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SUMARIO SUMMARY RESUMO

Editorial

Welcome to the June 2023 issue of the MLS Inclusion and Society Journal. In this issue, we will explore various topics related to inclusion and its impact on society.

We will begin with an article that examines LGBTI+ inclusion in companies in Nuevo León, Mexico, and its impact on employee motivation. This study provides a detailed view of how the creation of inclusive work environments can promote greater employee satisfaction and engagement, generating benefits for both individuals and organizations.

Continuing with the educational field, we will delve into the impact of PHET simulators on learning in physics, focusing on a specific look at the solution of electrical circuits. This article explores how the use of these simulators has revolutionized the teaching of physics, allowing students to experience and understand complex concepts in a practical and visually appealing way.

In another article, the relationship between learning strategies and critical reading is analyzed. Through research and analysis, we explore ways in which learning strategies can enhance students' ability to critically read, analyze, and evaluate information more deeply and reflectively.

In a different context, we found a study on the motivation to learn of 12th grade students at Escola Secundária de Mavila, Moçambique. This article introduces us to factors that influence student motivation, such as emotional support, content relevance, and active participation in the educational process. These findings are fundamental for the design of strategies that foster a stimulating and motivating learning environment. In addition, we will explore Ecuadorian teachers' perceptions of the inclusion of deaf students in regular schools.

Through interviews and data analysis, the opinions and experiences of teachers regarding the inclusion of these students are revealed. This article highlights the importance of providing adequate support and training to teachers to achieve effective and equitable inclusion. Finally, we will dive into the fascinating field of neuromethodology and its relationship to teacher education. This article examines emerging inclusive methodologies that are based on an understanding of how the brain functions in the learning process. Effective and personalized pedagogical strategies are explored to ensure equal opportunities for all students.

In this June issue, the MLS Inclusion and Society Journal invites us to reflect on the importance of inclusion in different fields and how it can positively transform our societies. We hope these articles will be a source of inspiration and knowledge to promote greater equality and diversity in our communities.

Editors-in-chief

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LGBTI+ INCLUSION IN COMPANIES IN NUEVO LEÓN, MEXICO: IMPACT ON EMPLOYEE MOTIVATION

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Abstract. Mexico continues to be a country where discrimination prevails and where lesbian, gay, bisexual, trans and intersexual (LGBTI+) employees are being victims and feel demotivated for openly expressing their sexual orientation and/or gender identity (SOGI). This study documents the variations in the degree of implementation of policies and strategies to prevent discrimination and promote labor inclusion of these minorities among large employers in Nuevo León México, and ponders the correlation between the correct implementation of this policies with the degree of motivation within the LGBTI+ community. Method: This study consists of the application of two instruments to measure the degree of implementation of LGBTI+ inclusion strategies and the degree of motivation of people from this minority within the organization. On one hand, a group of companies recognized for their progress in the implementation of inclusion strategies was studied, and on the other, a heterogeneous group of companies that have different degrees of inclusion. Results: The resulting Pearson correlation between inclusion and motivation variables were found to be 0.242 ($p > 0.005$) and therefore considered as not significant. The evaluation of every element of motivation, resulted in an only element with a significant correlation (recognition) of 0.307 ($p< 0.005$), indicating that LGBTI+ employees may perceive themselves as less recognized in companies with lower degree of inclusion policies and programs. Discussion: There is so much to do in terms of LGBTI+ inclusion thus no single organization scored more than 65 out of 100 points of the inclusion scale proposed.

Keywords: LGBTI+, labor inclusion, work motivation, minority groups.

INCLUSIÓN LGBTI+ EN EMPRESAS DE NUEVO LEÓN, MÉXICO: IMPACTO EN LA MOTIVACIÓN DE LOS EMPLEADOS

Resumen. Introducción: México sigue siendo un país donde prevalece la discriminación y donde las personas empleadas lesbianas, gays, bisexuales, trans e intersexuales (LGBTI+) siguen siendo víctimas y se sienten desmotivados por expresar abiertamente su orientación sexual y/o identidad de género (OSIG). Este estudio documenta las variaciones en el grado de implementación de políticas y estrategias para prevenir la discriminación y promover la inclusión laboral de estas minorías entre los grandes empresarios de Nuevo León México, y pondera la correlación entre la correcta implementación de estas políticas con el grado de motivación de las personas trabajadoras de la comunidad LGBTI+. Método: Este estudio consiste en la aplicación de dos instrumentos de medición del grado de implementación estrategias de inclusión LGBTI+ y el grado de motivación de personas de esta minoría dentro de la organización. Por un lado, se estudió un grupo de empresas reconocidas por su avance en la implementación de estrategias de inclusión y por otro un grupo heterogéneo de empresas que tienen diversos grados de inclusión. Resultados: La correlación de Pearson resultante entre las variables de inclusión y motivación resultó ser de 0,242 ($p > 0,005$) y, por lo tanto, se consideró no significativa. La evaluación de cada elemento de la motivación resultó en un único elemento con una correlación significativa (reconocimiento) de 0,307 ($p< 0,005$), lo que indica que los empleados LGBTI+ pueden percibirse menos reconocidos en empresas con menor grado de políticas y programas de inclusión. Discusión: Hay mucho por hacer en términos de inclusión LGBTI+, por lo que ninguna organización obtuvo más de 65 de los 100 puntos de la escala de inclusión propuesta.

Palabras clave: LGBTI+, inclusión laboral, motivación laboral, grupos minoritarios.

Introduction

The globalization process has accentuated inequalities in many areas, one of them being the labor market and its dynamics (Burín, et al. 2007). Included in this phenomenon, there has been exclusion of all minority groups, and particularly of members of the Lesbian, Gay, Bisexual, Transgender, Transsexual, Transvestite, and Intersexual community [LGBTI+] and other non-normative (Comisión Interamericana de Derechos Humanos, CIDH, 2015) Sexual Orientation and/or Gender Identities [SOGI] (Instituto Nacional de Estadística y Geografía [INEGI], 2022) who cannot aspire to equal labor conditions such as those offered to people with normative gender identity and orientation.

In Mexico, the results of the Sexual Orientation and Gender Identity Discrimination Survey, ENDOSIG for its Spanish acronym, (Comisión Nacional para Prevenir la Discriminación [CONAPRED] & Comisión Nacional de Derechos Humanos [CNDH], 2019), also demonstrate the prevalence of discrimination in employment for this specific group, as one out of every two people surveyed is not open about their SOGI at their workplace and had stopped attending to work related activities fearing being discriminated. Three out of four, or up to 75% of the surveyed people, feared being discriminated for reasons that normative SOGI people do not ponder, such as fully express their gender identity, giving public affection to their partners or sharing their SOGI with their coworkers or supervisors.

Another glance of discrimination is shown in the results of the Sexual Diversity and Gender National Survey, known by its abbreviation ENDISEG, where 28.1% of LGBTI+ community answered that in the last 12 months, they had suffered at least once, one of the following: unequal treatment on labor rights, benefits or promotions, offensive commentaries or have been teased in their work areas (INEGI, 2022). And if we dig deeper, discrimination in labor areas is suffered differently between SOGIs. For example, 41% of trans people surveyed by Labor inclusion and diversity alliance non-governmental organization (Alianza por la Diversidad e Inclusión Laboral [ADIL], 2018), nevertheless having a bachelor's degree, showed the less work experience all SOGIs, and the same goes to non-binary people.

Even when the companies come from countries where inclusive legislation exists and their inclusive policies are included in their sustainability reports worldwide, in Mexico the effectiveness of these policies is questionable and in many times the application of these policies is not measured in their local sustainability reports (Vázquez et al., 2020).

In this sense, and in general, inclusion can be considered as a necessary strategy for the reduction of discrimination of any vulnerable population. The concept of inclusion has different meanings; in a broad sense it focuses on the social relations, processes and institutions that encourage the integration of certain groups and the exclusion of others (Haan, 2000).

Inclusive organizations present advantages over those that deny integration and talent conservation for reasons of discrimination based on their gender, beliefs, sexual preferences, disability, age, race, or health situation (Ocaña, 2018).

Work motivation, on the other hand, is an indicator of well-being within the work environment and is influenced (among other factors), by interpersonal relationships, violence, and discrimination at work, as well as unequal opportunities, permanence, and development in the organization; work stress and broad personality expression (Buddel, 2011; Powers, 2008).

In Mexico, legislation towards inclusion is only halfway (Vázquez, et al., 2021). Legislation in a national level explicitly prohibit workplace discrimination on hiring, recruitment, access to employer-provided training, promotions, demotions, terminations, and equal payment based on sexual orientation. But it does not provide the same rights on regard of prohibition of indirect discrimination or retaliation for reporting workplace discrimination based on sexual orientation. Furthermore, neither of the previous rights are granted by the existing legislation based on gender identity. (World Policy Analysis Center [WPC] 2022)

A survey made by the Victims Attention Executive Commission and Rainbow Foundation in México in 2018 showed that one of every 6 participants considered that their SOGI was an obstacle to access any job, 43% of the participants had suffer from harassment and 78% argued that labor discrimination had impacted their professional and personal development. Also, this study revealed that the most common discrimination behaviors towards LGBTI+ community from their employees are unnecessary health diagnosis, unequal roughness in the selection process, unequal payment regard of having the same position, less development opportunities, actions driven to ascertain their sexual orientation, and physical or verbal aggression (Comisión Estatal de Víctimas & Fundación Arcoíris, 2019).

The state of Nuevo León represents the strongest state in economic terms, and the most industrialized in the country (Real Estate Market & LifeStyle, 2018); good quality of life prevails, providing access to health and education services. However, its capital city appears with a rating of CC (low), placing it as a partially open city for the LGBTI+ community (Miller & Parker, 2018). In addition, the results of the ENDOSIG 2018, place the entity as a frontrunner in terms of discrimination towards sexual minorities (CONAPRED & CNDH, 2018).

To close the gap between the legislation development on basis of sexual orientation and on gender identity (WPC. 2022), and to pair economic growth with social inclusion (Vázquez, 2022), it is necessary to talk about the differences between the inclusion policies and their implementation, in a subnational and institutional level.

It therefore becomes imperative to generate scientific knowledge on the impact of developing policies and practices of inclusion, diversity, and prevention of discrimination within organizations and their impact on the motivation of LGBTI+ employees, which in turn influences labor productivity. As a starting point, this study aims to develop a methodology that allows for a comparison between organizations: those that have had more experience in the implementation of inclusion policies and practices and have reached sufficient maturity, versus important companies in the State of Nuevo Leon that are at the earlier stages of opening to LGBTI+ minorities.

The events that marked the beginning of movements for the modern rights of sexual minorities served as a catalyst for the creation of groups who sought the recognition of rights for individuals regardless of their gender, sexual preference, gender identity or gender expression.

One of the first groups created is the International Lesbian, Gay, Bisexual, Trans, and Intersex Association, back in 1978 in the United Kingdom, which was formed as a federation of local and national organizations dedicated to achieving equal rights worldwide (International Lesbian, Gay, Bisexual, Trans, and Intersex Association [ILGA], 2017). Separately, in the United Kingdom, Stonewall emerged in 1989, whose work has been fundamental in protecting the rights of the LGBTI+ community ranging from universal marriage, adoption, labor equality and non-discrimination. In the case of the trans community, TGEU or Transgender Europe is recognized, founded in 2005 in Berlin, Germany that works in conjunction with the European Union, ILGA and more than 112 organizations with a mission to support a voice for the trans community and to be a platform that advocates for trans rights and justice (Transgender Europe [TGEU], 2018).

The advocacy focusses of movements fighting for the rights of sexual minorities has traditionally been on healthcare rights, gender identity, non-discrimination, and equal marriage, while a focus on equality in the workplace would not become visible until recently, with the participation in the18th March for Diversity of a group of companies forming a collective called Pride Connection. The purpose of Pride Connection was to share experiences and strengthen best practices for an inclusive and diverse work environment, prevent discrimination, attract allies, and raise awareness about the inclusion of LGBTI+ minorities. In this area, various groups have created methodologies to measure the degree of policies and practices of inclusion and non-discrimination of minorities in different areas.

The organizations ILGA, Rainbow Europe, WPC and TGEU analyze the legislation of each country, supported by a network of activists, organizations and local associations that provide information; these studies focus directly on the efforts of the governments of countries around the world to protect sexual minorities from acts of discrimination and violence. They do not measure the degree of motivation of populations or their perception of the degree of discrimination, or recognition and exercise of their human rights (ILGA, 2019; International Lesbian, Gay, Bisexual, Trans, and Intersex Association- Europe [ILGA-Europe], 2019; TGEU, 2018). In these measurements, protection from labor discrimination is included.

The Open for Business organization (Miller & Parker, 2018); on the other hand, has developed several studies and reports under the premise that diverse and inclusive cities are more competitive because they promote innovation, attract highly skilled talent, and have companies with high business growth rates. The organization performs an

evaluation to analyze how inclusive a city is, including 23 parameters that address social, economic, and legal factors in various aspects of competitiveness, national competitiveness, cultural values, and governance.

The measurement of labor inclusion and non-discrimination at work was fundamentally driven by organizations that work in the pursuit of recognition and effectiveness of sexual minorities rights. The main objective of these evaluations is to put inequality in the spotlight (labor, legal and social discrimination oriented towards LGBTI+ community is still a mayor cultural and structural problem) and to establish a roadmap to address the gaps of social and economic growth within the community and determine affirmative actions towards equality.

