón is essential.

In recent decades, SMEs have achieved significant growth for the economy at a regional, national and international level, thanks to trends in electronic markets, ICTs and the different changes in organizational issues, which has allowed more and more people to start a business.

Due to the lack of research on this area, the window of opportunity opens to carry out this work.

The added value of this research is to provide microentrepreneurs in the municipality of Progreso de Obregón with information on the analysis of the strategic management that they currently develop within their organization, which will allow them to identify their strengths, weaknesses, threats and opportunities, which will contribute to the development of strategic plans to achieve their organizational objectives.

According to the Sectoral Program of Economy 2020-2024, it establishes that the low productivity and consolidation of new MSMEs is a relevant problem that inhibits the economic growth of Mexico, whose main causes identified are: a) insufficient or deficient access to physical or financial capital; b) deficient human capital; c) suboptimal techniques and technologies applied to production, service and marketing processes; d) institutional environment and unfavorable environment for doing business (transaction costs); e) limited capacity for innovation and technological development; and f) poor infrastructure and services for production. (Secretariat of Economy, 2019-2024)

The present research aims to analyze from the perspective of the owners of the MSMEs, what are the strategic managements that they have used in the aspects of internal structure of the business, clients, use of information and communication technologies and their profitability; to be competitive in local markets. Therefore, with them, the research questions will be answered: Do the MSMEs of Progreso de Obregón have strategic plans? Will having strategic plans make the MSMEs of Progreso de Obregón, Hidalgo more competitive?

The work is structured as follows: first, the introduction is presented, where the topic in general is presented, and why strategy management is important in SMEs, and the research questions are posed. Second, the methodology is presented, including how the sample was obtained, the data was collected, and the variables used were measured. Third, the analysis of results is included; finally, the conclusions are presented.

Methodology

The research "Strategic management in the development of MSMEs in the municipality of Progreso from Obregón, Hidalgo" is of a mixed type, exploratory and descriptive; in this regard, Hernández, Fernández and Baptista (2003) refer that "Exploratory studies are carried out when the objective is to examine a little-studied research topic or problem, about which there are many doubts or it has not been addressed before". Likewise, it is considered descriptive because "it seeks to specify properties, characteristics and important features of any phenomenon that is analyzed, describing the trends of a group or population". (Hernández R., 2003)

Based on this, and with the information obtained and provided by the business owners, the management strategies applied by MSMEs in Progreso de Obregón, Hidalgo will be analyzed.

Research location

The research studies micro, small and medium-sized enterprises (MSMEs) in the municipality of Progreso de Obregón, Hidalgo; of which 1302 are dedicated to the most representative economic sectors (Commerce, services and industry).

Population and sample

The simple random sampling type was chosen, which is the simplest and best-known probabilistic procedure for selecting samples.

Having the information regarding the size of the population (1302 MSMEs) the formula for calculating the sample was applied, working with a confidence level of 95%, with a probability of failure of 50%, a probability of success of 50% and a standard error of 5%, as shown below:

$$n = \frac{N*Za^2*P*Q}{e2*(N-1)+Za^2*P*Q} \qquad [1]$$

n=Sample size
N=Population or universe size
Z=Statistical parameter that depends on N
e=maximum accepted estimation error
P=Probability of the event occurring
Q=(1-p)=probability of the event not occurring

Parameter	Sample size
N 1,302	n= 297
Z 1.96	
P 50%	
Q 50%	
e 5%	

Based on the application and calculation of the formula, it was found that the number of SMEs to be surveyed is 297 in order to have a relevant population sample to carry out the research.

The questionnaire, which is prepared specifically for this purpose, consists of 3 thematic axes, which will allow the collection of information regarding: generalities of the company, characteristics and business management.

Results

This section presents the results obtained from the analysis of the data generated by the survey applied to the owners of MSMEs.

Progreso de Obregón is one of the eighty-four municipalities that make up the state of Hidalgo in Mexico, it has an area of 91.00 km², and represents 0.44% of the state's surface; within the geographic region known as the Mezquital Valle.

In 2020, 36.3% of the population of Progreso de Obregón, Hidalgo was in a situation of moderate poverty, 2.7% in a situation of extreme poverty and the vulnerable population by income represents 5.29%, according to the National Council for the Evaluation of Social Development Policy (CONEVAL, 2020).

In a dynamic and competitive business environment, strategic management becomes a fundamental tool for the success and sustainability of organizations. This allows companies to define their direction, establish clear objectives, develop action plans and make sound decisions to achieve their long-term goals.

For MSMEs, it is also essential to carry out strategic management to obtain a competitive advantage.

From this perspective, the research is based on identifying if the MSMEs of the municipality of Progreso de Obregón, Hidalgo apply strategic management, knowing the profile of the administrators, as well as identifying if they establish strategies, make them known and the impact they had. in the profitability of companies.

The following graphs present the results of the research, taking into account gender, age, educational level and ownership structure.

Box 1

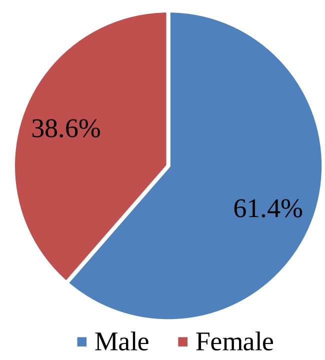


Figure 1
Gender distribution analysis

Source: Own elaboration

Figure 1 shows the analysis of gender distribution; where a significant gender gap is observed since men represent 61.4% and women 38.6%. Which represents a sale of opportunity to develop programs that strengthen gender equality in the administration and strategic management of companies.

According to Stephen P. Robbins, Mary Coulter and David A. DeCenzo (2020), they refer to gender equity in administration where they point out that, although the proportion of women in administrative roles has increased in recent years, there is still a long way to go. way to go to achieve true gender equality in this area. This quote supports the idea that significant challenges still remain in the pursuit of greater gender equity in administration. (Robbins, 2020).

Box 2

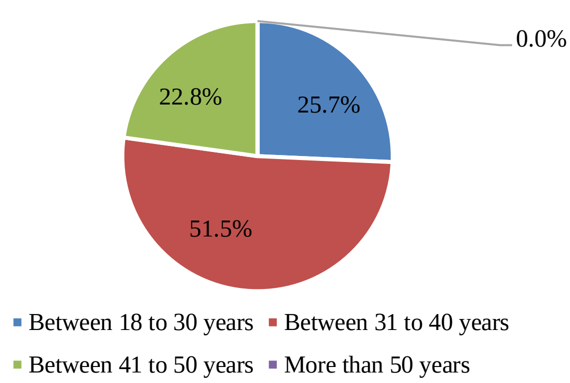


Figure 2
Analysis of age distribution

Source: Own elaboration

Figure 2 shows the analysis of the distribution by age, it was observed that the age range with the greatest presence in the administration is from 31 to 40 years with 51.5%, on the other hand, 25.7% are in a range of 18 to 30 years old and finally with 22.8% between 41 to 50 years old. Based on these results, it can be discerned that adult populations are more likely to undertake entrepreneurship than young people and the mature population.

Northouse addresses the importance of experience and work maturity as valued factors in the selection of personnel for administrative positions. He states that in leadership and management roles, previous experience and the ability to handle complex situations are fundamental qualities. Furthermore, he suggests that career maturity, which may include problem-solving, decision-making, and interpersonal skills developed over time, may be an important indicator of an individual's ability to perform effectively in management roles. (Northouse, 2019)

Box 3

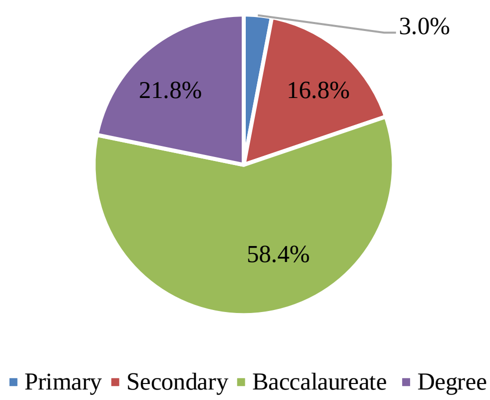


Figure 3

Analysis of educational level

Source: Own elaboration

Information was obtained on the distribution of the educational level of the administration, where it was observed that the owners of the MSMEs have a high school level (baccalaureate) with 58.4%, followed by bachelor's degrees with 21.8% and 16.8% have a high school level. secondary. Therefore, it can be seen that currently the upper secondary level population has the knowledge and bases to carry out the strategic management of a company.

On the other hand, Herminia Ibarra analyzes how leaders can transform and grow professionally through continuous training and constant learning, highlighting the importance of education and personal development for the success and growth of the company. (Ibarra, 2019).

Box 4

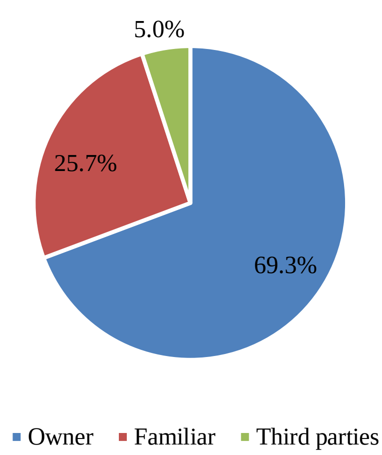


Figure 4

Analysis of ownership structure

Source: Own elaboration

Figure 4 shows the result of the analysis of the ownership structure; 69.3% of the administration falls on the owner, 25.7% on family members and 5% on external people, so it is inferred that sole proprietorships prevail, consequently, decision making is concentrated on the owner and his circle. close which could have impeded growth opportunities for other professionals.

Bennedsen, Fan, Jian, and Yeh (2021) establish how the concentration of ownership in the hands of the family and their close circle can affect decision making, organizational culture, and growth opportunities for other professionals. The authors focus particularly on Chinese family businesses and present a conceptual framework, a selective survey, and empirical evidence to support their arguments (Bennedsen, 2021).

Box 5

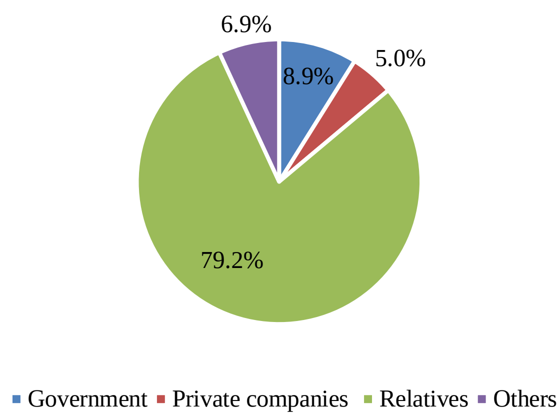


Figure 5

Sources of financing to start the company

Source: Own elaboration

Figure 5 shows the financing sources used; Family members represent the most significant group with 79.2%, followed by the government with 8.9%, private companies with 5% and other sources with 6.9%. It is observed that the majority of the owners required financing from their family because they were not able to start their business with their own resources; Therefore, it can be stated that derived from the representative sample, the majority of these are not legally constituted, which hinders access to financing, which is why they turn to family members.

The importance of financing according to Márquez, Cuétara, Carta and Labarca (2020), mention that it is a crucial issue for financial administrators, especially in a context of crisis such as the one experienced in 2020. Authors such as Gurley & Shaw (1955), Schumpeter (2008), González (2015), Quevedo (2019) and Márquez, Cuétara, Carta and Labarca (2020) have highlighted the importance of understanding the financing sources used by Small and Medium Enterprises in times of economic uncertainty. in addition to playing a fundamental role in making informed financial decisions and building a healthy and sustainable financial life. (Marquez, 2020)

Box 6

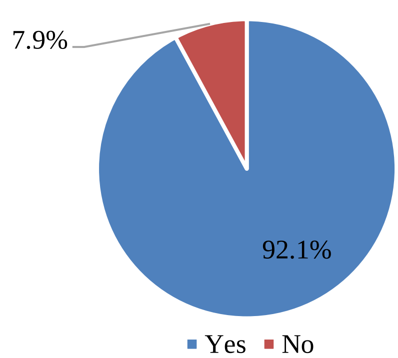


Figure 6

Existence of strategic management

Source: Own elaboration

Box 7

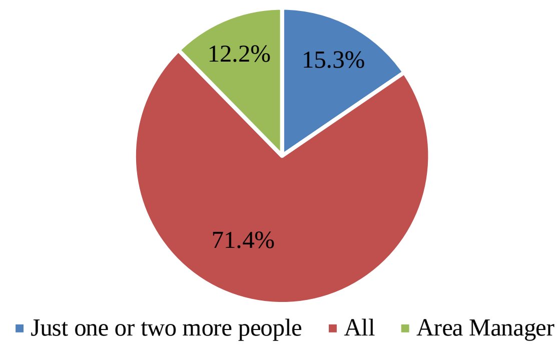


Figure 7

People who know strategic management

Source: Own elaboration

Valuable information was obtained about the degree of knowledge of the business strategy among the company's employees (Figures 6 and 7), where it is observed that 92.1% of the company's employees indicate that they know the strategies, 7.9% do not know it. On the other hand, it is observed that employees know the strategy, 71.4% indicate that all employees know it, 15.3% that only one or two people know it and 12.2% that only area managers know it.

