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Boulevard Belisario Domínguez, Km. 1081, Sin Número, Terán, Tuxtla Gutiérrez, Chiapas, México, 29050

E-mail: espacioimasd@unach.mx

www.espacioimasd.unach.mx

Operations management

Silvia E. Álvarez Arana • silvia.alvarez@unach.mx

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EDITOR'S LETTER

Dear university community, readers, and collaborators in general. Once again, we present this ordinary number, the second of 2024, and 37th throughout these almost twelve years. With this publication, we continue to adhere to our principles of periodicity and editorial quality. The content of this issue covers various disciplines of knowledge and culture, in addition to the fact that, with each of its materials, we communicate a fragment of the reality of Latin America, since our authors come from Ecuador and Mexico. From our country we have contributions from different entities such as Oaxaca, State of Mexico, Mexico City, and of course, Chiapas.

In the articles section, the materials presented are:

Automation of Drinking Water Collection Processes in the Rural Sectors of the Province of Chimborazo-Ecuador, using Free Software.
Prevalence of Cervicovaginitis in Pregnant Women at a Health Center in San Juan Cancuc, Chiapas, Mexico.
Community Savings Banks as an Alternative to Financing Rural Companies: A Theoretical Proposal.
Perceptual Analysis of the Communication Science Graduates from Universidad del Mar (UMAR) and their Professional Profile. Professional Competences.
Strengthening Digital Competencies: Recommendation of Practical Strategies for Teachers Using Neo LMS in Latin America.
Sense of Community in Rural Localities of Chiapas

Additionally, we include two academic documents: the first, "Is there "Desarrollo Sostenible" or "Desarrollo Sustentable" in the South of Mexico?", which clarifies the difference between these two concepts; and the second, "Two pages stored in Rubén Salazar Mallén's studio", which revolves around two documents that partially, but correctly, reflect the complex cultural and artistic context of Mexican literature of the last century.

Our contents reflect our multidisciplinary character, and we hope that you will continue to be part of this initiative of the Universidad Autónoma de Chiapas, which serves as a window for students and teachers to make their contributions to human knowledge known.

For the Awareness of the Need to Serve.

The editors
Espacio I+D, Innovación más Desarrollo journal.

"*Por la conciencia de la necesidad de servir*"
Universidad Autonoma de Chiapas

ARTICLES

Reception: **March 22, 2023** | Acceptance: **February 22, 2024**| Publication: **June 1, 2024**

Automation of Drinking Water Collection Processes in the Rural Sectors of the Province of Chimborazo-Ecuador, using Free Software

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Ángel Polivio Huilca Loyola[1]
ahuilca@sangabrielriobamba.edu.ec
ORCID: 0000-0003-4689-6757

Luis Fredy Sauce Tene[2]
lsauce@sangabrielriobamba.edu.ec
ORCID: 0009-0008-6514-1783

1 Instituto Tecnológico Superior San Gabriel Riobamba, Ecuador.

2 Tecnólogo, LS Technology-Soluciones informáticas, Chunchi, Ecuador.

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Huilca Loyola, Ángel P., & Sauce Tene, L. F. . Automatización de los procesos de cobro de agua potable en los sectores rurales de la Provincia de Chimborazo-Ecuador, utilizando Software Libre. *Espacio I+D, Innovación más Desarrollo, 13*(37). https://doi.org/10.31644/IMASD.37.2024.a01

— Abstract—

The automation of drinking water collection processes in the rural sectors of the province of Chimborazo, Ecuador, arises in response to the need to improve the efficiency and transparency of the water resources management in these areas. The objectives of the research were to replace manual processes with an automated system using open-source software, specifically by creating a website for water billing. The scope of the project involved developing the application, providing training to users, and establishing a water resource management that was managed in a democratic and participatory manner by a board made up of the community members of the area. The main results obtained were efficient and transparent management of water resources, as well as a significant improvement in access and quality of basic drinking water services in rural areas. Furthermore, the inclusion of villagers in project management allowed for more fair and equitable management of resources.

Keywords:

Drinking wáter; automation; free software; rural sectors.

Water, as a vital and limited resource in the last decade, has led all actors of society, politicians, social organizations, and the general population to cooperate to maintain this resource for the next generations (Torres, 2019). As Cheza (2014) points out, in the province of Chimborazo, Ecuador, rural sectors face challenges in the management and collection of drinking water, which has resulted in problems such as lack of transparency, errors in the measurement of consumption, and delays in customer service. The lack of automation of these processes has led to inefficient and error-prone management.

According to Gómez et al., (2021), in Latin America there are challenges in the access and administration of drinking water services in the rural sectors, some places do not have access, while in others there are deficiencies such as continuity. Despite these shortcomings, the population shows high levels of satisfaction with the services received, which raises questions about drinking water services and their administration. On the other hand, Moreno (2020) states that, in Colombia, to improve the management of drinking water in rural areas, indicators must be established, associated with the administration, measurement, and continuity of the service. In addition, it seeks to strengthen community management and the participation of all levels of the State to guarantee, in a sustainable way, the coverage and quality of these services throughout the country. Soto et al., (2016) state that the administration of drinking water in rural areas of Costa Rica presents challenges due to the conditions of the land, the distance between the houses, and the low profitability of the service. In these areas, Aqueduct Management Associations have emerged as a response to the difficulties faced by the state in providing the service. Although these have worked thanks to the efforts of farmers, the increase in population and productive activities causes risks of contamination and deterioration of water, climate change, and inadequate land uses affect the distribution of liquid, causing rationing. From the point of view of Vásconez (2018), the management of drinking water in rural areas, through the Rural Drinking Water Boards in Ecuador, is based on the use of existing social capital. These organizations arose to meet the need for water in rural households due to government limitations. The Organic Law of Water Resources in Ecuador establishes that water administration can be public, being the responsibility of local governments through public water companies. For Quindi et al., (2018), access to water in rural sectors for human consumption requires a sustainable and solid technical infrastructure. The information collected by the diagnostics and monitoring of drinking water systems must be in reference databases that allow cataloging and managing public water management within the community.

Although the above studies are relevant and contribute to the research, it is crucial to point out some deficiencies and areas for improvement

that could optimize the understanding and approach to the challenges of drinking water management in rural areas of Latin America. The levels of satisfaction of the population must have a more detailed evaluation of the quality of water services but above all the administration. In the case of Colombia, the proposal to establish indicators is positive. However, more specificity is needed on how indicators would be implemented and managed. The management of drinking water in rural areas of Costa Rica presents challenges, such as the profitability of the service and geography, so further exploration of solutions is needed, especially for the administration. None of the studies examined addressed automation processes for water administration or collection in rural areas, none of them focusing on the use of automation technologies to improve the efficiency and transparency of management and collection processes.

This study focuses on the automation of drinking water collection processes in rural areas of the Province of Chimborazo, Ecuador, using free software. This research collaborates with the field of study of drinking water management in rural areas and also proposes a practical and technological solution to improve the management of vital resources in rural areas. The implementation of an automated drinking water collection system using free software can serve as a replicable and scalable model to solve specific administration and billing problems in rural communities in Latin America.

The article is structured as follows: the introduction presents a review of the existing literature on drinking water management in rural areas, highlighting the problems and solutions that have been found in previous research. Subsequently, the methodological framework was used to develop and implement the automation system. Then, the results and discussion of the implementation of the system that include improvements in the efficiency and transparency of the collection processes. Finally, the conclusions where suggestions for future research and practical applications of drinking water management in rural areas are given.

MATERIALS AND METHODS

Location of the study area

The research was carried out in the Tolte community of the Pistishi Parish, belonging to the Alausí canton, province of Chimborazo, Ecuador.

Methodology

To develop the system, two proposals were processed: a preliminary one, in which a process of gathering information was carried out, which started from a theoretical, conceptual, and legal level, with a review of bibliographic

sources in e Scielo, Scopus, and Latindex. Authors such as Gil et al., (2014) and Moreno (2020) stand out, who specify, from a judicial point of view, the specific legislation on the collection of drinking water in rural sectors that may vary according to the region. Generally speaking, however, there are likely to be laws and regulations that establish the legal framework for the provision of drinking water services in rural areas, including issues such as technological automation, water resource management, land ownership, and use, user rights, fee setting, and conflict resolution. In addition, the creation of public or private entities in charge of providing these services and ensuring compliance with established regulations may be required. According to Cabrera and Mardones (2015), the automation of drinking water collection processes can improve the efficiency, transparency, and accessibility of water services in rural areas. However, it is important to note that results may vary depending on the region and the specific circumstances of each community. For Cano and Flores (2021), the design of automation and control systems for water purification systems is presented as a solution to improve the efficiency and quality of water distribution in rural areas. These systems can be installed in a variety of infrastructures at a reasonable price. On the other hand, Escuintla and Domínguez (2020) mention that the automation of the administrative processes of drinking water associations in El Salvador has been fundamental to improving efficiency and reducing costs. Automation has reduced human errors, increased the speed of task execution, and provided timely information for more efficient water resource management. According to these successful experiences described above, where the automation of the administrative processes of drinking water associations has resulted in greater efficiency and cost reduction, they support the importance of automation in water resource management in rural settings. Therefore, based on previous research, two main variables were considered in this study: automation of processes and accessibility of services. Process automation refers to the implementation of systems and technologies that automatically perform tasks related to the collection and management of drinking water services. On the other hand, the accessibility of services refers to the ease with which users can access and use the website, including aspects such as availability, affordability, and quality of service. As for the methodology, the Unified Process, proposed by García and García (2019) for the development of the website, will be used. The Unified Process is an iterative and incremental approach that adapts well to projects where the requirements are not completely defined at the beginning and can evolve, in which the research base begins in the Conception phase, where the current management and the obtaining of basic operational information is evaluated, and then begins with the Elaboration of the collection system, its construction, and transition. According to Zumba and

León (2018), these processes allow systems to be developed quickly. For the programming, we use the PHP language through Laravel as a Framework, and MySQL as a database manager, both the methodology and the tools will allow greater flexibility to adapt the system to the specific needs of users and the context of the Province of Chimborazo, Ecuador.

To complement the research, surveys were applied to 70 users, who have a drinking water connection and who are part of the organization "Water Board for Human Consumption", which is a non-legalized association that depends on SENAGUA (National Water Secretariat), a state company of the Water Resource Administration in Ecuador. The objective of the survey was to know how the payment process is for consumption, depending on whether the value increases or decreases, whether payment receipts are delivered or not, and how the record of their payments is kept. Since the calculation of the water service fee is according to a value approved by the board and depends directly on the readings of the meters installed in the home of each partner who has previously requested drinking water service, the data obtained were as follows:

Table 1
Survey Data

Question	Answer
How often do you get drinking water service in your home?	• Daily (60%) • Weekly (15%) • Monthly (5%) • Occasionally (2 0%)
How would you rate the quality of the drinking water service you receive?	• Excellent (15%) • Good (45%) • Regular (30%) • Poor (10%)
Do you receive a payment receipt for drinking water service?	• Yes (70%) • No (30%)
How is the drinking water bill calculated? Is it based on the consumption recorded by a meter installed in your home?	• Based on consumption recorded by the meter (85%) • Not based on consumption recorded by meter (15%)
Do you consider the payment process for drinking water to be transparent?	• Yes (50%) • No (30%) • Not sure (20%)
How do you keep track of your payments for drinking water service?	• With payment receipts (80%) • With other records (20%)
Have you experienced any unexpected increase or decrease in the value of your drinking water bill?	• Yes (40%) • No (60%)
How do you evaluate the communication and coordination with the Water for Human Consumption Board about the collection for the drinking water service?	• Excellent (10%) • Good (50%) • Regular (30%) • Poor (10%)
Do you think the Water Board should implement an automated system for the collection of drinking water services?	• Yes (60%) • No (30%) • Not sure (10%)

RESULTS AND DISCUSSION

In the development and implementation of the Tolte community's drinking water collection website, the Initiation, Elaboration, Construction, and Transition stages were established.

Beginning Stage

For this stage, information was collected on the current process of collecting drinking water, including the number of users, the amount of water supplied, operating costs, and other relevant details. Once the data was obtained, the problems in the collection of drinking water were identified. Are there users who are not paying their water bills? Is there a low level of fundraising? Is the manual collection system difficult for collectors?, How is each partner's information handled? Can sanctions be implemented for users who do not pay? The rates were evaluated to ensure that they were fair and reasonable. Users' ability to pay was considered. This stage resulted in an overview and list of use cases such as System Authentication, Customer Management, Meter Management, Payment Management, User Management, Report Generator, and Reading Taking.

Development Phase

The design of interfaces allows you to have an idea of how navigation is intended to be within the page of the informative site, this can be structured with multimedia content that contributes to the aesthetic presentation of the website, in this way, you have a general idea of how the website of the Drinking Water Management Board will be composed. The elements to consider are:

- **Logo**. The image or name of the Board of Directors was placed, a space that serves as identification and exposure of the company on the website.
- **Menu**. It is an important navigation tool that allows users to quickly find and access the different sections of the website. A good menu can also improve usability and user experience by making information easier to find and accessible.
- **Informative Content**. All the elements of the site are arranged within this section; modules, contents, and images. This section is adaptable to all browsers and devices that control the collection system of the administrative board.
- **Content**. The content on the Drinking Water Board Collections page is meaningful because it contains what users are looking for

when they visit the page. Whether they're looking for information or the ability to take a specific action (like registering or signing up for updates), the content on the website was designed to meet those needs.

- **Page footer**. The footer is the section of the webpage at the bottom. It is an important section that contains valuable information of interest to the Management Board such as Contact Information, Important Links, Copyright Attribution, Legal Notices, Social Media, and Additional Information.

Based on the above, the main page is established according to Figure 1.

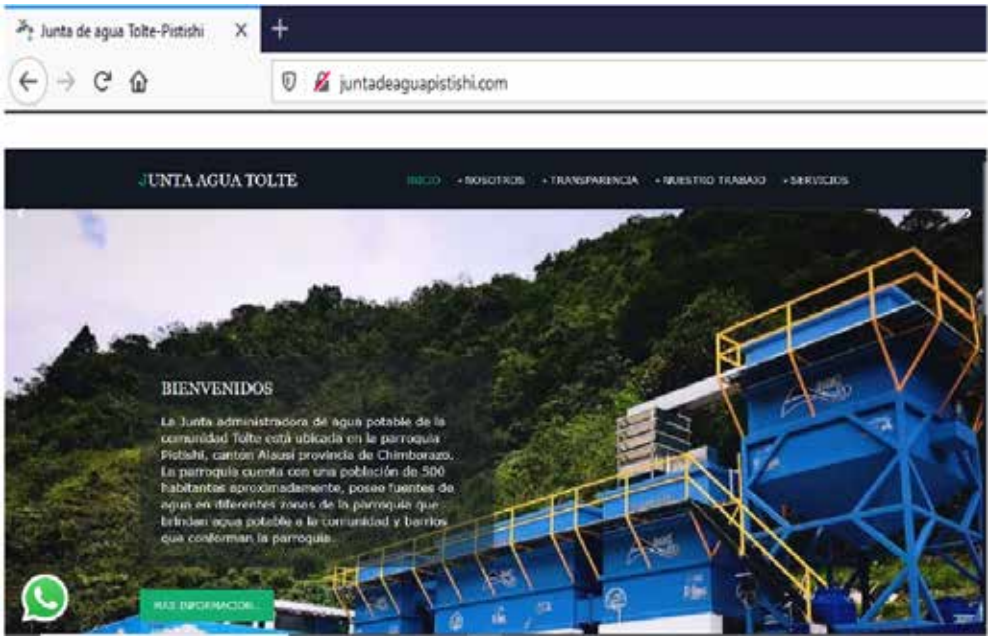

Figure 1. Home Drinking Water Board Pistishi

Construction Phase

Once the initiation and elaboration stages were completed, the development of the system began. This included:

- **Selection of tools**. PHP and MySQL are powerful tools that were used for the development of this site. During this stage, he made sure that the PHP and MySQL versions were up-to-date and compatible with the development tools used, such as IDE, and Laravel Framework.

- **Architecture Design**. During this stage of development, the system architecture was designed, including how the data in the MySQL database is structured, how the PHP application communicates with the database, and how user requests are handled.
- **Coding**. Once the architecture design was completed, coding of the system was started. Good programming practices were employed, such as writing clean, modular, and scalable code, and using software design patterns to improve code quality and efficiency.
- **Security**. During the development stage, the security of the system was taken into account. This included implementing security measures, such as using strong passwords, validating input data, and protecting against SQL injection and cross-site scripting (XSS) attacks.
- **Testing and Debugging**. After completion of coding, extensive testing and debugging were performed to ensure that the system was working properly. This included unit testing, integration testing, and acceptance testing to ensure that all system functionalities were running according to specifications.

Transition Stage

This stage was crucial to ensure that the web-based drinking water collection system in PHP with Laravel framework and MySQL database is effectively and seamlessly implemented on the Board. The following was considered:

- **System Delivery**. After system development and testing is complete, it is important to deliver the system to the end users (see Table 1), and to the Board's support team. A delivery meeting was held to ensure that everyone involved was aware of the details of the system, including how it is used, how maintenance is performed, and how problems are fixed.
- **User training**. It is important to train end users so that they can use the system effectively. This included providing detailed documentation, conducting personal or online training sessions, and providing ongoing support to help users solve problems and learn how to use the system effectively.
- **Data migration**. This involved transferring data of different formats to the MySQL database, ensuring that the information is complete and not lost during the process.
- **Server Configuration**. Ensured that the system is properly configured on the servers that will be used for its deployment. This included installing additional software needed, configuring user permissions, and configuring networks and security protocols.

- **Acceptance Testing**. Before deploying the system in a production environment, acceptance testing was performed to ensure that the system was functioning properly in the production environment. This included performance testing, load testing, and safety testing.
- **Implementation and monitoring**. After acceptance testing, the system was deployed in a production environment. The system was monitored regularly to make sure it was working properly and to troubleshoot any issues that might arise. In addition, backup and data recovery procedures were established to ensure that critical information is protected in the event of a system outage.

The results of the validation of the drinking water collection website are presented below, taking into account user satisfaction surveys (Table 2). End-user surveys (testers) were conducted to assess their satisfaction with the website and to obtain feedback on how to improve functionality. According to Redrován et al., (2020), specific questions were asked about system usability, effectiveness, efficiency, ease of use, responsiveness, and overall site quality. In which 10 questions were handled, the evaluation criteria in this metric goes from 1 to 3 respectively. Table 2 shows the evaluations obtained from the Potable Water Board Tester staff, to analyze the questions.

Table 2
Administrators, Tester, and Developer

Organization	Clerks	Testers	Developers	Total
Tolte Community's Administration Board	2	3	1	3

Table 3
Tester Evaluation

QUESTION	Grade from 1 to 3 (3=excellent, 2=good, 1=bad) 1	2	Average
1. Do you find the website easy to navigate?	3	3	3,00
2. Was it easy for you to find the information you were looking for on the website?	3	2	2,50
3. Do you find the menus and website structure clear and organized?	3	2	2,50
4. Is the website loading speed right for you?	3	3	3,00
5. Do you find internal website searches effective?	3	2	2,50
6. Did you find it easy to access the different sections of the website?	3	2	2,50
7. Do you think the design of the website makes it easier to navigate?	3	3	3,00
8. Was it easy for you to take actions like registering and logging in as an admin on the website?	1	3	2,00
9. Was it easy for you to perform actions such as making a pay-out and issuing a voucher to the subscriber on the website?	2	2	2,00
10. Was it easy for you to create reports on payments, subscribers, collection by dates, and collection by subscribers on the website?	2	2	2,00
Total average		2.50	

Note. Adapted (Redrován et al., 2020; López et al., 2016).

CONCLUSIONS

The Drinking Water Management Boards have a fundamental role in the management of drinking water in rural areas of our country because they are responsible for managing, maintaining, and operating the drinking water systems in their communities. It is important that training and technical advice be provided to the Boards to strengthen their capacities in the management of drinking water systems and decision-making. In this way, a more efficient and sustainable management of water resources in rural areas is guaranteed.

The automation of drinking water collection processes in rural areas of our country allows us to perform tasks more quickly and accurately, which reduces the time and resources needed against tasks when they are performed manually, in a manual process the possibility of human errors when entering data and performing calculations is very feasible, automation reduces the number of errors especially when issuing invoices and improve the accuracy of records.

The use of free software can make the automation of water collection processes more accessible to rural communities in our province that do not have the resources to acquire proprietary software, since it is not necessary

to pay for licenses or make significant investments in hardware. This can enable more efficient management of economic resources, democratize access to technology, and improve the efficiency and sustainability of drinking water through the administrative boards in these areas.

This research contributes to emphasizing the use of free software with adaptable methodologies when developing websites with specific organizational requirements to support rural farmer organizations, which means that they can access a community of developers and users to collaborate in the development of specific tools and solutions.

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Prevalence of Vulvovaginitis in Pregnant People in a Health Center in San Juan Cancuc, Chiapas, México

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Micaela López-Vázquez[1]
mlv960827@icloud.com • ORCID: 0009-0004-1685-397X

Miguel Ángel Rodríguez-Feliciano[1]
ORCID: 0000-0002-5001-8749

Néstor Rodolfo García-Chong[1,2]
nes26g@hotmail.com • ORCID: 0000-0003-2816-4907

María del Socorro de la Cruz-Estrada[1]
mdelacruzestrada@gmail.com • ORCID: 0009-0009-8841-8543

1 Facultad de Medicina Humana, C-II. Universidad Autónoma de Chiapas. Tuxtla Gutiérrez, Chiapas. México

2 Hospital de Especialidades Pediátricas. Centro Regional de Alta Especialidad de Chiapas

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— Abstract—

Infectious vulvo vaginitis is a pathology that affects women worldwide. First-level health centers report that there is a high rate of women of childbearing age who came for consultation during pregnancy due to alterations in the vaginal microbiota, causing asymptomatic/symptomatic infectious vulvovaginitis. In Mexico, infectious vulvovaginitis is one of the ten main reasons for consultation, which frequently occurs between 20 and 45 years of age, and 30% of gynecological consultations are due to vaginal infections. To determine the prevalence of infectious vulvovaginitis in pregnant women between 18 and 40 years of age, who attended prenatal care for the first time at the Health Center with Expanded Services (CESSA), in San Juan Cancuc, in the Chixtetic, Cancuc Abajo, and Choj Chow. Identifying the main etiological agent and the risk factors, the age group, and the number of pregnancies in which infectious vulvovaginitis was most common. An observational, descriptive-explanatory, cross-sectional, and prospective study was carried out. All pregnant women between 18 and 40 years old who attended prenatal care for the first time and belonged to the aforementioned neighborhoods, within the established period, were entered into the study. A clinical history, physical examination, routine admission studies, fresh smears, Gram stain, and cervicovaginal culture on blood agar were performed. A prevalence of infectious vulvovaginitis of 47% was found; 25% corresponded to Candida albicans (common in the age group 22-25 years), 14% to Gardnerella vaginalis, and 8% to Trichomonas vaginalis. The predisposing factors were: multiple sexual partners and lack of condom use. It is concluded that the prevalence of vulvovaginitis is moderate compared to other countries.

Keywords:

Cervical-vaginal infection; pregnancy; indigenous population.

Infectious vulvovaginitis is defined as inflammation of the vaginal mucosa, the cause of which is usually due to infections by fungi (*Candida*), bacteria (*Chlamydia trachomatis*), and protozoa (*Trichomonas vaginalis*) (CENETEC, 2014). Its prevalence is high, although the figures vary according to the sources, finding notable differences between geographical areas and ethnicities (SEGO, 2022).

In Mexico, the actual prevalence of infectious cervicovaginitis is unknown. The existence of asymptomatic cases is estimated at 15 to 19% in women of childbearing age; however, the percentage increases during pregnancy (Trejo, 2003). Of the multiple infectious pathologies that occur in the cervicovaginal canal, infectious vulvovaginitis is the most prevalent. Sexually Transmitted Infections (STIs) rank second in the overall morbidity of women between the ages of 15 and 44. According to Domingo (2019), the World Health Organization (WHO) reported in 2016 that more than 1 million people (pregnant and non-pregnant) contract at least one STI every day, which increases concern about the number of premature births and changes in the newborn.

Vulvovaginitis is common in pregnancy due to hormonal changes in the vaginal tract, causing a homeostatic imbalance of the vaginal microbiota. Asymptomatic cases are due to microorganisms such as *Candida albicans* or *Gadnerella vaginalis* that can remain in low concentrations as normal microbiota. These infections affect the fetal-placental junction, leading to maternal-fetal and newborn complications. With the determination of the etiological agent of asymptomatic evolution, first-level doctors give specific treatment and hygienic indications to combat the disease and avoid the risk of recurrence. Vulvovaginitis caused by *Candida* occurs between 20 and 25% of pregnancies and for bacterial vaginosis (BV) between 14 and 21% but, *Candida albicans* is the most frequent etiologic agent of infectious vulvovaginitis in pregnancy globally. The gold standard test to establish the diagnosis is endocervical culture (Roura, 2012).