Stonewall (2018), for example, has developed a Global Workplace Equality Index that is yearly reviewed and issued in a report on the best employers for the LGBTI+ population (Top Global Employers). The methodology of this study includes the voluntary submission by each employing organization of evidence of its performance in implementing LGBTI+ inclusion and diversity policies and practices (Stonewall, 2018). The evidence includes the areas of policy, training, management team engagement, leadership, monitoring, procurement, community involvement and understanding of the local context, global mobility, and additional in-country activities, which are evaluated and considered as variables in the index. The index is a tool that helps organizations navigate from a situational diagnosis and move towards LGBTI+ employee equity at work and beyond (Stonewall, 2015).

Human Rights Campaign (2019), on the other hand, evaluates the protection of employees through policies regarding sexual orientation, gender identity and expression. Important variables measured include the equivalence of health insurance for all individuals, support for a culture of inclusion and corporate social responsibility; conditions for gender transition, work climate surveys, establishment of a diversity committee or group of LGBTI+ employees, efforts to demonstrate commitment and extend actions outside the organization and existence of cases or complaints of discrimination against employees. It is noticeable that Stonewall and Human Rights Campaign recognize the importance of policies first, then inclusion and diversity practices, staff training, affirmative action to level the playing field and means to address any rights violations.

In Mexico, governmental efforts have had a progressive improvement in the visibilization of this phenomenon, institutions such as INEGI, CONAPRED and CNDH have developed surveys to measure discrimination on grounds of sexual orientation and gender identity such as ENADIS (INEGI, 2018), ENDOSIG (CONAPRED & CNDH, 2019) and ENDISEG (INEGI, 2022). Non-governmental organizations also have also shed a light in the specifics of SOGI labor discrimination, ADIL, Rainbow Foundation and the governmental organization Victims Attention Executive Committee developed surveys to measure labor assets, diversity among workspaces and a national diagnosis of labor rights and discrimination of LGBTI+ community in Mexico (Comisión Estatal de Víctimas & Fundación Arcoíris, 2019).

The Sexual Diversity and Gender National Survey, ENDISEG, led by INEGI in the year 2021, was driven with a methodology of stratified and cluster sampling, surveying up to 44,189 participants and representing up to 97.2 million people. The survey was applied with a hybrid questionnaire, face to face for questions that were less sensitive and a pre-recorded and interactive audio interview for the more sensitive questions (INEGI, 2022). Within the survey the results showed sociodemographic

statistics such as total population nationally and in a subnational level, age, labor situation, school assistance and educational level, marriage, co-living situation, disability, and health care access. It also showed aspects of their childhood, sexuality, mental health and more significant for our investigation social rejection at work. Another effort to reach sub represented groups (such as pansexual, asexual and gender fluid people) was made by making this survey accessible in a webpage, where people could answer voluntarily (INEGI, 2022).

For the case of the National Survey on Discrimination, ENADIS, the methodology was through the application of an electronic questionnaire collected face-to-face by interview (INEGI, 2018) with subjects selected by probability sampling (INEGI, 2018). Included in the survey, are the prevalence of discrimination, or perception of having been discriminated against in the last year, unjustified denial of their rights, prevalence of discrimination based on sexual orientation, perception of respect for their rights, openness to diversity, values, and attitudes towards same-sex couples.

The Survey on Discrimination on Grounds of Sexual Orientation and Gender Identity, ENDOSIG, on the other hand had a different methodology, making a questionnaire throughout an electronic tool on the website of both CONAPRED and CNDH. The sample was not selected, but rather responses were received according to the volunteers to participate and there was a large concentration of responses in Mexico City and the young and educated population that has more access to social networks and internet, thus the survey had a considerable bias (CONAPRED & CNDH, 2019). It is noteworthy that this survey already collects data on the prevalence of discrimination at work and the consequences of this reflected in fear. The questionnaire surveys for, among others, life stage at which people self-identified in terms of sexual orientation and/or gender identity, perception of the degree of respect for their rights, hostile social context, unjustified denial of their rights, discriminatory experiences at work, fear of suffering discrimination, suicidal ideation or attempt because of discrimination (CONAPRED & CNDH, 2019).

Another effort to measure the impact of inclusion in business was made by ADIL. Back in 2014, ADIL made their first national survey on homophobia in labor which led to know very important aspects of the LGBTI+ community such as occupation, income, main economic activity, labor discrimination, harassment, complaint of labor harassment and intimidation. In 2015 another survey was led by ADIL, putting the spotlight in labor inclusion and diversity, and showing the perception LGBTI+ people on the inclusive policies of their employees, productivity, sense of belonging and a comparison to other excluded group withing the enterprise. The survey made by ADIL 2018 made a specific effort to answer the main questions that employers are making on regard of improving their inclusive strategies. The specific objectives of this recent survey were to know labor assets of the working age LGBTI+ population their working situation, labor experience, academic formation, income, and its segmentation.

This surveys have thriven a significant impact on social awareness and a massive call to action. The increasing participation of organizations, awareness of the economic and social impact of SOGI based discrimination and the legal improvements have been noted throughout the nation. (HRC, 2019).

Therefore, to dig deeper into this phenomenon and shed a light of it in the local spectrum, the objective of this study is to evaluate the non-causal correlation between

inclusive policy implementation in companies in Nuevo León, Mexico, and their employee's motivation.

Method

Design. Considering the prerequisites for establishment of causal links and the plausibility of the results, the experimental design was carried out as described by Hernández Sampieri (2014). Questionnaires are used as non-experimental cross-sectional research used to establish correlational-causal relationships. The research started from a quantitative approach, based on data collection and its statistical analysis for the establishment of conclusions of the study.

As a first methodological step, a pilot questionnaire was developed and applied to employees working in the selected organizations; the evaluation criteria for labor inclusion were determined based on the identified variables and the possible responses were weighted. Once the feedback from the pilot questionnaire was received, the questions initially formulated were adapted to facilitate understanding and coherence, as well as to eliminate possible questions that could represent a bias in the results.

Study group. Access to members of the LGBTI+ population was made through contacts with civil and industrial organizations such as Mexican Federation of LGBTTI Companies, LGBTI+ Mexican Coalition, ExploraT, GESS, Pride Connection, Litiga, Curch of the Metropolitan Community, Transamor and Diversitas. Obtaining a database of participants working in 54 different companies (table 1). Of all the contacts established, only participants whose company operated in the state of Nuevo León were selected (52).

Table 1.

Organizations in which the instrument was applied in an alphabetical other.

Organizations		
Adidas	Grupo Posadas	Mondelez Kraft
Alsea	Grupo Soriana	Municipio de la Ciudad de Monterrey
Aluregio SA	HEB	Nemak
Atos	Heineken	Nestlé
Automotris	Henkel	Ocesa
Banamex	Herbax	Pepsi Co
BAT British American To	herdez	Pfizer
BCG	Home depot	Polaroid
Beiersdoff	ITESM	Schneider Electric
Carone	J&J	SEP
Christus Muguerza	Kraft Heinz	Teleflex
Cristian Torres Nutriólogo	La Ventana	Ternium
Danone	Lancome	Torogia
Dante Quintana	LCG Imagen y Comunicación SA de CV	Toyota
Experts Environmental Consultants	LEGO	Uber
FEMSA	Lixil Group	Vidusa
Ferrero	Lixil Water Technology Americas	Walmart

General Electric	Lola
Grainger	L´Oreal
Grupo Idesa	Maditrex Forwarding
Grupo Modelo	Mattel

As the research focuses on the identification of two types of companies (those that have incorporated in their policies, practices, and strategies to encourage labor inclusion of sexual minorities, and those that have not yet made much progress in this regard), to categorize the companies in the study, the policies, and practices of companies with operations in the State of Nuevo León were reviewed, resulting in a control group. The initial control group is composed of employees of two companies that have openly declared a policy of inclusion, diversity, and non-discrimination, as well as advanced practices in their implementation (Accenture and General Electric).

The study group - Group B – is integrated by workers from different companies in the State of Nuevo León, where inclusion, diversity and non-discrimination policies have not been implemented, or at least, the degree of implementation of their practices to increase the inclusion of sexual minorities has not been as high as that of the companies to which the people in the control group belong.

The functions performed by the participants of both groups within their respective organizations are varied, ranging from internal diversity or LGBTI+ association, LGBTI+ employee in another area, management, human resources, recruitment, social responsibility or sustainability, public relations, marketing, and legal department.

Respondents' ages ranged from 18 to 50 years old and identified themselves as male, female, transgender male or transgender female with homosexual, heterosexual, bisexual, queer, or gender fluid sexual preferences.

Instrument. Two instruments were applied to each of the individuals interviewed. Anonymity was crucial in terms of the application of the instrument, despite the application through LGBTI+ labor recognition organizations, their SOGI was kept secret and a significant part of the subjects find out of the survey and answered it through a snowball sampling effect. In the first questionnaire on labor inclusion of sexual minorities, the items were focused on the actions taken by the employer to promote labor inclusion. This instrument will be used to measure the degree of implementation of such plans and programs. In a second stage, the "Labor Motivation Questionnaire" will be used to measure the degree of labor motivation of the employees interviewed.

In the case of the development of the instrument for the measurement of work motivation, Maslow (1943), McClelland's & Burnham (2003), Alderfer (1972) and Herzberg (1968) theories of necessity were used as a basis for the formulation of the items.

The variable "degree of labor inclusion" of the organizations is described in this work as all actions aimed at achieving labor equality, improvement in working conditions and non-discrimination for homosexual, bisexual, transsexual, transgender, transvestite and intersex persons. The variable “degree of labor inclusion” is composed of the following dimensions:

Policies and action plans for the inclusion of sexual minorities, equal employment opportunity, egalitarian training and development plan, and organizational communication regarding LGBTI+ issues.

Policies and action plans for inclusion of sexual minorities, known in Results section as "Policies", measured perception of the participants of the level of publicity of these policies in webpages, sustainability reports, publicity campaigns or merch documentation and the implementation of gender equality, non-discrimination, and inclusive action plans such as equal labor opportunities for people with non-normative SOGIs. Equal employment opportunities, referred hereby as "Employment", assessed human resources processes of selection and hiring, promotion, equal salaries, benefits such as gender equity capacitation, training in LGBTI+ rights and obligations, inclusive language, and technique trainings for productivity improvement for trans people. Egalitarian training and development plan, which can be found in Results section as "Development", included constant training, non-discriminatory policies explained and teach since the hiring process, the existence of committees or groups who can evaluate, intervene, and reaffirm the porpoise of the action plan, process complaints in this matter and take empowerment effective actions toward LGBTI+ employees. Organizational communication regarding LGBTI+ issues dimension, assess working environment, inside and outside communicational efforts, the existence of pathways to present complains, complaints and recommendations, and protects victims from harassment on regard their SOGI; this variable was referred as "Communication".

Each of the dimensions of this variable is included in the research instrument through five questions that, depending on the answer, could acquire a value from 1 to 5.

The variable "employee motivation" has five dimensions that are explored in this study through a quantitative assessment: interest in the task performed (Task), sense of achievement and appreciation (Self-realization), interpersonal relationships (Belonging), ability to express his or her opinion (Influence) and sense of recognition for the tasks (Recognition). The instrument evaluates the extent of the variable through five questions that, depending on the answer, can acquire a value from 1 to 5.

This questionnaire survey resulted in decisions that led to the construction of the pilot instrument. This pilot instrument was applied to 27 volunteers to obtain feedback; among the comments received, the opinion was that the items were too long, with confirmation bias or containing two or more questions per item. Once the final instrument was obtained, a letter of informed consent was signed by each of the participants before the application of the instrument.

Data analysis. The method of validation consisted in the application of the survey on a pilot group to determine its applicability and validity and calculate initial reliability and validity. Feedback was also received during the application regarding the vocabulary and the syntaxis of the questions.

With the purpose to relate the actual data obtained from the instruments to the construct, using an evaluation scale to reflect the incidence presented, the statistical analysis was firstly submitted to a measurement of internal consistency using Cronbach's alpha coefficient, using the IBM SPSS v.26 statistical package. A value equal or greater than 0.7 on this scale, indicate the coherence of the answers given by DeVellis & Thorpe (2021).

Subsequently, an exploration of the data was carried out through descriptive statistics, in order to detect the composition of the sampled groups in terms of age, sex, sexual preference, country of origin of the employing organizations of the study subjects, religion, marital status and the presence of children in the family. This exploration was carried out through the calculation of measures of central tendency and variability.

Once this information was obtained, *a k-means cluster analysis* was performed to form two groups, allowing the formation of a group of organizations with good inclusion policies for LGBTI+ employees, as well as a group composed of those organizations with inclusion policies implemented to a lesser degree.

To the groups resulting from the cluster analysis, a single factor analysis of variance (ANOVA) was performed, in order to detect if there exists any significant difference between the motivation of both groups, considering as significant a p−value of ≤ 0.05a value greater than 0.70 as the minimum acceptable threshold.

In concordance with this intention, the correlation between the independent variables that comprise labor inclusion and the dependent variables that account for staff motivation was calculated in conjunction with its significance degree and assumed the be the strength of the relationship between variables.

Results

The resulting Pearson correlation between inclusion and motivation variables were found to be 0.242 ($p > 0.005$) and therefore considered as not significant. This result can be explained by the multi-factorial causality of the labor motivation variable, it also suggests that the correlation rather than being significant, it is positive, it may not have a strong Pearson correlation coefficient because of this multifactorial motivation variable but it gives a startup to analyze how motivation dimensions can impact and correlate to the organization efforts on inclusive policies.