These results indicate that there is strategic management in the MSMEs of the municipality of Progreso de Obregón, and the employees are generally aware of it. Although there is a window of opportunity to socialize all employees and contribute to the fulfillment of the organizational objectives of these business units.

Kaplan, R. S., & Norton, D. P. (2018), discuss how organizations can communicate and execute their strategies effectively. The focus is on linking strategy to daily operations, using tools such as the Balanced Scorecard to ensure that all members of the organization understand and align with the corporate strategy. (Kaplan, 2018).

Box 8

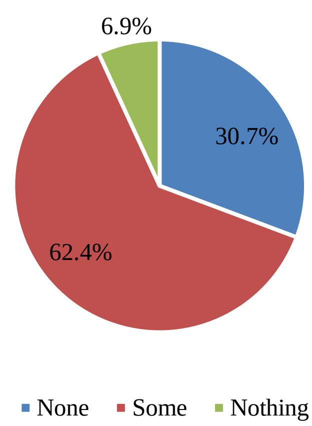


Figure 8

Formalization of strategic management

Source: Own elaboration

Figure 8 shows that 62.4% of MSMEs have a formalized strategy (in writing), 30.7% do not have it formalized and 6.9% lack strategic management; Therefore, it is important to consider that the formalization of the strategy is the means that allows everyone involved to understand and achieve the objectives, plans and goals of the company.

Rumelt, R. P. (2021), indicates the difference between good and bad strategies, emphasizing the importance of having a strategy formalized in writing. He argues that “a clearly documented strategy provides clear direction; “It facilitates internal and external communication, and helps align the organization's resources and efforts towards common objectives,” which corroborates what was obtained in the study. (Rumelt, 2021).

Box 9

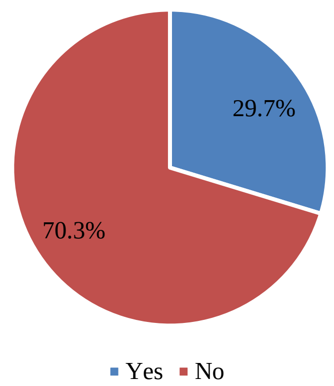


Figure 8

Analysis of process documentation

Source: Own elaboration

In Figure 9, it was observed that 29.7% of the MSMEs in the municipality of Progreso de Obregón have process diagrams, while 70.3% do not have them, which can be considered an area of opportunity in MSMEs, since that the importance of documentation and process diagrams is fundamental for efficient and effective business management, since it offers a clear and concise description of the activities that must be carried out by those responsible for each stage, the necessary resources and performance indicators, It facilitates the identification of areas of improvement and the implementation of changes to optimize processes and guarantee that all employees carry out activities in the same way, which contributes to standardization and consistency in the company's operation.

Jeston, J., & Nelis, J. (2019), refer that "documentation and process diagrams are essential for efficient and effective business management. The text explains how adequate process documentation can offer benefits such as improving quality, cost reduction, improved internal communication and more informed decision making" (Jeston, 2019).

Box 10

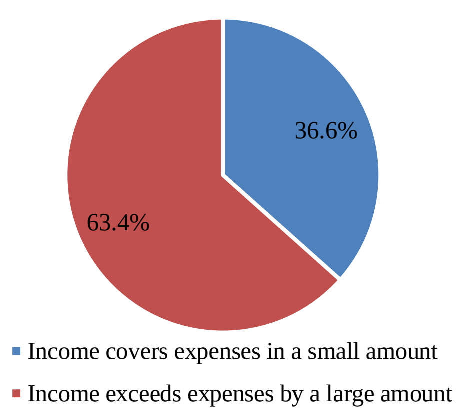


Figure 10

Analysis of business profitability

Source: Own elaboration

In this section, profitability is considered the company's ability to generate profits, that is, income that exceeds expenses. Figure 10 shows that 36.6% of owners indicate that their companies cover expenses by a small amount, while 63.4% state that their income exceeds expenses by a large amount. With this result, it can be inferred that almost 40% of these economic units do not achieve their organizational objective, which is to generate profitability.

According to Asanza and Avendaño Briones (2021), profitability is considered to be core for all organizations, because it will allow the operational margin to be calculated between sales, turnover and magnitude, and it is also considered an indicator that allows measuring the relationship that exists between the benefit obtained and the investment that was used to obtain it. Profitability is a financial ratio that helps SMEs measure the benefits obtained based on the investment and its ability to remunerate the financial resources. (Asanza & Avendaño Briones, 2021)

Box 11

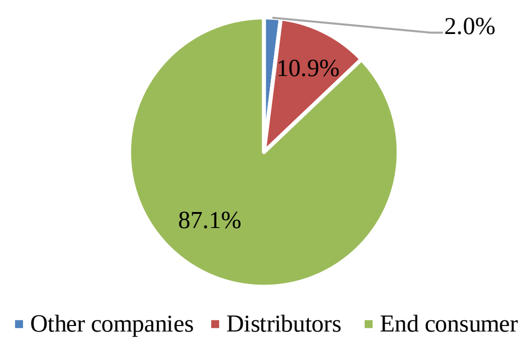


Figure 11

Analysis of client type

Source: Own elaboration

Box 12

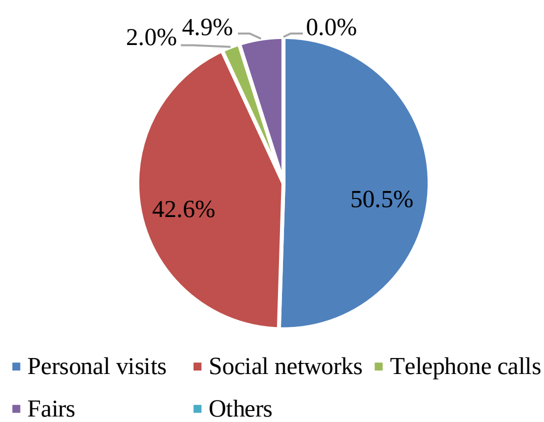


Figure 12

Analysis of the means used to know the client

Source: Own elaboration

The present analysis is based on the information extracted from figures 11 and 12, with the objective to evaluate the knowledge that the companies participating in the study have about their customers and the strategies they use to get to know them better.

The distribution of clients in the Mi MSMEs of Progreso de Obregón, Hidalgo, showed that 87.1% are final consumers, 10.9% are distributors and 2% were considered other companies (Figure 11).

Kotler (2019) highlights the importance of companies deeply understanding their customers in order to develop products and services that not only meet their expectations, but also foster lasting relationships. The book explores how marketing has evolved in the digital age and offers strategies to effectively connect with customers in a dynamic environment. (Kotler, 2019)

Figure 12 shows the means used to meet the client; According to the study, 50.5% were through personal visits, 42.6% through social networks, 2% through telephone calls and 5% the prospecting was at fairs.

It is important to get to know customers through personal visits which allow deeper relationships to be established. Through social networks, information is obtained about their interests and online behaviors. Telephone calls are useful for feedback on specific products or services. while fairs are an opportunity to prospect and attract customers, which coincides with what Bernard Marr (2017) establishes, explores how companies can use various tools and media to collect and analyze customer data. This includes the use of data analytics, big data, and specific metrics to better understand customer needs and behaviors, as well as the effectiveness rates of these media in various industries. (Marr, 2017)

Box 13

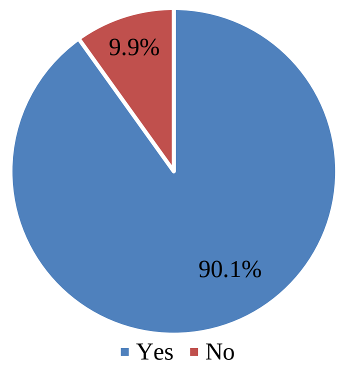


Figure 13

Diversification of new products and/or services

Source: Own elaboration

Box 14

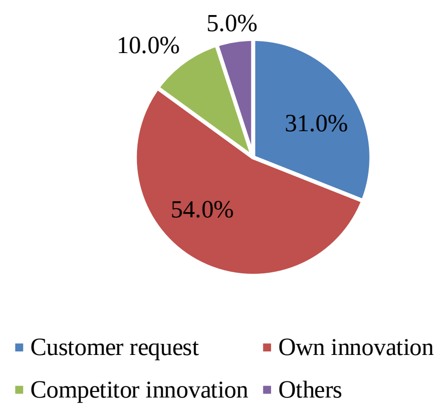


Figure 14

Causes of diversification

Source: Own elaboration

The percentage of companies that have ventured into new products, the MSMEs participating in the study stated that 90.1% have diversified into new products and/or services in recent years, while 9.9% said they have not. This indicates that MSMEs are looking for new opportunities for growth and development through innovation and the use of new technologies (Figure 13).

Regarding the reasons for entering new products, Figure 14 shows that the main causes are: own innovation with 54%, at the request of customers with 31%, and 10% due to competitor innovation. This suggests that companies are driven as much by their own desire to innovate as they are by the needs and demands of their customers.

Christensen, C. M., Raynor, M. E., & McDonald, R. (2015), examine how companies innovate and launch new products to stay competitive and grow. The text alludes to how a high percentage of companies participate in product innovation, highlighting the importance of this practice for business development and sustainability. (Christensen, 2015)

Discussion

This research was carried out with the purpose of analyzing strategic management in the development of MSMEs in the municipality of Progreso de Obregón, Hidalgo. Several aspects that affect the competitiveness of microenterprises were identified; mainly those caused by the lack of application in their operational processes of specific diagrams that contribute to achieving a competitive advantage that allows them to be profitable and sustainable.

Due to the above, there is a window of opportunity to work collaboratively between MSMEs, higher education institutions and Government at the three levels, on issues of strategic management, business plans, operational process diagrams, technological innovation, etc.

Conclusions

As a conclusion of this research, it can be seen that, in the MSMEs of the municipality of Progreso de Obregón, Hidalgo, a gender gap continues to exist; it also prevails that the organizational structure is family-type, in addition, initial financing is done as a priority through loans. and family contributions; The age range of the leaders is between 31 years and older, so it is inferred that they are of mature age, with a level of education from basic to upper secondary education.

Giving answers to the research questions posed in this work, it can be said that the MSMEs of Progreso de Obregón, Hidalgo do have strategic plans; Although they know strategic management and have it reflected in documents, they do not identify it precisely to be applied in diagrams of operational processes, therefore, having strategic plans, but not monitoring and evaluating them, affects their competitiveness and reduces the efficiency and effectiveness of these economic business units.

Under this tenor, the researcher suggests that they be linked; higher education institutions, government and the owners of MSMEs to carry out training, courses, workshops. etc., on financial education and business management with the aim of positively impacting the economy of the family, the community, the municipality and so on.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest.

Contributions

Trejo Encarnación, Patricia: She is the main author of the research, contributes to the development of the collection instrument, its application in the MSMEs of Progreso de Obregón, with the support of professional stay students.

Hernández Gómez, Diana: The author who contributes to the analysis of the collected data.
Aguilar Reyna, Veronica: The author participated in the data analysis and graphing of the information.
Bartolo De La Cruz, Marisol: The author participated in the data analysis.

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Abbreviations

CONEVAL	National Council for Evaluation of Social Development Policy.
MSMEs	Micro, small and medium enterprises.
ICTs	Information and Communications.

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Background

Asanza, T. O., & Avendaño Briones, Á. (2021). Gestión financiera y su incidencia en la rentabilidad en Pymes comerciales en la ciudad de Guayaquil periodo 2021-2022. Polo del conocimiento, 4.