Several risk factors are associated with the acquisition of sexually transmitted diseases, including biological and behavioral factors, cultural influences, lack of information on STD transmission and contraction, difficulty accessing prevention services, and number of sexual partners (Cohen, 2002, as cited in Fabiani, 2018).

In Indigenous communities, there are disadvantages that women experience concerning their well-being (deficiency or lack of respect for human rights, interculturality, and gender equality). The intercultural approach promotes and considers health as a fundamental right, so health professionals must be able to integrate scientific knowledge with traditional beliefs and practices in the management and treatment of the disease. The WHO (2018) mentions that health equity and the differences that exist in the state

of Chiapas are not the result of biological differences but rather, of social and economic processes; observing that there is little or no prevention in reproductive health.

Young indigenous language speakers show earlier entry into reproductive life, compared to young non-speakers. Some of the transformations in the transition from childhood to adulthood are related to sexuality and the beginning of reproductive life. Half of women in Chiapas use their first contraceptive method five years after the first sexual intercourse. There are multiple reasons for omitting the use of contraception in the first sexual intercourse such as the desire to conceive, not knowing contraceptive methods, not planning to have sex, not believing that they can get pregnant, and being uneducated women who did not use contraceptive methods due to ignorance. These figures increase the Global Fertility Rate and the risk of contracting an STI (SGCONAPO, 2021).

Thus, worldwide several factors predispose to the acquisition of vaginal infections in pregnant women: multiple sexual partners, promiscuity, practice of unprotected sex, douching, use of corticosteroids, Human Immunodeficiency Virus (HIV) infection, and diabetes mellitus, among others.

According to the Federal Ministry of Health (SSA, 2018), in Mexico, approximately 30% of gynecological consultations are due to vaginal infections, usually occurring between the ages of 20 and 45. Pregnancy in Chiapas, especially in indigenous communities, is considered a desired event and a sign of good health. In pregnancy, there are numerous reactions that the fetus and the excess of pregnancy hormones cause morphological, physiological, metabolic, respiratory, gastrointestinal, renal, urinary, cardiovascular, immunological, and psychological changes in the mother.

The immunological role plays an important role during pregnancy, as there is immunosuppression to prevent rejection of the embryo or fetus. This effect of immunosuppression in the female reproductive system causes a decrease in the vaginal hydrogen potential (pH) due to the increase in the secretion of nutrients and the increase in the concentration of lactobacilli (Mora, 2019).

Lactobacilli are part of the normal vaginal microbiota, protecting against infection through several mechanisms. Hormonal changes occur in the physiological process of pregnancy that alter the vaginal microbiota, making cervicovaginal infections frequent during pregnancy. Vulvovaginitisis the main cause of consultation in the first and second levels of health care. Ignorance of the magnitude of the prevalence of vulvovaginitis in a community leads to it being underestimated in the first-level consultation. On the other hand, their importance lies in the fact that they are mostly asymptomatic, which makes early intervention difficult, both for preventive purposes and

in timely treatment, becoming a factor for obstetric complications and often difficult to eradicate with a risk of recurrence (Mora, 2019).

The clinical practice guideline (CENETEC, 2014) states that vulvovaginitis is inflammation of the vaginal mucosa, caused by various etiological agents, such as fungi (*Candida*), bacteria (*Chlamydia trachomatis*), or protozoa (*Trichomonas vaginalis*) (Figure 1). Which are manifested by vaginal discharge or abnormal leukorrhea. In any of the entities, the medical history must be carried out with emphasis on sexual history (number of partners and use of condoms), any woman with a history of persistent abnormal vaginal discharge must be clinically examined (gynecological examination), and in the presence of abnormal vaginal discharge, it must be ruled out that it is secondary to the use or presence of foreign bodies (tampons and retained condoms). For bacterial vaginosis, there are certain diagnostic criteria, Amsel (abundant homogeneous transvaginal flow, grayish-white, small bubbles, fishy odor, and adherent to the cervix and vaginal walls), as well as the Hay-Ison criteria for cervical vaginal exudate smears (Vázquez, 2019; CENETEC, 2014).

The Spanish Society of Gynecology and Obstetrics reports that the main causes of consultation in health care units are genital infections in both primary, specialized, and emergency care consultations: representing 20% of total consultations; in the black American population it is 45% to 55% and in Asian women, it is reported between 20% and 30% (SEGO, 2022).

The WHO (2020) reported that more than 340 million cases of sexually transmitted infections occur every year. The highest rates of STIs are reported between the ages of 20 and 24, followed by the ages of 15 and 19, with 28% being positive for a sexually transmitted infection. In the United States, these infections account for approximately 10 million consultations annually (Sahagún, 2015). In Mexico, they are part of the top 10 reasons for consultation in the Gynecology and Obstetrics service as well as one of the top 20 diagnoses in the first level of care. The Ministry of Health (SSA, 2018) reports that they occur frequently between the ages of 20 and 45, representing 30% of gynecological consultations, due to vaginal infections, indicating that the women most likely to have this type of infection are women who are pregnant, with diabetes, under chemotherapy treatment, climacteric, and teenagers. In pregnant women, vulvovaginitis can lead to premature births, membrane rupture, infections in infants, and death (SSA, 2018).

This leads to reviewing the number of pregnancies and the risk of infectious vulvovaginitis. In this sense, in Mexico, the Global Fertility Rate in Chiapas in 2014 was 2.89 (the national rate was 2.21); while the Adolescent Fertility Rate was 93.25 (the national 77.04) (SGCONAPO, 2021). According to the National Demographic Dynamics Survey 2018 (INEGI, 2020), the Global Fertility Rate (GFR) from 2015 to 2017 was 2.07 live births for each

woman aged 15 to 49 years. It is estimated that in Mexico there are 22.2 million women between the ages of 15 and 49 who have been pregnant at least once during their lives.

In this order of ideas, Mexico ranks first in adolescent pregnancy, with a fertility rate of 77 births per thousand teenagers from 15 to 19 years of age, where 23% of teenagers begin their sexual life between 12 and 19 years of age; observing that 15% of men and 33% of women did not use any contraceptive method in their first sexual intercourse, so the risk of acquiring an STI is increased; in this way, 340 thousand births occur per year in women under 19 years of age (ENPEA, 2014).

The number of pregnancies in teenage women is higher in the states of Chiapas, Oaxaca, Guerrero, and Puebla according to ENADID (2014), with Chiapas being the state that ranks third in the number of pregnancies in children under 19 years of age; and ENADID (2018) places it as the state with the highest General Fertility Rate nationwide.

Chiapas is characterized by a demographic structure made up mostly of young people, being 34.7% of the total population of the state (INEGI 2010). In addition, it is the state with the second highest marginalization rate at the national level, with 88.7% according to the State Committee for Statistical and Geographic Information (CEIEG, 2020). The most recent update, according to CONAPO (2020), the Global Fertility Rate in 2020 was 2.69 and in the Mexican Republic 2.05.

In San Juan Cancuc, women, throughout their lives, between 15 and 19 years old have had on average 0.2 children born alive; while this average is 6.9 for women between 45 and 49 years old (INEGI, 2010). Half of the young people who speak an indigenous language had their firstborn at age 23, while non-indigenous young people did so at age 24. The former registered a global fertility rate (GFR) in 2010 of 2.5 children; and the non-indigenous ones of 2.6 children. This rate rises in non-urban women to 3.6 children and up to 4.2 children among Indigenous women (Vázquez-Sandrin, G. & Ortíz-Avila, E., 2020).

The use of contraceptive methods shows differences according to gender and ethnic status. According to the National Youth Survey (2010, cited in Ávila & Jáuregui, 2015), 48.1% have used some method in their first sexual relationship, with men being the ones who used it in the highest proportion (60.2%). By ethnicity, the proportion of young non-indigenous language speakers who used contraception is almost double that of indigenous language speakers (51.8% and 26.1% respectively). The condom is the most used method in the first sexual intercourse. Males used it 91.1%, while females used it 79.6%. The lowest percentage corresponded to Indigenous people, with 76.7% (Reardes, 2017).

Statistics on fertility, birth rate, demographic changes, and sexual and reproductive health, show the quality of reproductive life and sexuality of women, observing that the prevalence of vulvovaginitis increases as a result of poor or deficient prevention, and promotion of sexual health. In addition, the importance of primary care for the condition is consolidated, to provide adequate management for each type of vaginal infection and thus improve the reproductive quality of life of patients who suffer from it.

The scarce information on both at the national, state and local levels on the subject allowed the study to be approached to know the most frequent prevalence and etiological agent, as well as the age group most likely to develop infectious vulvovaginitis, as well as risk factors associated with vulvovaginitis in pregnant patients aged 18 to 40 who attended prenatal control for the first time at CESSA San Juan Cancuc, during the established time and place limit.

Infectious vulvovaginitis is a potential problem in pregnant women. Therefore, the purpose of this work is to know the prevalence of infectious vulvovaginitis in pregnant patients aged 18 to 40 who go for the first time to prenatal control at the Health Center with Expanded Services of San Juan Cancuc in the following neighborhoods: Chixtetic, Cancuc Abajo, and Choj Chow. Likewise, determine the main risk factors, group, most frequent age, and most common etiological agent, given that these infections are a public health problem. The actions that will be developed during the study will help prevent possible complications of pregnancy and the postpartum period, to reduce the incidence of maternal-fetal death. In addition, as a health unit, prioritize and implement vulvovaginitis prevention measures, encourage health promotion through educational talks, and increase the quality of life of women of childbearing age.

In Cuba, Martínez (2013) reported that in 1955 bacterial vaginosis was recognized as a nosological entity by the studies carried out by Gardner and Dukes, naming the disease as "Haemophilus vaginitis". The bacterium was thought to belong to the *Haemophilus* group; but due to the unique properties of the isolated bacterium, it was necessary to create a new genus: *Gardnerella*. Subsequently, they recognized that Gardnerella vaginalis is not exclusively the cause of the symptoms, since other microorganisms were discovered in the vaginal fluid, anaerobic species: *Bacteroides, Peptostreptococci, Mycoplasma* (*Mycoplasma hominis*), and *Mobiluncus*.

Rojas et al., (2016) conducted a study called "Vaginal infections in pregnant patients of a highly complex clinic in Medellín-Colombia" and found that, of 67 patients, there was a median age of 23 (IQR 21-29) years; 40% were pregnant for the first time, and 66% nulliparous. Only 15% of vaginal infections occurred in the first gestational trimester. The most frequent microbiological diagnosis was Vulvovaginal Candidiasis (41.4%), followed

by Bacterial Vaginosis (24.1%), concluding that vaginal infections constitute a pathology with frequent symptoms, which generally occurs in the second half of pregnancy, with Candida spp being the most common etiological agent (Toro, 2019).

Occhionero (2018), in the City of Bahía Blanca in Argentina, mentioned that vaginosis is the most prevalent pathology, finding that the highest prevalence corresponded to bacterial vaginosis (21,36%), then yeasts (13,90%), *T. vaginalis* (3,73 %) and *C. trachomatis* (3,05 %). The risk factors fall within the framework of values of the central-southern region of the country, but the significant frequency of alterations in vaginal function (68,87%) and chlamydial infection (4,35%) detected in asymptomatic women should be highlighted.

In Costa Rica, Sánchez (2018) pointed out that vulvovaginitis is inflammation of the vulva and vagina. The main etiologies are Candida albicans, Gardenerella vaginalis, and Trichomonas; a very common cause of consultation in primary care. Among them, trichomonas vulvovaginitis is a sexually transmitted infection that needs treatment for the patient and the couple. Vulvovaginitis does not provide complications, especially in pregnant women, its treatment depends on the etiology.

In Colombia, Gomez-Rodriguez (2019) calculated the prevalence of colonization period by some of the micro-biological agents and the specific one, finding that the global prevalence was 24,8% (56/226). Of these, 55,4% (31/56) were due to agents causing vaginitis, and 44,6% (25/56) were due to vaginosis. The specific prevalence by type of pathogens was: colonization by Candida spp. in 13,3% (30/226) and by T. vaginalis in 0,4 % (1/226). BV occurred in 8,0% (18/226), concluding that there is significant colonization of the lower genital tract of potentially pathogenic germs in pregnant women from 35 to 37 weeks.

In Venezuela, Maiellano (2020) mentioned that women's sexuality during pregnancy can present notable changes that often lead to unpleasant sexual relations. This generates negative effects on sexuality at this stage, causing modifications in the pattern of female sexual behavior, where a decrease in vaginal intercourse and other sexual practices is almost always observed in an unjustified way; concluding that in most cases there is less sexual activity due to the decrease in sexual desire, with alterations in the phases of the female sexual response and that these situations are influenced by external factors such as sociocultural ones.

On the other hand, it was observed that there may also be a positive effect on sexuality during pregnancy, especially in women with good sexual practices before pregnancy.

In Sao Paulo Brazil, Santos et al., (2023) found in a sample of 1.173 women that the prevalence of bacterial vaginosis was 31,8%. The degree of agreement between the two diagnostic methods by the Kappa index was

0,54, considered moderate, with a value <0,001. Sensitivity was 55,2% and specificity 94,1%, with an accuracy of 81,7%, a positive predictive value of 81,4%, and a negative predictive value of 81,8%. Vaginal smear, but can be used as an auxiliary method for the diagnosis of bacterial vaginosis.

Based on the above, and based on current knowledge of vulvovaginitis, the interest in asking the following question arose: *What is the prevalence of infectious vulvovaginitis in pregnant patients aged 18 to 40 who went for the first time to prenatal control at the Centro de Salud con Servicios Ampliados San Juan Cancuc, in the neighborhoods of Chixtetic, Cancuc Abajo and Choj Chow?*

Therefore, this research aimed to determine the prevalence of infectious vulvovaginitis, as well as establish which was the main etiological agent and identify what were the main factors associated with pregnant patients aged 18 to 40 who went for the first time to prenatal control at the Centro de Salud con Servicios Ampliados San Juan Cancuc in the neighborhoods of Chixtetic, Cancuc Abajo, and Choj Chow from January to November 2020.

MATERIALS AND METHODS

This is an observational, descriptive-explanatory, cross-sectional, and prospective study, developed through interrogation, medical history, gynecological examination, and cervical-vaginal culture sampling in pregnant patients with suspected infectious vulvovaginitis, who went for the first time to prenatal control at the Centro de Salud con Servicios Ampliados (CESSA) in the municipality of San Juan Cancuc. The population of pregnant patients who participated in the study was 18 to 40 years of age, who went for the first time to prenatal control at the CESSA related to infectious vulvovaginitis, who participated in the study voluntarily and met the inclusion criteria.

The context of the study considered CESSA, specifically from the neighborhoods of Chixtetic, Cancuc Abajo, and Choj Chow, which together have a population of 1,249; where 606 belonged to the male gender and 643 to the female gender, taking from this group a total of 276 women in the reproductive stage, in an age range of 15 to 49 years of age as possible candidates for the study, from which 36 pregnant women were selected who went to prenatal control registered in the MIUS platform, as pregnant patients for the first time, who met the inclusion criteria.

The sample extracted from the population was for convenience in pregnant patients of San Juan Cancuc's CESSA between 18 and 40 years old, and went for the first time to prenatal control with infectious vulvovaginitis, from January to November 2020. Personal data of the volunteer patients were recorded in the Integrative Module of Health Units (MIUS) platform: file number, unique registration key, patient's full name, age, height, weight,

date of consultation, diagnoses, requested laboratories, last date of menstruation, probable date of delivery, capillary glycemia, body mass index, first consultation, origin, and reproductive health, in addition to personal hygiene.

The inclusion criteria were all pregnant patients aged 18 to 40 years who entered the MIUS platform with a proven diagnosis of infectious vulvovaginitis. In addition to belonging to any of the three neighborhoods: Chixtetic, Cancuc Abajo, and Choj Chow. Considering also those who entered prenatal control on the established dates, and who accepted the performance of cervicovaginal culture. The study considered the presence of pathogenic microorganisms and the control variables were age and origin. The exposure variables were sex, gestations, prenatal control, number of sexual partners, origin, intercourse during pregnancy, condom use, anal sex practice, genital grooming, grooming before and after sexual intercourse, intensity of vaginal discharge, and appearance of vaginal discharge. All patients who were authorized to participate underwent obstetric gynecological examination and sampling of endocervical secretion with three swabs for each study, performing fresh smears, Gram staining, and cervicovaginal culture on blood agar (from 24 to 48 hours up to 72 hours). Samples were taken independently of gestational age, and the microbiota present was identified using the techniques described above (Table 1 and Figure 1).

Table 1

Differential diagnosis between infectious vulvovaginitis

	Vaginosis bacteriana (25-40%)	*Vaginitis por Candida (20-25%)*	*Vaginitis por Tricomona (15-20%)*	*Chlamydia Trachomatis (<15%)*
Etiología	Bacterias (*Gardnerella vaginalis* (40-50%), *Micoplasma hominis, Ureaplasma urealyticum, Prevotella, Bacteroides, Mobiluncus, Atopobium species).*	Levadura/hongo: *Candida albicans* (80-90%), *Candida glabrata, Candida tropicalis y Candida krusei.*	Protozoario flagelado anaeróbico: *Trichomonas vaginalis, Trichomonas tenax y Trichomonas hominis.*	Es un microorganismo intracelular obligado, Gram negativo.
Factores de riesgo	Duchas vaginales, cunnilingus receptivo. Raza negra, nueva pareja sexual, tabaquismo, anticonceptivos orales, ITS, DIU, obesidad, pérdida de lactobacilos por cualquier causa.	Diabetes descontrolada, anticonceptivos orales, uso de diafragma con espermicida, obesidad, uso de antibióticos y corticoides, quimioterapia, embarazo, ropa ajustada, alergia local a perfumes y jabones.	Múltiples parejas sexuales	Múltiples parejas sexuales.
Cuadro clínico	Leucorrea fluida blanca o grisácea fétida y olor a pescado, sin dolor. (50%-70%) son asintomáticas).	Inflamación vulvovaginal, fisuras, secreción blanquecina adherente a la mucosa con grumos (queso cottage, requesón o yogur), disuria postmiccional, dispareunia, ardor vulvar, eritema vaginal y no hay fetidez. (20% son asintomáticas)	Leucorrea amarilla- verdosa abundante espumosa, gaseosa, fétida, disuria, dolor pélvico bajo, vulvitis, vaginitis (edema, eritema, cervicitis), cuello uterino en fresa (colpitis en fresa). (50% asintomáticas).	Leucorrea amarillenta, molestia rectal y fetidez, disuria, cuello cervicouterino inflamado, edematoso, eritematoso y friable, dolor el hipogastrio, prurito y escozor vaginal durante el coito. (50% son asintomáticas).
pH vaginal	> 4.5	< 4.5	> 4.5	> 4.5
Pruebas diagnósticas	Estudio microscópico del frotis (Gram o citológico cervicovaginal o Papanicolaou), medición de pH vaginal, KOH al 10%, cultivo.	Frotis en fresco con suero fisiológico al 0.9%, tinción de Gram y estudio citológico cervicovaginal, cultivo.	Frotis convencional de Papanicolaou, microscopía, cultivo para *Trichomonas*, prueba de ácido nucleico, prueba rápido de antígeno o sonda de ADN y KOH 10%.	Cultivo endocervical
Microscopia	Células clave, leucocitos escasos, *Lactobacillus spp*, flora mixta abundante	Leucocitos, células epiteliales, levaduras y pseudomicelios (80%).	Leucocitos T	
Complicaciones	Abortos, ruptura prematura de membranas, endometritis, coriamnionitis, infecciones postparto e infección del tracto urinario.	Ruptura prematura de membranas y parto prematuro.	Parto prematuro y bajo peso al nacer. Aumenta el riesgo de contraer una ITS.	Embarazo ectópico, enfermedad pélvica inflamatoria, infertilidad y ruptura prematura de membrana.
Tratamiento	Metronidazol 400-500 mg VO cada 12 horas por 5-7 días. Metronidazol 2 g VO DU. Metronidazol local vaginal por 5 días. Tinidazol 2 g VO cada 24 horas por 2 días o 1 g VO por 5 días. Clindamicina 300 mg VO por 7 días o local vaginal 2% por 3 días.	Clotrimazol crema vaginal cada 24 horas por 14 días. Nistatina 100,000 UI óvulo vaginal cada 24 horas por 14 días.	Metronidazol 500 mg VO cada 12 horas por 7 días. Metronidazol 2 g VO DU Tinidazol 2 g VO DU en casos resistentes o Metronidazol 2 g VO cada 24 horas por 7 días.	Azitromicina 1 g VO DU. Alternativo: Eritromicina 500 mg cada 6 horas por 7 días. Ofloxacina 300 mg cada 12 horas por 7 días.

Note. (CENETEC, 2014), (Vázquez, 2019), (Roura, 2012), (Carretero, 2009), (Murray, 2017), (Nau, 2019).

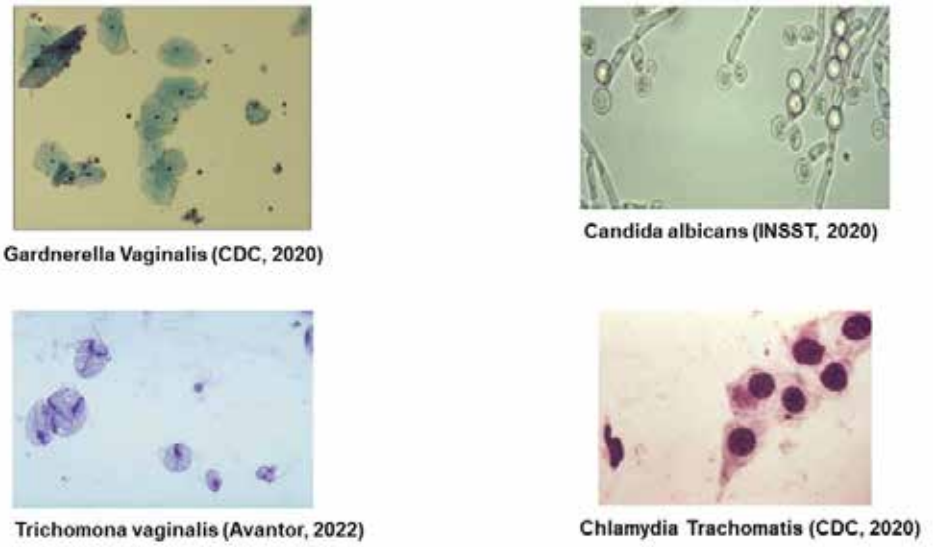


Figure 1. Microscopic view of microorganisms causing infectious vulvovaginitis during pregnancy

The samples that were obtained were sent to the CESSA laboratory. Subsequently, the results of the cervicovaginal culture were announced to the patients included in the study at their second appointment to start treatment. The rest of the information was obtained through gynecological-obstetric medical history direct interrogation and the MIUS platform. The data obtained were handled with absolute and relative values.

With the results and patient data, a database was built and subsequently analyzed using the SPSS statistical package. For the statistical analysis, a descriptive statistic of the variables was carried out in the first phase; and in the second phase, inferential statistics tests were carried out, through association tests with the Chi-square test statistic, comparing the etiological agents with the age groups.

RESULTS

Thirty-six pregnant patients aged 18 to 40 years from the Chixtetic, Cancuc Abajo, and Choj Chow neighborhoods of San Juan Cancuc's CESSA were studied, who attended prenatal control for the first time and authorized entry into the study. As illustrated in Table 4, the age distribution of the 36 patients was as follows: the most frequent age group was 18 to 21 years with 28% while the age groups from 30 to 33 and 38 to 40 years were the least frequent, both with 8% each.

Table 2
The age group who entered prenatal control

Age Group	Patients	%
18-21	10	28
22-25	9	25
26-29	7	20
30-33	3	8
34-37	4	11
38-40	3	8
Total	36	100

Note. Own elaboration according to registration sheet and MIUS platform, 2020.

Of the sample of 36 patients studied, 17 (47%) were positive for microorganisms and 19 (53%) were found to have normal vaginal flora.

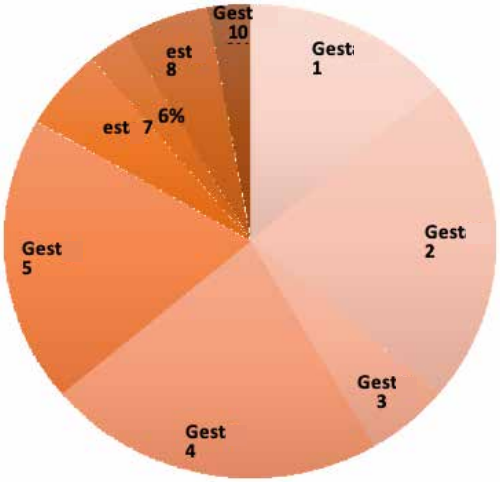
The most common etiologic agent was *Candida albicans* with 9 positive cases, regardless of age group, corresponding to 25%, followed by *Gardnerella vaginalis* with 5 positive cases, regardless of age group with a percentage of 14%. *Tricomonas vaginalis* was the microorganism less frequent, with 3 cases corresponding to 8%, while no cases were found for *Chlamydia trachomatis*. Regarding *Gardnerella vaginalis*, no statistically significant association was found concerning the age groups (p=0.78). However, there is a trend towards the 18 to 21 and 22 to 25 age groups. In the case of *Candida albicans*, no statistically significant association was found concerning the age groups (p=0.89), concerning the rest of the microorganisms, with a higher prevalence observed in the 22 to 25 age group. *Trichomonas vaginalis* was the least frequent microorganism, and no statistically significant association was found concerning the age groups (p=0.49). However, three positive cases were found within a wide range ranging from 22 to 33 years. Regarding *Chlamydia trachomatis*, no statistically significant association was observed, since no positive cases were found (see Table 3).