In order to give the instrument deeper analysis, each dimension of the inclusive variable was analyzed with the general level of motivation, showing non-significant results, secondly the motivation was torn in its five dimensions and each dimension was paired with the general level of inclusiveness, showing a significant result only in one of its elements. Thirdly the Pearson Correlation analysis was made with the general resulting level of inclusion and the level of the motivation.

The evaluation of every element of motivation, resulted in only one element with a significant correlation (recognition) of 0.307 ($p< 0.005$), indicating that LGBTI+ employees may perceive themselves as less recognized in companies with lower degree of inclusion policies and programs, and therefore less motivated.

As shown in *Table 2*, Group A has clearly a larger degree of inclusion of LGBTI+ minority group in all axes: implementation of policies, equal job opportunities, development for employees, and communication actions. The mean values for all four variables were at least four times bigger than compared to Group B. The biggest gap is observed in the variable related to the development opportunities for LGBTI+ employees. The Pearson's Correlation results between the four variables of inclusion and level of motivation is in general were non-significant, with a weak correlation value. However, the highest positive correlation coefficient was seen in equal employment opportunities and communication.

Table 2

Correlation of inclusion variables per study group and degree of motivation.

		Variable			
		Policies [e]	Employment [e]	Development [e]	Communication [e]
Group A [a]	Mean	12.19	13.12	12.12	11.73
	N	26	26	26	26
	Std. Deviation	2.333	2.251	1.633	2.051
Group B [b]	Mean	2.18	3.39	0.68	2.00
	N	28	28	28	28
	Std. Deviation	2.195	3.843	1.278	2.037
Motivation [c]		0.215	0.277*	0.205	0.234*
p [d]		0.051	0.011	0.063	0.033

Comparison descriptive statistics of total scores for each independent variable of inclusion of minorities, per study group and the resulting correlation to the observed degree of motivation.

[a] Companies with a high degree of labor inclusion of sexual minorities.

[b] Companies with deficient degree of labor inclusion of sexual minorities.

[c] Pearson's correlation

[d] Sig. (bilateral)

[e] Total scores

* p < .05. ** p < .01

Then, to get further analysis, the variable of inclusion was torn in its four dimensions and each one of them was analyzed with the general level of inclusion. The *Table 3* demonstrates the correlation between the five elements of motivation: task, influence, belonging, self-realization, and recognition, to the total degree of inclusion in Groups A and B. Results show only a moderate significant correlation in the element "Recognition" with the level of 0.307 (p< 0.005), coefficient higher than 0.25 and also higher by one half than each correlation level of belonging and self-realization (both 0.203), and twice the level of the element of task which was 0.145.

Table 3

Correlation between variables of motivation and the observed level of inclusion

		Variable				
		Task [e]	Influece [e]	Belonging [e]	Self-realization [e]	Recognition [e]
Group A [a]	M	23.31	22.81	24.19	23.38	22.84
	Std. deviation	2.363	3.073	1.497	2.368	2.853
Group B [b]	Mean	22.68	21.57	22.71	22.07	20.39

	Std. deviation	3.772	4.392	4.171	4.413	4.947
Inclusion [c]		0.145	0.211	0.203	0.203	0.307**
p [d]		0.189	0.054	0.64	0.64	0.005

Note: Comparison descriptive statistics of total scores for each dependent variable of motivation of minorities, per study group, and their corresponding correlation to the observed level of inclusion.

[a] Companies with a high degree of labor inclusion of sexual minorities.

[b] Companies with deficient degree of labor inclusion of sexual minorities.

[c] Pearson's correlation to the observed level of inclusion

[d] Sig. (bilateral)

[e] Total scores

* p < .05. ** p < .01

Pearson correlation between the implementation of inclusion policies and the level of motivation was verified. *Table 4* shows a result of 0.242, which is non-significant, given the coefficient lower than 0.25 though a bilateral significance (p value) lower than 0.05.

Table 4

Correlation between degree of inclusion and level of motivation.

		Inclusion policies	Motivation
Inclusion policies	Pearson's Correlation	1	0.242*
	Sig. (bilateral)		0.027
	N	84	83

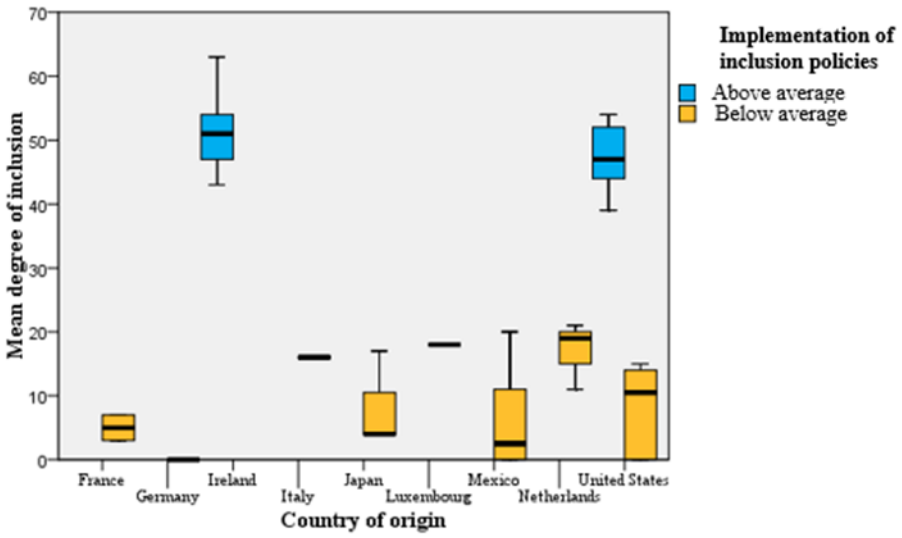
Notes: Observed correlation between the degree of implementation of inclusion policies within a company and the observed level of motivation of employees.

* p < .05. ** p < .01

Group A is comprised by two major employers, which countries of origin are United Stated of America and Ireland. Group B includes companies with head offices in a variety of countries: France, Germany, Italy, Japan, Luxembourg, Mexico, Netherlands and United States of America. *Figure 1* shows the results in the degree of inclusion based on the origin of the companies that participated in the study.

Figure 1.

Mean degree of inclusion, per country of origin.



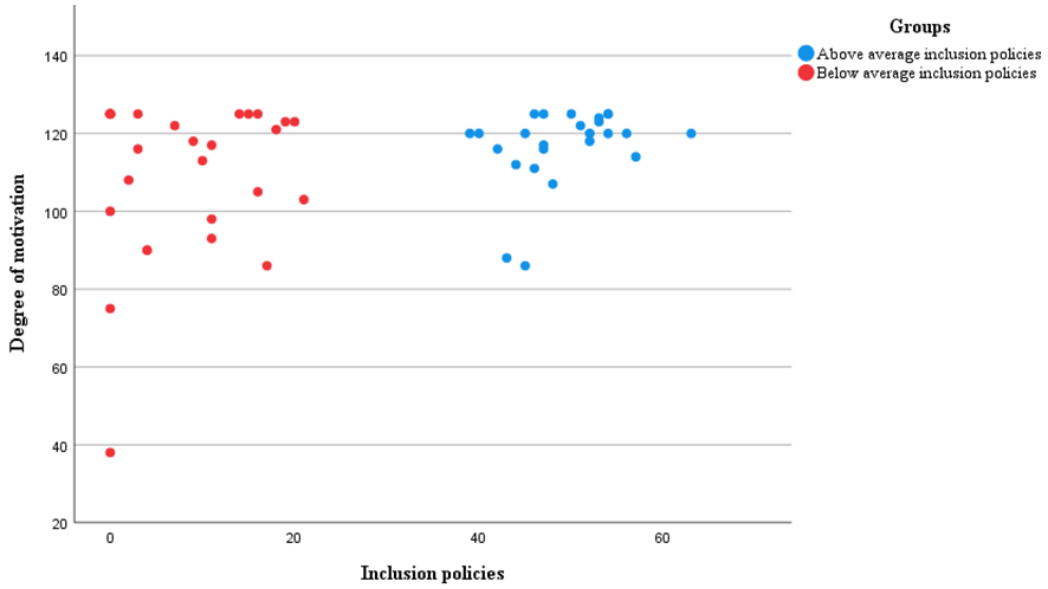
As shown in Vazquez, et. Al. (2020) transnational companies have weak concordance between their origin country legislative efforts towards the elimination of SOGIs labor discrimination, and the implementation of SOGIs inclusiveness policies within the subsidiaries that operate in Mexico.

Another notation for *figure 1* is found in the deviation standards between the degree of motivation of companies which origin country is Mexico and United States (excluding Group A, General Electric which is above average) compared with France, Italy, Japan, Luxemburg, and Netherlands.

Figure 2 shows the dispersion of individuals' motivation against degree of inclusion perceived by employees in their organizations. A broader dispersion is observed in Group B compared to Group A. Although there are employees fully motivated in both groups, more individual have a lower degree of motivation in Group B.

Figure 2.

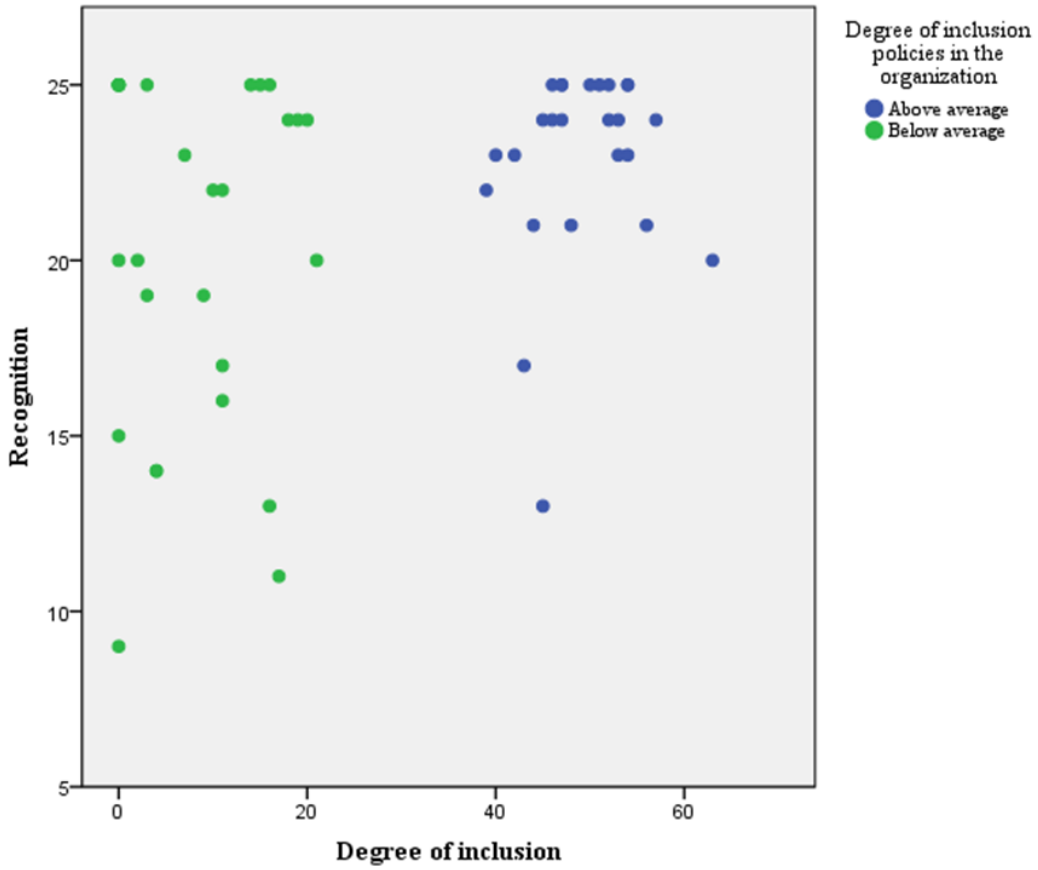
Resulting motivation per degree of inclusion policies in the organization.



Recognition was the motivation element with the highest correlation with organizational degree of LGBTI+ inclusion. The *Figure 3* shows the dispersion between individuals' recognition level compared to the degree of total inclusion (including four dimensions).

Figure 3.

Perception of recognition by employees working in organizations with varying levels of implementation of inclusion policies.



Discussion and conclusions

Finally, Group A responses to their perception on how their organizations have implemented inclusion policies and programs were in average in 49 points, which is close to half of the possible points in the measuring methodology. These companies openly communicate their diversity and inclusion policies, but still have not been able to permeate to all their LGBTI+ employees. Group B responses were considerably low compared to Group A with an average of 8 points. Even this study does not represent a statistically sound sample of employers, the results show that a wide range of companies in Nuevo Leon, Mexico, have not implemented diversity programs that prevent LGBTI+ discrimination and promotes inclusion.

In general, Mexican companies are less inclusive than foreign organization with subsidiaries in Mexico (Vazquez, et al. 2022), as can be seen in the *Figure 4*. Companies with head offices in countries with a longer history in LGBTI+ rights, such as Ireland, USA, Netherlands or Luxembourg, are perceived as more inclusive by the responding employees. That is especially observable in companies based in Anglo-Saxon countries, which have a high degree of protection for these minorities as observed by ILGA (2019) and ILGA Europe (2019).