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Validation, reliability and application of a survey to identify the accommodation needs of small and medium miscellaneous

Validez, confiabilidad y aplicación de una encuesta para identificar las necesidades de acomodo de las pequeñas y medianas misceláneas

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Area: Humanities and Behavioral Sciences
Field:
Discipline:
Subdiscipline:

Key Handbooks

Its main contribution is to design a methodology that provides reliable information for decision-making for small and medium-sized miscellaneous businesses. Obtaining and managing information. The design and statistical verification of the survey provides reliability in the information obtained when designing the necessary strategies.

Citation: Aguilar-Aguilar, Verónica & Hernández-González, Salvador. 2024. Validation, reliability and application of a survey to identify the accommodation needs of small and medium miscellaneous. 111-119. ECORFAN.

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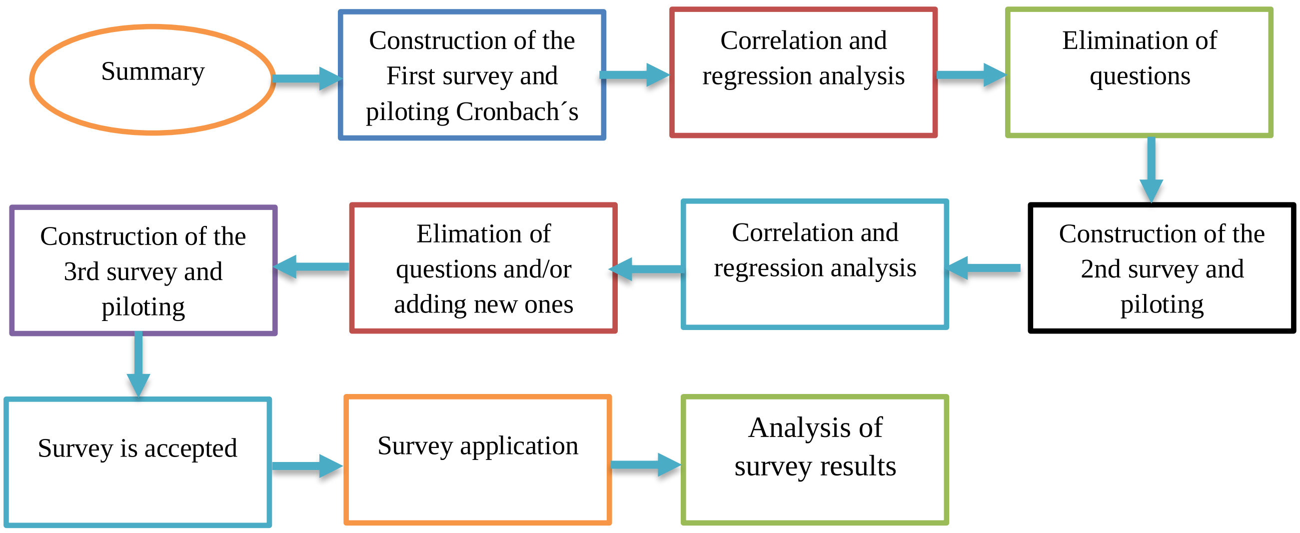
Handbook shelf URL: https://www.ecorfan.org/handbooks.php

Abstract

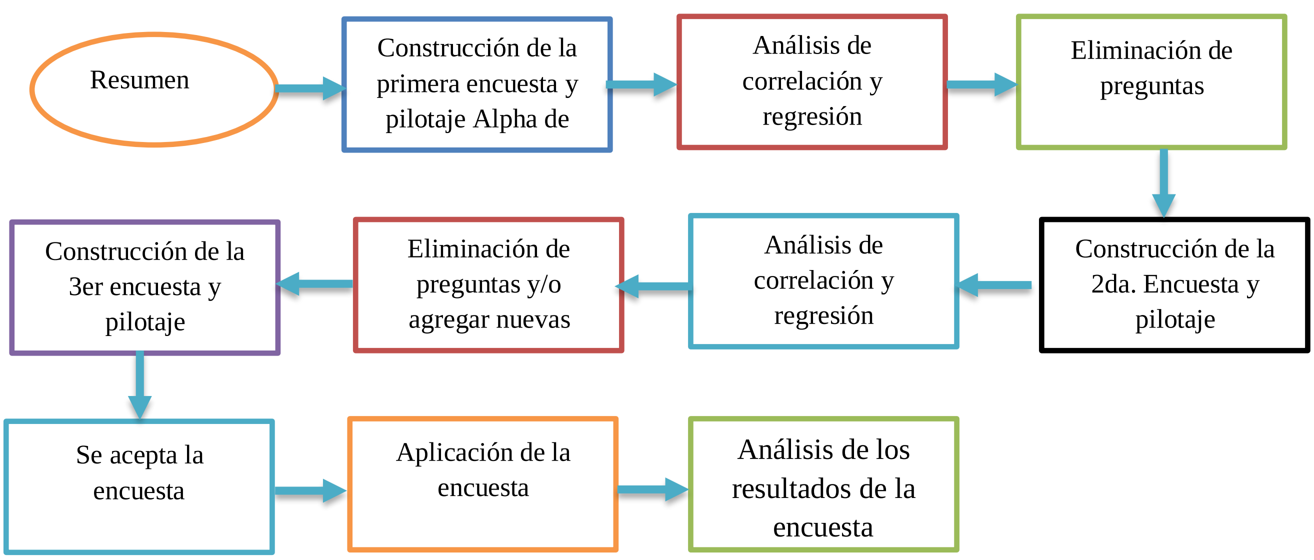
Small and medium-sized miscellaneous are a competitve industry. Efficient shelving allocation is critical to gaining a competitive advantage. They can increase their profits and reduce costs with a proper space management and product display. Information on the economically active society preferences at Celaya city, Guanajuato, was obtained through a survey, where a confirmatory factor analysis was carried out, internal consistency values were measured using Cronbach's Alpha. The relationship between variables was confirmed with correlation analysis and determination. The survey designe on a five-level Likert scale showed an adequate fit of the data based on a maximun likelihood test. The overall internal consistency was 0.973. The survey to measure shelving needs showed internal consistency and its five-correlated factor model was validated among respondents.



Validity, Reliability, Application

Abstract

Las pequeñas y medianas misceláneas son una industria competida. La asignación eficiente del espacio en los estantes es fundamental para obtener una ventaja competitiva. Pueden incrementar sus ganancias y reducir los costos con una gestión adecuada del espacio y la exhibición de los productos. Se obtuvo información de las preferencias de la sociedad económicamente activa de la Ciudad de Celaya, Guanajuato, mediante una encuesta, donde se realizó un análisis factorial confirmatorio, se midieron los valores de consistencia interna mediante Alfa de Cronbach. Se confirmaron la relación entre variables con análisis de correlación y determinación. La encuesta diseñada en una escala de Likert de cinco niveles mostró un ajuste adecuado de los datos basados en una prueba de máxima verosimilitud. La consistencia interna global fue de .973. La encuesta para medir las necesidades de acomodo mostró consistencia interna y su modelo de cinco factores correlacionados fue validado entre los encuestados.



Validez, Confiabilidad, aplicación

Introduction

The success of large commercial stores is due, among other things, through the extensive knowledge they have of their consumers. They know your throug likes, preferences, the time you prefer go to shopping, your favorite products, but above all they know your weaknesses. They apply this knowledge in strategies that help them to guarantee their sales, whether they develop advertising strategies, promotions, traffic building, etc.

Small and medium-sized commercial stores lack methods and strategies that provide them with information about consumer preferences when searching for the products they want to buy. The way they currently do this is through trial and error solutions, evaluating results based on experience. (Kateryna, Karina, Piotr, Marcin, & Artur, 2021).

The proposal of this research is to obtain primary information through a survey, which provides direct information on consumer opinions, giving more precision to that traditionally obtained.

The variables that stand out and are considered to determine the design of the survey are: assortment, arrangement, seasonal sales and promotions.

Development of headings and subheadings of the chapter with subsequent numbers

Small and medium-sized miscellaneous goods are relevant to the economies of the countries, not only because they contribute to the production and marketing processes, but also because of the large number of jobs they generate and their flexibility to adapt to new technologies. (economics, 2020)
According to a study reported in 2020 by T.MERC of the Secretary of Economy, they represent more than 97% of all businesses, employ more than half of the workforce in Mexico and contribute significantly to economic growth, with a proportion of Gross Domestic Product (GDP) that ranges from 20% to 50%. (economics, 2020)

The shelves space of small and medium-sized sundries is a limited and expensive resource, since a large number of products compete for limited display space. Therefore, shelf space allocation is a key activity to increase product sales and profits that requires a lot of accurate information. . (Kateryna, Karina, Piotr, Marcin, & Artur, 2021)

The allocation of spaces used or implemented by small and medium-sized miscellaneous stores depends on the needs of their commercial, financial and operational reality. Few strategies for obtaining information lack a correct analysis of the assortment variables, merchandise arrangement, seasonal purchasing preferences and promotions, which helps them have better control and management of their companies. (Kateryna, Karina, Piotr, Marcin, & Artur, 2021).

For small and medium-sized miscellaneous, space allocation is a decision problem; they lack reliable information collection tools that allow them to achieve the best result under various store operational restrictions.

The objective of this research is to design and validate a survey that identifies the best accommodation options for small and medium-sized miscellaneous.
A survey designed with the variables of assortment, arrangement, seasonal sales and promotions for small and medium-sized miscellaneous goods identifies the best arrangement options.

Small and medium-sized miscellaneous stores are the last contact with consumers, so good product distribution and good inventory management helps reduce economic losses due to shrinkage, which represents an impact on the internal economy of the countries.

Currently, small and medium-sized miscellaneous stores do not have a planimetry system that improves their method of arrangement, distribution and inventory management. The design of a measurement instrument appropriate to your needs will contribute to the collection of information for its construction.

What is its added value compared to other techniques?

It is common to use the opinion of experts to validate, this is a qualitative technique that is based on the opinion of people specialized in the topic or who have extensive experience in using or managing the topic being discussed. It has the advantage that information is obtained quickly, although it is not completely reliable. With this technique you cannot eliminate the tendency that may be generated in the opinion, that is, when expressing your point of view it is not necessarily impartial, it will be influenced by the beliefs and experiences of the person expressing it.

Besides another negative point of this technique is that the sample to be evaluated is very small, which makes its measurement difficult. Therefore, instruments that were only evaluated by experts may not be accurate at the time of their application and affect the final result, obtaining bias, data outside of normality, among others. To have greater accuracy in the results with this technique, it is necessary to use a second one to give quantitative support with statistics.

In a study by Hyett 2024, in the community of Victoria, Australia, for the plannig of sustainable rural systems, he show a method of obtaining information electronically base don an opinion survey that was sent to 40 experts, 20 patients and 7 caregivers. They obtained qualitative information. Later, they made a calculation of measures of central tendency based only on the count of the previous information. (Hyett, 2024)

One way to obtain this knowledge is by collecting information through measurement instruments. They are surveys with reliable information and susceptible to statistical analysis that allows determining the preferences and needs of consumers. (Malhotra, 2012)
Every questionnaire must meet three specific objectives:

Translate the necessary information into a set of specific questions that participants would answer.

Motivate and encourage the participant to answer the complete survey, reducing tedium and fatigue; language that is not complicated, easy to understand and has few questions should be used.
Minimize error and confusion by adapting questions in a format that is not confusing in its handwriting and design. (Malhotra, 2012)

The wording of the questions is based on the fundamental principles of information search according to (Kotler P., Marketing 5.0, 2021)

- Identify and locate the appropriate demand
- Select the appropriate channels in the market
- Create a profile of the client that identifies their generation and their drive
- Design customer service levels
- Identifies potential customer complaints and frustrations.