Table 3
Relationship between age group and microorganism

Age Groups	Type of microorganism															
	G. vaginalis				*C. albicans*				*T. vaginalis*				*C. trachomatis*			
	Pos	%	Neg	%	Pos	%	Neg	%	Pos	%	Neg	%	Pos	%	Neg	%
18 a 21	2	6	8	22	2	5	8	22	0	0	10	28	0	0	10	18
22 a 25	2	6	7	20	3	9	6	17	1	3	8	22	0	0	9	25
26 a 29	1	2	6	17	2	5	5	14	1	3	6	17	0	0	7	20
30 a 33	0	0	3	8	1	3	2	6	1	3	2	5	0	0	3	8
34 a 37	0	0	4	11	1	3	3	8	0	0	4	11	0	0	4	11
38 a 40	0	0	3	8	0	0	3	8	0	0	3	8	0	0	3	8
Subtotal	5	14	31	86	9	25	27	75	3	9	33	91	0	0	36	90
Percentage		14		86		25		75		9		92		0		
gl		5				5				5				0		
X2		2.44				1.6				4.41				0		
p		0.78				0.89				0.49				0		

Note. Own elaboration according to laboratory results, 2020.

The most frequent number of pregnancies (gestations) presented by the patients who entered the study was between 2 and 4 (Figure 2). Regarding the number of gestations and microorganisms studied, patients with five gestations presented vulvovaginitis more frequently (14%), followed by those with 4 gestations (11%), continuing with the first, second, and third gestations with 6 (see Table 4). No evidence was found on the number of gestations as an associated factor for infectious vulvovaginitis.



Note. Own elaboration according to registration sheet and MIUS platform, 2020.

Figure 2. Gestation Count

Table 4

Number of gestures and microorganism ratio

	Type of microorganism							
Gestation	**G. vaginalis**	**C. albicans**	**T. vaginalis**	**C. trachomatis**	**Casos positivos**	**%**	**Casos negativos**	**%**
1	0	2	0	0	2	6	3	8
2	1	1	0	0	2	6	6	17
3	2	0	0	0	2	6	0	0
4	0	3	1	0	4	11	4	11
5	2	2	1	0	5	14	2	5
6	0	0	1	0	1	2	1	3
7	0	0	0	0	0	0	1	3
8	0	1	0	0	1	2	1	3
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	3
Subtotal	**5**	**9**	**3**	**0**	**17**		**19**	
Percentage	**14**	**25**	**9**	**0**	**47**	**47**		**53**
Total	**36**							

Three patients mentioned having had 2 sexual partners since the beginning of their active sexual life (IVSA), aged 23, 19, and 20 years, being positive for Trichomonas vaginalis, Gardnerella vaginalis, and Candida albicans, respectively (see Table 7).

Table 5
Prevalence of vulvovaginitis in relation to sex life factors

Factors	POSITIVE AMOUNT	%	AGE	MICROORGANISM
Multiple sex partners	3	8.3	23	*Triconomas Vaginalis*
			19	*Gardenella Vaginalis*
			20	*Candida Albicans*
Intercourse during pregnancy	34	94.3		

Note. Own elaboration based on medical records and MIUS platform, 2020.

DISCUSSION

The prevalence of infectious vulvovaginitis found was moderate with 47% of positive cases, which is consistent with studies such as SEGO (2022), which found a prevalence of between 45% to 55%, these prevalences are the result of socioeconomic and cultural processes, coupled with the fact that health personnel in these communities lack more training and in the workplace, there is a shortage of supplies to treat this type of disease. Hence the importance of this type of study, which allows monitoring of the needs that exist to provide better care and improve the salutogenesis of these communities.

Regarding the prevalence of microorganisms, it was found that the main pathogens were: *Candida Albicans* at 25% *Gardnerella vaginalis* at 14%, and 8% *Trichomonas vaginalis*, behavior similar to that reported by Espitia (2021), which found a higher prevalence for *Candida albicans* with 60.3% followed by *Gardnerella vaginalis* with 19.5% and later by *Trichomonas vaginalis* with 0.8% to 3.2%. However, it differs from a study by Gomez-Rodriguez et al., (2019), in which the pathogens found were 0.4% for *Trichomonas vaginalis* and 13.3% for *Candida Albicans*, in support of the results found, Sanchez (2018) mentioned that the main etiologies of vulvovaginitis are: *Candida albicans, Gardnerella vaginalis* and *Trichomonas*, the latter being sexually transmitted that requires treatment for the patient and her partner. This shows the limitations that the health sector has in these communities to more effectively address these types of problems, which are mainly due to the lack of resources and training and can be improved with an adequate primary health care program.

Based on age groups, the prevalence of infectious vulvovaginitis was higher in the age group of 22 to 25 years, with no relationship to the etiologic agent. This coincides with that reported by García (2019), where he mentions that he found a prevalence of 17 to 26 years independent of the etiological agent causing salutogenesis, which agrees with the age ranges mentioned by other authors.

On the other hand, Rosada et al., (2019) found that the predominant vaginal infections at the secondary and pre-university education level occurred in children under 19 years old, followed by the group of 20 to 25 year olds. Similarly, Sánchez (2022) reported that vaginal infections affect the age group of 20 to 24 years.

One of the ways to explain the results of this study is what was proposed by Felipe (2019) and Domingo (2019). They suggest that the prevalence in this age group is due to several factors, such as the early onset of active sexual life, and relationships with multiple sexual partners, in addition to the fact that vulvovaginitis is closely related to the lack of condom use and, therefore, there is a high probability of unwanted pregnancies, which triggers hormonal fluctuations that make it more likely to suffer from some type of vulvovaginitis. Although there are currently economic limitations to being able to serve this group of the affected population, a good prevention program can help reduce these rates, within a primary health care program on sex education.

On the other hand, a higher incidence of infectious vulvovaginitis was found in women who have had more than one pregnancy, specifically those who have had 5, with 14% drastically decreasing the prevalence of infectious vulvovaginitis from the fifth pregnancy, this can be explained by the reduction in sexual activity (see Table 7), a result that differs from the study by Zaráte (2011). He mentioned that in first-time pregnant women, the incidence is more frequent, justified by the first sexual experience and by the lack of knowledge in hygiene techniques or the non-use of condoms. In the words of Maiellano (2020), women's sexuality during pregnancy shows notable changes, and in most cases, there is a decrease in this activity.

In addition, internal predisposing factors for infectious vulvovaginitis were sought using different data collection instruments, which were performed at the time of admission to prenatal control of the patients who were authorized to participate in the study. No statistical significance was found in the variables studied. However, it is important to note that 3 patients reported having had 2 sexual partners since the beginning of their active sexual life, positive for at least one type of etiological agent. In this sense, a study by Fabiani (2018) reported that multiple sexual partners increase the risk of suffering from some type of vulvovaginitis. What was relevant in this study was that 34 patients had sex during pregnancy, and both patients and their spouses denied the use of condoms. They were also asked about personal hygiene, so they certainly responded to the correct cleaning technique. Much of the problem can be addressed and solved with a good sex education program, which helps prevent these types of infections.

One of the main contributions of this work is to be able to know the conditions that women in this population have regarding sexually transmitted

infections. However, the type of community and the characteristics of the diagnostic tests made it difficult to have a larger sample size that would allow us to have a better inference.

CONCLUSIONS

The prevalence of infectious vulvovaginitis was moderate within the parameters referred by other countries. The most frequent age group with the most infectious vulvovaginitis independent of the etiologic agent was 22 to 25 years old. The most common etiologic agent was *Candida Albicans*. About the number of pregnancies and microorganisms in the population, women with multiple pregnancies had infectious vulvovaginitis more frequently.

Among the factors associated with sexually transmitted infections, multiple sexual partners were found to be a predisposing factor that increases the likelihood of developing infectious vulvovaginitis.

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Community Savings Banks as an Alternative to Financing Rural Companies: A Theoretical Proposal

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María Blanca Martínez Barajas
mmartinezb@cdserdan.tecnm.mx
ORCID: 0009-0008-5687-9620

Juan Pablo Torres Zambrano
jtorres@cdserdan.tecnm.mx
ORCID: 0009-0004-7967-2068

Tecnológico Nacional de México/ ITS de Ciudad Serdán. Puebla, México

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— Abstract—

The objective of this research was to propose alternatives to establish community financing models that allow meeting the financial needs of companies in the rural sector. This type of company contributes significantly to the development of the region where they carry out their activities, regions with generally lower incomes. In Mexico, there are around 56,700 rural organizations that carry out activities mainly in the agricultural sector, where current credit schemes do not have the same accessibility due to different factors such as high interest rates, complex requirements, and lack of guarantees. The work carried out was of the descriptive documentary type, which implied the collection, selection, analysis, and presentation of information to know the scope that the financing sources available for companies in rural areas. The efforts made by the State with "Fideicomisos Instituidos con Relación a la Agricultura" (FIRA) and the "Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero" (FND) for financial inclusion, expanding its programs and coverage, have had results. However, the lag continues and other strategies derived from the needs of its inhabitants have been implemented in rural areas. Community savings banks have been an example of this type of strategy that promotes the financial inclusion of the most backward sectors.

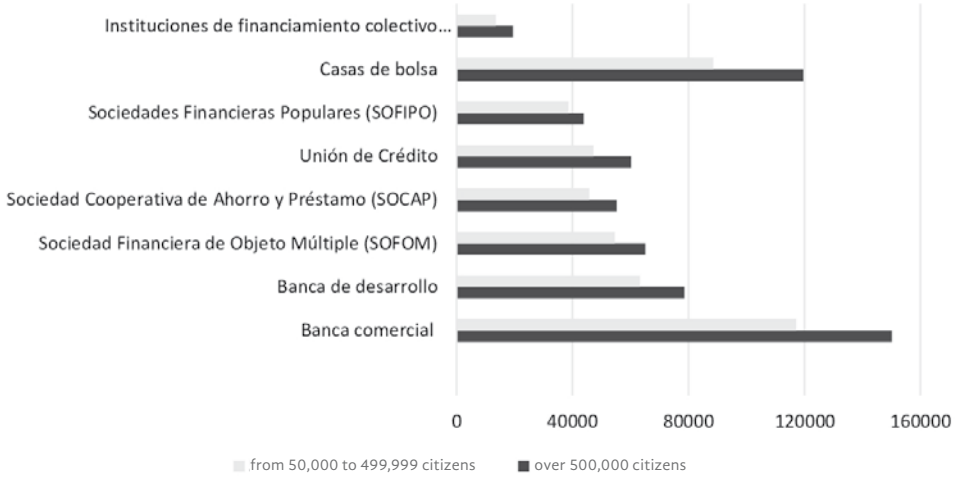
Keywords:

Credit; community financing; savings banks; rural companies

The Mexican Financial System, within some of its functions, is responsible for bringing resources from savers to the people who require them so that they can be used in various activities, including production and consumption (BANXICO, 2023). This is where companies can access those resources by applying for credits, using them as a way to finance some of the necessary activities, buy new machinery, or expand production, for example.

In recent decades, numerous efforts have been made in Mexico, from public and private institutions, to promote a more inclusive financial system (Heimann & Gómez, 2009). The creation of networks of banking correspondents, the investment in shared technological platforms, and the implementation of public subsidy programs for the expansion of microcredit have increased (Morfín, 2009).

According to the data reported in 2022 by the National Survey of Financing of Companies (ENAFIN), by 2021, 47% of companies had requested some type of credit for the development of their activities. Not forgetting that due to the COVID-19 pandemic, the number of applicant companies did not reach 50%. Banca Comercial remains the most well-known source of financing for companies (Figure 1), but this does not mean that it is the most used. It is important to note that crowdfunding institutions are the least known.



Note. Source: ENAFIN, 2022.

Figure 1. Number of companies that know or have heard about the different types of financial institutions by locality stratum

"The official report of the financial inclusion project in 2020 of the Center for Financial Inclusion in International Action, mentions that there remains an unmet need for financial services in Mexico" (CIF, 2009), the same as the World Bank conclusion (Reddy et al., 2013), mentioning that despite a sharp increase in the availability of *financial* products and services in

recent years, financial inclusion continues to be a challenge in Mexico. The main challenge is that if the availability of financial products and services increases, integration into some type of credit or financial service must also increase. Companies continue to rely on their own resources to fund their operations (Table 1).

Table 1
Main sources of financing used by companies

Locality stratum	Own resources	Utilities	Sale of assets	Savings
Over 500,000 citizens	73,440	33,838	15,005	36,217
From 50,000 to 499,999 citizens	58,399	29,424	9,605	26,485
Total	131,839	63,261	24,610	62,702

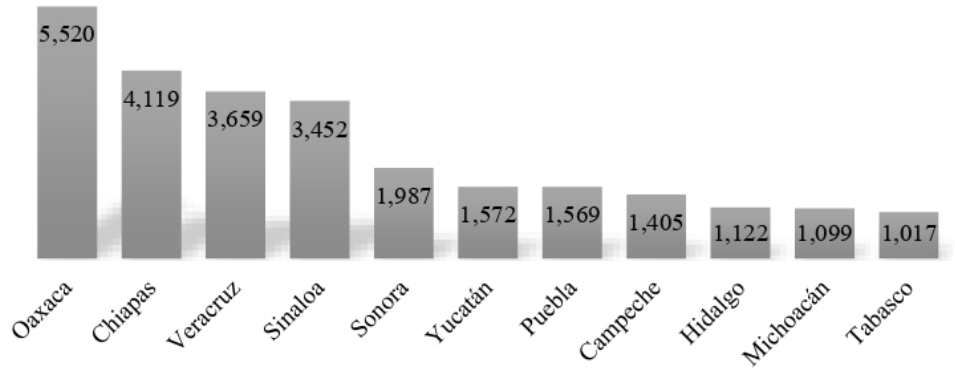
Nota. Source: ENAFIN, 2022.

In general, the business sector in Mexico keeps the economy running, particularly SMEs are a fundamental pillar of economic development by generating wealth and being dynamic entities that identify, exploit, and develop new productive activities (Delfín & Acosta, 2016).

In the case of companies in the rural sector, their importance is mainly based on the contribution they make to the development of the region where they carry out their activities, regions with lower incomes, generally. One of the most relevant challenges for any economy is the creation of jobs, this has become one of the fundamental objectives within the rural sector, in addition to new expectations linked to the social economy and small and medium-sized enterprises, through knowledge of the territory and the practice of local development (Márquez, 2002). Currently, women are more than a third of the people involved in business in the world. This phenomenon has not been exempt in Latin America and it is observed how women take an increasingly important role in the generation of new companies. Women's entrepreneurial activity is diverse and encompasses almost all sectors of economic activity (Chong, 2016). The role played by rural women in the business area is part of a strategy to survive and self-realize, even with the problem of reconciling their productive and reproductive work, already by tradition, the latter being their priority (Albarrán, 2017).

In Mexico, the National Agrarian Registry (RAN) has 34,281 Rural Societies registered throughout the country, which when obtaining legal personality can be established as companies specialized in the use of natural resources or the provision of services, in their agrarian nuclei. Figure 2 shows the states with the highest number of registered Rural

Societies, among them are: Oaxaca with 5,520; Chiapas, 4,119; Veracruz, 3,659; Sinaloa, 3,452; Sonora, 1,987; Yucatán, 1,572; Puebla, 1,569; Campeche, 1,405; Hidalgo, 1,122; Michoacán, 1,099; and Tabasco with 1,017. Other states with a significant number are the following: Morelos with 969; Durango, 924; San Luis Potosí, 847; Guerrero, 759; Nayarit, 677; Tlaxcala, 532; Tamaulipas, 637; and Jalisco with 312 (Government of Mexico, 2018).



Note. Source: Government of Mexico, 2018.

Figure 2. Rural Societies by State

It is essential to boost the growth of enterprises in the rural sector using available resources, in addition to access to credit through the various institutions and the government sector. For this, it is necessary to establish adequate financing schemes oriented toward a more supportive economy, which, according to Tapia et al. (2017), has begun to emerge as an instrument to achieve the objectives of local development, oriented toward the transformation of the productive structure in the same localities.

In the case of the object of study of this work, it is important to mention that current credit schemes do not have the same accessibility for companies due to different factors: high interest rates, complex requirements, and lack of guarantees. It is precisely here that companies in the rural sector are at a greater disadvantage. Geographical conditions and ignorance of government credit programs prevent access to credit services offered by financial institutions. This, in addition, adds to the complexity of the requirements that are requested.

From the above, the objective of this work is that, through a theoretical review, alternatives can be given to establish community financing models that allow meeting the financial needs of small businesses in the rural sector. It is assumed that a financing scheme appropriate to the conditions of these companies will allow them to have access to financial resources to

solve some of the needs within their production processes; improve their operating conditions; and finally, increase their life expectancy.

FINANCING IN THE RURAL SECTOR

In Mexico, financing for the rural sector has been characterized by the participation that the State has had in it. According to Vogel (2003), until the 1990s, rural financing was characterized by its accentuated intervention, in which credits were directed to specific products and activities, in addition to the imposition of ceilings on interest rates and transfer of subsidies to debtors.

The financing scheme that was implemented for many years benefited, in particular, large capitals, leaving aside producers with fewer resources and who did not have the knowledge to access loans offered by institutions such as Fideicomisos Instituidos en Relacion con la Agricultura (FIRA) or Banco de Desarrollo Rural (BANRURAL), who after 28 years of operation, and due to serious overdue portfolio problems and losses, disappeared giving way to the Financiera Nacional (Proceso, 2003).

Commercial Banking is also involved in the primary sector. However, this has been reduced over time. In 1990, its share in this area was 62%, by 2000, it fell to 45%, and at the end of 2012, it decreased to 37%. Therefore, in constant terms, its share in this market was reduced by half, from 1990 to 2012. Campos (2017) points out that, since 2010, there has been a trend in Commercial Banking to withdraw from municipalities that have less than 15,000 inhabitants. In addition to this, and after the disappearance of the Financiera Nacional de Desarrollo (FND), the Commercial Banking that operates in Mexico has not been able to solve the gap that the institution left in supporting companies in the field, it has even reduced its participation in the sector by 6.4% in real terms at an annual rate (Gutiérrez, 2023).

Until 2018, in general terms, the rural financial system presented a very poor performance, was highly fragmented and invaded by the informal sector (Campos, 2017). A sample of the above is provided by FAO (2012) by suggesting that only 10.4% of the 5.32 million Rural Production Units (RU) have access to credit. This percentage is similar to the 9.9% reported by INEGI (ENA, 2017).

In more recent years, the institutions in charge of granting credit to the Mexican agricultural sector are the Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero (FND); Intermediarios Financieros Bancarios (IFB) y no Bancarios; the Fideicomisos Instituidos en Relación con la Agricultura (FIRA); and other institutions also participate to a lesser extent: Banco Nacional de Comercio Exterior, SNC (Bancomext); Nacional Financiera (NAFIN); Sociedad Hipotecaria Federal (SHF); Banco del Ahorro Nacional y Servicios Financieros (BANSEFI); and Banco Nacional de Obras

y Servicios Públicos (BANOBRAS) (Espinosa & Martínez, 2017). However, rural areas continue to represent a challenge for access to credits that allow them to promote the products they make, so that they can operate as a fit company, seeking to activate the local economy and generate employment.

RURAL ENTERPRISES AND REGIONAL DEVELOPMENT

The most representative companies in the rural environment are, mainly, figures such as cooperatives, communities, or diverse associations, who seek to make use of the available natural resources. These companies develop activities such as jungle and forest management; organic production of coffee, cocoa, honey, and other products; ecotourism; responsible fishing; wildlife management, and community conservation. Today, there are more than 2,000 rural social enterprises distributed specifically in the center and south of the country, and some 18 regions identified as strategic for their valuable experience, which has made Mexico the first producer of organic coffee in the world and the second country in community management (CONACyT, 2012).

When rural businesses are established in a region, they seek to generate a new form of income, taking advantage of the natural resources available in the area. In addition to this, another relevant aspect is the generation of jobs as a way for members of the community to develop their own activities without having to emigrate. In this sense, there is a very marked gender work, women have a fundamental role in the development of productive projects that have allowed generating additional income for families.

Access to finance by companies in the rural sector is significantly behind schedule. According to FAO data (2012), this is manifested in the lag in the supply of financial services, since there is information that, unlike what INEGI reports at a general level, only 6.2% of rural economic units have access to credit, and of these, only 9.5% obtain it from Commercial Banking.

Financial exclusion in terms of credit, adapting the concept of the European Commission (2008), can be understood as difficulties in accessing and using credit services and products in the market, this implies, as mentioned by Zubeldia et al. (2008), that financial exclusion, specifically access to credit, is both a cause and a result of social exclusion. Derived from financial exclusion in rural areas, other forms of access to resources have been implemented, especially for the development of productive projects. These forms include savings and community loans, of which there are important antecedents.

In 1993, the Self-Sustained Comprehensive Rural Development project was developed for the Central Valleys of the states of Puebla and Oaxaca (PDRIA), funded by the W.K. Kellogg, and whose purpose was to generate

a development proposal that would allow farmers to be self-sufficient and capable of successfully facing the problems of their agricultural activities, and specifically, to seek an alternative response to the financing problem (Colegio de Postgraduados, n.d.).

As a result of the PDRIA experience, a new strategy was implemented in 1997 to improve the working method that sought to promote rural development with greater participation of producers in a self-sustainable framework, through financing through the mobilization of savings, loans, and technical assistance (Martínez, 2007). This phase operated with a pilot test during 1998-2003 in communities in the PDRIA regions.

There is another precedent regarding this financing model called the Savings Banks Project of the XIII León Foundation, which through an investment model tries to achieve benefits for rural families. This model operates from the Foundation's community development centers in the states of Chiapas, Oaxaca, and Puebla, with programs in health and nutrition; training, environment; agricultural and crafts development; solidarity economy; and savings. By 2011, it had 35 initiatives in Oaxaca, distributed in small towns in seventeen municipalities, and another five in four municipalities in Guerrero, with a total of 3,910 associates (Martínez et al., 2016).

These experiences are important examples of informal financial inclusion and, sometimes, with alternative approaches that are under different legal forms or protected by other organizations operating in Mexico (Conde, 2000). Its purpose is to contribute to the development of the most backward areas in rural areas, being informal, they represent a different and unrecognized way of including closer financing schemes with people who have not managed to have access to formal means.

METHODOLOGY

The work carried out is of the descriptive documentary type, which involved the collection, selection, analysis, and presentation of information to know the scope of the sources of financing available to small businesses in rural areas. For this, a major literature review was required to identify financing schemes that have been implemented, their operating mechanism, and which of them have been accessed.

Once the different financing schemes and their operation have been identified, the following questions can be answered: Do companies in the rural sector have access to financing schemes appropriate to their conditions? Can a financing scheme oriented towards a more supportive economy be implemented with the participation of the State? Can community savings banks work as a financing strategy for rural businesses?

The literature review also aims to propose, derived from the documented experiences that have been had in some communities, where financing strategies implemented by local companies have worked, seeking to provide alternatives oriented towards a more supportive economy.

RESULTS

In Mexico, several institutions are related to the granting of loans to the rural sector. The most representative are: Institutional Trusts Relating to Agriculture (FIRA) and the now-defunct National Financial Trust for Agricultural, Rural, Forestry and Fisheries Development (FND). Despite the efforts made by these two institutions to bring financing programs closer to lower-income producers and rural businesses, the sources of financing they continue to resort to are informal.

In the case of FIRA, and its latest data published in its 2022 progress and results report, the effort to extend its operating range to more vulnerable sectors is notorious. In the case of women, productive microcredits and technological support were granted for training and technical advice. Regarding producers without access to financing, projects have been implemented to bring financial services to some communities and programs to promote the financial inclusion of micro, family, and small businesses in the states of Chiapas, Guanajuato, Guerrero, and Baja California. These programs have operated with the participation of state governments (FIRA, 2022).

Regarding the FND, according to the 2021 progress and results report, activities were implemented to promote financial inclusion, mainly with producers who are below the welfare line. The intention was to give greater relevance to the placement of credits with small producers. This financial inclusion work should be reflected in the areas of greatest lag in the country, so according to the report, funding was granted to 142,186 final borrowers in areas of medium, high, and very high marginalization. 71% of the loans were granted in Chiapas (37%) and in the state of Mexico (34%). Through 12.7% of the credits, primary activities were financed and 76.3% were directed to the commercial sector (FND, 2021).