Motivation in the workplace, being a multi-factorial issue, its correlation to inclusion programs implementation was studied. The results from Pearson correlation between inclusion and motivation variables were found in 0.242, which means correlation, thus being positive, is not significant. When considering every element of motivation, the only one with a significant correlation was recognition. This means

that LGBTI+ employees may perceive themselves as less recognized in companies with lower degree of inclusion policies and programs. As stated by Miller & Parker (2018), a more inclusive environment attracts talent, and the result of this study confirms that recognition, an influencing variable for employees' retention is influenced by the inclusion degree of organizations. On the other hand, the specific elements of inclusion that correlate more to motivation are equal employment opportunities (Employment) as well as increasing communication (Communication) efforts to increase awareness of all employees.

In conclusion, there are much to do in terms of LGBTI+ inclusion in organizations in Nuevo Leon, Mexico, which is congruent with results from ENADIS (INEGI, 2018), ENDOSIG (CONAPRED & CNDH, 2019) and ENDISEG (INEGI, 2021) surveys. Since no single organization was perceived by employees to have more than 65 out of 100 points of the inclusion scale, considering the policies and programs for LGBTI+ diversity and inclusion. Even most companies were found to have a non-discrimination policy, the main focus may be to effectively hire individual from these minorities and extensively communicate the inclusion policies and programs throughout their organizations as well as externally. One good reason for that is the effect these actions have in employees' recognition, and therefore their permanence and growth in the organization.

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IMPACT ON LEARNING IN PHYSICS WITH THE USE OF PHET SIMULATORS, A LOOK AT THE SOLUTION OF ELECTRICAL CIRCUITS

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Summary: Based on the use of PhET simulators, which in principle is used as a complementary resource or as a basis for a theoretical-practical class session (Gallego Joya, 2022) (Gallego Joya, 2022)it is important to see the impact on the development of class sessions mediated by this type of tools used recurrently in physics courses at the high school and university levels. The relevance of the concepts would be reflected in the results of the general tests and evaluations of each course, according to the programming of each curriculum respectively. Based on the different moments in which the notions are evaluated, according to the curriculum of the physics courses in the two educational institutions of reference, the evaluation results obtained are recorded and with time, they are continuously retaken as part of the academic process, and it is there where their impact is evidenced, in the way in which new concepts are assimilated starting from preconceptions, or previously obtained concepts, in this case, those of Electrical Circuits such as Ohm's Law and Kirchhoff's laws, which are fundamental to approach other electromagnetism topics that are seen later and to evaluate their impact of their use in teaching.

Keywords: simulators, evaluation, impact, electrical circuits.

IMPACTO EN LOS APRENDIZAJES EN FÍSICA CON EL USO DE LOS SIMULADORES PHET, UNA MIRADA A LA SOLUCIÓN DE CIRCUITOS ELÉCTRICOS

Resumen: Partiendo del uso de los simuladores PhET, que en principio se utiliza como un recurso de complemento o ser fundamento de una sesión de clase teórico – práctica (Gallego Joya, 2022), es importante ver el impacto en el desarrollo de las sesiones de clase mediadas por este tipo de herramientas usados de manera recurrente en los cursos de física en los niveles de educación media y universitaria. La relevancia de los conceptos se vería reflejado en los resultados de las pruebas y evaluaciones generales de cada curso, de acuerdo con la programación de cada currículo respectivamente. Con base en los distintos momentos en que se evalúan las nociones, acorde al currículo de los cursos de física en las dos instituciones educativas de referencia, se registran los resultados de evaluación obtenidos y con el tiempo, se retoman continuamente como parte del proceso académico, y es ahí donde se evidencia su impacto, en la forma en que se asimilan nuevos conceptos partiendo de preconceptos, o conceptos obtenidos previamente, en este caso, los de Circuitos eléctricos como Ley de Ohm y leyes de Kirchhoff, que son fundamentales para abordar otros temas de electromagnetismo que se ven posteriormente y evaluar su impacto de su uso en la enseñanza.

Palabras clave: simuladores, evaluación, impacto, circuitos eléctricos.

Introduction

The use of the different PhET simulators as a complementary and/or structural resource of the class, particularly those of physics, it is of vital importance to maintain a constant evaluation, not only of the concepts addressed, but also of the use of the different elements that are used for this purpose, in this case, with the electrical circuit simulator in the classes on this topic (Alburqueque & Vicente, 2022).

The factors to take into account in the use of resources are not only in the development of the activities around the simulator, but also in obtaining the results related to the evaluation (Rodríguez Hernández, 2010) (Rodríguez Hernández, 2010)it is also important to consider the importance of the use of resources and the achievement of the different ways that the teacher has to perform the evaluation, according to the use of the tools that are intended for this purpose (Zúñiga-Meléndez et al., 2020).

Particularly, the activity carried out has the simulator, on a par with the physical laboratory practice, that is, the virtual resource reinforces the development of the practice with the appropriate learning environment (a virtual environment), with the respective practice in a regular laboratory of natural sciences (Quijano Hernández, 2021). After obtaining the results through the corresponding report, we proceed to evaluate the knowledge of Circuit Analysis acquired by the students, taking into account their level of complexity (interpretation of resistive circuits in series, parallel and mixed, as well as Ohm's and Kirchhoff's laws).

The levels of complexity mentioned above are two: the first one has to do with secondary education, and the second one at university level, specifically, in the third semester of engineering (Sandoval & Mora, 2009) (Sandoval & Mora, 2009). In one, the interpretative rigor transcends beyond the mathematical, it is in the conceptual more than anything else, and on the other, not only the conceptual, but also the mathematical rigor by using more complex elements than it would have at its level. What is common to both levels is the conceptual

approach, which should be similar, although with a different degree of depth (Wieman et al., 2014) (Wieman et al., 2014).

Method

The results of the different activities are reviewed, in particular, the PhET simulators on electrical circuits. The different tasks of each activity are being carried out with students in the eleventh grade of the Moralba Suroriental IED School and in the second academic semester at the Corporación Universitaria UNITEC in the telecommunications engineering program*(see appendix)*.

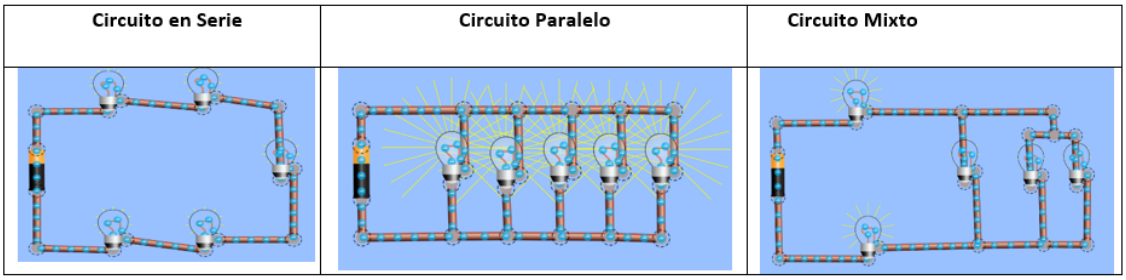
With eleventh grade, the corresponding explanation is made by developing circuits with series, parallel and mixed resistors using Ohm's law and Kirchhoff's laws, this would correspond to the first hour, in the second hour the practice is made together with the simulator, where the assembly is made on the board or protoboard (*See figure*). As they are carried out physically and measured, compare them with the results of the simulator and with the theoretical development.

With the Electromagnetic Physics course, the process is very similar, but with greater complexity, considering some other measurements directly obtained using multimeter, since an alternating current is not considered, it is not necessary to use oscilloscope to measure sinusoidal signals, only rectified or linear, i.e. direct current (Zúñiga-Meléndez et al., 2020). The topic is explained beforehand and exercises are carried out during the first hour. In the second hour, the activity begins using the simulator and laboratory elements and performing each of the practices mentioned in the guide*(see appendix*)

Some evaluation instruments are used in addition to the guide, already with the development of the theoretical and experimental practice, in annexes 2 and 3 the results of the procedures described above are shown. The circuits shown in Figure 1, where only five resistors are connected to each other, forming series, parallel and mixed circuits respectively.

Figure 1

PhET simulator. Circuit construction kit.



Note. PhET simulator. Circuit construction kit. https://n9.cl/v5qrquniversity of Colorado, 2022, screenshot of the laboratory practice (see attachments).

For the use of the simulator, two moments are considered, which are the ones applied in a previous guide (Gallego Joya, 2022):

Moment 1: Previous illustration of the subject.

The teacher explains the topics of the association of series, parallel and mixed resistors, Ohm's law and Kirchhoff's laws, based on the probing questions that are mentioned during the session:

- what are electric current, voltage and resistance and their units of measurement in the I.S.? how are series, parallel and mixed resistors connected? Explain how the equivalent resistance value is found in each case.
- what is the relationship between electric current, voltage and resistance? Explain that it has to do with Ohm's law.
- what are Kirchhoff's current and voltage laws? how are they used in the development of a circuit? Explains

After the explanation, the student answers the questions, and they are complemented as the experience progresses with the use of the simulator in the second moment.

Moment 2: Simulator application

Based on the guide (see annex 1), the simulator is applied for the different electrical circuits developed and based on the different elements used in the physical assemblies, so that complementarity is achieved in theory and practice (Montenegro, y otros, 2019). The virtual laboratory mediated by the PhET simulators "Circuit construction kit" is explained beforehand, after the theoretical development. During the development of the application, the teacher is constantly giving feedback on the topics in each practice.

And finally, in the work groups, they write down what they observed in each practice and then the answers are reviewed, contrasted with the results obtained and each result is complemented and fed back. The success of the activity depends on how feasible the subsequent use of the simulators is in each case in the achievement of the knowledge and its learning.

Results

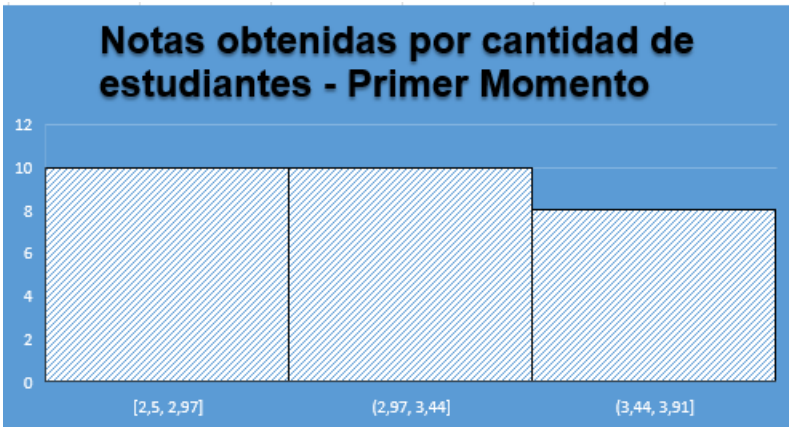
After the application of each resource, and taking into account the different intervals of each institution (1.0 to 5.0 in the school, being 3.5 the minimum grade, and from 0.0 to 5.0 in the university, being 3.0 the minimum grade), and considering the observations of each instrument, it is inferred:

Moment 1:

These are the results obtained in the first stage, in which the concepts are applied directly using the simulator:

Figure 2

Results with the students of the school (class 1102 morning session, year 2022)

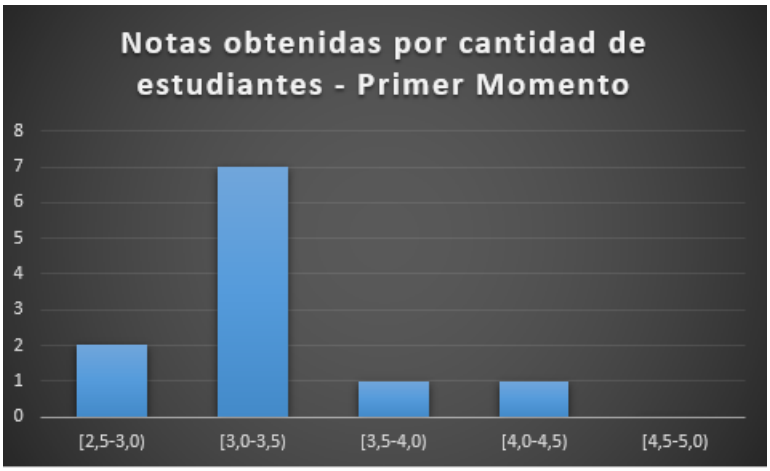


Note. Assessment scores were recorded at the school during the second half of 2022.

The school's results show that only 8 students obtained scores in basic and the rest in low, according to the evaluation scale of the educational institution. As the session continues, and with teacher accompaniment, clarification of the concepts addressed in the first part is intensified.

Figure 3

Results with university students (Physics II and laboratory, Telecommunications Engineering program, first academic semester, year 2022)



Note. Assessment scores were recorded at the university during the first half of 2022.

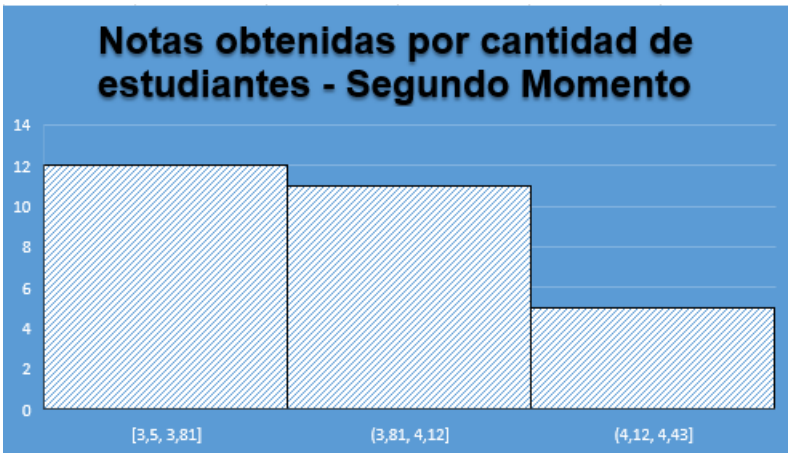
In the university, according to the evaluation criteria, there were very similar results, with a panorama of improvement that would be expected at the academic level, however, there are still conceptual shortcomings that are expected to be strengthened as the mediated session progresses with the theoretical-practical and practical component of the simulators and laboratory elements.