A structured survey is presented that is applied to a sample of a population, it is designed to obtain specific information. (Malhotra, 2012)

The instrument must be piloted on a representative sample of the segment chosen to apply the survey and then measured by a reliability method in order to be applied. (Rodríguez & Reguant, 2020)

The technique for applying the survey must be an interrogation applied to a certain number of individuals who are presented with a variety of questions regarding their behavior, intentions, attitudes, knowledge, motivations, demographic characteristics and lifestyle. (Malhotra, 2012)

Reliability has to do with the precision or consistency of measurement and is conceived as the consistency or stability of the measurements when the measurement process is repeated. There are different methods to estimate the reliability of an instrument, the most common methods are: test-retest coefficient, parallel forms or Cronbach's Alpha internal consistency. (Rodríguez & Reguant, 2020)

The test-retest coefficient or stability coefficient establishes the correlation between the responses that occur when applying the measurement instrument at two different times. The drawback that may arise is that when using the same instrument, errors generated by environmental and personal influences may occur. Another factor that reduces its effectiveness is that it is affected by the passage of time, the greater the time interval between one application and the other, the greater the probability of error. Because there are two applications, the cost increases, its effectiveness may be affected as it cannot be applied both times to the same person. To be accepted your result must be greater than 0.800. (Rodríguez & Reguant, 2020)

The coefficient of parallel forms or coefficient of equivalence takes into account the learning obtained by the people to whom the measuring instrument or test is administered initially and after a period of time after the first administration, therefore, this coefficient It is calculated by applying a parallel form to the initial test. A form A is administered at an initial time, and an equivalent form B at the final time. Problems arise when the measurement instrument cannot be applied to the same group of people or when access to the same people is difficult and expensive. To be accepted your result must be greater than .800. (Rodríguez & Reguant, 2020)

Cronbach's Alpha coefficient or the split-half method consists of dividing the measurement instrument into two equivalent parts and comparing both results, or making a comparison of all items with each other. For your result to be accepted it must be greater than .800. (Rodríguez & Reguant, 2020)

The most recommended and the one used to measure the reliability of this measurement instrument due to its method, level of confidence and application is Cronbach's alpha.

Methodology

The survey is aimed at the economically active population at Celaya city, Guanajuato, made up of 262,642 inhabitants. (Celaya, 2022).

The type of personal survey was used, consisting of questioning individuals in mall, schools, parks, etc.

It was presented to the respondents in the following way: The questions are based on the variables of assortment, seasonal sales, accommodation and promotions, they were adjusted in their writing, so that they could be understood by the respondents. The answers are designed on a Likert scale of classification by ITEM.

The survey was piloted on a sample of 124 people, validated based on Cronbach's Alpha coefficient with the help of the SPSS software, where according to (Malhotra, 2012) it is the average of two possible coefficients of division by halves that result from the different ways of divide the survey items. This coefficient varies between 0 and 1. A value less than 0.6 is unsatisfactory, because the closer it is to 1, the more consistent the ITEMS will be with each other and vice versa.
It develops giving the meaning of the variables in linear writing and it is important to compare the criteria used.

Results

Three consecutive pilots were applied in a period of one month because in the first one an acceptable reliability index was not obtained, it was corrected and applied again, a third improved one was designed with the experience obtained from the previous ones, obtaining the desirable indicators. For your application.

The first pilot was designed with 19 items, it was applied to 124 elements, obtaining Cronbach's alpha .329, which is not acceptable.

Subsequently, a correlation analysis was carried out to evaluate the ITEMS where those with negative or very low contributions must be reviewed in their position and wording; if they cannot be corrected, they must be eliminated.

The correlation has a variation range from -1 to 1, if the correlation is negative it means that, as the dependent variable growing, the independent variables decrease. When it is in a positive sign, if one variable growing, the other will also do so, therefore, values close to 1 mean that the variables have a strong relationship. (Hernández, Tapia, & Hernández, 2019).

Correlations measure how the variables or the orders of the ranges are related and this allows detecting atypical values outside the normality of the data that can generate unrelated results in the future and the intention of the research is lost. (Keith O'Brien, 2024)

From Person's correlation analysis, it was concluded that: questions 6 (-0.78), 9 (-0.01), 14 (-0.096) had a negative contribution and question 11 had a very low contribution, indicating that there is no relationship with the others. items and may be the factor of the low reliability index, therefore, they must be eliminated because they do not provide information to the questionnaire, leaving 16 items.

In the second pilot, it was applied to the measurement scale resulting from the elimination of questions, leaving a survey made up of 16 items, it was applied to a sample of 124 people where the result was updated to a Cronbach's Alpha of .730, which indicates that the decision to eliminate questions 6, 9,11,14 based on the correlation analysis was correct.

With the intention of obtaining more information on external factors other than the product that discourage consumers when making their purchases, 4 questions were added. With the update of the survey, the piloting was applied again to 124 people. The new questions contributed to better understanding, raising the results of the total Cronbach's Alpha reliability analysis by .973.

Box 1

Table 1

Pilot results of the survey

First piloting sample N=124	**Sample N=124 % of elements evaluated 100**	**Cronbach´s Alpha .329**
Second piloting sample N=124	Sample N=124 Excluded 1 % of elements evaluated 99.2	Cronbach´s Alpha .730
Third piloting sample N=124	Sample N=124 Excluded 1 % of elements evaluated 99.2	Cronbach´s Alpha .973

Autor/own elaboration

Additionally, in order to confirm the design of the survey, an R analysis or simple linear regression analysis was applied, measuring the quantifiable relationship between a dependent variable and a set of independent variables to see how well the model works with a range between 0 and 1, the closer it is to 1, the greater the relationship. (Hernández, Tapia, & Hernández, 2019).

The results were as follows as shown in table 2

Box 2

Table 2

Results of the linear regression analysis applied to the survey

Model	R	R square	R square Adjusted	Estándar error of the estimate
1	.912	.831	.750	.240

Author/own elaboration

The result of R is .912, very close to 1; R measures the coefficient of determination, which varies between 0 and 1, and indicates the portion of the total variation of the dependent variables that is explained by the variation in the independent variable (Malhotra, 2012). .831 was obtained, which explains that it is an adequate model.

Adjusted R is .750, indicating that the data is still in close function with R . (Minitab, 2022). The standard error of the estimate is .240, being below the square mean, which indicates that the questions and answers are understood clearly and precisely by the respondents in their writing , giving precision to the survey. (Malhotra, 2012).

The data obtained from the Cronbach's Alpha reliability analysis of the third pilot of the survey applied to a representative sample of 124 people is .973. It is above the desirable parameters of .800. Validity and confidence are observed in its construction, therefore, the questionnaire is accepted for application.

Application

The inclusion criteria are based on the economically active society of Celaya, Guanajuato. The survey was presented as follows: the questions are based on the variables of assortment, seasonal sales and promotions. They were adjusted in their writing, so that they could be understood by the respondents. The answers are designed on a Likert scale according to item.To calculate the sample size, the following equation was applied:

$$n = \frac{(N)(Z^2)}{(e^2(N-1))+Z^2} \qquad (1)$$

where,

n=sample size
Z= corresponds to the value of the 95% confidence level interval, 1.96
E= sampling error of 5%

N=Size of study population 262642
From data taken from (Celaya, 2022)
n=262642*(1.96)2/(0.05)2 (262641) + 3.8416
n= 1008965.5072/660.4441
n=1527.70

Rounding up to the nearest integer, the number of surveys to apply is 1528. Once the measuring instrument was approved, it was applied. 1,528 people were surveyed, they were subsequently coded with the intention of classifying those that were answered incorrectly or had errors, leaving 1,446 for analysis. The results are as follows:

The factor loadings, the error, the mean, the correlation of the items and the model fit were calculated. Additionally, the mean and standard deviation were calculated in order to evaluate the factor scores and the total score of the survey.

Descriptive statistics were calculated using IBM SPSS Statistics software version 29.0.0.0
The correlation of the Spearman ranks of congruence and agreement between the variables was calculated.

Box 3

Table 3

Statistic analysis

	Cuestion 1	Cuestion 2	Cuestion 3	Cuestion 4	Cuestion 5	Cuestion 6	Cuestion 7	Cuestion 8	Cuestion 9	Cuestion 10	Cuestion 11	Cuestion 12	Cuestion 13	Cuestion 14	Cuestion 15
Average	2.4827	3.4281	3.0574	2.0145	2.1030	2.3204	2.9322	2.7420	3.0387	2.7116	1.9675	2.6286	2.3209	2.6017	3.0698
Median	2.0000	4.0000	3.0000	2.0000	2.0000	2.0000	3.0000	3.0000	3.0000	3.0000	1.0000	2.0000	2.0000	3.0000	3.0000
Std.Dev	1.22745	.95142	1.2834	1.23465	1.11288	1.21756	1.28751	1.42075	1.59450	1.19246	1.50696	1.04420	.97267	1.22165	1.23219
variance	1.507	.905	1.647	1.524	1.239	1.482	1.658	2.019	2.542	1.422	2.271	1.090	.946	1.492	1.518
N Válid	1446	1446	1446	1446	1446	1445	1446	1446	1446	1446	1446	1446	1446	1446	1446
N lost						1									

Conclusions

- The age range that most visits local stores is between 26 and 50 years old.
- Their education is high school and university level.
- Go to the local store once a day.
- Spend an average range of 51 to 200 pesos on each purchase.
- Purchases on average a range of 1 to 10 products.
- The time spent inside the store range from 5 to 20 minutes.
- You are discouraged from entering the establishment if there are many people and/or it is dirty.
- If the delivery people are arranging merchandise, they prefer not to enter and express that it bothers them because they feel that they are not giving them their space.
- They like the attention they receive to be friendly, fast and efficient.
- The products that are difficult for them to find are washing and cleaning products.
- They prefer to find groceries first.
- They consider that refrigerated products should be at the end of the establishment.
- They like and take advantage of the promotions of armed packages at a special price, discounts and 2X1 promotions.
- Seasonal products are considered by consumers to be important to find occasionally in the local store.

Order of importance of variables for the consumer.

8) If the delivery drivers are arranging merchandise in the store, are you?
9) How do you like to be served?
11) What products would you like to find first?
7) Of the following aspects, which discourages you from shopping at your local store?
3) How much money do you spend on average when shopping at the local store?
4) How many times do you go to the local store?
15) Is it important to you that the local store sells seasonal products?
1) Age
14) What type of promotions would you like to be offered?
6) How many time do you stay in the store from the moment you arrive until you are charged for your products?
10) What category products are you having difficulty finding?
5) How many products on average do you buy?
12) What products do you think should be at the end?
13) Do you take advantage of promotions?
2) Level of studies

Discussion

The information obtained will be used to design a mathematical optimization model that provides information on the best arrangement of merchandise for small and medium-sized miscellaneous.

Conclusions

The information obtained through a survey must be reliable, because the results of an investigation depend largely on it. This is where an adequate design of the survey becomes important, subsequently meeting the reliability objective of the pilot(s) as necessary.

For this research, having carried out three piloting of the survey, statistically analyzing each one, taking into account the experience obtained from each application for corrections, reduces the error and proves that there is consistency in its questions and answers. This results in obtaining reliable information that is reflected in the data obtained.

Declarations

Conflict of interests

The authors declare that they have no conflict of interest. They have no known competing financial interests or personal relationships that could have influenced this chapter.

Author contribution

Aguilar-Aguilar,Verónica: Contributed to the idea of the project, the method and the research technique.

Salvador-Hernández, González: Contributed to the review and supervision of the project.

Availability of data and materials

Available

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Cluster composition and regional resilience: The case of the U.S. in the Great Recession

Composición de clusters y resiliencia regional: el caso de Estados Unidos en la Gran Recesión

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Area: Social Sciences
Field: Economic Sciences
Discipline: Industrial Organization and public policy
Subdiscipline: Economic Concentration

Key Handbooks

This paper contributes to the discussion of industrial composition as a determinant of resilience by analyzing cluster composition. These findings come at a moment where policymakers are especially needed for regional resilience guidance. The COVID-19 crisis produced straggles in all regional economies around the world. The analysis contributes in particular to disentangling industrial composition as one of the main determinants for resilience. Existing literature has focused on variables like industrial specialization, industrial diversity, related variety, and unrelated variety. In this work, we analyze the industrial composition of clusters, which are groups of interconnected industries linked by externalities of various types. A cluster is a geographically proximate group of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by externalities of various types. Many regions worldwide have already implemented a cluster policy, and therefore, these findings contribute to improving a policy that they have already carried out. We find that the U.S. regions characterized by strong clusters and high innovation before the Great Recession present less vulnerability than the rest of the country in the years of this downturn. The common technological base makes it easier for the reallocation of skills, technology, and workers from one industry to the other, allowing the economy to adjust to the new conditions in the short run.