FIRA and the now almost extinct FND operate at affordable rates. However, its operating levels have been reduced and the transaction costs and access difficulties that result from individual credit management make it inaccessible, untimely, and with a net financial cost that is high. At the state level, some other credit institutions have also operated, in an attempt to bring financing to rural sector working groups. To mention an example, in the case of Puebla in the northern and northeastern mountains, access to credit is extremely limited, even when companies that offer microfinance operate, among which Banco Azteca, Compartamos, Finamigo, Banxico,

Promujer, and lenders stand out, which offer very high commercial interest rates that range from 37% to 150% per year (Garza et al., 2018).

The efforts made by the State for financial inclusion have had some results. However, the lag continues and other strategies derived from the needs of its inhabitants have been implemented in rural areas. Community savings banks have been an example of this type of strategy that promotes the financial inclusion of the most lagging sectors.

There are already various experiences regarding the operation and operation of savings banks in rural communities. It may seem complex to understand in regions of the country where poverty is extremely marked. The intention of making this type of proposal is that, from previous experiences, knowledge about the benefits that can be achieved through its implementation is expanded. It is known from these experiences that its main function is to generate a culture of savings among members of the community but, at the same time, this savings is transformed into an investment model to generate subsequent benefits.

From the review, community savings banks can operate as a source of development for rural businesses. The savings scheme must start from the disposable income of the families, based on the assumption made by Martínez et al. (2016), on the conviction that families with limited resources and income not only want and can save but do so when they have at their disposal organizations and instruments adapted to their particularities.

One of the most marked challenges to this type of project is the low income of families, which prevents a culture of savings. It is therefore necessary for the priority needs of families to be met, referring specifically to food security issues. In an ideal scenario for the project, community savings banks would have to operate alongside other community development projects that incentivize food security.

The operation of the project requires the contribution of initial capital that may come from the State itself or some Non-Governmental Organizations (NGOs), in addition to adequate training and support to comply with the agreements established and operate properly. It is necessary for the institution that provides the initial capital to monitor the operation of the project.

The operation of the savings banks must be in charge of the people of the same community, chosen by themselves. In addition to this, the operating rules, savings amounts, interest rates, and fines will be designed by the people who can join the project. The main reason for this way of operating is to build trust in the community, this is derived from previous experiences related to fraud.

While it is true, community savings banks, as they do not have an official registry, are classified as informal sources of financing, representing alternative access to financial resources for the most lagging sectors in rural areas. The literature review work carried out made it possible to identify

some community savings projects that have worked and, in addition, have promoted groups that work with productive projects in some of the regions with the greatest degree of lag in the country.

CONCLUSIONS

In Mexico, financial exclusion continues to represent a pending challenge to be addressed. Although it is true, and according to what was found in the literature review, the efforts of the State through its institutions have managed to advance in some aspects such as expanding the coverage and characteristics of the credits offered. Some examples of these efforts are productive microcredits; expansion of financial services to communities; and attention to producers below the welfare line.

There is still an important sector within micro, small, and medium enterprises in the country that has been limited in terms of access to some type of credit. Within this sector are rural companies, who, due to the lagging conditions of many of the country's regions, do not know about the programs they operate and to which they can have access. Added to this is the complexity of the operating rules or the guarantees they request.

In the case of private microfinance, which has grown in recent years, the main problem is high interest rates and payments, which even if they are small extend to very long periods. It is necessary to design financing schemes appropriate to the particularity of companies in the rural sector. There is progress in this regard and it is from there that it should be taken as experience to identify the functionality of replicating and improving it, adapting the various strategies implemented to the particularities of this type of company. Recalling that they seek to generate income and jobs for the people of the region.

The financing project on savings banks has turned out to be one of the functional strategies from different scenarios. On the one hand, it allows people to get involved in saving, designing a form of operation that could be functional according to their conditions. On the other hand, it forces people to get involved in the design of their own operating rules, savings amounts, interest rates, and sanctions to be implemented.

For the implementation of community savings banks, the active participation of the State is necessary, since initial capital is required to start operations. In addition, it can be complemented with community development projects that improve the food security conditions of the population.

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Perceptual Assessment of the Communication Sciences Graduates from Universidad del Mar (UMAR) and their Professional Profile. Professional Competences

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María Teresa López Martínez
mariateresal@huatulco.umar.mx
ORCID: 0000-0001-6800-1833

Sonia López Hernández
sonial@huatulco.umar.mx
ORCID: 0000-0002-9669-1488

Universidad del Mar, Campus Huatulco. Oaxaca México

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— Abstract—

The evolution of communication due to the convergence of media and digitalization makes it necessary to review the role and competencies of the communication professional to adapt university studies. At this juncture, and with the theoretical assumption that the curriculum not only has intrinsic value in knowledge (Díaz and Barrón, 2023) but that it is important for students to develop problem-solving skills and strategies (Gil-Galván, 2018) and that from practical rationality, we reflect on the profile of the communicator to whom the current curriculum at the Universidad del Mar is oriented through a survey of its graduates, with open and closed questions, in Google form format sent through social networks. The objective is to know, from these communicators, the imaginary of this profession and the knowledge, skills, and attitudes demanded in the social field, as a source in the development of the curriculum in "specific know-how" (Casarini Ratto, 1997).

This article presents the partial results of that survey. Among these, the work skills obtained at the University are positively evaluated. The positive perception of UMAR by the participants is evident through the survey of its graduates (mentioned). As a complementary part, conversations with students are collected on social networks (Brito et al., 2015) such as Facebook and WhatsApp (Bordas-Beltrán et al., 2021), as well as some other oral sources that have participated in the graduate monitoring area and the Communication Sciences career department.

Keywords:

Educational relevance; higher education; professional competence; communication Sciences; Curriculum; practical rationality; social networks

The results of higher education graduates in the Mexican labor market, based on information provided by the Organization for Economic Cooperation and Development (OECD) (2019), indicate that "there is no comprehensive information available to evaluate the skills of adults in Mexico, although the country recently joined the Program for the International Assessment of Adult Competencies (PIAAC)." In addition, the public information on the subject is not comprehensive or representative concerning the specific competencies of specific programs of university graduates. On the other hand, "employers argue that higher education graduates lack the skills they require, both in terms of specific knowledge of a discipline and transversal skills" (OECD, 2019).

In the particular case of Communication Sciences programs, even though "subjects for digital media have been included, employers consider that theoretical and practical teaching in the field of new media is not being efficiently covered" (CONEICC, 2014, as cited in Chamosa & Herrera, 2018). Moreover, with the rise of digital media (in a broad sense) and the changes in the communication sector linked to ICT, "there is a need to compensate the knowledge acquired in academia with the skills and abilities demanded in the digital labor sector" (Ventura et al., 2018, p. 333).

Studies of higher-level curricular theory have had an extensive scenario (Álvarez et al., 2023; Turbí et al., 2023; Espejo et al., 2020) and allow the analysis of various aspects of the educational space in an interconnected way, such as the curriculum itself, the individuals who are the ones who receive that instruction or education materialized in the curricular network and a social context.

In graduates, the role their university education has played in the workplace is fundamental. In this framework, it is understood that "curricular intentions and the development and practical application of the curriculum feed into each other" (Casarini, 1997, p. 22), as well as being modeled in curricular design and supporting the pedagogical model. Other authors such as Díaz Barriga and Barrón (2023) have studied the role of the curriculum to explore various aspects where forms of social representations, pedagogical practices, and the stories of each of the actors involved in these processes (institution, teachers, students) are located. We can say that from different perspectives the interest in understanding the curriculum has increased.

For this study, the integrative approach theory by Díaz Barriga (Ramírez, et al., 2009) was used, in which the curricular design methodology is framed, which is based on the social, psychoeducational, epistemological, and technical dimensions. That is a vision that recovers a holistic aspect that can help to explore different scenarios in the conformation of the curriculum (Díaz Barriga & Barrón, 2023). From this perspective "the purpose of training competent subjects, is to enhance in new societies the bases to face situa-

tions of a professional nature or of everyday life and solve them forcefully" (Arrieta & Acosta, 2014, p. 176).

In particular, in the curricular design process, it is necessary to have a mechanism to ensure contact between the university and society (Weiss, 2015) is culturally, socially, and economically relevant (Malagón, 2006), to collect, observe, select, and operationalize generic and specific competences to review (or redefine) the graduate's professional profile and "the curriculum, understood as processes of selection, organization, production, reproduction, and distribution of culture" (Malagón, 2006, p. 89).

In this sense, although educational institutions are a continuous system and the construction of indicators to monitor students' knowledge and skills are included and analyzed at different times in the process, a tool to guide educational practices is the analysis of graduates' indicators (their evaluation and opinion). Thus, as can be seen in the following:

> When professional culture is expressed as one of the integrative references of the curriculum, the knowledge, skills, motives, values, and personal resources of the students that give meaning and print an authentic personal and social value to the mode of action of the university graduate are considered. (Lena & Reinoso, 2022, p. 165)

Strategies to collect evidence from graduates vary according to the institution (resources) and objectives, therefore, they can be long-term or temporary, and the actors also change.

However, one of the factors that must be taken into account is the following:

> "Educational institutions by their nature require the permanent impulse of curricular changes, to achieve and/or maintain leadership in their substantive functions; however, Sánchez (1995) argues that updating the contents of educational programs, as a single action, is insufficient to face the challenges of the accelerated advancement of knowledge." (Ramirez et al., 2009, p.6)

That is, educational institutions depend on a cultural, social, political, and economic context (Arrieta & Acosta, 2014), but strategic planning also reflects the internal context of the institution, the general plans of the organization, and its model (vision, philosophy, mission, objectives, policies, strategies, programs, budgets).

In this context, this research report analyzes the professional perception of the Graduates of Communication Sciences (ECC) at the Universidad del Mar (UMAR), analyzing their performance and professional development through the observation of the professional trajectory considering the areas of performance integrating activities related or not with their education.

The work is an approach to the evaluation of the graduation profile and the diagnosis for the modification of the Communication Sciences curriculum in the UMAR that belongs to the University System of the State of Oaxaca (SUNEO).[1] It should be noted that the process of restructuring the curriculum has not been completed.

BACKGROUND

The degree of Communication Sciences in Mexico has been a research problem. María Antonieta Rebeil (as cited in Pérez & Torrescano, 2021) pointed out at the time that there were a variety of programs offered by Universities in Mexico where, according to the researcher, there are more than a thousand programs. The National Association of Universities and Institutions of Higher Education (ANUIES, 2019), it is quoted verbatim: "reports the existence of 445 curricula offered in Mexico referring to Communication, Communication Sciences, Communication Sciences and Techniques, Communication and Digital Media, Digital Journalism, among others" (Pérez & Torrescano, 2021, p. 78).

In Oaxaca, according to information retrieved from the Catalogue of the Higher Education Offer in the state of Oaxaca from 2022 to 2023, as shown in Table 1, which has been the work of the Technical Secretariat of the State Commission for the Planning of Higher Education in the State of Oaxaca (COEPES) in collaboration with Higher Education Institutions (IES), 14 institutions offer variants in the area, such as Communication Sciences, Communication Sciences and Techniques, Audiovisual Communication, Graphic Communication, and Communication for Social Development, (State Commission for the Planning of Higher Education in the State of Oaxaca, 2022).

1 The University System of the State of Oaxaca (SUNEO) is aimed at decentralizing higher education services and obtaining a high academic quality in the development of its substantive functions: teaching, research, dissemination of culture, and advocacy for development.

Table 1

Bachelor's Degrees Educational Offer Related to the Area of Communication Sciences 2022-2023

1.	Bachelor's Degree in Audiovisual Communication (IESEAN)-**INSTITUTO DE ESTUDIOS SUPERIORES EMPRENDEDORES ALFRED NOBEL CAMPUS TEHUANTEPEC**
2.	Degree in Graphic Communication (UNIVAS)-**UNIVERSIDAD JOSÉ VASCONCELOS DE OAXACA (OAXACA DE JUÁREZ)**
3.	Degree in Communication Sciences and Techniques (IESO)-**INSTITUTO DE ESTUDIOS SUPERIORES DE OAXACA (OAXACA DE JUÁREZ)**
4.	Degree in Communication Sciences (IESPE)-**REUS-INSTITUTO DE ESTUDIOS SUPERIORES DE PUERTO ESCONDIDO**
5.	Degree in Communication Sciences (IMES)-**INSTITUTO MIXTECO DE EDUCACIÓN SUPERIOR (TEZOATLÁN, HUAJUAPAN)**
6.	Degree in Communication for Social (ISIA)-**INSTITUTO SUPERIOR INTERCULTURAL AYUUK (MAGDALENA JALTEPEC)**
7.	Associate Professional in Social Communication (ISIA)-**INSTITUTO SUPERIOR INTERCULTURAL AYUUK (MAGDALENA JALTEPEC)**
8.	Degree in Communication (UAO)-**UNIVERSIDAD ANÁHUAC DE OAXACA (SAN RAYMUNDO JALPAN)**
9.	Degree in Communication and Digital Media (ULSAO)-**UNIVERSIDAD LA SALLE DE OAXACA**
10.	Degree in Communication Sciences (UMAR)-**UNIVERSIDAD DEL MAR (CAMPUS HUATULCO)**
11.	Degree in Communication Technical Sciences (UNID)-**UNIVERSIDAD INTERAMERICANA PARA EL DESARROLLO (CAMPUS TUXTEPEC)**
12.	Degree in Communication (UNIMESO)-**UNIVERSIDAD MESOAMERICANA (OAXACA DE JUÁREZ)**
13.	Degree in Communication Sciences (UNIVAS)-**UNIVERSIDAD JOSÉ VASCONCELOS DE OAXACA (OAXACA DE JUÁREZ)**
14.	Degree in Communicationand Information Media (UNIP)-**UNIVERSIDAD INTERNACIONAL DEL PACÍFICO (PUERTO ESCONDIDO)**

Note. Own elaboration based on the Catalogue of the offer of higher education in the state of Oaxaca 2022-2023 (COEPES, 2022).

From the data presented, it is observed that the bachelor's degree in Communication Sciences of the UMAR is the only one in the Costa, Itsmo, and Sierra Sur regions of the state that belongs to a public institution.

The Universidad del Mar (UMAR) was born under the direct request of the then governor of Oaxaca, the founding director Modesto Seara Vázquez, and began its construction in 1991 in Puerto Ángel. In the beginning, the project considered maritime and tourism issues. In 2000, the Huatulco campus opened with degrees in Tourism Administration and International Relations (Seara, 2010). The Communication Sciences degree welcomed the first generation in 2002 with a total of 21 students, of whom 21 graduated in three generations: 6 in 2007, 3 in 2008, and 12 in 2009.

The bachelor's degree in Communication Sciences of the UMAR, in testimony with the teacher who was Head of the Communication Sciences Degree (JCCC) at that time, obtained the registration before the SEP of her curriculum between 2006 and 2007, and so far, it has not been modified or

updated. It is school-based and full-time, and consists of 10 semesters with 5 subjects each, in addition to languages.

The competencies of the graduation profile of the Communication Sciences student, according to the official website (UMAR, 2024), have to do with the ability to acquire theoretical and methodological knowledge applicable to social communication from the community to the world; it also includes mastery of foreign languages, professional ethical performance, as well as social responsibility, information management, project evaluation, in addition to the preparation of messages in different scenarios and media.

From the above, it should be noted that, in the profile of the graduate, around the competencies that they must have, there is their "analytical, critical, and proactive capacity", that is, cognitive skills (Shunk, 2012), since they were acquired in the classroom and that will be explained later in the exploratory work. Similarly, the planning and coordination work through the communication strategies that graduates must have to correspond to social skills (Alania, et al, 2019). Finally, the values that are in the first instance in the competencies are to be able to work with ethics, professionalism, and social responsibility, which should have been acquired in the classroom (Cevallos, 2012).

Among the follow-up and evaluation actions of the curriculum of the Bachelor of Communication Sciences at the UMAR are different projects and works whose objectives vary between those recognized by Stenhouse (1998): "improvement of the course; decisions about individuals; and administrative regulation" (p. 144). These include the exercise for evaluation by the Interinstitutional Committees for the Evaluation of Higher Education (CIEES, 2010), the annual reports of the Coordination of the Academic Tutoring Program (PITA), and research on the subject (Dzul & López, 2015, as cited in Romero & Vázquez, 2017) that include data supporting learning and labor insertion; the annual reports of the institutional program of Professional Internships "compulsory academic activity to be carried out by the student at the end of the sixth and eighth semesters" (UMAR, 2016), with quantitative and qualitative data on "skills, knowledge, standards, and abilities" recorded in the final evaluation prepared by the immediate heads or directors of each location where the students were, being students from the sixth to the tenth semester, and some graduates.

It is necessary to clarify that there are barriers to accessing the aforementioned information to manage it, which deserves another analysis and is not the subject of this work. In particular, in the area of graduate monitoring, according to testimony from the JCCC on duty in 2019, the Universidad Tecnológica de la Mixteca (UTM), of the System of State Universities of Oaxaca (SUNEO), presented to the UMAR a digital platform for Graduate Monitoring to retrieve current information from young people, publish-

ing job offers, validating companies, and generating databases with salary statistics adapted to the needs of graduates (Martínez et al., 2019). That same year, the person in charge of the area of graduates of the Degree of Communication Sciences interviewed 6 graduates of the 2018 class about the importance of an institutional platform. The results of both processes in the case of the bachelor's degree in Communication UMAR are unknown.

Likewise, on January 5, 2023, the Academic Vice-Principal's Office of the UMAR sent a survey to graduates of all degrees at the University to announce the creation of an institutional Graduate Monitoring site and collect information from this group. These results are not public at this time.

It should be noted that currently, the degree in Communication Sciences at the UMAR is in the process of curriculum review, which includes different procedures such as the preparation of the mission, vision, objective, and admission profile by the university authorities (UMAR, 2024).

METHODOLOGY

This research was part of a Graduate Monitoring project, to update a directory of graduates and know the career path of professionals trained in the degree of Communication Sciences (CS). Thus, at the time of data collection, the total number of graduates was 257. The work is exploratory with variables focused on the perception of the graduate, regarding the effectiveness of using the intellectual and cognitive skills obtained in the University to solve problems in their employment; as well as the management of social relationships.

The total number of graduates was summoned (as there is no directory of alumni), the data reported are from the 31 generational cohorts with more than five years in the labor market, which corresponds to the group of people who began their studies in the same period or can also be defined as a temporary situation that marks cycles and/or processes (ANUIES, 2018). It also takes into account that Fresán Orozco (ANUIES, 2018) points out that for this type of study, "it is required that the generational cohorts correspond to graduates who have five years in the labor market" (p. 29).

The instrument was developed with the Google Forms tool to improve information processing and access for graduates. We first contacted them through social networks (Facebook and WhatsApp) based on horizontal communication, as a strategy to convince participants (Brito et al., 2015). This addressed one of the problems of trajectory studies related to the graduates' location and their disposition, which increases their complexity and restricts randomness. (Sánchez-Olavarría, 2014, p. 45).

The population was made up of 257 graduates of the UMAR[2] CS degree, who make up 13 classes (2002-2019). The questionnaire was inboxed

from the alumni Facebook page and collected continuously for over seven months. 65 questionnaires were retrieved, but 47 were considered for this work (a sample of 18.21% of total alumni). Those without identification of the graduate's year of admission were excluded.

The reagents (open and closed) were designed (2019) based mainly on the Manual of Instruments and Recommendations on the Monitoring of Graduates of the GRADUA2/GRADUA2/Asociación Columbus Network (2006), an instrument discussed in committee of teachers and adapted to the needs and particular context. For this report, six items out of a total of 26 (which includes personal, school, and competence data) are taken up, which addresses its exploratory nature, given that there is no precise background of the case and for subsequent analysis of the information of the open questions.

Regarding the testimonies on social networks between the graduates and the JCCC, those that occurred in May 2019, were contemplated, and they had opinions of their employers and work skills. A total of 26 conversations were recorded on Facebook and WhatsApp from the JCCC personal accounts, and six are included in this work; WhatsApp and Facebook audios and texts are presented, and there is explicit authorization for their use since the objective is to complement the information (López, 2017; Brito et al., 2015). Each participation is identified in the text as: "Graduate 1", "Graduate 2", etc.

As a technique, the unstructured interview was used for an informal dialogue, it was a tool in which they had a free conversation (Sagastizabal, 2006). The questions of interest are: *How are you doing at work? How do your employers feel about your performance? What did you learn from college? And what do you gain from work?*

It should be noted that in this scenario, before the pandemic, the use of networks allowed them to be tools that, as Agostini et al. (2003) point out, generated virtual dialogues that brought graduates closer, thus networks facilitated the link (Angulo-Armenta et al., 2021) between young people and the JCCC (who is also a teacher) at that time.

The study notes that social networks "have become one of the main communication channels for higher education institutions -IES-" (Segura-Mariño et al., 2020, p. 131), in particular Facebook, and as Esquivel and Rojas (2014) point out, it became a means to achieve an institutional objective: to contact graduates and follow up on them. With an emphasis on providing information and taking advantage of the platform effectively (Brito et al., 2015), these testimonies from graduates (*key informants*) contribute data to this research (Baez, 2009).

2 By 2022 there will be 287 graduates.

DEVELOPMENT

The Río Arcotete ejido is located in the municipality of San Cristóbal de Las Casas, Chiapas (Figure 1). It is located 4 kilometers northwest of the city's urban layout (Montoya & Hernández, 2013). According to the farmers, it is argued that the ejido was founded by 45 people from other communities surrounding the municipality such as El Aguaje, Agua de Pajarito, Carmen Arcotete, Las Ollas, and Yut-osil II. The latter two correspond to the municipality of San Juan Chamula (Fieldwork, 2019). Many indigenous people were expelled or displaced for having opposed the religious beliefs and "traditional" policies in their communities. Particularly, in Chamula thousands of indigenous people were expelled due to religious and agrarian problems (Cortéz & Velasco, 2012), and the nearest point of refuge and settlement for the displaced population was San Cristóbal de Las Casas.

The next aspect to consider in the research approach is practical rationality, which is a line of thought focused on meaning human action, as opposed to the dichotomy between theory and practice and bringing together thinking and doing. This approach is more attached to a reflective moral practice than to the exercise of a technique in which one chooses between several alternatives (Márquez, 2015, p. 21). Pila Martínez (2022) alludes to the balance that must exist between the human perception of reality about its technical manipulation. In this sense, this rationality in the *curriculum* is conceived as an instrument to organize educational practice.

For Schwab (as cited in Márquez, 2015,) the opportunity for the *curriculum* field to be reborn "is to reorient its universal and decontextualized theoretical principles, towards new methods of action based on the deliberation of unique problematic situations" (p. 28).

In this sense, one stage of the curricular design work is the investigation of specific situations, and a specific one is the relationship of society with the discipline considering the labor development of the graduates, to obtain a map of the areas and activities that the graduate will carry out. However, defining the field of professional development of graduates of the curriculum requires observing the growth of the employability environment in global, national, and regional contexts, among others.

A performance study of graduates is useful for "self-knowledge and for the planning of processes of improvement and consolidation of educational institutions" (ANUIES, 2018, p. 19). This does not mean depending on the dynamics of the market, because they can be temporary, but neither can it be alien to the demands because it loses validity.

In addition, the graduate studies show that with the training received, they can develop in the chosen area of knowledge or if they require training for professional work. Likewise, the information allows us to analyze the

"paths" that professionals follow when joining the labor market and whether they can climb into complex positions. They also "indirectly contribute to highlighting the quality of the academic staff of educational institutions, the relevance and timeliness of their curricula and programs, and the suitability of their pedagogical strategies" (Cano, 2008, p. 23).

As Sánchez (2017) points out, graduate studies at the IES are an important part of evaluation and certification programs such as the Evaluation of Higher Education (CIEES) or the Council for the Accreditation of Higher Education (COPAES).

The term of *graduate* for this research is defined as: "Student who, having passed all the subjects and established requirements of a study program during the immediately preceding school year, is entitled to the respective certificate of studies". Said term was published in the Ministry of Economics (2024) on current aspects of the Universidad del Mar.

Therefore, this work considered its graduates to identify the skills demanded when they enter the labor market. This research considers skills for which the graduate must be competent when using strategies, actions, and diverse didactics that come from their university studies. Other skills added by Alania et al. (2019) are the social ones that, through behavior, allow the graduate to perform effectively in their interpersonal relationships, in a satisfactory way.

For cognitive skills, since the students surveyed indicated their experience in the classroom, it is based on social cognitive theory. These are given in a classroom learning where the teacher explains and demonstrates the skills that students must learn, to subsequently perform the corresponding directed practice and be evaluated. Finally, if instruction is learned at the teacher's discretion, students engage in independent, teacher-supervised practice (Shunk, 2012).