Moment 2:

These are the results of the second moment of the post-simulator practice activity:

Figure 4

Results with the students of the school (class 1102 morning session, year 2022)

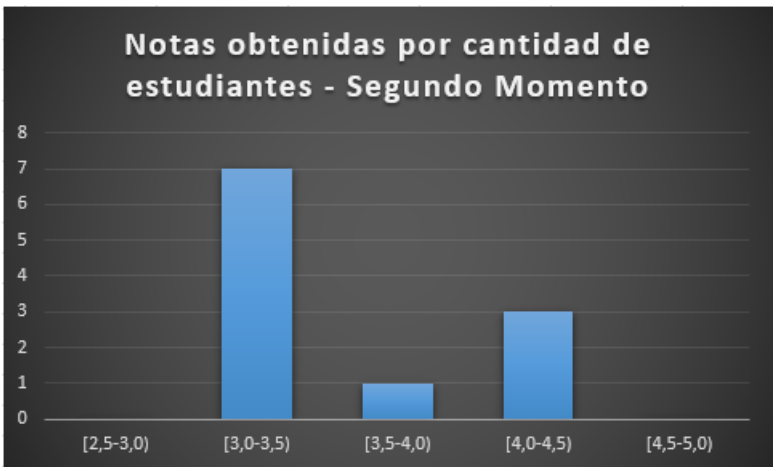


Note. Assessment scores were recorded at the school during the second half of 2022.

After the second activity, the results are better than the initial ones; at the end, the improvement is perceived with the use of the simulator together with the laboratory practice. According to the graph, there is a better assimilation of the concepts when the practical part is carried out, and an improvement in the grades obtained is observed.

Figure 5

Results with university students (Physics II and laboratory, Telecommunications Engineering program, second academic semester, year 2022)



Note. Assessment scores were recorded at the university during the first half of 2022.

And in the university, in this same part, the expected improvement is achieved, with greater rigor and constant accompaniment of the teacher during the process of elaboration of the theoretical-practical activity with the simulator and the physical laboratory practice, using the corresponding elements.

Discussion and conclusions

With the results obtained, the importance of the practical part in the development of learning in the scientific field can be inferred. This proves once again that the added value offered by the support of simulators, and in conjunction with practice. It is essential to recognize in a virtual practice which real objects it represents? how do you represent it? does it represent it in accordance with scientific theories? Recognizing variables and the phenomena being addressed (Villegas & Benegas, 2020).

It would already be the beginning of the learning process, pointing to the contribution of the simulators, which would be a resource that complements and/or reinforces the concepts in the classroom exercise. Classroom practice is evaluated on a continuous basis, and the results obtained indicate the relevance and accuracy in the use of each work and evaluation tool. Research on the use of digital resources in the teaching of science, particularly physics, little is said about the potentialities of the development, especially the use of simulators for learning (Pacheco Aguilar et al., 2021)it is necessary to work on this criterion every time the use of this type of virtual tools is tested.

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Annex 1:

ALCALDÍA MAYOR DE BOGOTÁ D.C.
SECRETARÍA DE EDUCACIÓN

COLEGIO MORALBA SUR ORIENTAL

Jornadas Mañana y Tarde

Resolución de Aprobación No. 04-0123 del 16 septiembre de 2009 de la SED.

NIT 830.115.387-0

Código Postal 110431

Guía de laboratorio

Nombres: _____ **Curso:** _____

Tema: Circuitos eléctricos

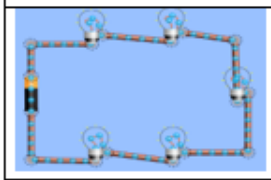
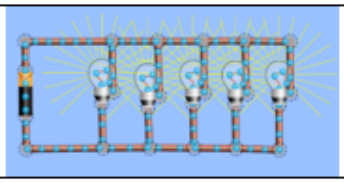
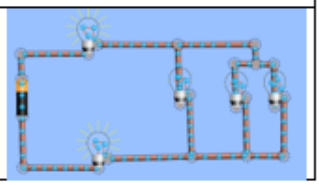
Objetivo de Aprendizaje

- Explicar las relaciones eléctricas básicas en circuitos en serie y paralelo.

Materiales: Kit de Construcción de Circuitos: CD de Simulaciones Interactivas PhET, además de una protoboard, resistencias de diferentes valores, una batería de 9 voltios y multímetro.

Procedimiento

1. Considera las imágenes de cada uno de los circuitos realizados con bombillas y lo explicado en clase usando el simulador, luego responde las preguntas a continuación.

Circuito en Serie	Circuito Paralelo	Circuito Mixto
		

a. De los circuitos anteriores, predecir qué bombilla (o bombillas) será la más brillante. ¿Por qué piensas eso?
b. Describe cómo fluirá la corriente en los diferentes tipos de circuitos anteriores.
   - Circuito en serie:
   - Circuito en paralelo:
   - Circuito Mixto:

2. Construya en la protoboard los circuitos realizados en el simulador, usando 5 resistencias de diferentes valores, no tan distintas entre sí, utilizando la tabla de colores (Ver imagen)

3. Mide los valores de Voltaje y de Corriente eléctrica en cada resistencia para cada circuito (serie, paralelo y mixto) como se indica (Tabla 1) y complete cada tabla:

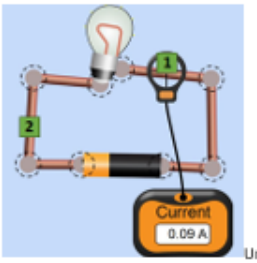
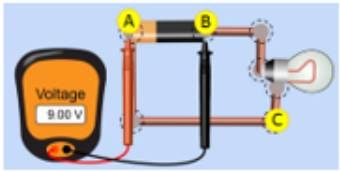
Corriente de Medición	Voltaje/Tensión de Medición
 Un amperímetro mide el corriente abriendo el circuito y conectándolo en serie, en el simulador, solo se coloca en un punto donde se desee medir	 "Voltaje" es una medida de la diferencia en el potencial eléctrico entre dos puntos. El voltímetro mide esta diferencia colocando los dos cables en paralelo, tanto en la protoboard como en el simulador.

Tabla 1. Medición de Voltaje y corriente

Serie

	RESISTENCIA	VOLTAJE	CORRIENTE
R1			
R2			
R3			
R4			
R5			

Paralelo

	RESISTENCIA	VOLTAJE	CORRIENTE
R1			
R2			
R3			
R4			
R5			

Mixto

	RESISTENCIA	VOLTAJE	CORRIENTE
R1			
R2			
R3			
R4			
R5			

Análisis de Resultados

1. Elabora la gráfica de Voltaje – Corriente para uno de los circuitos, usando los valores de una de las tablas obtenidos en cada medición:

2. Responde:

- ¿Qué gráfico se obtuvo y que comportamiento tiene la relación entre ambas variables? Explique

- Explica si la relación de la Ley de Ohm v=ir es coherente con el resultado obtenido

		Tema: Análisis de circuitos eléctricos			Rango calificación 1-5	
	1102 - 2022	Resultados Actividad de clase			Mín aprobación 3,5	
	Nombres				1er momento	2do Momento (prueba final)
1	BERNAL	FUENTES	JUAN	CAMILO	2,5	3,5
2	CAGUA	TORRES	KAROL	JULIETH	2,6	4
3	DUEÑAS	DIAZ	FELIPE		2,8	3,5
4	FIRIGUA	LUGO	MICHAEL	STEBAN	3	3,8
5	GUERRERO	MESA	HEIDY	NATALY	3,2	4,2
6	HOYOS	ZULUAGA	LUISA	FERNANDA	3	4
7	MARTINEZ	SUAREZ	ALISON	YEANNET	3,2	4
8	MONTIEL	BUSTAMANT	YAIR	ELIAN	3	3,7
9	MOSQUERA	HERNANDEZ	LAURA	CAMILA	2,5	3,5
10	NOVOA	RODRIGUEZ	JUAN	DIEGO	3	3,6
11	OSORIO	QUINTERO	JESHUA	DAVID	2,5	3,5
12	OSORIO	QUINTERO	JOSHUE	DANIEL	2,5	4
13	PERDOMO	GOMEZ	SANTIAGO		2,5	3,7
14	PERDOMO	SANDOVAL	MARIANA		3	3,9
15	PIMENTEL	LUGO	FRAURYMAR	ALECXANDRA	3,1	4
16	POVEDA	PAEZ	JOEL	MATEO	3,6	4
17	RODRIGUEZ	BENAVIDES	LUNA	SOFIA	3,3	4,2
18	RODRIGUEZ	HERNANDEZ	AMMY	KARIME	2,6	4
19	RODRIGUEZ	SANDOVAL	JEIMMY	SOFIA	2,8	3,5
20	ROLDAN	MARTINEZ	KAROLL	JOUZETHWOU	3,7	4,3
21	SATOBA	PIÑEROS	JOHAN	SEBASTIAN	3,5	3,5
22	SEPULVEDA	MONTAÑA	CATALINA		2,5	3,5
23	SIERRA	RODRIGUEZ	SERGIO	IVAN	3,5	3,7
24	TELLEZ	GUEVARA	LUISA	FERNANDA	3,3	4
25	VELASQUEZ	IPUZ	BRAHIAM	STIVEN	3,5	4
26	VICTORIA	PRADA	KELI	TATIANA	3,5	3,9
27	VIDES	ROMERO	LUISA	FERNANDA	3,6	4,2
28	ZAPATA	GRANADOS	ARIANA	SOFIA	3,5	4,3

		Tema: Solución de Circuitos resistivos	Rango calificación 0-5	
	Física II y laboratorio	Resultados prueba final	Mín aprobación 3,0	
N° est	NOMBRES		1er momento (Etapa Conceptual)	2do Momento (Evaluyación actividad)
1	BARRERA RAMIREZ NICOLAS		2,6	3,3
2	BARRETO GARZON ANGIE VALENTINA		2,8	3,1
3	CUEVAS GONZALEZ WILLIAM FERNEY		3	3
4	GIL TOVAR MIGUEL ANGEL		3	3,4
5	HERNANDEZ RIVERA DANIEL FELIPE		3,1	3,2
6	MATIZ CÁRDENAS CESAR MAURICIO		3	3,3
7	OROZCO GIRALDO JUAN ESTEBAN		3,4	3,3
8	PARRADO ALFONSO CAMILO EDUARDO		3,4	3,7
9	RAMIREZ MANRIQUE SANTIAGO NICOLAS		3	4
10	REYES APONZA CAMILO ANDRES		3,5	4
11	VASQUEZ BRIJALDO OMAR ENRIQUE		4	4

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IS THERE A RELATIONSHIP BETWEEN LEARNING STRATEGIES AND CRITICAL READING?

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Summary. The development of Critical Reading and the acquisition of Learning Strategies in the student will allow him/her to infer, analyze and create his/her own meanings, thus awakening his/her reflective and metacognitive attitude; fundamental elements in teaching-learning. The objective of the present study was focused on analyzing the variables Learning Strategies and Critical Reading of 9th grade high school students, which was done through a descriptive analysis using the correlation coefficient; the intention was to determine whether there is a degree of relationship between these variables to identify the factors that affect the learning process of students. These results showed that, in this case, there was no correlation between the variables: Learning Strategies and Critical Reading, however, the general objective of this research study was achieved, since the respective analysis was made in which it was found that students rarely use learning strategies for the reading process, thus making it difficult to achieve reading levels appropriate to the academic cycle in which they are. Subsequently, an intervention proposal is proposed to contribute to the strengthening of the application of learning strategies and to enhance reading levels, in order to improve results.

Key words: Learning Strategies - Critical Reading - Analysis - Reading Levels

¿EXISTE RELACIÓN ENTRE LAS ESTRATEGIAS DE APRENDIZAJE Y LA LECTURA CRÍTICA?

Resumen. El desarrollo de la Lectura Crítica y la adquisición de Estrategias de Aprendizaje en el estudiante le permitirá inferir, analizar y crear sus propios significados, despertando así su actitud reflexiva y metacognitiva; elementos fundamentales en la enseñanza-aprendizaje. El objetivo del presente estudio fue enfocado a analizar las variables Estrategias de Aprendizaje y Lectura Crítica de las estudiantes de 9° de secundaria, lo cual se realizó por medio de un análisis descriptivo utilizando el coeficiente de correlación; la intención fue determinar si existe un grado de relación entre dichas variables para identificar los factores que inciden en el proceso de aprendizaje de los estudiantes. Dichos resultados demostraron que, en este caso, no existió una correlación entre las variables: Estrategias de Aprendizaje y Lectura Crítica, sin embargo, el objetivo general de este estudio investigativo fue alcanzado, pues se hizo el respectivo análisis de las mismas en el que se pudo constatar que pocas veces los

estudiantes utilizan estrategias de aprendizaje para los procesos lectores, dificultando así alcanzar niveles de lectura propios del ciclo académico en el que se encuentran. Posteriormente se propone una propuesta de intervención para contribuir al fortalecimiento de la aplicación de estrategias de aprendizaje y potencie los niveles de lectura, para la mejora en resultados.