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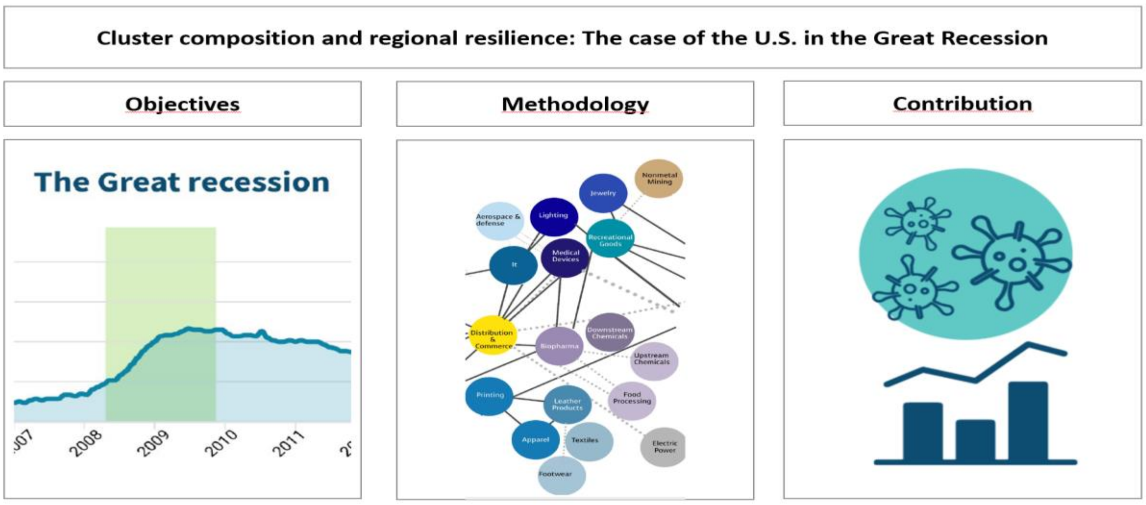
Abstract

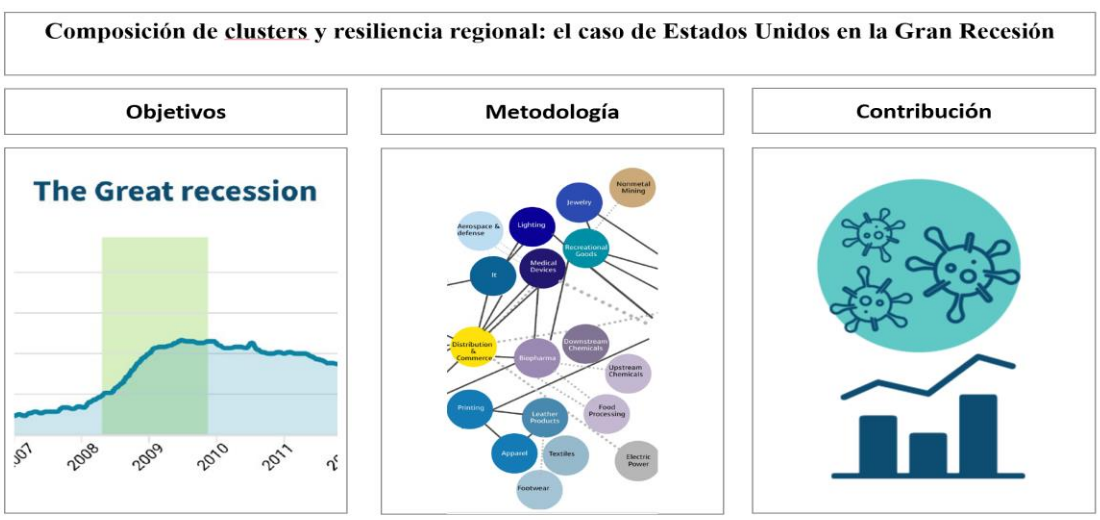
This paper contributes to the discussion of industrial composition as a determinant of resilience by analyzing cluster composition. A cluster is a geographically proximate group of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by externalities of various types. We describe the cluster composition via cluster specialization, a measure of cluster strength in the region, and cluster diversity, a measure of how diversified the presence of clusters is within the region. We find that the U.S. regions characterized by strong clusters and high innovation before the Great Recession present less vulnerability than the rest of the country in the years of this downturn. The common technological base makes it easier for the reallocation of skills, technology, and workers from one industry to the other, allowing the economy to adjust to the new conditions in the short run.



Resilience, Composition, Clusters

Abstract

Este artículo contribuye a la discusión sobre la composición industrial como determinante de la resiliencia regional, mediante el análisis de la composición de sus clusters. Un cluster es un grupo geográficamente próximo de empresas, proveedores, proveedores de servicios e instituciones asociadas interconectadas en un campo particular, vinculados por externalidades de varios tipos. Describimos la composición de los clusters en la región a través de su especialización, una medida de la fuerza de los cluster en la región, y la diversidad de los clusters, una medida de cuán diversificada está la presencia de los cluters dentro de la región. Encontramos que las regiones de Estados Unidos caracterizadas por fuertes clusters y alta innovación antes de la Gran Recesión presentan menos vulnerabilidad que el resto del país en los años de esta crisis.



Resiliencia, Composición, Clusters

Introduction

Resilience has become one of the most crucial topics in regional literature. The interest in this topic gained a special momentum after the Great Recession, when a heterogeneous economic recovery was observed among regions. This downturn made it evident that regions have different capacities to overcome economic shocks, and it is necessary to find the mechanisms that explain such a process (Martin and Sunley, 2015). Recently, the enthusiasm for this topic has gained a higher proportion with the COVID-19 crisis (Turgel and Chernova, 2024). Regions around the world have been seriously affected by the consequences that this pandemic has had on economic activity. More than ever, it is necessary to figure out the mechanisms that increase the regional ability to overcome economic shocks.

Literature on this topic presents three main definitions of resilience. Firstly, the ecological approach, which assumes that the regional economy will reach a new steady–state while maintaining its structure, identity or function (Holling, 1973; Reggiani et al., 2002). Secondly, from the engineering perspective, resilience is the region's capacity to return to a persistent steady-state equilibrium after a shock (Fingleton et al., 2012; Pimm, 1984; Rose, 2004). Finally, the evolutionary approach defines resilience as the ability to adapt in the short run or to develop new growth paths in the long run (Martin, 2012; Boschma, 2015). For this last definition, we must consider resilience as a process of stages, as Martin et al. (2016) describe: risk, resistance, reorientation, and recoverability.

In terms of the evolutionary definition, the resistance and recoverability phases are of particular interest because it is in these stages that adaptation take place in the short run and new growth paths take place, respectively. Literature related to the evolutionary definition deems industrial composition as one of the main determinants of a region's capacity to react positively to economic shocks (Boschma, 2015; Breathnach et al., 2015; Martin and Sunley, 2015; Eraydin, 2016; Nyström, 2018; Cainelli et al., 2019).

The discussion on industrial composition goes around the issue of whether industrial specialization (when few sectors account for a relatively large share of the region's GDP or employment) or industrial diversity (each of a wide range of industries accounts for a relatively small share of it) enhance regional resilience (Martin and Sunley, 2015). On one hand, regions specialized in highly productive activities have been found to be more resilient to recessions (DiCaro, 2015) because specialization is associated with productivity growth (Van Oort et al., 2017). However, if the economic shock affects particularly the industries in which the regions are specialized, the sectoral linkages and interrelatedness among them may increase the diffusion of the shock from one sector to the rest. In this sense, Brown and Green- baum (2017) find that more concentrated industry structures face a greater risk of economic growth subsequent to experiencing economic shocks. On the other hand, diversity can benefit regional resilience in the short and long term. In the short term, industrial diversity can spread the risk when a specific sector is affected by an economic shock (Boschma, 2015; Brown and Greenbaum, 2017; Crescenzi et al., 2016).

In this line, DiCaro (2015) provides evidence that the most resilient Italian regions have the highest level of industrial diversification. In the long term, sectoral heterogeneity generates externalities à la Jacobs (1961) that influence the regional capacity for adaptive resilience (Martin, 2012; Martin and Sunley, 2015). In other words, knowledge spillovers between different industries create innovation that benefits resilience.

On the issue of diversification, one step forward is the one given by Frenken et al. (2007), who consider that a key point is the degree of diversification or variety. They define "related variety" as the presence of a variety of industries within a region that are cognitively related, and "unrelated variety" as the existence of a variety of industries that do not share complementary competencies. In this sense, the question is which kind of diversity has a higher impact on resilience: a group of diversified industries with certain cognitive.

Proximity between them, or a group without any proximity. According to some empirical works, these concepts are determinants of regional resilience (Holm and Østergaard, 2015; Sedita et al., 2017; Cainelli et al., 2019).

This paper contributes to the discussion of industrial composition as a determinant of resilience by analyzing cluster composition. A cluster is a geographically proximate group of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by externalities of various types (Porter, 2012). For instance, the automotive cluster is composed of 26 industries like motor vehicle body manufacturing, light truck and utility manufacturing, gasoline engine manufacturing, etc.

Consequently, clusters represent an aggregate level to organize and analyze the industries in a region. Recent evidence shows that cluster presence in a region matters for economic performance (Ketels and Protsiv, 2021). In this sense, Dueñas and Campi (2024) find evidence about the clusters' role in Colombian regions' regional resilience during the COVID-19 crisis. This finding leads to the issue of the role of clusters' presence in a region on regional resilience. Reminiscent of the industry level analysis, we question whether it is cluster specialization or cluster diversity that matters for resilience.

To be more precise, we refer to "cluster diversity" as the presence of many clusters similar in size, which implies the region is not only dominated by a few clusters. The cognitive proximity among the industries inside a cluster (related variety) is evident, but this relationship is weak between clusters. However, it does not imply that they never collaborate. Clusters can work together to create revolutionary technologies, but the lack of cognitive proximity complicates this process making it risky and implying high switching cost. This concept resembles the one driving the innovation process in industries characterized by unrelated variety. Therefore, we proximate a high degree of cluster diversity with the concept of unrelated variety.

Similarly, we refer to "cluster specialization" as the strength of the related industries inside a cluster, not the specialization of a narrowly defined single industry. Such strength can be proxied by quantifying how concentrated that cluster is in the region as compared to the nation. Since industries inside a cluster are connected by linkages of skilled workers, supply, and technology, these factors imply a cognitive proximity among them, facilitating the creation of new processes and new products. In this sense, cluster strength would be conceptually similar to the notion of "related variety" developed by Frenken et al. (2007).

Given the similitude between these concepts, we formulate our hypotheses for clusters following the evidence for related and unrelated variety on resilience. Evidence shows that related and unrelated variety have different impacts on resilience according to the knowledge-based in the region (Sedita et al., 2017). Therefore, we consider this matter to set the following six hypotheses that we describe in detail in the next section: 1) Cluster specialization (related variety) is positively related to resilience in regions that show a high level of innovation; 2) Cluster specialization (related variety) is negatively related to resilience in regions that show a low level of innovation; 3) Cluster diversity (unrelated variety) is positively related to resilience in regions that show a low level of innovation; 4) Cluster diversity (unrelated variety) is negatively related to resilience in regions that show a high level of innovation; 5) Cluster specialization is related to resilience during the resistance stage, 6) Cluster diversity is related to resilience along the recoverability stage.

The paper is organized as follows. The next section reviews the literature associated with the impact of related and unrelated variety on resilience, which upholds our hypotheses. Methodology section explains the model to test our hypotheses. Data description section describes the implemented data, the computation of the main variables, and presents their descriptive statistics. Result section shows the main findings and finally, the conclusion presents the policy implications of the findings.

Literature Review

As we point out in the introduction, our hypotheses are based on the empirical evidence for related and unrelated variety. Therefore, this section reviews the evidence, analysing its impact on resilience. Related variety refers to a variety of industries within a region that are cognitively related. Their relatively diversified structure allows them to share, modify and recombine ideas to develop new products and services. Boschma (2015) claimed that related variety benefits resilience by facilitating the adaptation and adaptability processes, which, according to the evolutionary perspective, are two components of resilience. The first one refers to changes within preconceived paths, while the second one is about developing new pathways.