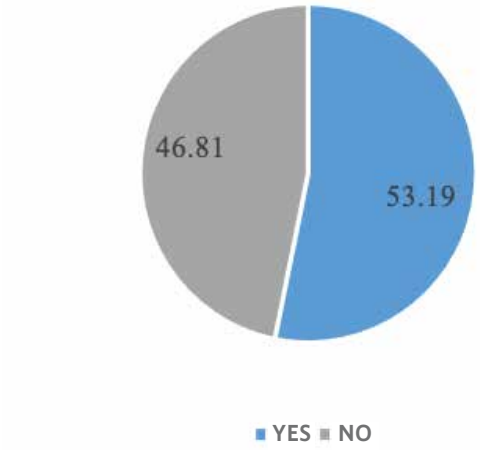
Hence, León et al. (2018) emphasize the role that universities (public and private) have in the generation of skills and knowledge specific to each discipline, with the aim of "raising, describing, understanding, interpreting, and explaining the phenomenon of education as an intercultural and subjective expression" (p. 124). In this process, Pinilla and Moreno (2015) point out that those who interact, in addition to the institution, are the teacher and the student, to ultimately articulate knowledge and innovation in social practices that allow for the transformation and construction of equitable policies (Alvarado, et al, 2016).

In short, the students acquire knowledge granted by the career curriculum, and obtain professional skills after applying said knowledge in specific situations.

RESULTS

The educational process cannot be oblivious to social needs and the changing labor market with the advent of new information technologies. Understanding the reality in which IES graduates are inserted implies an adequate diagnosis of these social demands.

The results of the research indicate, as shown in Figure 1, that the graduates of the UMAR chose their career as the first option. This, as Pérez and Torrescano (2021) point out, is a way in which the student aspires to an integrated whole and in which he is projected in the future towards concrete actions.



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

Figure 1. Was the degree you studied your first choice?

On the other hand, vocational choice can allow the student to discover interests, attitudes, and skills related to it (Hermosillo 2008, as cited in Alarcón 2019). Similarly, as expressed by D'Angelo (2000):

> The life project, precisely, is the general structure that would channel the directions of the personality in the different areas of activity and social life, flexibly and consistently, in a temporal perspective that organizes the main aspirations and current and future achievements of the person (p. 272).

Regarding obtaining a university degree after graduation, at the time of the survey application, more than 50% indicated that they do not have a degree yet. The graduation types are presenting a thesis or taking the General Graduate Examination (EGEL) (Universidad del Mar, 2016), the latter, according to León et al. (2018), has a close link with the professional field, since it identifies skills for the "country's professional career" (p. 47).

Some students pointed out about the degree process the following: "Finishing the English language course should not be a requirement." However as stated by Montero et al. (2019), mastering another language is important because it is demanded by companies and by the advancement of science. In addition, this aspect is part of the institutional spirit, which was part of the foundation of the UMAR and SUNEO by Mr. Seara (2010). On the other hand, according to Edel et al. (2005, as cited in Rodriguez, 2014):

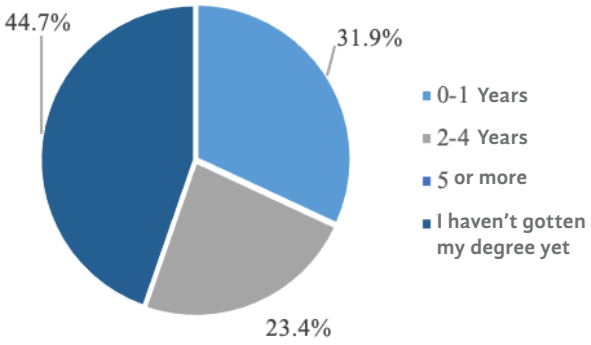
> Quality indicators in higher education determine that terminal efficiency represents one of the ways to achieve productivity and social objectives [...] Having a university degree is essential, not only for access to better jobs, better salary, and greater professional status but also for the level of economic and cultural development of a country. (p. 118)

In this regard, the results of this study, as shown in Figure 2, reveal that only a third of students graduate in less than a year, it is necessary to analyze the reasons for the delay, since they can be (by geographical area) for economic reasons (if the process is expensive or the graduate is required to enter the labor market to support the family), or for long or complicated administrative procedures.

About this topic, a testimony pointed out that to improve the possibility of graduating through the thesis modality, it should be taken into account: "to teach classes or a workshop on how to research since it would help those students who wanted to do a thesis". Likewise, according to Rodríguez (2014):

> Determine if the fact that the institution does not offer students within its curricula subjects that support them in carrying out their thesis work throughout their professional career is another factor that influences the low degree rate of its students. (p. 121).

Therefore, the subject must be deeply reflected in the updating of the curriculum.



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

Figure 2. How long did it take you to get your college degree once you graduated?

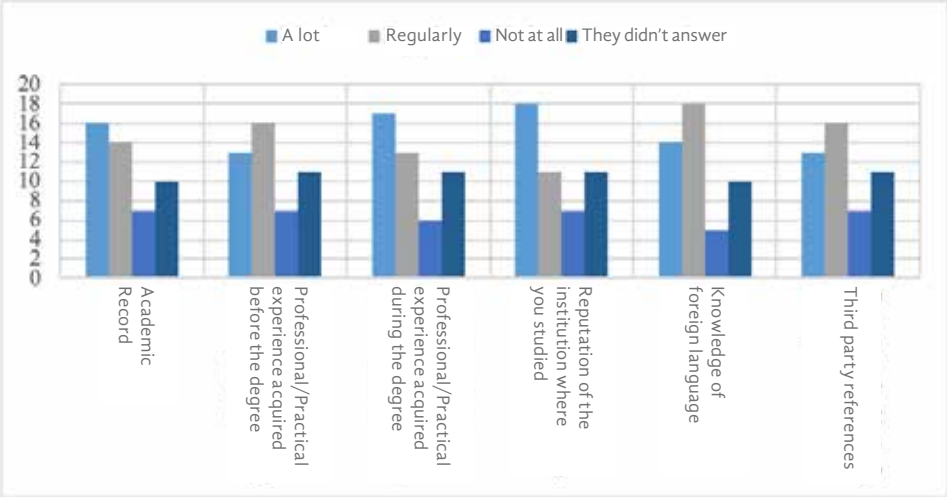
This was assessed following the graduation profile of the student of the Communication Sciences degree at the UMAR, who obtains the following:

> Theoretical-methodological skills to participate in social communication processes within their community and at a global level with mastery of foreign languages based on their analytical, critical, and proactive capacity. They will be able to: perform with an ethical-professional foundation and social responsibility; create and organize working groups in the field of communication; plan, coordinate, and evaluate projects and communication strategies; manage information and elaborate and produce messages in different areas and media. (UMAR, 2024, Bachelor's degree in Communication Sciences)

Thus, Table 2, presents the results of the graduate's perception of the employer:

Table 2

In your opinion, how were the following aspects assessed by your first employer after you graduated?



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

About question *H1 In your opinion, how were the following aspects assessed by your first employer after you graduated?* The aspects to consider were the following: academic record, professional experience/practice acquired before the degree, professional experience/practice acquired during the degree, reputation of the institution where you studied, knowledge of foreign languages, and recommendations/references of third parties.

Below are some testimonials:

> My boss says that I am a responsible person with a focus on details. That I am very human, and my way of leadership is effective. (Graduate 1).
>
> The feedback I have been given on my work has been that I am a good leader, responsible, a person who can be trusted, and who likes to continue learning new things. (Graduate 2).
>
> My employers have described me as a creative and talented person who always seeks to innovate and achieve set goals. In addition, they highlight my commitment and my effort to give more than what is expected of me. (Graduate 4)

The highest percentage corresponds to *the reputation of the institution where you studied*, which indicates that the perception of the educational center where students have received their training is a fundamental pillar. However, also the items best valued by the employer (according to the graduate) are knowledge and practical and language skills: "Really, my strength is having good English skills". (Graduate 1).

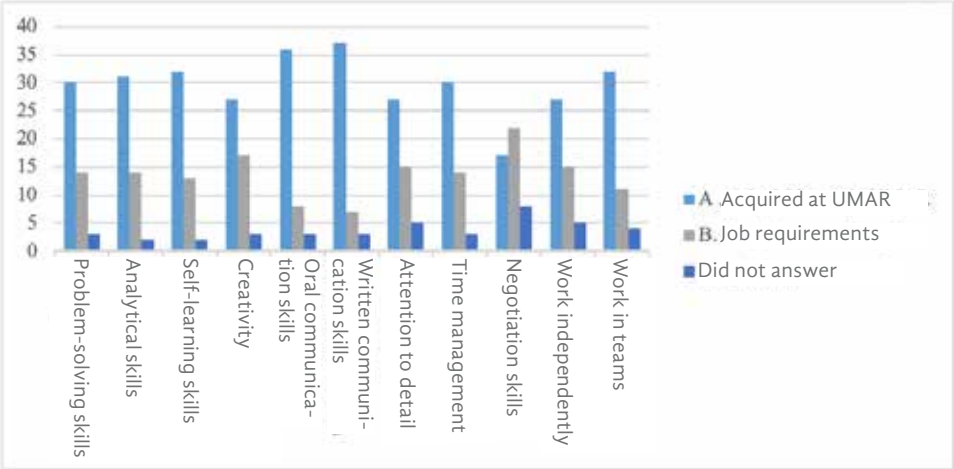
On the other hand, the student's own opinion of his work performance suggests a positive assessment of the institution for offering necessary work skills.

One of the questions of the questionnaire corresponded to *indicate to what extent you possessed the following skills at the time of your graduation and which of them are necessary for your current work*, here the variables to consider were: the ability to solve problems, analyzing skills, ability for autonomous learning, creativity, oral communication skills, written communication skills, accuracy, attention to detail; time management, negotiation skills, working independently, working in a team.

> Since I left UMAR, I am still disciplined and a team player. (Graduate 2).
>
> Although I do not consider myself an expert in these fields, I have been able to do a good job. Even concepts that I learned in subjects such as organizational communication, despite not being my favorite, have been very helpful to me. (Graduate 4)

Table 3

To what extent did you possess the following skills at the time of your graduation and which of them are necessary for your current job? If you are not working, please just answer column A



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

The above aspects correspond to skills at the end of the degree, although not necessarily acquired in the UMAR, but as requirements in employment. It is considered that these skills should be transversal to the different areas of the curriculum. However, this has a direct relationship with teaching practice, since "teachers start from their work to link it with different aspects of social reality, to build the representation of their exercise" (Evangelista, 2015, as cited in Villalpando et al., 2020, p. 232). In this sense, there are elements to observe the role of the teacher in their daily work. Below are the following testimonials:

> I don't know whether to take it as a value or skill, but the love and passion with which teachers exercise. (Graduate 2).
>
> I dedicate a lot of time to work not because they ask me to, but because I also have that availability that is taught to us at school, and as much as it could be counterproductive because “they never overwork, they are not paying you more, no one is going to recognize it”, and maybe it is true, but I think that we learned that you are not doing it for someone to reward you, but for personal satisfaction and I like that a lot, because they have recognized it: “We can count on you (name of graduate 5), we can trust you, we can assign more responsibility”, and I believe that this was instilled in me a lot by the school. (Graduate 5)

In the first instance, the skill with the highest percentage they expressed when graduating was *written communication*. It should be noted that students take subjects to learn how to write, they are subjects related, mainly to journalism, since in this area a student in the role of the journalist is allowed to approach reading, inquiry, analysis, and critical thinking, in addition to contributing to the improvement of their language skills (Domínguez & Rivero, 2018). Below are some testimonials retrieved from WhatsApp:

> I mostly developed writing skills. (Graduate 1).
>
> The presentation is important and the content even more, so one of my strengths has been written communication, and that has given me a lot of recognition. They ask me to write certain things and they give me total freedom. (Graduate 5)

The second skill required in current employment (as they are also skills at the end of university) is *negotiation*, and to a lesser extent *written communication*. In this sense, it can be said that technological aspects could have greater inference because ICTs are part of the scenarios of socialization and learning of new forms of communication involving the use of smartphones, digital platforms, and book readers (Casillas, 2016) that have reduced the use of written communication, which has been occurring in the forms of socialization. In addition to this group of evaluated items, graduates recognize knowledge and skills that are not mentioned in the applied instrument. Some of these are entrepreneurship, personal character, and ICT. Topic comments are: *Putting theory into practice. Work with companies, institutions, or in real situations, so that what is seen in class is part of an impact in some area of professional development/ Professionalism among teachers, a staff of teachers appropriate to the degree, and an updated curriculum. /Be picky about spelling. Working under pressure Forge character and leadership/ Use more technology tools.*

Two testimonials retrieved from Facebook noted the following:

> As for the skills that have been useful to me at work, my technical skills in photography, video, and design have played a crucial role. (Graduate 4).
>
> I have tried to teach my classmates new things about what I know, such as program management, and the use of some technologies. I work with people who are older than me and are not very familiar with it and I have been recognized as being very self-taught and good at teaching. That's what they say (laughs). (Graduate 5)

According to the testimonies, young people consider, as stated by Cevallos (2012), that in the achievement of objectives in higher education, there must

be comprehensive training that can incorporate theory and practice, as well as aspects related to attitudes, procedures, and the generation of values in the pedagogical process within the university environment.

Another significant part corresponds to the question: *To what extent did you possess the following competencies at the time of your graduation and which of them are necessary for your current job*, in this topic the variables to consider were: adaptability, determination, resolution, and persistence; the power of concentration, predisposition to be personally involved in the work, critical thinking, tolerance, and leadership skills. Three testimonials retrieved from WhatsApp and Facebook:

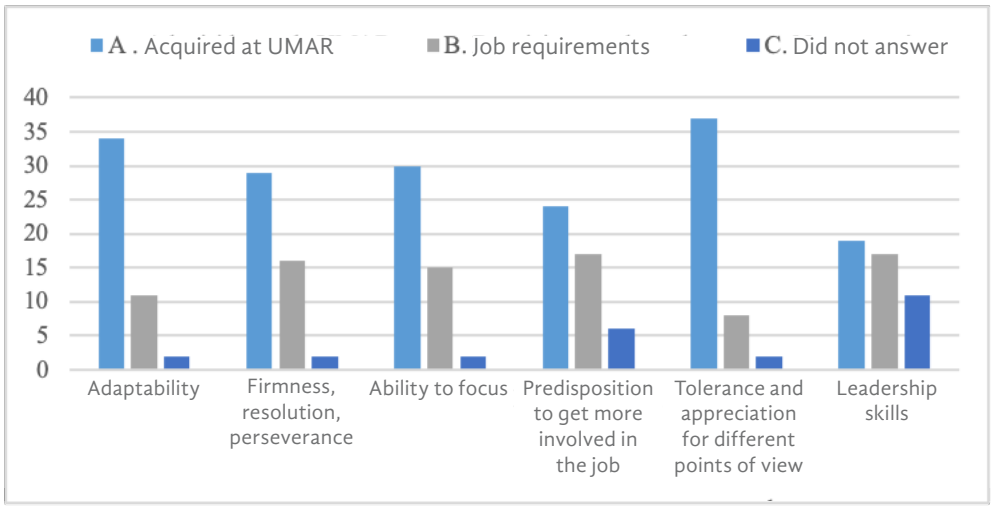
> The guys I manage in my current job say that I am organized and that I give them confidence in that part because I can handle situations without any risk. (Graduate 3).
>
> My employers have told me that I need to work on improving my ability to deal with frustration and react more positively when things don't go as expected. (Graduate 4).
>
> What they have told me when they recognize my work is my ability to make decisions for myself to solve certain things. Certain procedures were performed in a certain way and I have tried to suggest how to do it better and in less time. (Graduate 5)

The variables acquired at the UMAR that had a high percentage are adaptability, determination, resolution, persistence, power of concentration, and tolerance as part of the work requirements. The role of social skills (Alania, 2019) has contributed to their ways of interacting in the workplace. A WhatsApp testimonial: "When handling personal issues, I generate trust" (Graduate 3).

It is significant that during university life, students adapt to the system full time (Seara, 2010), while young people face the climatic conditions of the Oaxacan coast where the UMAR is located. Hence, as Arón and Milicic (2004) reflect, in terms of infrastructure and also an external element in education such as the climate factor can affect performance. In this regard, the following results are presented in Table 4

Table 4

To what extent did you possess the following competencies at the time of your graduation and which of them are necessary for your current job? If you are not working, please just answer column A



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

On the other hand, the opinion of graduates regarding their training and its impact on their lives (in a broad sense of existing) positively values the institution. In the case of the question: *To what extent have the degree you graduated from been useful in preparing you for professional tasks?* More than 50 answered a lot. The university environment impacted the graduates and in the related areas for *other spheres of life*, in the same way, and they responded that *a lot*. What they expressed in Facebook messages was about their ethical performance and work well done:

> Another aspect that I put a lot of emphasis on is working ethically. I especially remember one of my teachers telling us that what starts well, ends well. Therefore, I try to do each task efficiently and responsibly, knowing that skipping ethical values, even though it may involve a shortcut to reach goals, can have negative consequences for both my employers and myself in the long term. (Graduate 4).
>
> The thing that the university taught me was to give a little more than what is asked of me. So, I try to put extra effort into things. They never give you a job when you are lacking, they didn't teach me that at school either. They taught me to deliver things well done, and very well developed. (Graduate 5).
>
> Ethics in the workplace is a value, it is a responsibility as a person. It helps to be empathetic in situations that are not within reach, especially because society generates changes, it helps to have empathy and an organized climate

> in employment. A value I acquired in school is punctuality, speaking truthfully, and loyalty. Now I owe it to an institution that is now my workplace. I learned those values from my teachers. (Graduate 6)

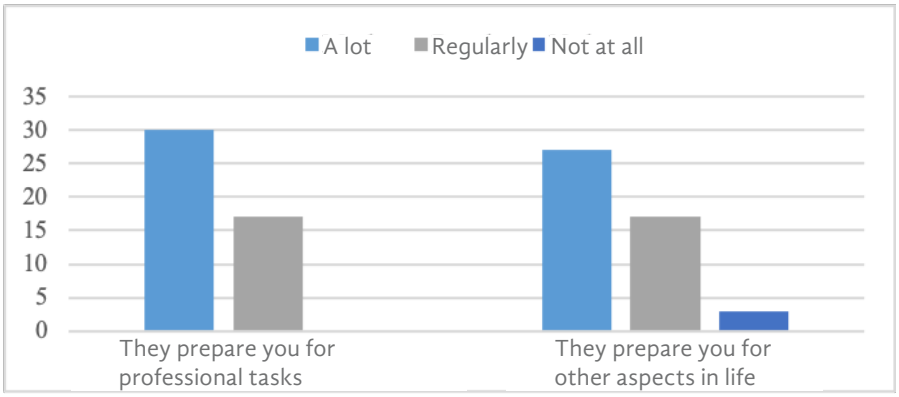
These testimonies show the experience gained at the school that has allowed them to carry out their work with ethics and professionalism. As noted by Salvatierra (2019):

> From a conception, the principles of general ethics applied to the ethics of the professions must contemplate respect for dignity, freedom, equality, and human rights. Always proceed following social justice, autonomy of exercise, and full use of their skills, knowledge, and abilities. (p. 41)

It should be noted that in testimony with the JCCC at the time of the investigation, many graduates have been awarded recognition for their good work performance. That is, graduates consider that the UMAR teaches them relevant aspects, as noted, and recognize the impact of studies on their university life and, subsequently, on their professional lives. The intellectual skills (Acosta, 2019) that they have acquired in their university education acquire a priority role.

Table 5

To what extent have the studies you graduated from been useful in preparing you for other spheres of life?



Note. Information retrieved from the JCC Graduate Monitoring Area (2019).

Finally, as Fresán Orozco (ANUIES, 2003) indicates, the speed of technological innovation has caused the educational system to resort to strategies to know the impact it has had. The cited author points out the lack of diagnoses in which strengths and weaknesses can be identified to contribute to under-

mining the educational lag, hence this approach to the graduates' perception regarding the skills acquired to be applied in the professional field is important. For the bachelor's degree in CC, Fresán Orozco pointed out:

> The knowledge of the performance of its graduates constitutes a way of approaching the professional fields that, together with prospective studies on economic and social trends at the local or regional level, are very useful for dimensioning educational work. (ANUIES, 2003, p. 20)

Therefore, the value of this type of study exceeds the institutional scope and contributes to the knowledge of the region in which the university is located.

CONCLUSIONS

The "low acceptance of professionals whose training does not meet their needs, constitute inputs of great relevance for planning and its most reliable origin are also graduate studies" (ANUIES, 2003, p.23). In other words, this process starts from the fact that there is a very large gap between what is learned in the university environment and what the labor field demands. (Blanco & Ruiz, 2022). Therefore, public IES are not only evaluated through their scientific production or the relevance of actions to disseminate culture but also through the training of professionals that evidences the performance of their graduates, which reflects the training received and university values.

There is a lack of knowledge of the universities' training process that guarantees the improvement of their educational programs. There are no contextualized studies in the regions and neither is there a constant activity that has deficiencies such as a lack of experts in the area, scarce databases of graduates, and few assigned resources, since "most of the research on graduates are studies of a transversal and specific nature that are not taken up again to verify their evolution in stages after the completion of the study" (ANUIES, 2003, p. 24).

> In line with the ANUIES recommendations, the result of this study is that graduate studies should be institutionalized to support academic decisions in the process of training professionals; create information banks on graduates; and carry out periodic studies and share the information obtained.

Social networks allowed a link with graduates since there was an immediacy to collect feedback and that allowed a more direct approach, hence the functions of the use of web 2.0 are ratified (Agostini, et al., 2013).

There is still work to be done in the CC and UMAR Graduate Monitoring Area to know where the young people are working and how they have adapted to the demands of the work scenario. The challenge is that students.

> Must graduate with solid foundations and be willing to keep learning throughout their professional life to be able to perform with solvency in jobs that do not yet exist, use technologies that have not been invented, solve unprecedented problems, and learn to work collaboratively in multicultural and multidisciplinary environments. (ANUIES, 2018, p. 42)

However, the Covid-19 pandemic that impacted the world educational scenario also had consequences on the environment of the UMAR[3]. In an interview with some graduates, on January 27, 2023, they mentioned that during the period of the Covid-19 pandemic they did not receive information about it from the Graduates Monitoring Area on duty, although they indicated that in 2023 the JCC was using the Facebook social network with another Graduates Monitoring account to publish information In addition, the UMAR is going through a transitional stage regarding the change of principal for the Universities System the State of Oaxaca (SUNEO)[4].

In conclusion, the government of Mexico in the National Higher Education Program (2023-2024), among its strategies to promote a stable graduation scenario for young people at the higher level is to generate the working conditions to which graduates of the "different subsystems of higher education" can access (p. 39).

Thus, showing this exploratory work of the various skills that young people have been able to develop in the workplace, also leads to assessing the skills already offered by the degree, and rethinking the adequacy of the curriculum to meet the needs demanded by the labor market.

In addition, it allows us to reflect on the creation of a platform for monitoring graduates, which allows us to identify where graduates are, not only from the Communication Sciences Career but also from the different university formations that host the UMAR.

It should be noted that this work allows reflection on the ways of relating the institution and the graduates of the UMAR in a post-pandemic

3 The UMAR was adapted to safeguard the health of academic and university staff (UNESCO & IESALC, 2020). The institutional email of the Deputy Head of School Services (SSE) on duty in 2020 was used to communicate with students, the topics in 2021 were: vaccination campaigns, school scholarships, and reincorporation into face-to-face mode. The JCC used *WhatsApp* to communicate issues about the use of *Classroom* and general news.

4 Mr. Modesto Seara Vázquez, founder and Principal of the Universities System of the State of Oaxaca, passed away on December 28, 2022.

context in which it is necessary to influence to generate and sustain a university identity. The use of technology brought young people closer, but it is necessary to have a systematization and strategies that are part of the indicators demanded by government institutions.

Thus, the monitoring of graduates must be understood and work continuously within the evaluation processes of a study program, its relevance, and its impact. It must, as an activity, generate indicators, analyze data, and disseminate them, so that decision-making is relevant to the functions of the University and its context.

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Sense of Community in Rural Localities of Chiapas

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Jesús Ocaña Zúñiga[1]
jesus.ocana@unicach.mx • ORCID: 0000-0003-0300-0797

Germán Alejandro García Lara[1]
german.garcía@unicach.mx • ORCID: 0000-0002-4075-4988

Oscar Cruz Pérez[1]
oscar.cruz@unicach.mx • ORCID: 0000-0003-2452-2834

Juan Carlos Nájera Ortiz[2]
juan.najera@unicach.mx • ORCID: 0000-0002-5673-0112

1 Universidad de Ciencias y Artes de Chiapas, Facultad de Ciencias Humanas y Sociales. Tuxtla Gutiérrez, Chiapas. México

2 Universidad de Ciencias y Artes de Chiapas, Facultad de Ciencias Odontológicas y Salud Pública, Tuxtla Gutiérrez, Chiapas. México.