Palabras clave: Estrategias de aprendizaje- Lectura crítica- Análisis- Niveles de lectura

Introduction

Reading is nowadays considered one of the most important cultural and specifically academic competencies. It is considered that a person must be a reader in order to adequately develop his or her education, since the teaching-learning process takes place in all educational environments.

However, in recent years, national (Reading and Writing Network) and international studies: The Program for International Student Assessment (PISA) report and the Progress in International Reading Literacy Study (PIRLS), which evaluate the reading and writing levels of students, show not very encouraging results, as they show low reading levels, specifically in the comprehension of what they read, because they only identify the literal meaning of the text; this means that they cannot construct their own learning based on the experience they have with the outside world, that is, they cannot meaningfully construct their knowledge. According to the report of the observatory of the Universidad del Norte, compared to the ICFES tests of the official sector in the years 2016 to 2021 Only 41 % of students in public schools in the region showed inferential and critical reading skills of texts. This percentage is lower than that of Colombia, by 12 percentage points, meaning that 6 out of 10 students can do literal reading. (Valencia, 2021).

For authors such as Lozano (2016), reading is a process that is increasingly complex, he states that students manage to read, understand and infer, but at the moment of getting to perform critical reading, is where the difficulty lies.

From what has been said above, it can be inferred from the results obtained in the aforementioned research studies that the Basic Language Competency Standards of the Ministry of National Education, which aim to

> ... that the pedagogy of literature is basically centered on the students' playful, critical and creative appropriation of the literary work; that is to say, it is expected that they get to know the text, read it, enjoy it, make inferences, predictions, relationships and, finally, interpretations. (Ministry of National Education, 2006)

It should be noted that the role of the teacher is fundamental as a facilitator in the teaching-learning process. In this regard, Juan Carlos Vergara, director of the Master's program in Pan-Hispanic Linguistics at the Universidad de La Sabana, affirms that the language or Spanish teacher is a key mediator, since if a student has the wealth of having a good teacher in this area, the student will have an excellent level upon reaching university, therefore the educator's effort is evidently notorious.

Regarding evaluation, it is essential to take into account Decree 1290 of 2009, which refers to the fact that students have diversity in terms of their rhythms and styles in their way of learning, so at the time of evaluation, importance should be given to personal characteristics and learning styles; reorient educational processes in favor of the student's integral development and enable the implementation of pedagogical strategies that support the training of those students who present some difficulty in their performance. This means that in the role of a

teacher, evaluation cannot be pigeonholed into a routine summative procedure that often tends to label or schematize students' competencies; on the contrary, it should focus on the subjectivities and strengths of each individual so that it can be carried out through different possibilities.

Evaluating reading implies transcending the limits of routine, since the purpose of reading is in fact to understand and reflect on a type of text; it is to understand that I can find unknown words, it is to know what and how to read, it is to be aware that rereading facilitates comprehension, it is to be able to predict what happens in the text (Puente, 1990)

On the other hand, many teachers tend to confuse evaluation processes with measurement, so that their methods do not constitute elements that allow them to evaluate students subjectively, for example, the presentation of notebooks, written evaluation or dictation of phonemes; Rodriguez and Garcia (1972) as cited in Cordova (2010) indicate that evaluation goes beyond this, it implies a process that allows reorienting and planning teaching, has knowledge about what happens in the classroom from the pedagogy used and its insistence on student learning, reorienting, as often as necessary, the processes during the development of the same. This, undoubtedly, is one of the main foundations of the evaluation.

The evaluation of critical reading comprehension was rated superficially, i.e., with more basic indicators. Moreno, et al. (2010) argue that

> When the teaching of reading did not go beyond the formal level of phonographic decoding, assessment was carried out under the same concepts. Identify, recognize and reproduce signifiers, intonate, articulate, reproduce with melodic quality the syntagmatic chain[1] of the text. (p. 170)

After scientific research on the cognitive aspect, concepts of more global aspects, related to the intratextual and extratextual, began to be embraced. Finally, the identification of the contents of the text, the interpretation of the events of the text from the author's emotions, its production and the reader's capacity to produce from the text, other types of interpretations.

Therefore, the evaluation of the reading process requires evaluation criteria related to the aforementioned aspects that allow the interaction between the subject-text-context, to make reading an intellectual, dynamic and complex activity (Moreno et al, 2010).

Herrera (2017), points to the development of four cognitive skills which are clarity, conciseness, precision and appropriateness. These skills provide the tools to move in a text, although without leaving the literal level, and promote the development of a critical reading and it is from this, where strategies are implemented that will form these skills in young people and is tied to their habits and skills. This means that within this complex process, learning strategies play a fundamental role, since they are actions generated by the learner to learn and control his or her learning.

The term *Learning Strategies* is not something new, since throughout the history of the psychology of learning, emphasis was placed on them, demonstrating that the way in which the student learns has been of great importance in recent years. Monereo (1993) defines learning strategies as methods of cognition that guide actions in various educational manifestations in an intentional and direct manner, rescuing knowledge to reach a goal related to learning. Other authors relate it to those behaviors of the learners in their teaching and learning process.

[1] Said of a relationship: That which is established between two or more units that succeed each other in the spoken chain" (RAE, 2016).

On the other hand, Weinsten & Mayer (1983), affirm that learning strategies are based on behavior and thinking in learning, and this, in turn, influences the coding processes, an important aspect in reading, in which two important aspects stand out, the first is that these strategies imply a series of operations performed by the student to improve his learning and the second is that they have an intentional character (Valle & Cols, 1990).

For the development of critical reading, education must provide learning strategies in the student, such as acquisition, codification and recovery, which will allow him/her to infer and create his/her own meanings, through the reading of a text, this will develop in the learner, a reflective and metacognitive attitude; key elements in teaching and learning.

It is necessary to train students to the assertive use of learning strategies in each of the cognitive processes (acquisition, encoding and retrieval) so that they reach a reflection of both their tasks and their intrinsic motivation. Solé (1998) states that reading strategies involve goals, planning, evaluation and possible change.

Method

The present study was developed from the quantitative approach, since the aim was to find the relationship between the variables: *Learning Strategies and Critical Reading*, using specific instruments and the results obtained will be analyzed statistically, with a non-experimental design, since the variables will not be manipulated, but only analyzed from a descriptive approach and from these results the correlation between the two variables will be established, using a correlation coefficient and thus describing the relationship between them. The first is that *there is a relationship between learning strategies and critical reading*, the second is that *the greater the appropriation of learning strategies*, the *greater the improvement in critical reading processes* , and the third is that *the greater the appropriation of critical reading, the greater the improvement in learning strategies*.

Regarding the population, the participants in this research study were 9th grade students of the Colegio Eucarístico de la Merced in the city of Barranquilla; a private institution, with a single school day, offering education to boys and girls from preschool level (kindergarten, transition and pre-kindergarten) to vocational secondary education (tenth and eleventh grades). A sample of 30 female students was taken from this population, whose ages ranged from 14 to 16 years old. This sample was obtained by a purposive procedure.

The participants of this research study were selected taking into account the conformation of the academic groups of the Colegio Eucarístico La Merced, choosing the 9th grade as the population to be analyzed, taking 30 female students as a sample.

The school's faculty and administration were informed about the study and families were asked for permission on a global basis. With both permissions, and with the conditions of not altering the usual practice, the evaluation was limited to the application of the tests collectively in the group's regular classroom. Initially, the complete Prolec-SE-R battery was applied (Ramos and Cueto, 2016), subsequently ACRA, Escalas de Estrategias de aprendizaje (Román and Gallego, 2001).

For the evaluation of the ACRA scale, the indications indicated in the "steps to follow" mentioned above were taken into account, which will be recorded in the Excel spreadsheet and for the evaluation of the PROLEC-SE-R battery, of this test, only one of the tests will be evaluated, related to Comprehension of texts, for which students will be given two texts that they must read and then answer a questionnaire of 10 questions for each one. The reliability

level of the test is 0.85 and each correct answer will add one point, therefore, in order to pass the test, the student must answer at least 50% of the questions (10) correctly.

Results

Descriptive analysis of the variable Learning strategy

These are (conscious and intentional) decision-making processes in which the learner chooses to recover, in a coordinated manner, the knowledge needed to meet a given demand or objective, depending on the characteristics of the educational situation in which the action takes place (Monereo, 2000).

For the measurement of learning strategies, the learning strategies scale - ACRA (Román and Gallego, 2001) will be used to identify the most frequent learning strategies used by students when they are assimilating the information contained in a text, in an article, in some notes... when they are studying.

Description: There are four independent scales that assess the uses of information strategies employed by students and are discriminated as follows: acquisition (7 strategies), encoding (13 strategies), retrieval (4 strategies) and processing support (9 strategies). This scale can be applied in various forms of initial, final or follow-up evaluation and types of psychoeducational mediation.

Cognitive learning strategies or processing strategies can be defined as integrated successions of mental actions, which are activated with the intention of processing or mental activities that are activated for the purpose of providing information storage and utilization. There are four types of strategies:

1) Information Acquisition Strategies Scale: Attentional and repetition
2) Information Coding Scales: Nemotechnology, processing and organization.
3) Scales of Information Retrieval Strategies: search and response generation.
4) Processing Support Strategies Scales: metacognitive and socio-affective.

Scoring is defined depending on the application of the instrument; if it is done as a diagnosis or evaluation, prior to the intervention, the "A" items should be taken into account, that is, those strategies that are almost never or never used by the students. If the purpose is related to research, each point allows a score from 1 to 4.

The results of the mean and standard deviation of the ACRA test are presented below:

Table 1
Descriptive Analysis of the ACRA test

	ACRA SCALES			
Analysis	**Acquisition**	**Coding**	**Recovery**	**Support**
Media	2,07	2,43	2,13	2,60
Standard deviation	0,640	0,626	0,507	0,563

The results of each of the scales of the ACRA test are also shown:

Table 2

Descriptive analysis of the scales of the ACRA test

TYPE OF STRATEGY	ANSWER							
	Under	%	Basic	%	High	%	Superior	%
ACQUISITION	13	43,33	9	30	5	16,67	3	10
CODING	5	16,67	12	40	7	23,33	6	20
RECOVERY	9	30	10	33,33	3	10	8	26,67
SUPPORT	15	50	6	20	5	16,67	4	13,33

Figure 1

Level of the ACRA Test Acquisition Scale

According to Figure 1, 43.33% have a low level, 30% have a basic level, 16.67% have a high level and only 10% have a higher level. These results show the difficulty that the sample analyzed has in putting into practice strategies that allow them to acquire knowledge.

Figure 2

Level of the ACRA Test Coding Scale

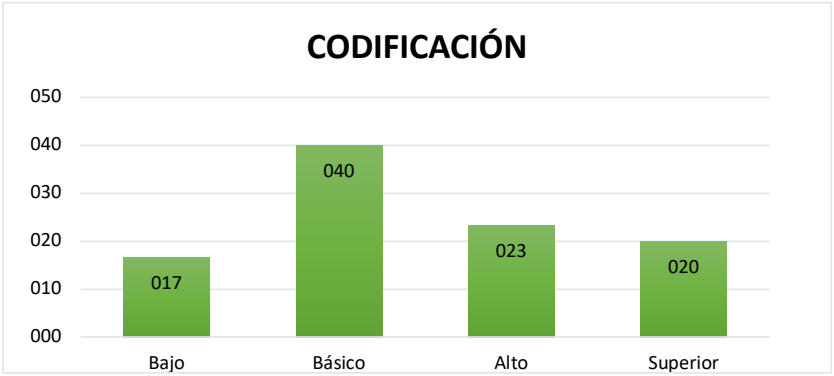


Figure 2 shows that 16.67% of the sample obtained a low level, 40% a basic level, 23.33% a high level and 20% a higher level. According to the results, it can be seen that in this scale a significant percentage of the students put into practice strategies that enable them to code the information being studied information.

Figure 3
Level of the Recovery Scale of the ACRA Test

With regard to the ACRA Recovery scale, it was found that 30% obtained a low level, 33.33% a basic level, 10% a high level and 26.67% a higher level. These results show that a high percentage of the sample does not use learning strategies, as the low and basic levels exceed by far the high and superior levels.

Figure 4
Level of Support Scale of the ACRA Test

Figure 4 shows that 50% of the sample obtained a low level, 20% a basic level, 16.67% a high level and 13.33% a superior level. According to the results, it is evident that most of the students have a low level of application of strategies to retrieve information.

Figure 5
General Level of the ACRA Test.