Related variety guarantees adaptation because the local presence of a high number of related industries provides a supportive local environment. Additionally, it promotes adaptability because related variety is a crucial factor in developing new growth paths. Recently, Celebioglu and Brenner (2024) found evidence of a positive relationship between related variety and both resistance and recovery for German regions (municipal level) facing the Great Recession in 2008/2009. Giannakis et al. (2024) find evidence that supports the intersectoral linkages as essential actors in explaining regional resilience to economic shocks. Similarly, He et al. (2024) proclaim that regional resilience hinges on global connections and local networks. On the other hand, unrelated variety measures the extent to which a region is diversified in activities that share low cognitive proximity. Boschma (2015) argued that unrelated variety enhances adaptability because it increases the potential to make new recombinations that lead to new growth paths.

Some studies provide empirical evidence for the Boschma assumption. According to Holm and Østergaard (2015) related variety influenced the resilience of the information and communication technology (ICT) sector in Denmark, which had previously been shocked by the dot.com bubble and the economic recession in 2000-2001. The diversity within the ICT sector creates a greater variety in the knowledge base and thus a greater source of cross-subsector knowledge spillovers and an opportunity for the emergence of new activities, leading to higher resilience. Sedita et al. (2017) found that after the Great Recession in Italy, the impact of related and unrelated variety differs according to the region's knowledge base.

They differentiate three knowledge bases: analytical (which requires scientific knowledge to generate radical innovation), synthetic (innovation that depends on new combinations of existing knowledge), and symbolic (more related to design elements in in- novation). Their results show that related variety enhances regional resilience capacity when it is complemented with analytical knowledge. Since this kind of knowledge concerns a very specialized group of industries, they benefit more from higher cognitive proximity (related variety). Meanwhile, unrelated, more than related variety, benefits from the impact of synthetic knowledge on resilience. This kind of knowledge is required for a larger number of industries rather than using other knowledge bases, so that a broader diversity among industries improves their performance. Finally, related variety supports a region's resilience capacity when linked to symbolic knowledge because there is a large relatedness across creative services. To sum up, the impact of related and unrelated variety depends on the region's knowledge based specialization.

We combine two arguments in related and unrelated variety literature to set up our hypotheses. Firstly, Boschma (2015) argues that a high related variety, which implies a high cognitive proximity, allows industries to generate changes in the short term to confront economic shocks. In other words, they generate the changes within the preconceived paths to increase the adaptability resilience process. Second Miguelez and Moreno (2018) find that high cognitive proximity among industries increases the general innovation in the region.

Therefore, a general high innovation level in the regions can be considered as a sign that related variety mechanism is working properly. In the opposite case, we expect that low innovation indicates the regions have not benefited from the related variety mechanism. Considering these arguments, we therefore put forward the following hypotheses:

- H1. Cluster specialization is positively related to resilience in regions that show a high level of innovation.
- H2. Cluster specialization is negatively related to resilience in regions that show a low level of innovation.

We follow similar arguments to set up hypothesis 3 and 4. Boschma (2015) assumes that unrelated variety increases resilience because it guarantees adaptability, that is, it increases the potential to make a new recombination of preexisting knowledge. In this line, Castaldi et al. (2015) and Miguelez and Moreno (2018) show that unrelated variety raises the likelihood of breakthrough innovations. This recombination between unrelated knowledge domains implies more risk and higher switching costs, making this breakthrough rare.

Therefore, the innovation arising when the knowledge base consists of unrelated technologies is less frequent than the innovation produced in a knowledge base consisting of related technologies. Considering these arguments, we therefore put forward the following hypotheses:

- H3. A presence of a diversity of Clusters in a region is positively related to resilience in regions that show a low level of innovation.
- H4. A presence of a diversity of Clusters in a region is negatively related to resilience in regions that show a high level of innovation.

A higher presence of related and unrelated variety should have a beneficial effect on regional resilience. Boschma (2015) points out that related variety (within each knowledge domain) secures adaptation, while unrelated variety (unrelated knowledge domains) guarantees adaptability. This may imply that related variety would affect resilience during the years of the downturn, and unrelated variety would have a more prolonged effect during the resilience stage. Similarly, Wagner and Deller (1998) expect that industrial specialization is beneficial for comparative advantages as a short-run growth strategy and diversity for long-run stability.

This information implies that we expect to observe a greater effect of cluster specialization in the moment of the economic shock and a more important role of cluster diversity for a more prolonged period. If we translate these effects to the resilience multi-phase process (Martin et al., 2016), we may think that cluster specialization would impact resilience during the resistance period and cluster diversity on the recoverability. Therefore, we may put forward the following hypotheses:

- H5. Cluster specialization is related to resilience during the resistance stage, that is, higher cluster specialization increase resilience.
- H6. Cluster diversity is related to resilience along the recoverability stage, that is, higher cluster diversity increase resilience.

Methodology

To test our hypothesis, an economic shock needs to be selected in which it demonstrates regional resilience. The world economy was hit by the COVID- 19 pandemic, which caused the most recent downturn. Unfortunately, not enough data was able to be collected to analyze the different stages of resilience due to it still being a recent event. It is necessary to have data some years after the economic shock has taken place. This is referred to as the recovery stage. 2019 is the year the most recent data was available for the cluster classification that this work follows. Another economic shock such as the Great Recession is an excellent selection apart from the COVID-19 downturn, mostly due to its prolonged downturn since the Great Depression of the 1930s (Grusky et al., 2011).

The U.S. economy's housing bubble s collapse and the excessive expansion of credit were rooted from the Great Recession. In December 2007, when this financial collapse commenced, growth didn't recover until the summer of 2009.

Employment was the most severely affected even with production beginning to recover. From the point of view of the labor market, it was considered a "Great Recession", which had losses of over 7.5 million jobs dating from May 2007 to October 2009 (Grusky et al., 2011). The severe negative effects of the Great Recession in the United States increased the unemployment rate by 5.7 percent between the pre-recession period and October 2009. Not only did it have an ill effect on the U.S. but it severely affected Europe more so than the end of World War II (Capello and Caragliu, 2016).

For these reasons, the Great Recession has been considered by researchers as the downturn for further research and evaluation for European and U.S. studies on regional resilience (Ringwood et al., 2019; Han and Goetz, 2015; Giannakis and Bruggeman, 2017; Ezcurra and Rios, 2019; Brakman et al., 2015; Arbolino and Di Caro, 2021; Cainelli et al., 2019; Davies, 2011; Rios and Gianmoena, 2020). The Delgado and Porter studies measured resilience with employment using evaluations from strong clusters and their resilience in the Great Recession. They developed the cluster classification which is the same classification used in the study above, which is a very relevant reference.

We refer to Delgado and Porter (2021) studies on the relationship between cluster presence and resilience in our empirical model, which evaluated the role of strong clusters in the resilience of regional industry employment to the Great Recession. The model by Delgado and Porter shows strong clusters using the cluster specialization variable, which they want to vary every year to test and see what precise years have cluster strengths allowed resilience. Our cluster presence variable is used in the same way as their cluster specialization variable as an interaction term with the years.

During this analysis, this term allows them to assess in what precise year the presence of strong clusters would benefit the regional clusters that would experience fairly higher employment growth. Interestingly, this positive effect was stronger at the beginning of 2008, the start of the Great Recession. On the other end of the spectrum, industries that were located in weak clusters were more vulnerable to the effects of the Great Recession. The authors discuss mitigation of the impact of recessions and the resulting uncertainty that increases with regions specialized in particular agglomeration economies.

Our analysis was inspired by the empirical model of Delgado and Porter (2021), as there were a lot of similarities in the results of the studies. In our analysis we looked at the effect of the clusters' strength on the resilience of state employment, while their evaluation was on the impact of clusters' strength on the resilience of regional industry employment. In both evaluations there was a focus on looking at a strong cluster presence on resilience but on contrasting aggregate levels, as theirs was on industrial employment and ours was on state employment. We followed the exact cluster classification for the U.S. industries as the authors did, and curiously enough, the cluster definition (Delgado et al., 2016) was designed by them for the U.S. Cluster Mapping Project.

According to the above mentioned, the results of our analysis will be of great interest to the policymakers involved in this project. As both studies examined the Great Recession as the economic shock to evaluate resilience, we decided to create a model of our analysis with the influence of the authors and include cluster strength and year as the interaction terms. The term helps us to see if the positive effect of strong clusters is stronger during the year of the Great Recession than in other years, as demonstrated in our work. If this is the case, the clusters strength has a lower severity on the effect of the economic shock at both industrial and state levels. Please refer to the following model:
We specify the following empirical model to test the relationship between cluster composition and resilience at the regional level:

$$\boldsymbol{Resiliencex_{rt} = \alpha + \beta_1 Year_t * In\big(Cluster\ Spec_{r,t-1}\big) + \beta_2 Year_t * In\big(Cluster\ diver_{r,t-1}\big) + In\ \rho_5 x_{rt} + \mu_r + \varepsilon_{rt}} \quad [1]$$

The dependent variable refers to the resilience in region *r* in time *t*. The main independent variables appear as an interaction term between the proxy for the cluster presence and each year. The coefficients of these interaction terms will allow us to observe how the effect of the cluster's composition changes over the period, especially in the years of the great recession. Furthermore, because the results of innovation activities are not immediately visible, we introduce these variables late in one period. *Cluster Spec*$_{r,t-1}$ de- scribes how specialized clusters are in region *r* for time *t-1*. Meanwhile, *Cluster diversity*$_{r,t-1}$ represents the heterogeneity in the set of clusters in region *r* for time t-1. In addition to the cluster composition, we include a vector of control variables $x_{r,t-1}$ as well as the term that accounts for unobserved or omitted heterogeneity across regions that do not vary over time μ_r and the time variant component of the error ε*rt*.

Data description

To measure our independent variables, we need to identify the clusters in a region. To accomplish this goal, we follow the cluster definition by Delgado et al. (2016). Their algorithm generates clusters based on occupation links, input-output links and inter-industry measures of colocation patterns of employment and the number of establishments. This methodology takes 778 (six-digit NAICS) U.S. industries and classifies them into 51 mutually exclusive clusters. This classification is implemented for the industries in each region. For instance, the automotive cluster, which is composed of 26 industries is present in each one of the U.S. states. Table 4.5 in the appendix section shows a full list of these clusters as well as the number of industries that each one includes.

Some relevant reasons justify following this cluster definition. First, we can compare the same cluster across the regions because the industries that integrate a cluster are always the same. Second, these cluster definitions have served as the foundation for other research works that evaluate regional prosperity (Ketels and Protsiv, 2021), innovation in clusters (Delgado, 2020), and cluster resilience (Delgado and Porter, 2021). Third, this cluster definition has been implemented not just in research, but also in the elaboration of some policies. It is the base data for the U.S. cluster mapping project, which aims to strengthen U.S. competitiveness by helping regions understand and improve their economic composition and performance. Finally, it is relevant to mention that this cluster definition only considers traded industries characterized for being geographically concentrated and producing goods and services sold across regions and countries (Delgado et al., 2016).

Until now, we have grouped industries into clusters, but we ignore the number of employees in them. We obtain the employment data for the 778 industries in the 51 U.S. states from the County Business Patterns (CBP), which is an annual series that provides subnational economic data by indus try. Once we know the number of employees in each industry, we can obtain the corresponding number at the cluster level and consequently, we can measure our independent variables. Employment data at the state level is also necessary to measure the dependent variable, which we obtained from the U.S. Bureau of Labor Statistics. All these information sources allow us to build panel data for the period 2005–2015.

Dependent variable

As mentioned in the literature (Martin and Sunley, 2015), there are different perspectives in approaching the concept of a resilience measure. The methods used to measure resilience can be classified into four main groups (Bristow and Healy, 2020). The first group, called the case study base, talks about simple descriptive data and interviews with key actors (Evans and Karecha, 2014; Cowell, 2013; Lyon, 2014). The second, the resilience indices group, ex- presses the comparative measures of resistance and recovery (Martin, 2012; Augustine et al., 2013). The third group, the statistical time series model, offers an approximate time for the impact of shock to dissipate. And lastly, the causal structural models, embed resilience in regional economic models to estimate where the economy would be in the absence of the downturn (Doran and Fingleton, 2018; Sensier et al., 2016). As you have just read, each method of measuring resilience has its advantages and disadvantages in its differing ranges of models.