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— Abstract—

The concept of community has a different connotation in multiple disciplinary fields. It can refer to a system of psychosocial relationships, to a group of people with a certain level of interaction, to people sharing a geographical space, or to those who share the use of a language according to certain patterns or cultural habits (Causse, 2009). Considering the community as the fundamental basis of coexistence, the Sense of community, according to the model proposed by McMillan and Chavis (1986), assumes that such a construct implies the sense of belonging of the people towards their community, the level of influence in collective decision-making, common cultural idiosyncrasy and strong affective ties between those who are part of it. Chiapas, a state in southern Mexico, is distinguished by its socio-cultural and natural resources; however, it also presents high levels of backwardness, inequality, and poverty. This work aims to assess the Sense of Community in five rural towns in Chiapas to assess this construct in contexts of high social vulnerability. To this purpose, the Sense of Community Scale proposed by Sánchez-Vidal (2009) was applied to a non-probabilistic sample of 238 inhabitants of five communities in Chiapas. The results show lower scores for the scale in the town of San Rafael, in the municipality of Ocozocoautla, and in La Florida, municipality of Jiquipilas. The results are discussed within the framework of the sociocultural conditions that prevail in the communities and their demographic configuration.

Keywords:

Community psychology; sense of community; rural communities; psychosocial problems.

The concept of community has a different connotation in the multiple disciplinary fields, that is, it does not have a single definition. In this sense, Causse (2009) points out that a community "can refer to a system of psychosocial relationships, a human grouping, geographical space or the use of language according to certain cultural patterns or habits" (p. 12). In the disciplinary field of psychology, and specifically in community psychology, the concept of community has evolved. Sarason (1974) established a general notion of the concept of community by considering it as a network of relationships of mutual help and collaboration in which a person can develop dependence. On the other hand, Montero (2004) underpinned the idea of community reciprocity by defining it as a dynamic, historical social group that is constituted and developed culturally; in which the members share needs, problems, objectives, and interests; in a specific space and time, and that generate, over time, a collective identity.

More recently, Romero and Muñoz (2014, as cited in Drake-Tapia, 2022) identified several elements that characterize a community. In principle, the authors define a community as "a social group with common relationships and ties that shares certain interests and participates in some common objective or interest" (p. 162), which maintains social interaction in a given context in a sustained manner. The authors point out that, over time, this interaction develops identity that includes the sense of belonging, a feeling of being part of something larger that, gradually, turns the group into a historical-social entity with shared traits, such as customs, traditions, symbols, and lifestyles. In this sense, a community is, in the perspective of Romero and Muñoz (2014), a historical form of social relationship that, from the action linked to the satisfaction of daily needs and problems, produces institutions and values that are established as collective heritage. This work falls within the framework of such references to the concept of community.

The psychological sense of community is a key concept in community psychology (Ramos-Vidal & Maya-Jariego, 2014). Sarason (1974) defined the sense of community as the feeling that a person belongs to a larger community, for which they are assumed to be someone important to them. This refers to a conceptual proximity to the sense of belonging. Subsequently, McMillan and Chavis (1986), to delimit and measure the sense of community, identified four dimensions that, to this day, shape the construct. These four dimensions are belonging, influence, meeting needs, and shared emotional connection. More recently, Esteban-Guitart and Sánchez-Vidal (2012, as cited in Ante & Reyes, 2016), reviewing the concept of sense of community, concluded that the different studies of the construct focus on considering it as a psychosocial experience that is integrated by three dimensions: the territorial dimension, understood as the spatial scale where people develop; the relational dimension, that is, social

interactions; and the symbolic dimension, which includes the elements of social and cultural identity, such as religion.

Regarding the measurement of the sense of community, the proposals of McMillan and Chavis (1986), Chavis et al. (2008), Bishop et al. (1997), Sánchez-Vidal (2001, 2009), and more recently Ante and Reyes (2016). McMillan and Chavis (1986) formulated what is possibly the most used scale to measure the sense of community. This is the Sense of Community Index (SCI), composed of 12 items distributed in four dimensions that correspond to the conceptual arrangement proposed by the authors: satisfaction of needs, influence, belonging, and emotional connection. Later, Chavis et al., (2008) updated the SCI (SCI-II), expanding the scale to 24 items integrated into the same four dimensions of the original instrument.

The Perceived Sense of Community Scale (PSCs), developed by Bishop et al. (1997), measures the sense of community from 30 items that take as reference the conceptual framework of McMillan and Chavis (1986), as well as the authors' own expectations. The PSCs consider three dimensions: mission, which evaluates the perception of what the person is committed to others to achieve common goals; reciprocal responsibility, which refers to the perception that community members are responsible for each other; and disharmony, which represents dissatisfaction with aspects of the community life experience. Sánchez-Vidal (2001; 2009) developed an 18-item scale that, considering the conceptual proposal of Sarason (1974), groups it into four thematic areas: territorial roots, neighborhood interaction, interdependence, or mutuality, and others. In recent years, other proposals have been made to measure the feeling or sense of community. One of them is the one carried out by Ante and Reyes (2016), who designed a scale to measure the sense of community in an urban context, at the neighborhood level, which was made up of 9 reagents grouped into culturally relevant aspects and that consider the components of belonging interrelation, and common culture. In this work, we chose to use the Sánchez-Vidal scale (2009) of 18 items, since it has been applied in similar population contexts, specifically in other localities of Chiapas, Mexico. According to Ante and Reyes (2016), the sense of community is a complex construct, because it has been extremely difficult to define universal elements in its conceptual structure and because, in addition, it must consider specific elements of the culture and context in which it is analyzed or addressed. However, what is less diffuse about the feeling or sense of community is the fact that it is relevant to know and measure it. Knowing the sense of community in highly vulnerable populations, as is the case in this work, becomes relevant in the identification of mutual support networks within communities; information that can be retrieved to outline future intervention strategies aimed at addressing psychosocial problems

such as alcohol consumption, domestic violence, depression, teen suicide, among others; many of which are growing in the study communities.

In this context, the objective of this work is to measure the sense of community in adults living in contexts of high social vulnerability, from five rural localities in Chiapas, Mexico.

METHOD

Study Type

The work is quantitative, descriptive in scope, with a non-experimental, transversal design.

Subjects and context

A non-probabilistic sample was used, for convenience, of 238 inhabitants of five communities in Chiapas, in pre-pandemic times. The percentage distribution was as follows: 39.9% (n= 95) of the participants live in the Gabriel Esquinca community; 24.8% (n= 59) in the town of Gral. Emiliano Zapata; 5.9% (n= 14) in La Florida; 21.4% (n= 51) in Lázaro Cárdenas; and 8% (n= 19) in San Rafael.

The Gabriel Esquinca ejido is part of the municipality of San Fernando, which is 20 km from the state capital, in the economic region III called Mezcalapa. This community was founded in 1938 and currently has a population of close to 2,000 inhabitants. The main economic activities are agriculture, livestock, and trade. The main crops are corn and beans. On the other hand, the community Gral in Emiliano Zapata, founded in 1980, is located in the municipality of Chiapa de Corzo which integrates, along with Tuxtla Gutiérrez, Suchiapa, and Berriozábal, the I Metropolitana economic region. It is a relatively large community, with a current population of around 600 people. It is located 1 km from the El Chorrito River, which comes from the Grijalva River. Its economic activities are self-consumption fishing and the cultivation of corn and beans. The La Florida ejido is located in the municipality of Jiquipilas, in the II Valle Zoque region of central Chiapas. This community was officially founded in 1995 and currently has a population of close to 100 inhabitants, which has conditioned access to health services since they do not have a health center in the community. As for education, they only have preschool and primary school, both multigrade, so interaction with the neighboring community called Vicente Guerrero is imperative.

Unlike the other communities considered in this study, in Florida, most men go to other neighboring communities to work in field-related tasks,

while women remain at home, taking care of children and attending small businesses (State Committee for Statistical and Geographic Information [CEIEG], 2020).

The communities of Lázaro Cárdenas and San Rafael are located in the municipality of Ocozocoautla de Espinosa, in the same region II Valle Zoque. The ejido Lázaro Cárdenas, which is located approximately 1 km from the ecotourism center El Aguacero, has a population of about 300 inhabitants, who are predominantly engaged in agriculture and livestock. This community was founded in 1975 by indigenous migratory movements, mainly from Zinacantán and San Juan Chamula, who sought to settle on lands with legal certainty that they lacked in their places of origin. In the case of San Rafael, the settlement originated in the nineties, through a land invasion process, which was finally legalized in 1998 through agreements with the state and federal government. Currently, the community has just over 100 inhabitants, who are dedicated to the field and the breeding of backyard animals (CEIEG, 2020).

Chiapas is one of the states with the highest number of inhabitants living in poverty among all the states in Mexico. According to data from the National Council for the Evaluation of Social Development Policy (CONEVAL, 2022), until 2020, 75.5% of its inhabitants live in poverty and 29% in extreme poverty. According to Villafuerte-Solís (2015), this condition acquires a greater dimension among the peasant and indigenous population of Chiapas, who survive mainly from government social support programs and, in recent years, from the economic remittances sent by relatives of these who have emigrated to the United States.

Among the municipalities in which the communities considered in this study are located, Jiquipilas, Ocozocoautla de Espinosa, and San Fernando are classified as being at a high level of marginalization, while Chiapa de Corzo is at a medium level (Government of Chiapas, 2020). These circumstances place these communities in a condition of high social vulnerability.

Instruments

The Sense of Community Scale, proposed and validated by Sánchez-Vidal (2009), was applied to the Spanish-speaking population. The instrument consists of 18 items in self-report format on a Likert scale ranging from 1 (no agreement) to 9 (strong agreement) that considers the dimensions Interaction (5, 10, 7, 13, 2, 18, and 9), Rooting (6, 1, 16, 3, and 4), and Interdependence (17, 15, and 14). The Cronbach's Alpha coefficient, the internal consistency metric, reported by the authors is higher than .85, which is sufficient. In a subsequent study by Esteban-Guitart and Sánchez-Vidal (2012) with Indigenous and mestizo youth from San Cristóbal de las

Casas, Chiapas, the authors reported a Cronbach coefficient of .87. In this research, this coefficient has a value of .83, very similar to those reported in those studies.

Procedure

Work teams composed of students from the Faculty of Human and Social Sciences of the Universidad de Ciencias y Artes de Chiapas were organized, who carried out academic internships in each of the communities considered in the study. The scale analyzed in this work was part of a broader instrument that included other variables and scales related to the evaluation of human development. In addition to quantitative data, the fieldwork included the retrieval of qualitative data from interviews with key figures such as community founders, ejido commissioners, or municipal agents; information that was useful exclusively for their description. For the collection of quantitative data, the working groups were trained for this purpose. The application of the instruments was in situ in tours that were made house to house to as many inhabitants as possible, all of them of legal age. The applied instruments were emptied into an SPSS v. 21 for analysis. This procedure was endorsed by the Postgraduate Coordination of the Faculty of Human and Social Sciences.

Data analysis

First, the frequency distributions for the sociodemographic variables of the sample were obtained. Secondly, the scores were obtained for each of the communities considered, both generally and by dimensions; this is using the simple average between all the items, as indicated by the author of the scale. In this way, the higher the score obtained on the scale, the greater the feeling of community and vice versa. Subsequently, descriptive statistics were calculated, both for the general scale and by dimensions, reporting mean and standard deviation for each item. Finally, comparisons were made between the means of the five communities using one-factor ANOVA. The normality of the scale scores was performed using Q-Q diagrams, being satisfactory. The results are discussed in the context of where the data comes from.

RESULTS

Of the total number of participants, 56.7% are men and 43.3% are women. The majority, 84.4% reported being married or living in a free union, the rest unmarried or divorced. Regarding religion, 65.9% said they were

Catholic, 8.7% said they were evangelical, and the rest were distributed among other religious beliefs.

Among all the items on the scale, considering the five communities, it stands out that the highest average scores correspond to the items that integrate the interdependence dimension (items 15, 14, and 17), which correspond to the recognition of the importance of establishing collaboration schemes with other people. On the contrary, the items with the lowest average are item 18.- *I can trust others* (M= 6.11) and 7.- *One of the best things in life is my neighbors* (M= 7.05), both are part of the interaction dimension. However, for these items, the standard deviation is among the highest, which also suggests a high variability between the participants' responses. In general terms, high averages are observed for all items, as can be seen in Table 1.

Table 1

Community Sense Scale Descriptive Statistics by Item

Num.	Item	M	DE
Interaction			
5	I know and get along well with my neighbors	8.08	1.64
10	My neighbors help me if I need it	7.58	2.33
7	One of the best things in life is my neighbors	7.05	2.33
13	I help my neighbors when they need me	8.29	1.45
2	I have good friends among my neighbors	8.29	1.41
18	I can trust others	6.11	2.73
9	I am satisfied with my relationships with the other people who live here	8.19	1.64
Roots			
6	I am part of the community	8.26	1.76
1	I like this community because it has its own character and traditions	8.11	1.79
16	If I want to, I can influence the life of my community	7.70	1.93
3	My roots are in this place	7.60	2.53
4	I feel the community as my own	7.99	1.92
Interdependencia			
17	It's important to have good relationships with those around me	8.62	1.05
14	I believe that we all need each other	8.66	1.01
15	It is important to help one another	8.78	.70
8	Many things can be done in this community	7.83	1.92
11	I plan to live in this community for a long time	8.42	1.53
12	I see myself as basically the same as everyone else	7.34	2.48

Table 2 shows that, in terms of the overall score, the Lázaro Cárdenas community in the municipality of Ocozocoautla showed the highest average, followed by Gabriel Esquinca in San Fernando and Gral. Emiliano Zapata in Chiapa de Corzo. In Figure 1, it is notable that another community in Ocozocoautla, San Rafael, with the La Florida community, obtained the lowest average scores. However, according to the one-factor ANOVA procedure, it is noted that these differences are not significant, that is, the scores can be considered equivalent.

Table 2

Community Sense Scale Comparison by Community (Lkert 1-9)

	Gabriel Esquinca		Gral. Emiliano Zapata		La Florida		Lázaro Cárdenas		San Rafael			
	M	DE	M	DE	M	DE	M	DE	M	DE	F	p
Sense of community	7.96	.99	7.93	.94	7.66	.85	8.12	.75	7.61	1.18	1.399	.235
Interdependence	8.72	.86	8.47	.87	8.86	.25	8.92	.25	8.39	.85	3.467	.009
Interaction	7.67	1.23	7.70	1.20	7.33	1.12	7.74	1.07	7.47	1.67	.449	.773
Roots	8.08	1.31	7.98	1.06	7.34	1.36	8.05	1.20	7.19	1.51	2.900	.023

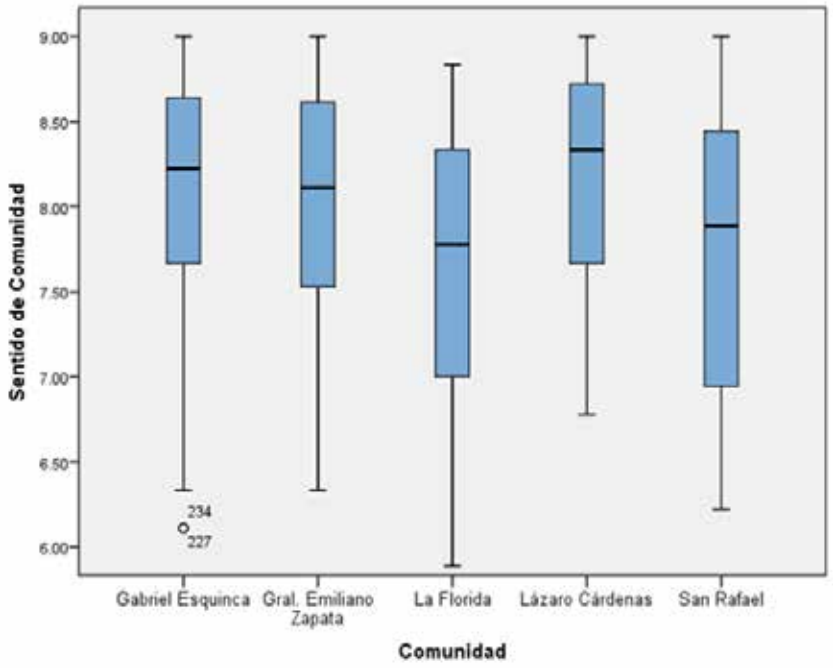

Figure 1. Box Diagram for Sense of Community Scale Overall Scores

When analyzing the scores by dimension, again Lázaro Cárdenas evidenced the highest scores for interaction and interdependence. In this sense, the differences were significant only for the interdependence dimension, not for interaction. On the other hand, the lowest score in interaction corresponded to the San Rafael community. As for Arraigo, significant differences were observed, with the highest scores being obtained by the Gabriel Esquinca community, with a marginal difference over Lázaro Cárdenas. For this dimension, again, the lowest statistically significant scores were obtained by San Rafael.

These results suggest that in the Lázaro Cárdenas community, there is a greater bond between its inhabitants expressed in the recognition of the importance of mutual support, that is, dependence on each other to meet common needs. On the other hand, those who are assumed to have the greatest adaptation and appreciation for their community are the inhabitants of Gabriel Esquinca. These data are relevant when carrying out interventions that require participatory schemes of the premises since greater success is predicted when solidarity schemes of coexistence and a sense of belonging prevail in the communities.

DISCUSSION AND CONCLUSIONS

The construct *sense of community* refers to a notion about the sense of belonging of the members of a community towards the social construction that life implies within it. In this way, it constitutes an approach to the knowledge of the territory and how it is configured from the perception of the inhabitants.

Rural communities, unlike the urban context, often refer to schemes of collaboration and knowledge of their inhabitants, since customs, traditions, and, on many occasions, history, promote a higher level of empathy and solidarity within the community. However, the conditions of poverty, marginalization, and lack of opportunities could lead to disgust and reproach towards the place where one lives. In this context, the Sense of Community was measured in five rural localities in Chiapas with high social vulnerability, according to the measurement proposal of Sánchez-Vidal (2001; 2009). The results make it clear that the sense of community is a quality that is built collectively within each place, each territory; and, therefore, homogeneous metrics do not fit for its evaluation. Therefore, the interpretation of the results must be assumed with caution.

In general, the scores obtained by all the communities are high (greater than 7.5), which given the context of socioeconomic vulnerability in which the communities of study are located, contrasts with what Vallejo-Martín (2017) proposed, in that the sense of community is influenced by the perception

of social status, being greater when people have a better job and income. This data reveals a different reality in a rural context about urban contexts where a high ethnic heterogeneity is associated with low levels of sense of community and vice versa (Esteban-Guitart & Sánchez-Vidal, 2012). Regarding urban centers, a coincident point is the value placed on trust with neighbors as an expression of interdependence (Ante & Reyes, 2016). However, it differs in the collective participation degree, which refers to interaction mechanisms, being low in urban contexts (Marín et al., 2002). In this case, the inhabitants of these communities come from a common regional context that has facilitated the appropriation of the territory they occupy. Another reading on high scores of sense of community, according to Cueto et al. (2016), maybe in terms of contexts of social vulnerability, which lead the inhabitants of the communities to promote coexistence schemes that allow them to face precariousness and adverse conditions.

Regarding the comparisons made between the communities considered, it is revealed that, in the same municipality (Ocozocoautla), the ejido Lázaro Cárdenas obtained high scores for all the dimensions considered by the instrument used. On the other hand, San Rafael, another community within the same municipal demarcation, recorded the lowest scores among all the communities evaluated. These scores, which are comparable by the similar number of inhabitants residing in these communities, can be explained, among other things, by the history of each place. On the one hand, the origin of Lázaro Cárdenas dates back to 1975 and, since that time, it has changed in terms of infrastructure, services, land regularization, and community organization. In principle, the first settlers came from other parts of the state and found in Lázaro Cárdenas the possibility of establishing themselves with their own land to plant crops and, in this way, support their families. In this regard, it should be noted that a large part of the founding families of this community came from the highlands of Chiapas and shared relevant sociocultural elements, for example, the original language: Tsotsil. However, as suggested by Delgado (2005), beyond the idiosyncrasies and their shared historical context, the inhabitants of this community have been motivated by their needs and the search to satisfy them.

To this day, the Lázaro Cárdenas ejido is a community that has reached a certain level of social cohesion, families recognize each other, have a defined organization, and, collectively, have sought to take advantage of opportunities offered by its location near both the municipal capital and the Selva El Ocote biosphere reserve. This level of consolidation is evident *in situ* in the landscape that describes the place and explains, in a way, the high scores obtained in this study. In this sense, Vallejo-Martín et al. (2017) point out that social interaction between community organizations and their

members represents a potential source of support for the community, contributing to the development of feelings of belonging.

On the other hand, the history of San Rafael is much more recent, as the first settlers of the ejido settled in the late nineties, in a process of land invasion that, years later, was regularized. The territorialization of lived space, according to Rincón (2021), is a process that is gestated from the thoughts, actions, and experiences of people, united by subjectivity, which produces a meaning and existential sense for places. This process involves time, does not occur spontaneously, and is impossible to induce. However, the community of San Rafael, which from the beginning has had a well-defined organization, is clearly in the process of appropriating its territory, which has been articulated from the management of improvements to the ejido, the regularization of the land and, above all, the search for sources of economic subsistence and political participation. Regarding roots, it is relevant that the locality Gabriel Esquinca of the municipality of San Fernando, the one with the largest population among the communities studied, has obtained the highest scores in this dimension, because the ejido was founded in 1938, which is evident in the community with a higher level of organization that has allowed them to access, over the years, public, educational, and health services. In this sense, mobility processes, such as that experienced by the community of San Rafael in contrast to the community of Gabriel Esquinca, mean a break in space and time (Hoffmann, 2018) and have a great influence on the roots developed by the inhabitants of the communities.

In this context, the sense of community is a variable that has a high subjective load, which is configured from the experience of people and, therefore, constitutes a valuable tool to assess community social processes, social cohesion, interaction, and even as a metric of development. From this work, it can be seen that, despite the limitations inherent to rural communities in Chiapas, the sense of community, roots, and interdependence develop from socio-cultural-historical processes linked to the territory. Therefore, before any intervention initiative in these scenarios, whatever its type or modality, it is desirable to know as much as possible about the historical and cultural context of the community, making the sense of community a good approach to it.

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Strengthening Digital Competencies: Recommended Practical Strategies for Teachers Using Neo LMS in Latin America

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Patricia Herrera López
patriciahl17@gmail.com
ORCID: 0009-0004-0954-2743

CYPHER LEARING. Estado de México, Ixtapaluca. México

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— Abstract—

In the current digital era, the mastery of digital skills by teachers is fundamental to enhancing student learning. This study addresses the need through the analysis of the implementation of pedagogical strategies with the NEO LMS platform in Latin America. The research evaluated how the effective use of NEO LMS can improve teachers' digital skills and, in turn, enrich the learning experience of students in online, virtual, and face-to-face modalities.

Through a qualitative approach and a non-experimental cross-sectional design, the study collected data from 549 teachers at educational events in countries such as Mexico, Peru, and Colombia. The strategies examined included gamification, adaptive learning, flipped classroom, competency-based learning, and microlearning, taught in masterclasses designed to provide practical and applicable training.

The findings reveal that most participants highly valued the relevance and applicability of the presented pedagogical strategies, reporting a positive impact on teaching practice and student learning. Specifically, it was observed that learning about these strategies and their proper implementation contributed to a more effective use of the NEO LMS tools, which in turn favored a higher quality educational experience.

Despite the positive results, the study identifies the need for continuous training and evaluation for teachers. The adoption and effectiveness of new tools and pedagogical approaches require constant commitment and sustained effort to ensure optimal long-term results. The research underscores the importance of well-designed pedagogical strategies and teacher training as key elements to improve teaching and learning in digital environments, emphasizing the relevance of these practices in the continuous improvement of virtual education.

This study contributes to the understanding of how focused training and the implementation of specific pedagogical strategies can significantly improve the digital competencies of teachers in Latin America, offering valuable insights for future research and educational practices in the region.

Keywords:
Distance learning; NEO LMS; Pedagogical strategies; Educational technology; Technology-mediated education

The use of educational platforms has impacted teaching and learning processes since the emergence of distance education as a modality of virtual or online education, which has been fundamental to providing another type of education. However, it has been observed that teachers who have access to NEO LMS are not yet prepared to properly use these tools due to a lack of knowledge of their use or due to the implementation of a new methodological model in virtual environments. This contributes to the improper design of their virtual classes.

In this regard, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) published a report in 2020 that notes that the transition to online education during the pandemic has accentuated existing inequalities in access to education in Latin America and the Caribbean. According to the report, limited access to technology and connectivity are the main obstacles to online education in the region. In addition, the lack of technology training for teachers and the lack of preparation of students for online learning have also contributed to the educational lag.

Likewise, in CYPHER LEARNING[1] It has been observed closely that some of the problems in teachers are the ignorance of learning strategies and the inappropriate use of the tools of the NEO LMS platform, as well as their non-homologated use for the development of learning environments, where the construction of knowledge in students is observed so that learning experiences are innovative. On the other hand, this can reduce teacher workload by using automation to keep students motivated and engaged in the process, so teachers can save time, improve efficiency, and improve learning. This has been one of the reasons why customers opt for another LMS or stop including a technology-mediated learning environment because they feel overwhelmed by the lack of knowledge and implementation of technology in their schools, universities, or companies. Although technological education in Latin America, in many cases, is still an issue under construction, strategies must be implemented to adapt to the Latin American environment and improve teaching programs to make them even more personalized. This will help counteract the fear of implementing technology in educational processes. The implementation of teaching strategies was mostly successful, but a continuous and sustained approach is required to ensure optimal long-term results.