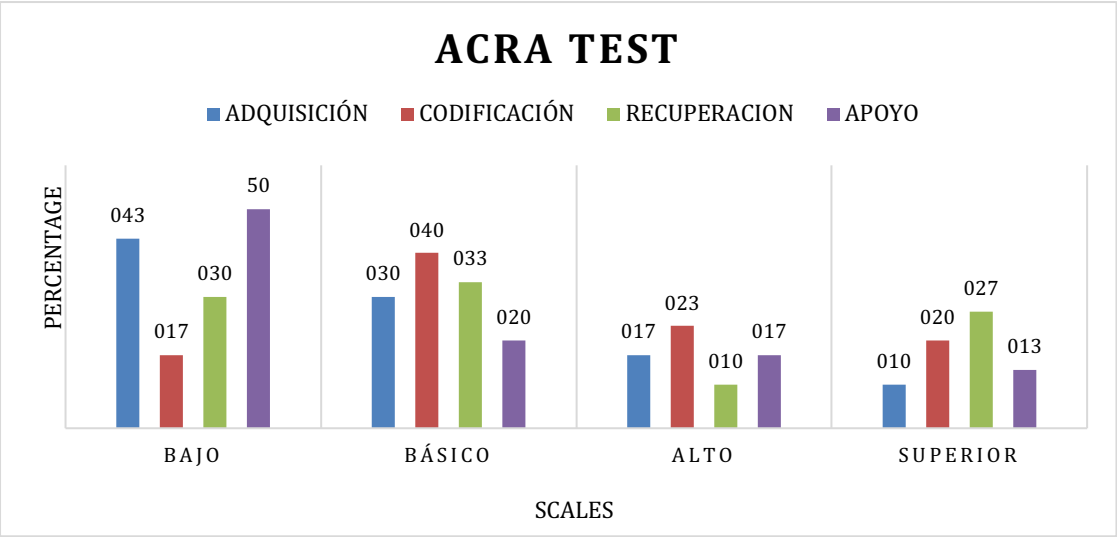


Figure 5, which shows the general results of the test, shows that the highest percentages of schools are in the Low and Basic levels, standing out in the Acquisition and Support scales. With respect to the high and superior levels, the highest percentages were obtained in the Recovery and Coding scales.

From the above it can be deduced that, in general terms, students do not put learning strategies into practice.

Descriptive analysis of the variable: Critical Reading

It is the reading performed in analytical mode. This means that in addition to understanding what is said in a given text, an attempt will be made to analyze what is expressed in order to verify its correctness, its errors and the way in which the information is presented.

Herrera (2017), points to the development of four cognitive skills which are clarity, conciseness, precision and appropriateness.

a) These skills provide the tools to be able to move within a text, although without leaving the literal level, and promote the development of a critical reading.

b) For this author, determining the relevant information such as the main idea of a text, the secondary ideas, the author's intention and the theme it develops is vital to be able to speak of critical reading. In the case in question, we have been working on this type of guidelines with the population under study, in the interpretation of texts to reach a higher level of comprehension.

The Bateria para la Evaluación de los procesos Lectores en Secundaria y Bachillerato - Revisada Autor (Battery for the Evaluation of Reading Processes in Secondary and Baccalaureate - Revised Author) was chosen for its measurement: Cuetos, Arribas and Ramos (2016) "PROLEC-SE-R", which consists of thirteen tests to assess and detect reading difficulties in adolescents aged 12 to 18 years. Its application allows obtaining information on the three main processes of reading at these ages: lexical, syntactic and semantic processes.

For the evaluation of these processes, the battery uses the following tasks:

Lexical processes

☐ Word reading: composed of a word list made up of 40 words, 20 frequently used and 20 infrequently used. In each case half of the words are of short length (two syllables) and the other half of long length (4 and 5 syllables). The time spent reading the 40 words is measured.

☐ Reading of pseudowords: composed of 40 pseudowords, i.e. words that do not mean anything, separated into two groups of 20, one formed by simple syllables (with CV structure) and the other formed by syllables with complex structure (CCV, CCVC and CVVC). Half are long pseudowords and half are short. The time spent reading the 40 pseudo-words is measured.

Syntactic processes

☐ The test is comprised of 24 items, four sentences of each type, and each item is made up of three sentences and a drawing, one of which is the answer indicated in the drawing. Drawing-prayer matching: The grammatical structures used are: passive sentences, object sentences, split subject sentences, split object sentences, relative subject sentences and relative object sentences.

☐ Punctuation marks: the intention is to corroborate whether punctuation marks are being respected, which is represented through a text. There are a total of 24 signs (9 periods, 7 commas, 3 question marks, 3 exclamation marks, and 2 periods).

Semantic processes

☐ Text comprehension: Reading of two expository texts followed by 10 questions for each text, half of the questions are literal and the other half inferential.

☐ Text structure: Reading of a text followed by an outline already started, but in which 22 gaps to be filled in must be completed.

☐ Reading speed: Time spent reading a text and time spent reading lists of words and pseudowords.

Table 3

Total Score Prolec Se R

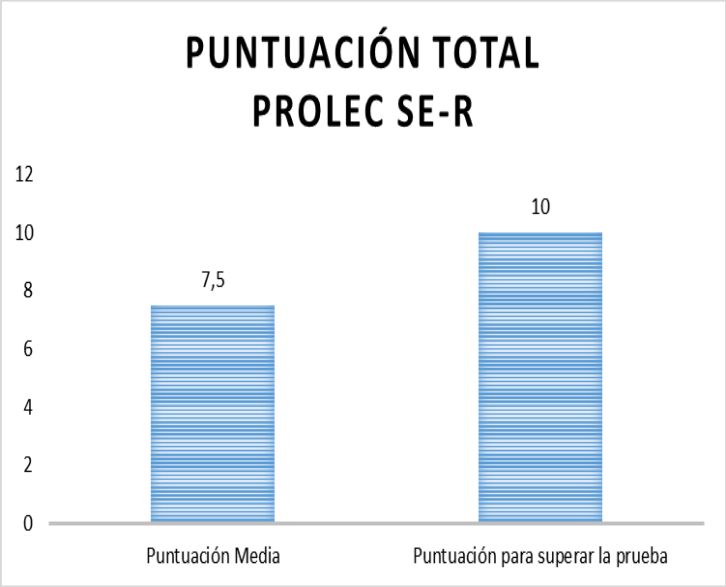
Reading level	Average score	Standard deviation
Literal	5,2	1,9
Inferential	2,3	1,2

Total Score	7,5

Source: Prolec Se-R Test

Figure 6

Total score of the Prolec Se-R test (Comprehension of texts)



According to the results of the Prolec Se-R test in the test referring to text comprehension, the sample did not exceed the expected centile, it can be evidenced in Graph 6 that they only reached an average score of 7.5 in the literal and inferential levels, reflected in Table 3 as follows: Literal Level with a score of 5.2 and the Inferential Level with 2.3.

Correlation between Learning Strategies and Critical Reading

Acquisition and critical reading

To establish the correlation between the variable Acquisition and critical reading it is necessary to establish the type of variables. Both acquisition and critical reading variables are quantitative. Table 1 shows the descriptive data of the variables.

Table 4

Correlation coefficient between the variables Acquisition and critical reading critical reading.

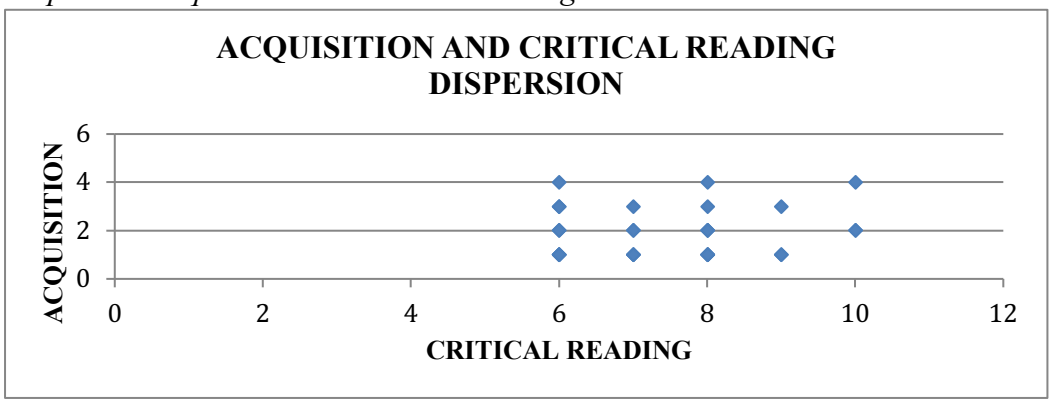
		ACQUISITION	**CRITICAL READING**
ACQUISITION	*Pearson correlation (r)*		0,104
	P		0,584
	Pearson correlation (r)	0,104	.

CRITICAL READING	*P*	0,584	

Table 4 shows that the correlation coefficient between the variables is positive, so the relationship between the variables in the group is direct, and weak, since the r value is 0.104. As the acquisition variable increases, the critical reading increases with a weak intensity, as will be seen in Figure 6. The significance value obtained is 0.584, which means that there is no relationship between the variables Acquisition and Critical Reading, since it is not significant at the 0.05 level.

Figure 6

Dispersion Acquisition and Critical Reading.



Coding and critical reading

To establish the correlation between the variable Coding and critical reading it is necessary to establish the type of variables. Both variables Coding and critical reading are quantitative. Table 2 shows the descriptive data of the variables.

Table 5

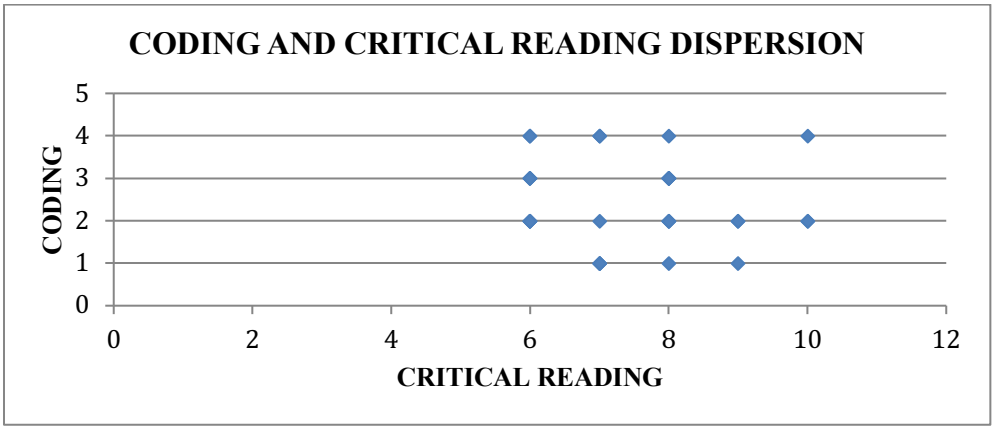
Correlation coefficient between the variables Coding and critical reading.

		CODING	***CRITICAL READING***
CODING	*Pearson correlation*	.	-0,131
	P		0,490
CRITICAL READING	*Pearson correlation*	-0,131	.
	P	0,490	

Table 5 shows that the correlation coefficient between the variables is negative, so the relationship between the variables in the group is inverse, and weak, since the value of r is -0.131. As the coding variable increases, the critical reading decreases with a weak intensity, as will be seen in Figure 7. The significance value obtained is 0.490, which means that there is no relationship between the variables Coding and Critical Reading, since it is not significant at the 0.05 level.

Figure 7

Dispersion Coding and Critical Reading.



Recovery and critical reading

To establish the correlation between the variable Retrieval and critical reading it is necessary to establish the type of variables. Both variables Retrieval and critical reading are quantitative. Table 3 shows the descriptive data of the variables.

Table 6

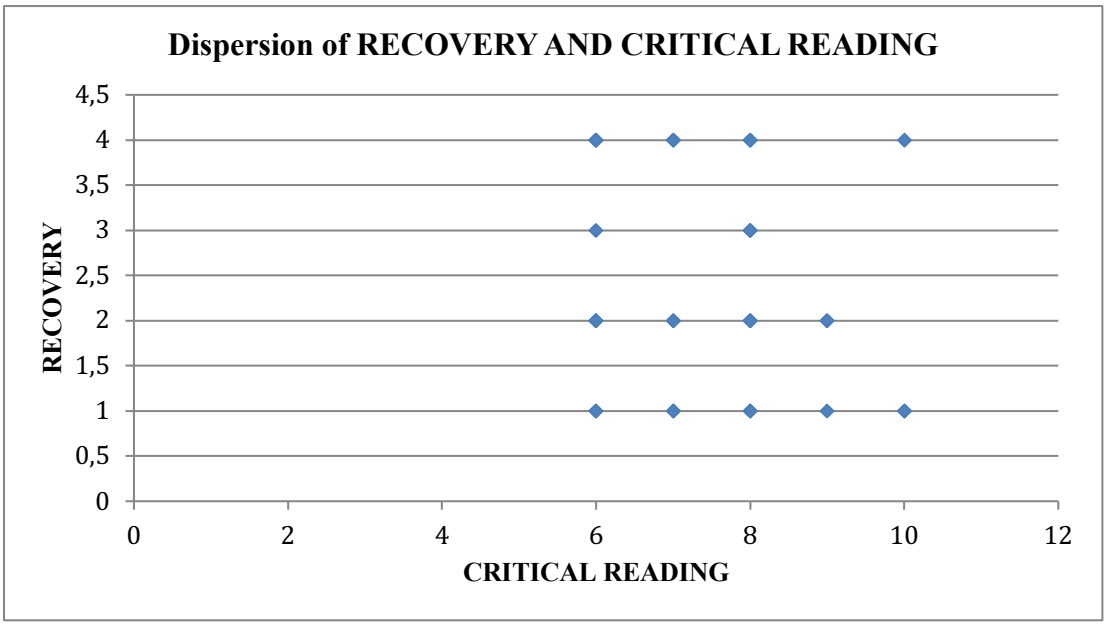
Correlation coefficient between the variables Retrieval and critical reading.

		RECOVERY	*CRITICAL READING*
RECOVERY	*Pearson correlation*		-0,178
	P		0,346
CRITICAL READING	*Pearson correlation*	-0,178	.
	P	0,346	

Table 6 shows that the correlation coefficient between the variables is negative, so the relationship between the variables in the group is inverse, and weak, since the value of r is -0.178. As the Recovery variable increases, the critical reading decreases with a weak intensity, as will be seen in Figure 8. The significance value obtained is 0.346, which means that there is no relationship between the variables Retrieval and Critical Reading, since it is not significant at the 0.05 level.