The analysis objective is dependent on the convenience of using one of these measures. We need a measure that can be compared with the resilience indices group due to the desire to compare resilience among the states. There is no need for analysis of the case of a natural disaster in a specified region, a localized financial crisis, or the collapse of a major local employer. A common shock that impacted all the regions was the Great Recession. There is a need for a relative instead of an absolute measure of resilience to compare the behaviors of the different regions. It is very useful to cite the following indexes for the comparison of resilience in various regions, such as the UK (Lagravinese, 2015), the Italian regions (Cainelli et al. 2019), and lastly, the varying regions in Europe, Giannakis and Bruggeman (2017) and Rios and Gianmoena (2020), to study the various effects of the Great Recession. See the resilience index that follows:

$$\boldsymbol{Resilience_{rt}} = \frac{\left(\frac{E_{rt}-E_{rt-1}}{E_{rt-1}}\right)-\left(\frac{\sum_{r=1}^{S} E_{rt}-\sum_{r=1}^{S} E_{rt-1}}{\sum_{r=1}^{S} E_{rt-1}}\right)}{\frac{\sum_{r=1}^{S} E_{rt}-\sum_{r=1}^{S} E_{rt-1}}{\sum_{r=1}^{S} E_{rt-1}}} \qquad [2]$$

where E_r denotes employment in region *r* during period *t* and s denotes the total number of regions; where E_{rt} represents employment in region *r* in period *t*; s is the total number of regions. These equations are regional growth rates standardized by the growth rate in all other regions for the same year. By definition, these measures are centered at zero. We have three possible interpretations for this index: 1) $Resilience_{rt} > 0$ indicates that the region shows less vulnerability to an adverse shock compared with the national effect, which means the region is resilient; 2) $Resilience_{rt} < 0$ reveals that the region is more vulnerable than the nation, implying the region is not resilient; 3) $Resilience_{rt} = 0$ means there is no difference with the rest of the country.

Key Independent variables

To proxy the regional cluster specialization, we use a location quotient (LQ) representing how concentrated a particular cluster is in the region compared with the nation. Some previous studies proxy cluster specialization with LQ measures (Delgado et al., 2010, 2014), such as follows:

$$\textit{Cluster Location Quotient}_{c,r,t} = \frac{E_{c,r,t}/E_{r,t}}{E_{c,US,t}/E_{US,t}} \quad [3]$$

Indicators of cluster composition: (top) cluster specialization (average of cluster location quotient) across the U.S. regions; and (bottom) cluster diversity (extent to which employment is dispersed throughout clusters) across the U.S. regions.

Box 1

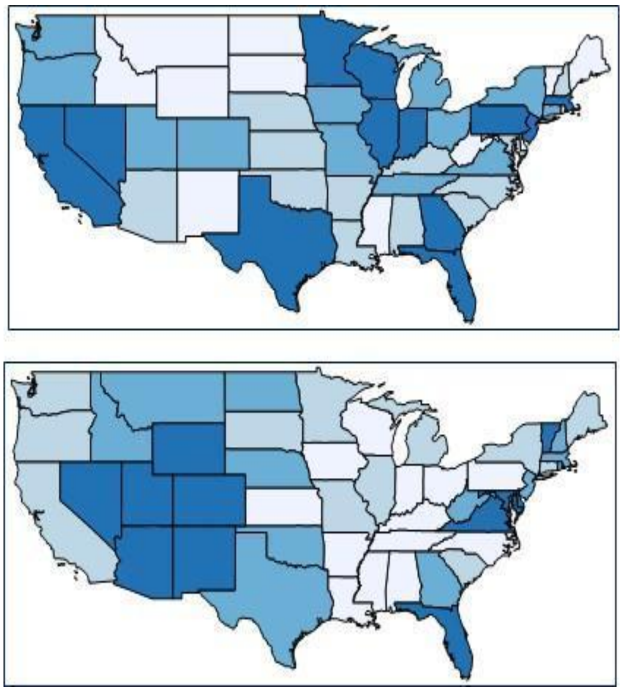


Figure 1

Indicators of cluster composition

Note: Colours refer to quartiles of the corresponding variables such that darker colours indicate higher values. For cluster diversity, higher value means less diversity.

Source: Own elaboration

Where c describes each cluster; r is the region; U.S. is the country. In order to know if the LQ of a specific cluster is high or low, we must compare it with the rest of the clusters. Once we get the LQ for each cluster in a region, their average represents the cluster specialization for that region. If this value is high, it means the region is accounted for by clusters that are highly concentrated in that region compared with the rest of the country. Some of the U.S. regions with the highest cluster specialization are California, Texas, Massachusetts, Florida, and Pennsylvania (figure 5, top).

We proxy cluster diversity based on measures of the Herfindahl index. Recent studies of regional resilience include this index to proxy the diversity of industries (Eraydin, 2016; Giannakis and Bruggeman, 2017). Similarly to these studies, we implement this index to measure the diversity of regional clusters. This index indicates the extent to which employment is dispersed throughout clusters.

$$\textit{Cluster Diversity}_{r,t} = \sum_{c=1}^{S} \left(\frac{E_{crt}}{E_{rt}}\right)^2 \quad [4]$$

Where E_{crt} is the employment in cluster *c* in the region r for the year *t*; E_{rt} is the total employment of clusters in region r for the year t; S refers to the total number of clusters. The closer to zero the value of this index, the higher the diversity within the clusters in the region.

For that reason, the U.S. states with the highest diversity are the brightest ones in figure 5 (bottom), like Indiana, Ohio, Tennessee, Alabama, and Kentucky. As we can see from this map, the regions with the highest diversity are concentrated in the western part of the country.

Results

We built a series of regression models with resilience as the dependent variable and cluster specialization and cluster diversity as the main independent variables. We controlled factors such as region and year fixed effects as well as the interaction term between region and year effects. The region fixed effects observe all region-specific factors beyond cluster composition, which were not specifically included in our model. Year fixed effects capture the differences across years driven by specific events. The interaction term, region-year fixed effects, controls for changes in resilience derived from region-specific factors each year. Tables 2 and 4 show the results of the estimation of the model by groups of regions with low or high innovation. The group of highly innovative regions is composed of those that register a higher number of patents than the national average. Otherwise, they are included in the group of regions with a low innovation level.

Table 1 shows the impact of cluster composition on resilience for the whole period 2006–2015. Results suggest that regions characterized by a high cluster diversity are more vulnerable to downturns than the rest of the country. However, cluster diversity turned into one of the resilience determinants when we ran the same model just for regions with low innovation activity (table 2), which is fully in line with hypothesis 3. The low cognitive proximity among the clusters makes the emergence of new technology less frequent, but when it does take place, such innovation is a breakthrough. On the other hand, when we run the model for regions with high innovation, cluster diversity has the same negative effect as in table 1, confirming hypothesis 4. Additionally, table 4.2 provides evidence for the cluster specialization variable, which is significant for regions with high innovation. Strong cluster specialization in the regions implies high cognitive proximity between their industries, leading them to the creation of paths in the short term and thus to their adaptation. The positive influence of cluster specialization on resilience supports hypothesis 1. These first tables demonstrate the necessity of differentiating regions by innovation intensities to capture the effect of the cluster composition variables.

Table 3 introduces the interaction term between the main independent variables and each year, which are necessary terms to examine the impact of cluster composition over the period. Results show that higher cluster specialization makes the regions more vulnerable in the Great Recession years (2008–2010). The coefficients corresponding to these years are the only significant ones throughout our period of analysis. However, like in the previous tables, we can observe how cluster composition variables change their effects when we obtain the results by innovation intensity. In table 4, columns that correspond to high innovation indicate that strong clusters contribute positively to overcoming economic shocks, supporting the argument for hypothesis 1. On the other hand, coefficients in columns for low innovation suggest that regions with strong clusters will be less resilient than the rest of the country, evidence that confirms our hypothesis 2. It is relevant to mention that coefficients in the Great Recession years increased their proportion two or five times compared with coefficients one year before. The magnitude of these coefficients confirms the relevant influence of cluster specialization on resilience. Nevertheless, the high proportion of these coefficients can work in both directions, making the regions more or less vulnerable according to their innovation intensity.

With respect to cluster diversity, almost all coefficients are significant throughout the period, supporting the impact of these variables in the long term.

However, similar to cluster specialization, this variable effect can benefit or harm resilience according to the regional innovation level. Columns that correspond to low innovation show clearly that high cluster diversity will in- crease resilience, supporting hypothesis 3. On the other hand, the corresponding columns for high innovation demonstrate that cluster diversity makes the regional recovery more vulnerable to an economic shock, confirming hypothesis 4.

So far, we have not commented on the effect of cluster composition in the short and long term. We can observe in Table 4.4 that cluster specialization coefficients are significant in 2008, the year when the Great Recession hit the economy. There are also other significant coefficients in 2010, one year after this downturn took place. We mentioned above that adaptation is the resilience stage that occurs in the years following the economic shock, which corresponds to the short-term reaction of the economy towards the downturn.

Therefore, we can conclude that cluster specialization impacts the adaptation stage of resilience, confirming hypothesis 5. Furthermore, cluster specialization coefficients show their highest values in the year in which the Great Recession started. In 2008, the coefficients are between two and five times higher than in the previous year, 2007. All these facts support the hypothesis that high cluster specialization impacts the adaptation process of resilience. On the other hand, coefficients for cluster diversity are significant in the long term. They are significant for almost every year analyzed (in our model). Furthermore, they reach their highest values after 2012, years considered a part of the adaptability period, when the economy develops new growth paths to recovery, confirming hypothesis 6. These results are consistent with the Boschma (2015) assumptions explained above.

Our results are in line with Sedita et al. (2017), and Boschma (2015), who were our primary references to set our hypotheses in the literature section. We agree with Sedita et al. (2017) in the sense that related and unrelated variety, equivalent to our measure of cluster specialization and cluster diversity, can be determinants of regional resilience depending on specific characteristics of the region. In their study, one such characteristic is the knowledge-base of the regions, which, in this study, is the innovation level. These two concepts are closely linked since the innovation processes of firms are strongly shaped by their specific knowledge base (Asheim and Coenen, 2005).

Therefore, our results support Sedita et al. (2017) findings, but on a more aggregate scale, they measure related and unrelated variety at the industry level, whereas, our work did so at the cluster level. Furthermore, our findings are consistent with Boschma (2015) in that related and unrelated variety is significant at different stages of the resilience process. Related variety, cluster specialization in our case, influences the resistance process, and the unrelated variety, cluster diversity in our case, contributes to the recoverability stage of resilience.

Box 2

Table 1

The role of regional cluster composition on resilience (all regions)

	All regions	**All regions**	**All regions**	**All regions**
Ln(Traded Cluster Specialization)$t-1$	-1.08	-0.136	-1.175	-0.662
Ln(Traded Cluster Diversity)$t-1$	0.701	0.567	-1.096*	-1.498**
Control variables	No	Yes	No	Yes
Year Fixed Effects	Yes	Yes	No	No
Region Fixed Effects	Yes	Yes	No	No
Year – Region Fixed Effects	No	No	Yes	Yes
R-squared	0.094	0.273	0.088	0.172
Obs.	500	500	500	500

***p < 0.01, **p < 0.05, *p < 0.1

Box 3

Table 2

The role of regional cluster composition on resilience (innovation level)

	Low innovation	**High innovation**	**Low innovation**	**High innovation**	**Low innovation**	**High innovation**	**Low innovation**	**High innovation**
Ln(Traded Cluster Specialization)$t-1$	-1.134	0.027	-0.696	2.14*	-1.487	0.075	-0.955	1.252
Ln(Traded Cluster Diversity)$t-1$	1.959**	-1.54*	1.585**	-1.248	-0.742	-1.896**	-1.013	-3.086***
Control variables	No	No	Yes	Yes	No	No	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	No	No	No	No
Region Fixed Effects	Yes	Yes	Yes	Yes	No	No	No	No
Year – Region Fixed Effects	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.153	0.064	0.295	0.335	0.074	0.144	0.158	0.268
Obs.	311	189	311	189	311	189	311	189

***p < 0.01, **p < 0.05, *p < 0.1

Box 4

Table 3

The role of regional cluster composition on resilience (all regions and interaction terms)