1 CYPHER LEARNING is a company that provides learning management systems (LMS) for businesses, schools, and other organizations. The company offers three different LMS products: NEO, MATRIX, and INDIE. NEO is a cloud-based LMS that includes features like gamification, automation, and custom learning paths.

The findings of the research indicate that the vast majority of participating teachers valued the information received as relevant and applicable to their educational practice. The implementation of this knowledge in their virtual teaching environment had a positive impact on the student's learning process. Although the implementation of the teaching strategies was mostly successful, the need to maintain a constant and sustained approach to ensure optimal long-term results is underlined. In this sense, the mastery and proper application of teaching strategies are effective tools to improve the teaching practice and academic performance of students.

USE OF TECHNOLOGY FOR DEMOCRATIZATION AND ACCESS TO KNOWLEDGE

Educational platforms are computer systems developed specifically for the administration of online training. These tools allow the comprehensive management of courses, activities, content, students, assessments, and other relevant aspects of the virtual learning process. Overall, they are software applications that facilitate the administration of online courses, providing the possibility of creating, publishing, and managing access to content, as well as promoting communication and collaboration between teachers and students.

In recent years, various studies on science and technology have highlighted the relationship between education and learning, including the development of educational technology, the use of ICT in the educational process, the impact of technological platforms on education, the influence of the Internet on educational processes, models and modalities of distance education, and the phenomenon of virtual education (Edel-Navarro, 2010). These studies have found that the use of technology has given rise to a new style of learning: distance education in its online, virtual, or hybrid modality.

This learning style has several advantages, considered democratization is the most important, since "it also enables and diversifies the educational offer to meet current training needs" (Casas, 2011). In this way, education can be provided to a greater number of people, seeking equal opportunities in a diversified way.

Online education is a form of training delivered over the Internet. It is composed of a series of courses or programs that can be taken from anywhere and at any time since they are accessed through a computer with an Internet connection. Online education is an increasingly used alternative to getting a quality education as it offers great schedule flexibility and allows students to learn at their own pace. On the other hand, hybrid education is a teaching modality in which different learning styles are mixed, such as face-to-face and online. This form of education allows students to learn flexibly and adapt to their needs. It is worth mentioning that this new form

of learning is becoming increasingly popular, especially after the pandemic, because it allows students to learn in various ways, using different means (Obesso, & Núñez. 2020).

As has been observed, access to the Internet constitutes one of the most powerful tools in all areas, especially in education, because it is possible to create pedagogical environments with digital tools to bring education of greater quality and scope. However, there is still a marked digital divide in Latin America, so little is yet known about the development of skills and competencies for the use of technology.

LANDSCAPE OF TEACHERS' DIGITAL SKILLS BEFORE AND AFTER THE PANDEMIC

Until 2017, it was known that Latin America did not have the technological skills necessary to integrate ICT into teaching. According to the report "ICT in Education: Latin America and the Caribbean" published by UNESCO, only 36% of teachers had experience using ICT for teaching, while the remaining 64% had no idea how to use it. In addition, only 16% of teachers had internet access at home, limiting their ability to integrate ICT into teaching. According to the report, this situation was because education systems in the region were not prepared to integrate ICT effectively. (Hinostroza, 2017)

2.2. The University and Entrepreneurship

Awareness of the importance of entrepreneurship is a task that must be addressed daily. In universities, it is a priority to highlight the fact that new companies promote the economic growth of a territory, due to the creation of new jobs and the increase in income from the payment of taxes, the increase in exports, and an increase in productivity, (Pérez & Solíz, 2020). "Entrepreneurship is an important vehicle for the growth and economic development of countries and young people are the ones who usually lead it" (Kantis, 2017, p.120).

On the other hand, in the post-pandemic context, entities such as UNESCO, the United Nations Children's Fund (UNICEF), and the World Bank have carried out various investigations in the ministries of education to know the current state of education worldwide. In their executive summary "What have we learned? Highlights from a survey of ministries of education on national responses to COVID-19" have found that the continued use of technology to accompany and complement learning is critical. Among these aspects, the study has collected that "almost all the countries that responded to the survey reported remote learning as part of their response in education

to COVID-19, using online platforms, television/radio programs, and printed materials" (Vercellino, 2022).

These common-order institutions provide information to observe what are the areas of pain that require efforts, such as monitoring school dropout and student disengagement, the ongoing role of distance learning, recovery plans and monitoring their effectiveness, new approaches, and the changing role of learning assessments, skill development, and teachers' support, among others (Vercellino, 2022).

In Latin America, digitalization is a powerful tool to overcome the structural challenges of the region, as it drives the creation of new sectors, quality jobs, capacity development, and innovation, according to the study "Latin American Economic Outlook 2020: Digital Transformation for Better Reconstruction", published by the Economic Commission for America and the Caribbean (ECLAC) and the Organization for Economic Cooperation and Development (OECD).

TEACHING STRATEGIES FOR TECHNOLOGY-MEDIATED DISTANCE EDUCATION

In this regard, the use of learning strategies is of great value for technology-mediated educational processes, Capita (2009) learning strategies can be used to learn content in any situation for the acquisition of knowledge, whether at school, at home, or in any other context. These strategies are "educational practices that have to do with how cognitive development occurs, the elements that influence it; memory function, motivation; how knowledge transfer occurs; and learning classes" (Schunk, 1997, p. 18).

Teaching and learning strategies are a set of procedures that a teacher can use in the classroom to promote the learning of their students; each strategy has its characteristics and advantages, so the teacher must choose the one that best suits the needs of their students and in the context in which they are since teaching strategies are those that aim to facilitate their learning. There are teaching strategies that cannot be adapted to face-to-face environments or environments mediated with technology, but even more so using educational platforms, so the appropriate strategies must be chosen according to the context in which the learning takes place, considering among other things, the student's profile, technological resources, and their conscious and intentional planning aimed at a learning objective.

METHODOLOGY

Objective

The objective of this research is to recommend some teaching strategies that can be used in conjunction with the NEO LMS tools, to observe their use and benefit the strategies offered to teachers who use the LMS.

The research is intended to help other interventions or compatible methodological research, to enable access to the information and results obtained. Likewise, the study aims to contribute to studies that are carried out at the Latin American level on methodological and pedagogical principles implemented with the use of NEO LMS, which can benefit teachers and students who use it, and that these strategies can be implemented in other platforms with the same characteristics.

Participants

For this research, a simple random non-probabilistic sampling was used, since, according to López (2004), it is characterized because each unit that makes up the population has the same possibility of being selected. Different teachers from universities and colleges were requested to be part of the study for our sample.

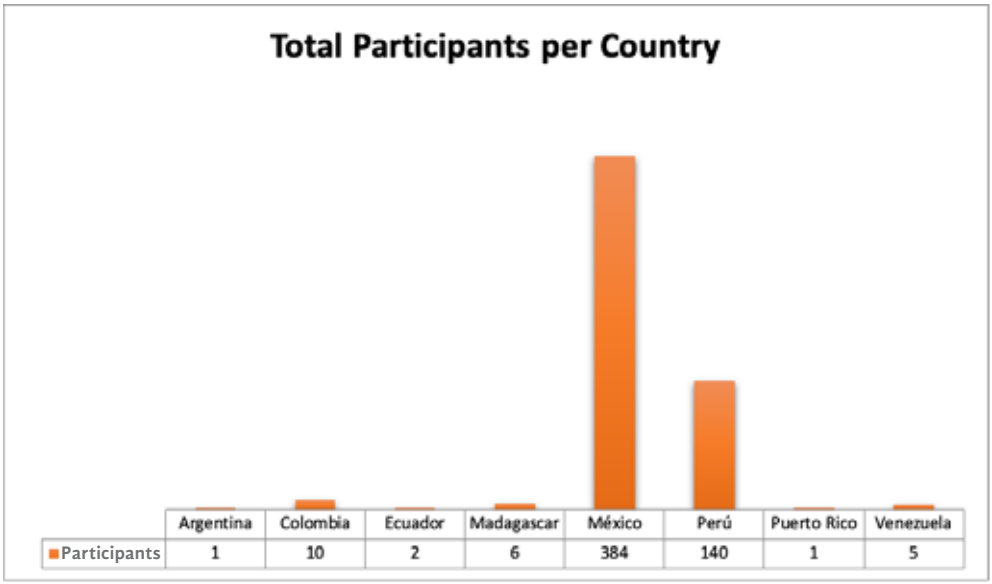
Tools

Initially, the information on the platform was used to observe the level of participation and learning outcomes of each teacher. In a second moment, a Google Drive survey (idem) was sent by email to all the teachers who participated to retrieve information on the implementation of the strategy and whether improvements were obtained in the use of the tools, in addition to whether the above helped their students in acquiring their knowledge regarding the subject that was taught.

The study analyzed which teaching strategies are suitable for the formation of virtual environments using NEO LMS and that they can favor student learning. For this, a non-experimental design was used that was applied transversally, since according to Hernández-Sampieri et al., (2010), non-experimental research is based on categories, concepts, variables, events, communities, or contexts that occur without the direct intervention of the researcher, that is, without the researcher altering the object of research. Since it is not intended to test the previously established hypothesis, as well as the objectives set, this work was prepared under the methodological approach of the qualitative methodological approach of the qualitative approach.

In this research, statistical information was collected on the participation of teachers in the different events. The masterclass' objective was to provide teachers with a unique and high-quality educational experience and offer them an opportunity to develop their skills and knowledge about the different strategies that could be actively implemented in their educational environments. In total, 5 Masterclasses were taught about teaching strategies: Gamification, Adaptive Learning, Flipped Classroom, Competence-Based Learning, and Microlearning. These Masterclasses were held throughout 2022 and were replicated twice, obtaining the following information.

A total of 549 teachers from different Latin American countries (Argentina, Colombia, Ecuador, Madagascar, Mexico, Peru, Puerto Rico, and Venezuela) participated, who had access to an NEO LMS platform to create content and implement teaching strategies. The participating teachers taught levels from basic to postgraduate education.



Note. Own elaboration based on empirical data.

Figure 1. Total Participants per Country

During the events, learning strategies were selected that could be used in a complementary way with the NEO LMS functionalities. These strategies were taught through a Masterclass, in which teachers initially participated as students and subsequently applied them in their virtual teaching environment. The strategies provided are described below.

Gamification: "refers to a process of improvement, with possibilities to provide gaming experiences and to support the activities carried out by users" (Contreras & Erguía, 2017).

This strategy is used to motivate and engage students in the tasks they need to accomplish. Gamification involves the application of game mechanics to non-game situations, allowing people to become more actively involved in them. One of the benefits is increased motivation, improved concentration, and increased productivity.

The objective of gamification is to generate an emotional response in the participant that leads him to actively get involved in the situation. In this way, it is sought that people learn and get involved in a more committed way in the activities in which they participate. Gamification is an increasingly used strategy in education, work motivation, and people management.

This learning strategy would be thought to be optimal only for early, middle, and higher education levels. However, interest in its implementation for postgraduate levels was observed at the event, to motivate students, through a game narrative of interest.

Adaptive learning: "uses new technologies and digital tools to personalize the teaching-learning process and adapt the work proposal to the needs and characteristics of students" (Morillo, 2016).

This learning strategy uses new technologies to analyze responses as data obtained from students to adapt teaching to the personal needs of each student. Thanks to this methodology, the student can learn through solving real problems, since the adaptive system provides personalized learning based on the difficulties they encounter.

One of the main objectives of this type of learning is to improve the quality of education because it allows identifying the needs of each student and offering them more personalized training. In this way, the student can significantly improve their academic performance.

In adaptive learning, there is a continuous and two-way interaction between the student and the platform, which allows the student to know at all times what they are learning, what they have to improve, and what activities they must do to achieve it. In this way, student autonomy is promoted and individual learning is enhanced. (Morillo, 2016).

In this strategy, it was observed that its implementation is laborious, since having a detailed design of the paths that the student wants to travel, in such a way that, the teacher can observe what contents and resources are required to build or look for if the courses are curated[2], for their implementation and, in this way, automate the LMS, so the search or creation of

2 Content curation in education refers to the process of effectively selecting, organizing, and presenting educational resources available online to meet students' learning needs and facilitate teaching by educators.

resources must be rough to have a differentiation of paths and automation that will be carried out.

For face-to-face and hybrid use, the Flipped classroom learning strategy is suggested, it is a teaching methodology in which the teacher teaches the subject outside the classroom and students learn it by solving problems and studying materials online at home. "The flipped classroom is a teaching method whose main objective is for the student to assume a much more active role in their learning process than the one they have traditionally occupied" (Aguilera et al., 2017).

Flipped learning is a teaching methodology in which the student has access to information before class, usually via the Internet or digital resources. During class, the teacher guides the students through the information and uses questions and activities to help students understand and apply what they have learned.

For this strategy, it is important that the teacher carries out an analysis of the resources available to the student within their home since access and connectivity will be essential to carry out the strategy and that it does not become a limitation for the student, due to the lack of resources in their home.

The competency-based learning strategy is an educational methodology proposed by Professor César Coll and his colleagues. According to the theory of Juan Ignacio Pozo and Miguel Ángel Santos, this strategy is based on the constructivist approach to learning, which proposes that learning is an active and autonomous process that is carried out through the construction of knowledge by the student.

The competency-based learning strategy focuses on developing students' skills, rather than simply conveying information. According to Díaz Barriga, competency-based education seeks to develop practical and theoretical skills in students so that they can apply them in real situations.

To implement this strategy, the objectives and competencies that students are expected to acquire must be defined. In addition, learning situations should be created in which students can apply their skills and knowledge in real contexts. As well as encouraging students' participation in their learning process constant feedback should be provided to help them improve and develop their competencies. The competency-based learning strategy focuses on the development of practical and theoretical skills in students and seeks to provide learning situations that allow them to apply their knowledge in real contexts.

It was noted during the masterclass that many teachers were unaware of the competency-based approach. Knowledge of competency-based assessment will be important for the implementation of this strategy because the creation of tasks and assessments where the learning products are observed by the student will be essential for the effective development of skills.

Microlearning is a learning strategy that is based on the delivery of educational content in small doses or segments of information, designed to be consumed quickly and efficiently. This learning modality adapts to the needs of people today, who demand access to relevant and updated information immediately and when they need it. Through microlearning, students can access educational materials at any time and place, through different digital devices, which allows greater flexibility and autonomy in the learning process.

Microlearning cannot be used as a traditional class, since the approach is aimed at learning from 10 to 15 minutes at most, so this strategy serves as a refresher learning or small learning topics.

According to data from the Statistic Brain Research Institute, in 2000 the human attention span was 12 seconds; by 2015, it was modified to 8,25 seconds, so microlearning also allows better retention of information, so it focuses on specific topics and is presented clearly and concisely. Microlearning is a teaching strategy that adapts to the needs of current students, allowing more efficient access to information and improving long-term knowledge retention.

PROCEDURE

First Stage

In the first stage of the research, the following results were obtained. The teachers' participation in the masterclass was as follows:

Gamification 119, Competency-Based Learning 137, Adaptive Learning 92, Flipped Classroom 96, Microlearning 78 enrolled teachers.

Masterclass impartidas							
países participantes	A1. Administración de competencias en NEO	A2. Administración de competencias en NEO	B1. Uso de las herramientas de Gamificación dentro de un curso	C1. Aprendizaje Adaptativo	D1. Aula invertida	E1. Microlearning	Total, general
Argentina	1						1
Colombia	4		3	2	1		10
Ecuador			1		1		2
Madagascar	1	1	1	1	1	1	6
México	86	7	86	72	69	62	382
Perú	24	12	27	16	22	14	115
Puerto Rico					1		1
Venezuela	1		1	1	1	1	5
Total, general	117	20	119	92	96	78	522
Total de personas participantes en las diferentes Masterclass							

Note. Own elaboration based on empirical data.

Figure 2. Masterclass taught

There were two types of events that were held, face-to-face events in the institutions and the presentation of virtual masterclasses. However, the greatest documentation gathered was obtained from the masterclass, since in this way it was possible to extract information from the results of the implementation and improvement in teachers' classes.

So the masterclass aimed to carry out continuous training of NEO tools, which as mentioned were based on innovative pedagogical foundations for teachers to carry out their praxis within their virtual classrooms and get the best out of the tools that NEO provides.

Each masterclass was proposed to be presented in a period of no more than 15 to 20 days within our NEO platform provided by the company, for the opening a virtual Webinar was held, where the subject was specifically discussed and instructions on the masterclass were given. Each masterclass had the recording of the opening Webinar, as well as resources such as digital materials and manuals to help teachers learn more about the subject and, above all, implement NEO tools for the teaching strategy. The evaluation consisted of a summative evaluation, the teacher had to answer the exams, in addition to uploading a final product to the platform, which consisted of uploading evidence of the conformation of their virtual classroom, through a screenshot or the same link to access it, since the teacher had to demonstrate the implementation and conformation of the learning strategy that was seen in the masterclass; these learning products had a learning rubric where the standards to be evaluated were shown, if the teacher complied with each element he passed the masterclass. It is worth mentioning that some teachers participated in all the masterclasses, but others only participated in those that were of interest to them, since as mentioned above, teachers taught classes of different educational levels.

Of a total of 549 teachers registered, only 416 completed the masterclasses promptly, it was observed that teachers who did not complete the masterclass only registered for the course and lasted a short time browsing the platform, others registered, but never entered. The following general averages were obtained from each masterclass.

Teachers' grade averages obtained in the masterclass	
Masterclass Name	**Average Percentage%**
A1. NEO Skills Administration (Masterclass)	84.3
A2. NEO Skills Administration (Masterclass)	86.9
B1. Use of Gamification tools in class (Masterclass)	81.6
C1. Adaptive Learning (Masterclass)	96.1
D1.	92.0
E1. Flipped classroom (Masterclass)	88.6
Overall total	88.4

Note. Own elaboration based on empirical data.

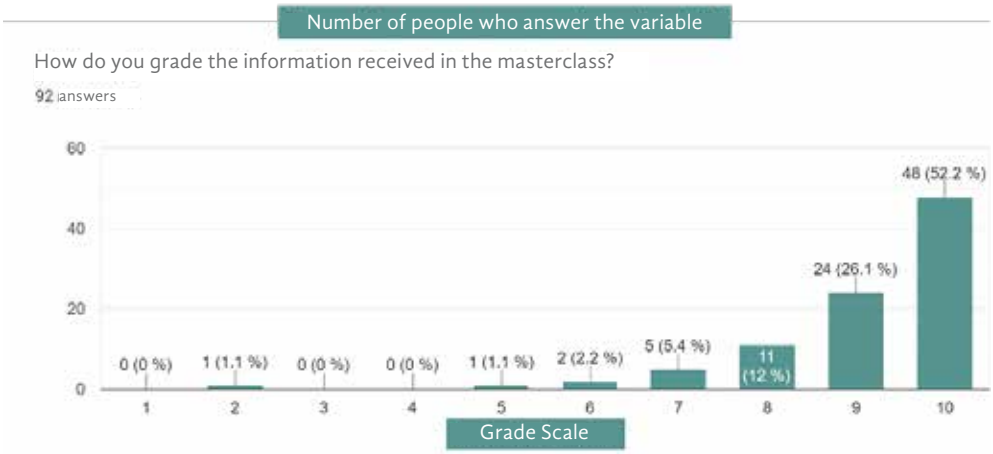
Figure 3. Teachers' grade averages obtained in the masterclass

RESULTS

Second Stage

In the second stage of the research, and after four months of masterclasses, a survey was sent on Google Drive to all the teachers who completed the masterclasses, to give time in its implementation and observation of the interaction with the students and their learning. We asked the teacher to answer the survey three times to obtain the highest number of answers, it is worth mentioning that of the 416 teachers who completed the masterclass, only 92 answers could be obtained, thus obtaining 90% reliability. The questions asked were about the variables required to be observed, thus obtaining the following research results.

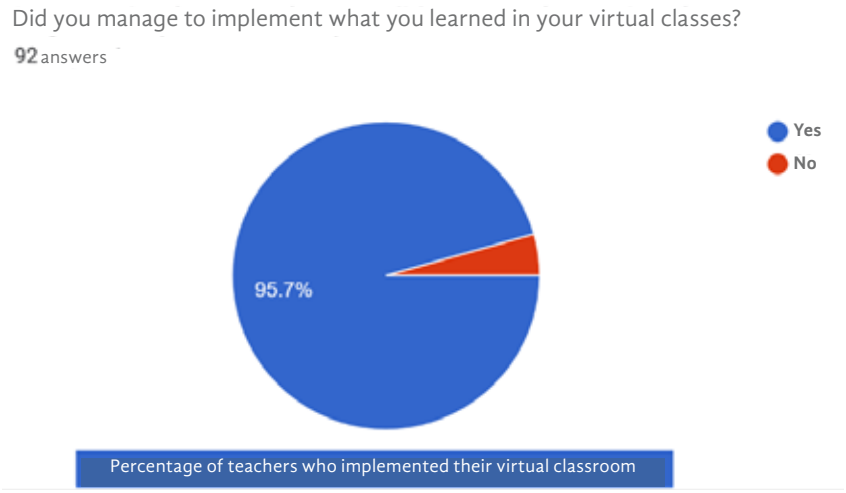
In the first variable, we got to know if the information that the teacher received from the masterclass was pertinent, clear, current, and applicable to the educational process. Which was scored with 10 for 52.2%, 26.1% with 9, 5.4% with 7, and the rest between 5 and 6.



Note. Own elaboration based on empirical data.

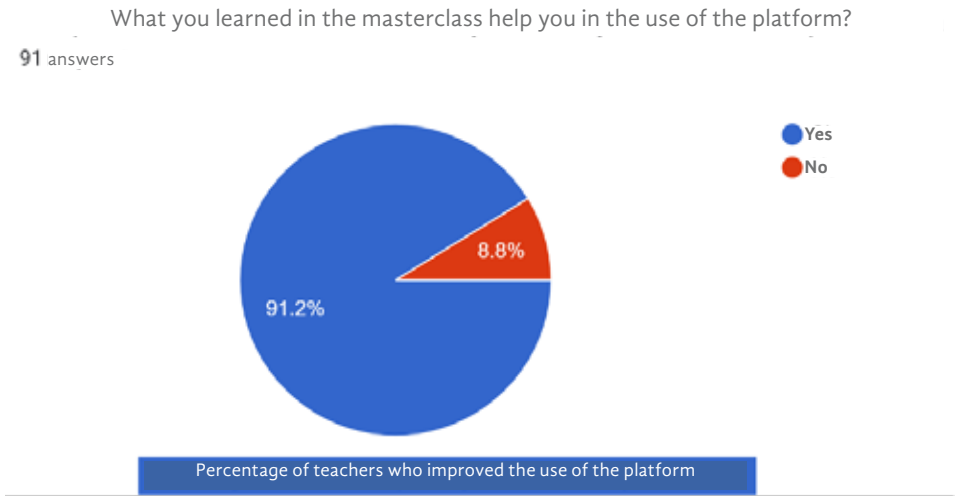
Figure 4. Number of people who answered the variable

For the second variable let us know if the teacher implemented what was learned in the masterclass in his virtual classroom; both the characteristics and the necessary tools were scored in the evaluation rubric, of which 95.7% did implement it and 4.3% did not implement it.



Note. Own elaboration based on empirical data.

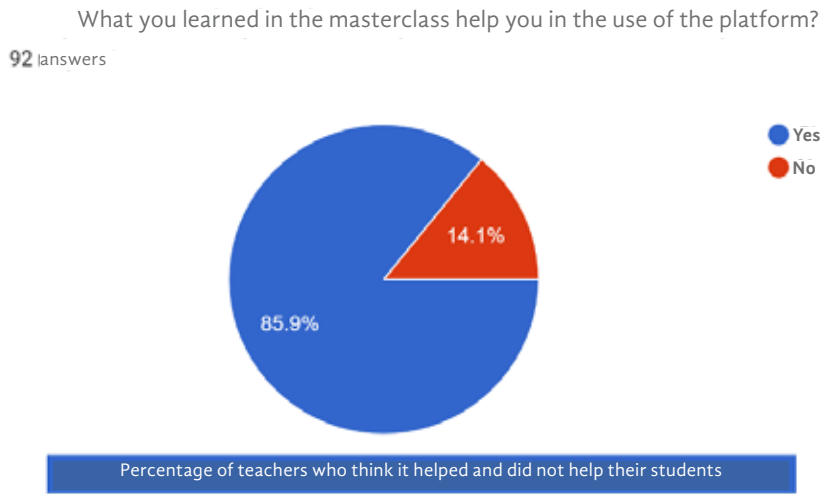
Regarding the previous variable, it was verified that what was learned about teaching strategies in the masterclass helped 91.2% of teachers improve the use of LMS tools, and that 8.8% had no benefit in increasing their use.



Note. Own elaboration based on empirical data.

Figure 6. Percentage of teachers who improved the use of the platform

To verify if the implementation of the teaching strategy in conjunction with the NEO tools impacted the learning of the students of the participating teachers, 85.9% observed it did help the learning of their students, while 14.1% did not observe benefits.



Note. Own elaboration based on empirical data.

Figure 7. Percentage of teachers who think it helped and did not help their students

The analysis of the survey revealed a significant positive response from teachers towards the training received, with 90% reliability, based on 92 responses. Calculating confidence intervals for these ratios suggests that the effectiveness of implemented pedagogical strategies, including gamification and adaptive learning, is consistently high in different educational contexts.

However, when performing an analysis of variance, ANOVA, to compare the average grades obtained in each masterclass, it was identified that adaptive learning and flipped classrooms were particularly effective, indicating that these strategies may have a more pronounced impact on improving teachers' digital skills and student learning.

Using multiple regression analysis, we examined how the combination of variables, such as the teacher's country of origin, the educational level at which they teach, and the specific teaching strategy influence the perception of improvement in digital skills and student learning. The results suggest that while the country of origin has a moderate effect, the level of education taught and the specific pedagogical strategy are significant predictors of success, underlining the importance of tailoring pedagogical strategies to the specific educational context.

Discussion of these results encompasses several key dimensions. First, the regional contextualization highlights how variability in access to technology and internet infrastructure in Latin America can influence the effectiveness of the implementation of digital pedagogical strategies. These factors should be considered by education systems when generalizing and applying these findings.

In terms of pedagogical implications, the study reinforces the need for teacher training in pedagogical strategies that enhance the use of LMS platforms such as NEO. The adaptability and customization of these strategies to meet the specific needs of students and teachers emerge as crucial elements for educational success.

The sustainability and scalability of these improvements represent a challenge and an opportunity. The study suggests the need for institutional engagement to integrate these strategies into regular educational practice and explore mechanisms to extend the benefits to a wider audience.

Finally, the discussion points to future research that should explore the long-term effects of the training received the comparison between different LMS platforms, and the impact of pedagogical strategies in various academic disciplines. These research areas could provide a more complete understanding of how to maximize the potential of educational technologies in Latin America.

This detailed analysis and discussion underscores the complexity and potential of implementing digital pedagogical strategies in varied educational settings, highlighting the importance of an adaptive and sustained approach to improving education through technology.

CONCLUSIONS

In conclusion, teaching strategies are essential for online education, as they allow teachers to provide an effective and quality educational experience to students. Implementing these strategies can improve teaching practice and student learning, which in turn can have a positive impact on their academic performance and future success. Teachers must be constantly trained and updated on these strategies to be able to adapt to changes in the educational environment and provide a high-quality education.

The research results show that most of the teachers who participated in the masterclass found the information received relevant, clear, current, and applicable in the educational process. In addition, the vast majority implemented what they learned in their virtual classroom, using the necessary features and tools according to the assessment rubric. It was also noted that learning about learning strategies helped improve the use of LMS tools and that this had a positive impact on student learning from participating teachers. These results indicate that learning about the teaching strategies taught in the masterclass was effective in providing teachers with knowledge and skills that they were able to apply in their educational practice and benefit their students. However, some teachers who did not obtain benefits or did not implement what they learned in the masterclass were also identified, which could indicate the need to continue working on teacher training and support to ensure greater adoption and effectiveness of the new educational tools and approaches. As noted, appropriate and effective teaching strategies allow students to actively engage in the learning process, which helps them better understand concepts and retain information more effectively. If these strategies are effective, they can improve students' ability to retain and remember information, especially in environments considered dehumanized such as distance education. Likewise, if the strategies are creative and stimulating, they can help motivate students and keep their interest in the learning process, as well as be adapted to meet the specific needs of students and ensure that the material is presented. In this sense, the use of learning strategies is of great value clearly and effectively.

Overall, the results suggest that the learning of teaching strategies had a positive impact on teaching practice and student learning, but continuous evaluations and improvements should continue to be made to ensure optimal results in the implementation of the tools and approaches learned. Thus, the results indicate that learning about teaching strategies and implementing them appropriately will be effective in improving teaching practice and student learning, but an ongoing and sustained approach is required to ensure long-term effectiveness.

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A C A D E M I C S
P A P E R S

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Is there "Desarrollo Sostenible" or "Desarrollo Sustentable" in the South of Mexico?

—

Jaime Torres Fragoso
jaimetorres@bianni.unistmo.edu.mx
ORCID: 0000-0002-6941-7272

Universidad del Istmo, Oaxaca, Campus Ixtepec, Oaxaca, México.

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BUT WHAT IS DEVELOPMENT?

The first thing to note is that development brings together a series of economic, social, cultural, political and technological activities that seek greater well-being and quality of life for the population of the entire planet. It is so important that, in addition to being part of human rights, it demands the fulfillment of all other human rights, basic freedoms, and contributes to all people favoring development and enjoying it, as stated in the Declaration on the Right to Development of the United Nations of 1986. In this sense, Amartya Sen (2000), Nobel Prize in Economics, points out that development means the increase of people's freedoms, which forces the elimination of poverty and guarantees economic opportunities, public services, and civil and political rights.

WHAT IS DESARROLLO SOSTENIBLE?

In 1987, the World Commission on Environment and Development published the document *Our Common Future*, known as the Brundtland report, in which the concept of sustainable development was coined in English, which in Latin America was interchangeably translated as *desarrollo sostenible* and *desarrollo sustentable*. This led to a debate on which of the two expressions associated with development, sostenible and sustentable, is more appropriate. For example, in Mexico, almost without exception, desarrollo sustentable is used and in the rest of Latin America the use of desarrollo sostenible is more frequent. This discussion could have been avoided if the term lasting development (desarrollo duradero) had been adopted, which is the one used by the United Nations (1987) in the Spanish version of the aforementioned document. This means that development must meet the needs of the present without jeopardizing the ability of future generations to meet their own.

Subsequently, in 1992, the United Nations Assembly held the Earth Summit in Rio de Janeiro, where Agenda 21 was approved, which considers sustainable development as a strategy to address the global environmental crisis. Following this event, the World Summits on Sustainable Development were held in Johannesburg (2002), Rio de Janeiro (2012) (named Rio+20), and New York (2015). The renowned Sustainable Development Goals (SDGs) that make up the 2030 Agenda were presented in the last Summit; it receives its name because, no later than that year, the 17 SDGs must be

achieved (see Figure 1). According to the United Nations (2015), sustainable development must be driven by three factors: economic, social, and environmental, among these, democracy, good governance, the rule of law, inclusive economic growth, social development, environmental protection, and the eradication of poverty and hunger stand out as central issues.

Note. United Nations (UN). Source: https://www.cepal.org/es/temas/agenda-2030-desarrollo-sostenible/objetivos-desarrollo-sostenible-ods

Figure 1. Sustainable Development Goals (SDGs)

BUT WHAT IS DEVELOPMENT SUSTENTABLE?

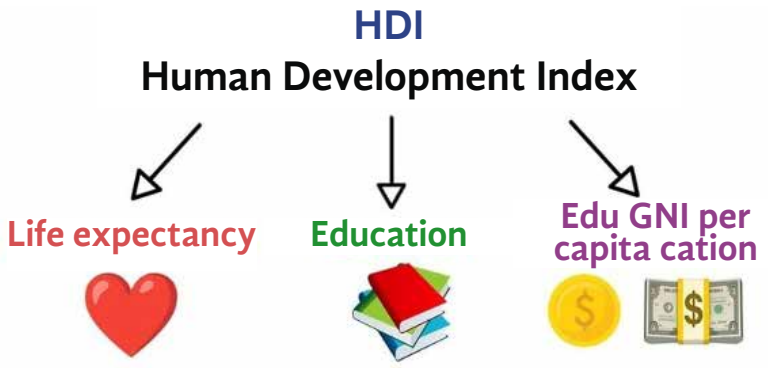
Although, as mentioned above, the terms desarrollo sostenible and desarrollo sustentable are often used synonymously, conceptually there are differences in nuance between them. As indicated by Rivera and other authors in 2017, desarrollo sostenible is defined in the aforementioned Brundtland report, while sustentable constitutes a deontology that transcends the economic, since it promotes values such as solidarity, reciprocity, and the common good. Various research indicates that the objective of desarrollo sostenible is to balance the social, economic, and environmental components (Figure 2), while the goal of desarrollo sustentable is to generate a higher quality of life and the progress of people. Therefore, the components of sustainability are the environment, the economy, ethics, governance, democracy, citizen participation, access to public services such as health and education, cultural diversity and the identity of peoples.

Note: Human Development Index Concept, Measurement, and Limitations. Source: Catorce6 https://www.catorce6.com/384-guia-del-consumidor/17726-que-es-desarrollo-sostenible

Figure 2. Factors of sustainable development

A REVIEW OF THE HUMAN DEVELOPMENT INDEX (HDI) ON THE NORTHERN AND SOUTHERN BORDERS

The United Nations Development Programme (UNDP) designed a method to measure and understand the development of a country, region or municipality, called the Human Development Index (HDI), which is integrated with three sub-indices referring to aspects vital to the well-being of society: health, education, and income (the economy). Therefore, this approach is closely related to the 2030 Agenda and sustainable development. The health dimension or sub-index is measured by life expectancy at birth, education by expected years of schooling and average years of schooling, and income by gross domestic product (GDP) per capita (see Figure 3). HDI measurements are grouped into four categories. Low level: when the grade is less than 0.55, medium level: between 0.55 and 0.7, high level: between 0.7 and 0.8, and very high level: when it is greater than 0.8.



Note: Human Development Index Concept, Measurement, and Limitations. Source: bit.ly/3XDDek3

Figure 3. Human Development Index

As can be seen in Tables 1 and 2, the HDI scores of the states that make up the border with the United States exceed those of the states that make up the southern border of Mexico. In fact, the rating of Tamaulipas, which is the lowest of the northern states, is the same as that of Quintana Roo, the highest of those in the south. Five border states have high HDI levels and one, Nuevo León, very high, with an average score of 0.785 and, in addition, four of them are among the top ten in the country. In contrast, three southern border states have a high HDI and one has a medium level, with an average score of 0.730. Likewise, two of these states, Tabasco and Chiapas, are among the ten most laggard in the country. Of the latter, the case of Chiapas stands out, which, despite its great social, cultural, and environmental wealth, it is unjustifiable that it occupies the country's last position in HDI.

Table 1
2020 HDI of Northern Border States

State	HDI 2020	Category	National Place
Nuevo León	0.803	Very high	2
Baja California	0.793	High	3
Coahuila	0.789	High	6
Sonora	0.782	High	9
Chihuahua	0.771	High	13
Tamaulipas	0.769	High	14

Note. PNUD (2022)

Table 2
2020 HDI of Southern Border States

State	HDI 2020	Category	National Place
Quintana Roo	0.769	High	15
Campeche	0.753	High	19
Tabasco	0.748	High	22
Chiapas	0.648	Medium	32

Note. PNUD (2022).

A NOTE ON BIODIVERSITY IN MEXICO

As pointed out by the Ministry of Environment and Natural Resources in 2014, Mexico's biological diversity is one of the most remarkable in the world and that wealth allows it to be classified, along with nations such as Colombia, Brazil, Peru, Indonesia, and China, as a "megadiverse" country. In addition, the biodiversity of our country also stands out for its high degree of endemism, that is, the existence of species that live only in Mexico, with Oaxaca, Chiapas, and Veracruz being the states with the greatest biological diversity. In this regard, Martínez-Meyer et al. (2014) report that 94,112 species live in Mexico, equivalent to 8.5% of the world, with an endemism of almost 40%. In addition, they add that in our country there is an abundance of terrestrial, coastal, and marine ecosystems (Figure 4). Regarding water, in 2012 the southern border region had almost 164 km^3 per year, while the Baja California peninsula and the Valley of Mexico had only 4.99 km^3 and 3.47 km^3, respectively.

Note. iSTOCKbit.ly/439xwYg

Figure 4. Biodiversity Example in Mexico

FOR SOUTHERN MEXICO, DESARROLLO SOSTENIBLE AND DESARROLLO SUSTENTABLE!

The information that has been presented shows that it is a priority to implement public policies, programs, and projects of a diverse nature that promote greater well-being and quality of life for the inhabitants of the southern states of Mexico. In addition, these activities must incorporate the approaches of desarrollo sostenible and desarrollo sustentable as a hallmark. The first is to promote balanced economic, social, and environmental development that, among other things, allows states such as Chiapas to address the problem of poverty and an inappropriate HDI. As a complement, the sustainable development model is important to promote, in addition, principles such as social solidarity, democracy, access to better public services and respect for cultural diversity, so present in southern Mexico. Finally, we must remember that development is a right of all people that must be fulfilled.

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Two pages stored in Rubén Salazar Mallén's studio

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José Martínez Torres
jose.torres@unach.mx

Antonio Durán Ruiz[1]
antonio.duran@unach.mx

1 Universidad Autónoma de Chiapas, Tuxtla Gutiérrez, Chiapas, México

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— Abstract—

This collaboration presents two brief fragments kept in Rubén Salazar Mallén's studio, one is a flyer that was distributed on the street with the title MASCULINITY. / BETTER SAFE THAN SORRY. / MANIFESTO OF OCTOBER 31, 1934. The first decades of the 20th century show a weighing of values ––ethical, moral–– exacerbated by the Mexican Revolution and that today seem decidedly obsolete, the same as the brief scene that was eliminated due to self-censorship the author of the novel The Initiation in its first two editions.

Keywords:

Masculinity; suggestiveness; self-censorship

Around 1981, Rubén Salazar Mallén showed a group of students meeting in his studio in the El Rosedal neighborhood of Mexico City, two brief polemical documents, which are analyzed below. The first is a manifesto. It should be remembered that since André Breton's *Surrealist Manifesto* of 1924, manifestos by different collectives were frequent and, around 1934, the one we are referring to appeared. It was also very common at the time to hand out hundreds of flyers to announce a new commercial product or a new radio program. The extraordinary thing is that this was a proclamation against homosexuality.

One of the topics of that evening among the guests around Salazar Mallén's desk was the literary group of the Contemporaries. This name was taken from the magazine published by Salvador Novo, Jorge Cuesta, Xavier Villaurrutia, José Gorostiza, Bernardo Ortiz de Montellano and Carlos Pellicer, among others, with a format and layout inspired by the *Revista de Occidente*, edited by José Ortega y Gasset.

Salazar Mallén belonged in his own right to this literary group, as he collaborated in their editorial projects on different occasions. However, he said he never felt he was part of the group, “although with as much recognition as they get now, I think it would be good for me to proclaim it,” he said. It could certainly be said that he was part of the Contemporaries. It should be remembered that several chapters of his novel *Cariátide* were published in the magazine *Examen* directed by Jorge Cuesta, and that because of that publication they went to jail, Cuesta as editor and Salazar Mallén as author. According to the committee overseeing morals and decency, the story was inappropriate and its language extremely foul and scandalous. After a trial, accused of publishing bad words, they were acquitted and Mexican literature began to use these words as a resource of literary realism. “Cariátide as a novel was bad, but the writers felt free to write rudeness and swearing. That's what it was good for."

Regarding the homosexuality of his Contemporary colleagues, he proposed to make a survey among them. Curiosity made him wonder why they were so frowned upon and why there were so many taboos and prejudices towards homosexual writers and artists of those generations. So he went to interview each of them to find out why they preferred him: “I said to Elías Nandino: 'Tell me, Elías, why are you a faggot? He replied, “If you could only see what a tragedy it is!” The society of that time saw it as a scandal for someone to have an inclination towards individuals of his own sex and, what is worse, that stigma became a tragic fact for a sensitive and artistic being like Nandino. He asked Villaurrutia the same question: “Why are you a faggot, Xavier, if women are so tasty? Villaurrutia made fun of me, shook his head and said, as if it were something very obvious, or as if I did not know the truth of life: 'Oh, Burrén!

Being recognized as a homosexual was the worst situation an individual could face. They had a wide variety of derogatory names: “They were called cuarentaiunos, femenine, faggots, and queer from the other side. For this reason, as there were several of us in the group, people thought we were homosexuals. Actually, there were some who, yes, were heterosexual, some had tendencies of that kind, just tendencies, and others were blatantly so, like Salvador Novo, the most blatant of all. He was not ashamed and confessed it with great cynicism and with great grace. When I asked him the same question as the others, Novo, why are you a faggot? He just said "Oh, I'm starting to like cadets more than boleros!"

Salazar Mallén (2015) continued: "The group gathered around the publication, but personally we were all solitary, individualistic, and independent, each one in his own way. A closer friendship could be seen between Novo and Villaurrutia, or between Cuesta and me, but I did not attend the editorial meetings or be invited to the selection of materials. My important link with all of them was Cuesta, to whom I delivered the essays they published." He also said that Contemporaries were of enormous intellectual density, but that their prestige was diminished by their sexual inclinations, and as they were considered despicable people, their publications did not get the attention they deserved. Before, on the contrary, Mallén said: "Of course, the magazine we have been talking about, *Contemporáneos*, as well as *Ulises* and *Examen*, were elitist magazines, whose contents were not understood everywhere." He observed that they were publications of great editorial elegance, with English and French poems translated by the members of the editorial staff themselves, Ortiz de Montellano, Novo, Villaurrutia. “I can't say if it was elitist in response to the environment that detested them, or if the very essence of the magazine was elitist. Surely it was a mixture of both. The Group without a group, as Villaurrutia defined it, imposed its quality, achieved enormous respect, literally speaking, even when everyone spoke horrors of its faggotry."

This group without a group came to have recognition in the aesthetic plane and to have a public presence and power due to the remarkable talent of its members, although, Mallén observed, "supported by the patronage of Genaro Estrada, who was a minister. Estrada took advantage of their intellectual capacity, and they, especially Novo, of the power he conferred on them."

This situation of seeing the Contemporaries positioned in the literary field caused annoyance and displeasure: "Among my papers I found this sample button. I have in my hands a curious document that I think is worth quoting, he said, and began to read the first of the documents to which we alluded at the beginning of these pages:

MASCULINITY.
BETTER TO DEBUG THAN REGRET.
MANIFESTO OF OCTOBER 31, 1934

> Since an attempt is being made to purify the public administration, we request that their agreements be extended to individuals of dubious morality who are ruling official positions, which, with their effeminate acts, in addition to constituting a punishable example, create an atmosphere of corruption that goes to the extent of preventing the rooting of virile virtues in youth. If the presence of the fanatic is fought, the presence of the hermaphrodite, unable to identify with the workers of the current reform, must also be fought.

Of course, the use of words that reveal the values of the time is striking: "masculinity", "effeminacy", "virile virtues". It should be remembered that just ten years earlier, in 1924, the pages of *El Universal* published the controversy over whether *Los de bajo* by Mariano Azuela was the most representative novel of revolutionary *virility*. In the discussion initiated by Francisco Monterde and Julio Jiménez Rueda, it was assumed that "masculinity" was a virtue and "effeminacy", on the contrary, was "a punishable example".

After joking and laughing about "masculinities" and "effeminations" —words that have certainly reappeared in the social imagination along with that of visibility, such as in some cultural propaganda that announces a "Masculinities Workshop"—, Salazar Mallén took out another letter that he had hidden under his sleeve and said: "In addition to it being a grid against Estrada and the Contemporaries who positioned themselves in positions of government administration and who take refuge in the macho values that we already know, who do you think signed the Manifesto?" He immediately began to read the names that came at the bottom, before the gaze of those present: Mauricio Magdaleno, master of the Mexican novel, author of *El resplandor*. Every time he said a name, a cry of disbelief could be heard, while Salazar Mallén laughed. Renato Leduc, of whom no one was surprised that he appeared as a signatory, because he was known for his homophobia which he never hid, because, very shortly before, in 1932, he had written "Corydon o de los amores" in the book *Los banquetes. Quasi-novela*, where he says in that tone of guasa, almost with double meaning, that predominates throughout the essay, that homosexuality "is acquired with birth or by a later situatio, precisely after, birth".

After that, José Rubén Romero came up, the great narrator of *Mi caballo, mi perro y mi rifle*, as well as the famous story *La vida inútil de Pito Pérez*. Every time Salazar Mallén mentioned a new name, something was said about his work and miracles. Rafael F. Muñoz, the author of the novel *Vámonos con Pancho Villa*, made into a film by Fernando de Fuentes, with adaptation

and screenplay by the aforementioned Xavier Villaurrutia. Juan O'Gorman, the great muralist, who made the fabulous coating of the Central Library of Ciudad Universitaria. Francisco L Urquizo, one of the fundamental writers of the so-called Novel of the Mexican Revolution, especially for the extraordinary *Tropa vieja*, a masterful piece of Mexican letters.

It is now worth noting the point made by Carlos Monsiváis (1998) regarding homophobia. In those years of the controversy in *El Universal* about virilities and effeminations, there was an evident machismo, however, Monsiváis explains, Leduc is not homophobic, because when publishing pages such as "Corydon o de los amores" fragment the book *Los banquetes. Quasi novela* in 1932, no one complained about his attitude. At that time, not only is it normal but his criticism does not admit censorship, not even "the natural inferiority, or, better, the evident inhumanity of the homosexual," was discussed. Whoever practices sex with their peers, lacks virtues and only deserves that form of forgiveness that is mockery". The term *homophobia* was unthinkable back then, which catalogs almost clinically that sexual condition.

Something similar happens in the other document that Salazar Mallén was already preparing to include in the next edition of his novel *La iniciación* (1966), published in Costa-Amic after an author's edition made by his friend Olga Arias, in Durango. Here appears a theoretical aspect regarding whether pornography can be considered to be excluded from all literary value. According to Salazar Mallén, he was carried away by the opinion of a colleague and removed a pornographic passage from his story.

Salazar Mallén explains that a friend warned him that he ran the risk of *La iniciación* looking like a erothic novel. The paragraph was excluded from the edition of Durango and also from that of Costa-Amic. Of course, the author retained the self-censored part: "I deleted that page because I was impressed to hear the argument that it would turn my novel into a erothic work, that it would thus cease to be a literary work. Now I've changed my mind. I don't think there's any sicalipsis there, and if there is, that's not why it ceases to be literature. " He said that, in the third edition, if there were to be a third edition, he would include that part:

> "[Luis] Mario Schneider wants to publish it in the Oasis publishing house, let's see if they allow it and he's not stopped by morality and prejudice. The case, "he continued," is that my friend's opinion made me doubt. I certainly didn't want to turn my novel into such a novel, so the page I'm going to read to you was deleted. It remains unpublished and reads as follows:
>
> No supo lo que aquello quería decir. Los sonidos resonaron en sus tímpanos sin proyectarse. Sin adquirir significación: su inteligencia y su voluntad estaban abolidas. Por eso, dócil, dejó que Isabel lo llevara hasta un sitio de la habitación en donde la imagen de ambos se duplicaba en el espejo del tocador.

"No te muevas", conminó casi afónica de tan ronca. Tan fuera de sí estaba Diego y tan lejano de su facultad de pensar que no se le ocurrió inquirir que intención guiaba a la ramera, pero de repente aquella atonía ascendió y él se llenó de un espasmo que lindaba con el terror. Isabel había caído de rodillas. "¡No! ¡no!", gimió, enronquecido también. "¡No te muevas!", exigió ella nuevamente. De hinojos, como estaba, diestro el ademán, tomo en sus manos la erecta virilidad del joven y empezó a llevársela a los labios con ese ademán lento y goloso. Previniendo lo que iba a ocurrir, se retajo ligera, casi imperceptiblemente, dando un vuelco del asombro al asco; no un asco físico, sino un estado en que la repugnancia, una repugnancia súbita que se apoderó de él, se entreveraba al desprecio y al desencanto. Había oído hablar en la escuela de acto que iniciaba Isabel, pero desde su inocencia creyó siempre que se trataba de hipérboles fraguadas en la vanagloria, o de exageraciones inspiradas en una lujuria insana, y he aquí que una mujer a la que hasta ese instante había admirado se disponía a incurrir en la repugnante acción. "debe ser más sucio que limpiar excusados, que comer tlaconetes, que...", se dijo rápidamente, sin encontrar un término de comparación que lo satisficiera. Sintió el impulso de darle un puntapié, pero no se atrevió a hacerlo. "¡Qué vergüenza!, eso es, vergüenza de que alguien pueda rebajarse a tanto", se decía atropellada, vertiginosamente, de tal modo que las ideas cabalgaban unas tras otras en el informe asco que se fundía en un pequeño odio superpuesto a la excitación suscitada por la desnudez de la prostituta. "¡Qué grande! ¡qué bueno estás!", articuló Isabel embelesada después de hacer estallar un beso suculento. No había terminado: echó a cabeza hacia adelante, imitando a la fiera que lanza un mordisco; sus labios rodearon como un cinturón de pez el enhiesto miembro; sus mejillas palpitaron henchidas de él; la rubia cabellera resbaló blandamente sobre los testículos del muchacho."

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