	All regions	**All regions**	**All regions**	**All regions**
Year2006*Ln(Traded Cluster Spec)$t-1$	-0.779	0.609	-2.131	-1.392
Year2007*Ln(Traded Cluster Spec)$t-1$	-1.269	0.184	-1.282	-0.874
Year2008*Ln(Traded Cluster Spec)$t-1$	-4.892***	-3.231***	-4.667***	-4.380***
Year2009*Ln(Traded Cluster Spec)$t-1$	-1.972*	-0.447	-1.945*	-1.874*
Year2010*Ln(Traded Cluster Spec)$t-1$	-2.383**	-1.495	-2.370**	-2.701***
Year2011*Ln(Traded Cluster Spec)$t-1$	-0.496	-0.062	-0.549	-1.281
Year2012*Ln(Traded Cluster Spec)$t-1$	-0.645	-0.831	-0.704	-1.825*
Year2013*Ln(Traded Cluster Spec)$t-1$	-0.46	-0.852	-0.492	-1.890*
Year2014*Ln(Traded Cluster Spec)$t-1$	-0.298	-0.898	-0.312	-1.903*
Year2015*Ln(Traded Cluster Spec)$t-1$	-0.403	-1.081	-0.463	-2.062*
Year2006*Ln(Traded Cluster Div)$t-1$	1.278**	1.509**	0.558	0.937
Year2007*Ln(Traded Cluster Div)$t-1$	0.547	0.993*	0.449	0.642
Year2008*Ln(Traded Cluster Div)$t-1$	-0.215	0.474	0.327	0.308
Year2009*Ln(Traded Cluster Div)$t-1$	0.453	1.015	0.489	0.455
Year2010*Ln(Traded Cluster Div)$t-1$	0.359	0.726	0.394	0.528
Year2011*Ln(Traded Cluster Div)$t-1$	0.649	0.806	0.476	0.814
Year2012*Ln(Traded Cluster Div)$t-1$	0.686	0.505	0.499	0.864
Year2013*Ln(Traded Cluster Div)$t-1$	0.941	0.648	0.505	0.972
Year2014*Ln(Traded Cluster Div)$t-1$	0.734	0.379	0.498	1.125*
Year2015*Ln(Traded Cluster Div)$t-1$	1.003	0.51	0.531	1.185*
Control variables	No	Yes	No	Yes
Year Fixed Effects	Yes	Yes	No	No
Region Fixed Effects	Yes	Yes	No	No
Year -Region Fixed Effects	No	No	Yes	Yes
R-squared	0.212	0.342	0.265	0.416
Obs.	500	500	500	500

***p < 0.01, **p < 0.05, *p < 0.1

Box 5

Table 4

The role of regional cluster composition on resilience (innovation level and interaction terms)

	Low innovation	High innovation	Low innovation	High innovation
Year2006*Ln(Traded Cluster Spec)$_{t-1}$	-0.741	0.728	-0.022	3.386**
Year2007*Ln(Traded Cluster Spec)$_{t-1}$	-1.427	1.061	-0.428	2.934*
Year2008*Ln(Traded Cluster Spec)$_{t-1}$	-6.688***	2.799	-5.528***	4.263**
Year2009*Ln(Traded Cluster Spec)$_{t-1}$	-2.137	1.366	-1.061	3.005
Year2010*Ln(Traded Cluster Spec)$_{t-1}$	-2.747**	1.648	-2.165*	2.633
Year2011*Ln(Traded Cluster Spec)$_{t-1}$	-0.542	1.094	-0.327	1.938
Year2012*Ln(Traded Cluster Spec)$_{t-1}$	-0.91	2.234	-1.149	2.909
Year2013*Ln(Traded Cluster Spec)$_{t-1}$	-0.775	2.182	-1.167	2.351
Year2014*Ln(Traded Cluster Spec)$_{t-1}$	-0.387	1.863	-1.141	2.117
Year2015*Ln(Traded Cluster Spec)$_{t-1}$	-0.539	1.59	-1.174	1.958
Year2006*Ln(Traded Cluster Div)$_{t-1}$	2.467***	-1.442	2.275***	-0.152
Year2007*Ln(Traded Cluster Div)$_{t-1}$	1.697**	-2.072	1.653**	-0.962
Year2008*Ln(Traded Cluster Div)$_{t-1}$	1.306	-3.449***	1.438*	-2.154*
Year2009*Ln(Traded Cluster Div)$_{t-1}$	1.819**	-2.757**	1.829**	-1.292
Year2010*Ln(Traded Cluster Div)$_{t-1}$	1.822**	-3.238**	1.605*	-2.163*
Year2011*Ln(Traded Cluster Div)$_{t-1}$	2.060**	-3.203**	1.608*	-2.252*
Year2012*Ln(Traded Cluster Div)$_{t-1}$	1.969**	-2.423	1.198	-1.293
Year2013*Ln(Traded Cluster Div)$_{t-1}$	2.314**	-2.458*	-1.325	1.964**
		1.425		
Year2014*Ln(Traded Cluster Div)$_{t-1}$	2.042**	-2.817**	1.216	-1.846
Year2015*Ln(Traded Cluster Div)$_{t-1}$	2.395**	-2.462*	1.297	-1.600
Control variables	No	No	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Year - Region Fixed Effects	No	No	No	No
R-squared	0.337	0.124	0.422	0.385
Obs.	311	189	311	189

Conclusions

The purpose of this paper is to contribute to current literature already available on regional resilience. The analysis contributes in particular to disentangling industrial composition as one of the main determinants for resilience.

Existing literature has focused on variables like industrial specialization, industrial diversity, related variety, and unrelated variety. In this work, we analyze the industrial composition of clusters, which are groups of interconnected industries linked by externalities of various types. We describe the cluster composition via cluster specialization, a measure of cluster strength in the region, and cluster diversity, a measure of how diversified the presence of clusters is within the region.

We assume that the impact of cluster specialization and cluster diversity on resilience is similar to the effect of related and unrelated variety. We make this assumption since the innovation process between these concepts is analogous. Similar to related variety, high cluster specialization implies strong cognitive proximity between the industries which facilitate the emergence of new technology to increase regional adaptation to economic shocks. Meanwhile, high cluster diversity implies low cognitive proximity among the clusters, which scarcely generates the emergence of new innovation.

However, when they collaborate, they produce breakthrough innovations that lead to new growth paths for resilience adaptability, resembling the process for unrelated variety. In our view, testing the cluster composition variables is like evaluating related and unrelated variety at a more aggregated level. To test our assumptions, we follow the cluster methodology by Delgado et al. (2016), which groups 775 U.S. industries into 51 clusters for each of the 51 states in 2005-2015. In general, we find that cluster specialization and cluster diversity resemble the effects that current literature has shown for related and unrelated variety on resilience.

We find that the U.S. regions characterized by strong clusters and high innovation before the Great Recession present less vulnerability than the rest of the country in the years of this downturn. The common technological base makes it easier for the reallocation of skills, technology, and workers from one industry to the other, allowing the economy to adjust to the new conditions in the short run. We observe the opposite effect when the region is identified with a low innovation level. Even when there is a great cluster specialization (related variety) in the region, a low innovation level indicates that short-term adjustment mechanisms do not work properly. This situation could be explained by a recent increment in the regional cluster specialization that requires a longer time to make the adaptation mechanisms visible.

We also find that U.S. regions with high cluster diversity and low innovation levels show higher adaptability in the years after the Great Recession. The lack of cognitive proximity among the clusters increases the collaboration cost, making the innovation that works between them less frequent. However, when this innovation process takes place, it results in breakthrough innovations that lead to the creation of new growth paths. Since the creation of these breakthrough innovations requires a long time, cluster diversity affects resilience in its adaptability period in the long run. On the other hand, when a high cluster diversity is combined with a high innovation level, the region is less resilient than the rest of the country. Even with high cluster diversity, the regions are more vulnerable to the downturn.

These findings are relevant to policy-makers. Firstly, many regions worldwide have already implemented a cluster policy, and therefore, these findings contribute to improving a policy that they have already carried out. Secondly, if policy-makers want to implement cluster policy as a tool to reinforce regional resilience, they must consider the innovation level in the region. Our results show that cluster specialization and cluster diversity can benefit or damage resilience depending on the innovation intensity in the region.

Thirdly, these findings come at a moment where policymakers are especially needed for regional resilience guidance. The COVID-19 crisis is producing straggles in all regional economies around the world. Recently, a considerable amount of funding has been made available to research projects that can provide clues in disentangling the resilience determinants. These findings contribute to the necessity of the cluster approach. However, it is still necessary to elaborate more on how clusters can contribute to resilience. Fourthly, the findings of this paper are of particular interest for the design of cluster policies in the U.S. We follow the cluster definition by Delgado et al. (2016), which is the same implemented for the U.S. cluster mapping project. This project is a platform that provides cluster information for business design, cluster projects, and cluster policies in the U.S. Our findings have a direct implication for these regions.

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence in this chapter.

Author contribution

Zárate-Mirón, Viviana Elizabeth: Contributed to the project idea, technique and witting the document.

Moreno-Serrano, Rosina: Contributed to the research method and document review.

Availability of data and materials

Data is not available since this information is part of a funded project.

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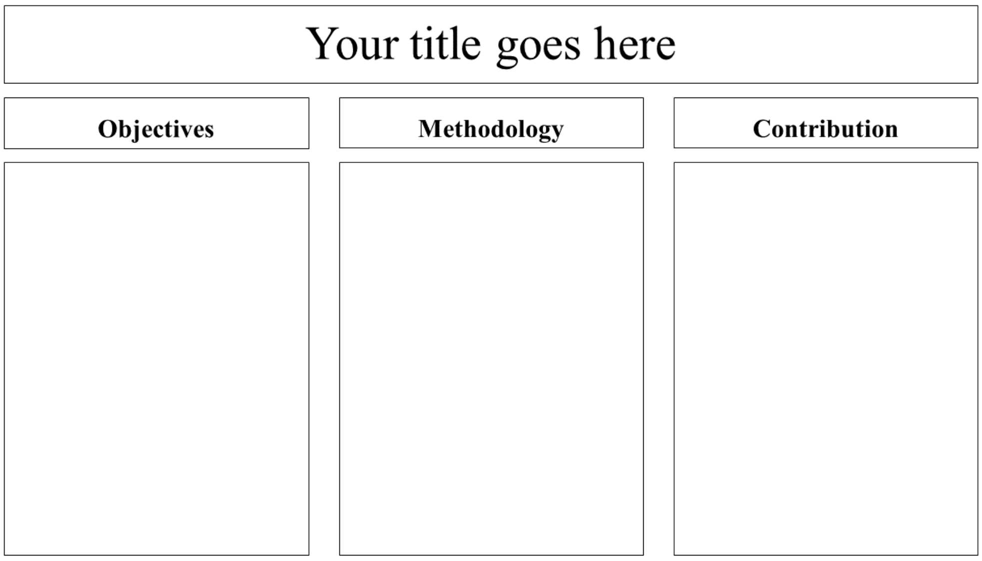

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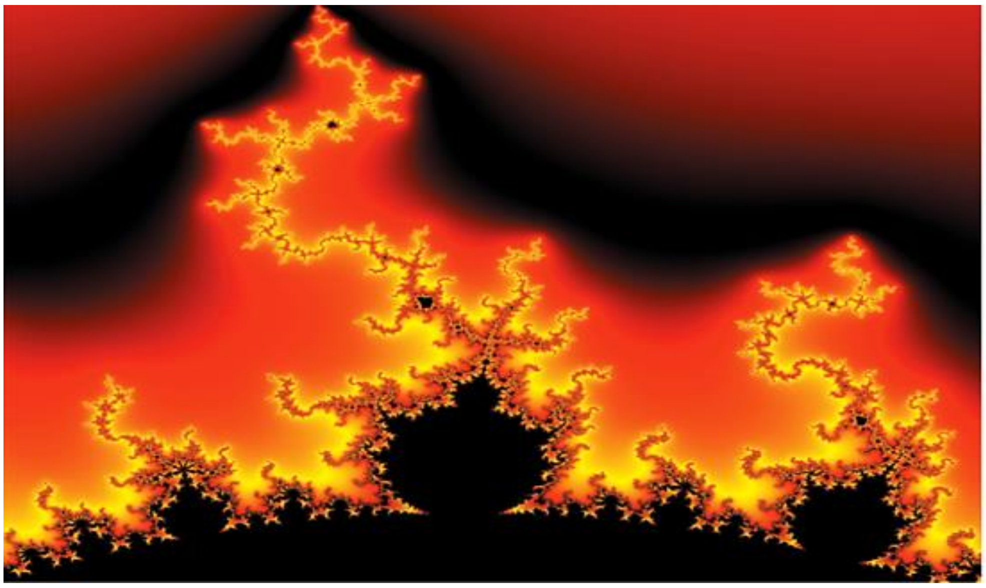

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