Figure 8

Dispersion Recovery and Critical Reading.



Support and critical reading

To establish the correlation between the variable Support and critical reading it is necessary to establish the type of variables. Both variables Support and critical reading are quantitative. Table 4 shows the descriptive data of the variables.

Table 7

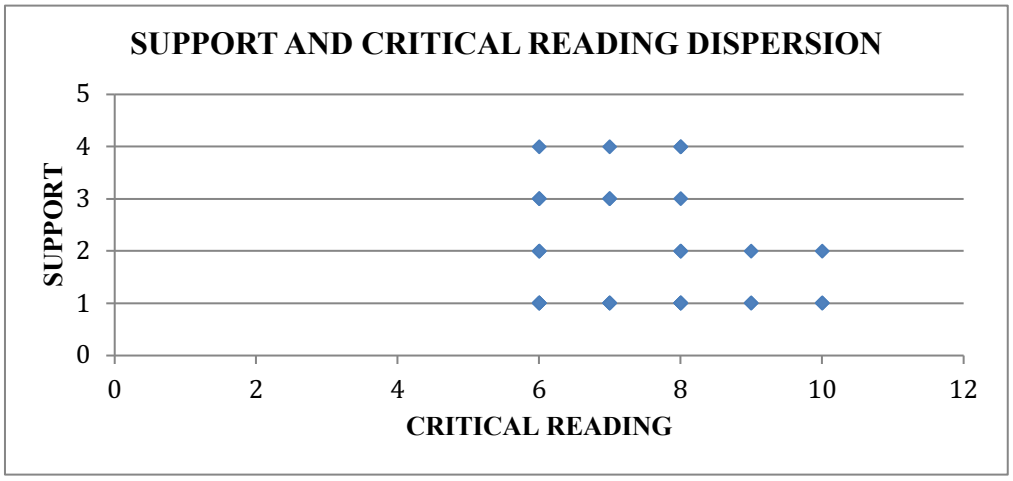
Correlation coefficient between the variables Support and critical reading.

		SUPPORT	***CRITICAL READING***
SUPPORT	*Pearson correlation*		-0,190
	P		0,315
CRITICAL READING	*Pearson correlation*	-0,190	.
	P	0,315	

Table 7 shows that the correlation coefficient between the variables is negative, so the relationship between the variables in the group is inverse, and weak, since the r value is -0.190. As the Support variable increases, the critical reading decreases with a weak intensity, as will be seen in Figure 9. The significance value obtained is 0.315, which means that there is no relationship between the variables Support and Critical Reading, since it is not significant at the 0.05 level.

Figure 9

Dispersion Support and Critical Reading



Discussion and conclusions

After performing the descriptive analysis of the variables "learning strategies" and "critical reading" and making the corresponding correlation between them, it can be inferred that the first hypothesis: "There is a relationship between Learning Strategies and Critical Reading", is not very significant, since the results do not show correlation in most of the ACRA scales, only in the Acquisition scale, since it is observed that the correlation coefficient between the variables is positive, therefore, this hypothesis is not accepted, since there is not enough evidence of correlation between the two variables. This shows that the application of learning strategies by students is not a determining factor in achieving reading levels.

There are other factors that affect text comprehension, such as the social context in which the student finds him/herself and even the disposition he/she has towards academic processes.

The wealth of the student's background (measured as socioeconomic status) has positive effects on the student's academic performance. This result confirms that the sociocultural richness of the context (correlated with socioeconomic level, but not limited to it) has a positive influence on students' school performance. This underscores the importance of shared responsibility between the family, the community and the school in the educational process. (Piñeros and Rodriguez, 1998)

According to the above, it can be considered that the progress of the reading process is of a multifactorial nature, that is to say, for the present research work, other factors that influence the development of critical reading were not taken into account.

Considering the importance of learning strategies as a cognitive resource in academic processes, especially in the reading process, there should be a relationship between the variables, as expressed by Roman (2004), who refers to self-regulated learning as the way in which the student manages to become independent, emphasizing critical reading that will allow him to have a good academic performance and also to apply it to his future needs. The use of such strategies (cognitive, metacognitive, and affective), influence the development of critical and creative thinking skills, as well as teaching strategies critical reading and problem-based learning (Sarmiento, 2017).

With respect to the second hypothesis: "The greater the appropriation of learning strategies, the greater the improvement in critical reading processes", the results show no

correlation between the two variables, therefore, the hypothesis is not accepted. As was evidenced in the research work of Alegre (2009) between the variables Learning Strategies and Reading Comprehension, where it was found that there is no relationship between these variables, contrasting these results with the work of Gonzalez and Quesada (1997) in which the failure of students to comprehend texts can be appreciated.

Likewise, the third hypothesis: "The greater the appropriation of critical reading, the greater the improvement in Learning Strategies", could not be accepted because no correlation between the variables was observed. With the absence of correlation, it could be affirmed that this is due to the fact that the results in learning strategies are better in relation to those of critical reading, hence it could be thought that, if there is equity between the results of both variables, there could be the expected correlation.

After analyzing and interpreting the results obtained from the instruments and research techniques applied, it can be concluded that:

The general objective of this research study was achieved, since the variables "Learning strategies" and "critical reading" applied to 9th grade students of the Eucharistic School of La Merced in the city of Barranquilla, Colombia, were analyzed, and it was found that they rarely use learning strategies for the reading process, making it difficult to achieve reading levels appropriate to the academic cycle in which they are, which is reflected in academic performance, not only in the subject of Spanish language, but also in other areas of knowledge, taking into account the transversality of reading.

Therefore, it is necessary to implement an intervention plan that strengthens the application of learning strategies and enhances reading levels in order to obtain better academic results.

Among the limitations found in this study, we can identify, firstly, the sample size is small, since only 30 students were analyzed, therefore the results cannot be generalized to all 9th grade students, so it is necessary to expand it for future research.

Likewise, the variables analyzed do not allow for reliable results, considering that the selected topic is of a multifactorial nature, as mentioned in the correlation between variables.

Another limitation that could be identified in the research was of a temporal nature, since, due to the short time for the development of the research, it was not possible to implement the intervention plan, preventing the results of the plan from being evidenced and thus verifying its reliability.

For future research, it is suggested to take into account the aforementioned limitations in order to guarantee reliable results that allow an approach to the educational reality, thus designing ideal intervention plans to improve the existing deficiencies.

Similarly, it is important to continue the search for neuropsychological factors that are related to the reading processes to achieve positive results to be correlated, finding in these training experiences, significant experiences of great help, demonstrating a high degree of sustainability, sustainability, systematization and sustained results over time, as well as recognition and influence in other areas other than that of its origin.

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MOTIVATION TO LEARN AMONG GRADE 12 STUDENTS, MAVILA SECONDARY SCHOOL, MOZAMBIQUE

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Summary. The present research focuses on motivation, which is fundamental in influencing better student learning. Thus, the objective is to analyze the learning motivation of 2nd cycle students at Mavila Secondary School, Mozambique. This is a mixed; described; field and cross-sectional study research with a sample of 145 grade 12 students. As variables we have VI: motivation, VD: better learning; The measurement instruments and techniques: document analysis; participant observation, Neves and Boruchovitch's (2007) MAS and interview, as for the procedures, we must emphasize that the data were collected collectively in the classroom from the application of Neves and Boruchovitch's (2007) MAS. Statistical analysis performed by the program SPSS version 23 for Mac OS, enabled descriptive, factorial and inferential analysis. The factorial analysis was possible from the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) test, the Bartlett's Test of Sphericity evidenced a correlation between the items and the measure of sample adequacy demonstrated by the Kaiser-Meyer-Olkin (KMO) index was 0.772; the total variance explained of the EMA was 29.380 and Cronbach's alpha was 0.853 for n=145; the correlations showed a significant relationship between high scores with intrinsic motivation and profession of the caregiver, and not with gender and age of the students. From the study it is concluded that the EMA was adequate to gauge motivation and influence on better learning, proving the hypothesis raised.

Keywords: Education; psycho-pedagogical intervention; Motivational factors; Improved Learning; Motivation.

MOTIVAÇÃO PARA APRENDER DOS ALUNOS DA 12ª CLASSE, ESCOLA SECUNDÁRIA DE MAVILA, MOÇAMBIQUE

Resumo. A presente pesquisa debruça-se sobre a motivação que é fundamental na influencia da melhor aprendizagem dos alunos. Assim, o objetivo é analisar a motivação para aprendizagem dos alunos do IIº Ciclo na Escola Secundária de Mavila, Moçambique. Trata-se de uma pesquisa mista; descrita; de estudo de campo e transversal, com uma amostra de 145 alunos da 12ª classe. Como variáveis temos VI: motivação, VD: melhor aprendizagem; Os instrumentos de medição e técnicas: analise documental; observação participante, EMA de Neves e Boruchovitch (2007) e entrevista, quanto aos procedimentos, de frisar que os dados foram colectados de forma colectiva na sala de aulas a partir da aplicação da EMA de Neves e Boruchovitch (2007). Análise estatística feita pelo programa SPSS versão 23 para Mac OS, possibilitou a análise descritiva, factorial e inferencial. A análise factorial foi possível a partir do Teste de Esfericidade de Bartlett e o Teste de Kaiser-Meyer-Olkin (KMO), o Teste de Esferecidade de Bartlett evidenciou uma correlação entre os itens e a medida de adequação de amostra demostrada pelo índice de Kaiser-Meyer-Olkin (KMO) foi de 0,772; a variância total explica da EMA foi de 29,380 e o alfa de Cronbach de 0,853 para n=145; as correlações demonstraram uma relação significativa entre as altas notas com a motivação intrínseca e profissão do encarregado de educação, e não com sexo e idade dos alunos. Do estudo conclui-se que a EMA foi adequada para aferir a motivação e influência na melhor aprendizagem, comprovando a hipótese levantada.

Palavras-chave: Educação; intervenção psicopedagógica; Factores motivacionais; Melhor Aprendizagem; Motivação.

Introduction

Several studies by psychologists and others prove that motivation is indeed fundamental for better learning, so it is necessary to take into account the two motivational factors, intrinsic and extrinsic, which act in a complementary way. In this way, motivation constitutes the *input* for better student learning. Let's see, in Mavila Secondary School there is a problem related to motivation that concerns the school performance of the students, although there are those who perform better than others, depending, therefore, on external or internal motivation. In view of the above, the following research problem is presented: *how does motivation influence better learning among^{2nd} cycle students at Mavila Secondary School, Mozambique?*

The problem raised is answered by the following hypotheses:$_{ho}$ - There is no significant relationship between motivation and improved student learning;$_{h1}$ - There is a significant relationship between motivation and improved student learning.

This research from a social point of view aims to make a study to try to understand the influence of society itself (external factor) on the motivation of the learning process in the student (internal factor), something that is not rarely neglected by all agents that act in this process. The study serves as a catalyst for awareness of the importance of everyone's involvement in creating the conditions for learning from the affection of parents, teachers (student-teacher relationship, vice versa), the conditions of the school itself; teacher training, the curriculum itself; relationships as a whole, as well as the learning environment itself.

This research when discussing motivation, contrasts with the reality of the school, starting from the assumption of the existence of many cases of school failure, which our point of view is the problem of motivation, taking into account the external factors that somehow condition the internal factors, as stressed Chiavenato (2005), as well as could also solve in a practical way the problem at Mavila High School, with

feasible proposals. Therefore, motivation can explain both the observed learning problems and the school failure.

This research has a great theoretical and practical contribution. Thus, it makes a very important contribution, in that it seeks to analyze and discuss motivation as fundamental to the academic success of students, but also as a key element of the teaching and learning process as a whole, since motivation generates expectations of achieving the desired goals, both by the institution and individually, as we can read in the main motivational theories selected: maslow's hierarchy of values; Herzberg's two-factor; Mcclelland's socially acquired needs and Victor Vroom's expectation, and others, which relate success in its general sense to individual and/or collective motivation. Thus, the objective of this research is to analyze the motivation to learn of grade 12 students in Mavila Secondary School, Mozambique.

Regarding the theoretical framework, stress that Martins (2007, p.35) says that the word motivation comes from the Latin "*motivus*", which refers to movement and describes the desire to achieve high performances.

For Chiavenato (2005) motivation is the desire to exert high levels of effort toward certain organizational goals, conditioned by the ability to satisfy individual goals. Motivation depends on the direction (goals), strength and intensity of the behavior (effort), duration and persistence, i.e., expectancy which is grounded in Victor Vroom's Expectancy Theory (1932).

From these perspectives, we conclude that motivation is a set of internal forces that mobilize and guide an individual's behavior toward certain goals, giving rise to a certain type of action or behavior. Motivation involves a complex interaction of the individual's conditions and the total environment, that is, it concerns internal and external factors, which we can base on Maslow's Hierarchy of Needs theory (1954) cited by Cardoso, Fróis & Fachada (1993); Herzberg's two-factor theory (1960), as well as Meclelland's theory of socially acquired needs (1960).

As an empirical framework to refer that Mozambican education in public schools, particularly in the last 15 years, faces difficulties related to the quality of teaching, because of the semi-automatic passages, which lead students to pass from one class to another carrying with them difficulties in the initial classes (reading, writing, and math), which later turn into learning difficulties, which in a way condition the student's motivation to learn.

In public schools, 90% of pedagogical achievement is charged per year, in addition to the precarious conditions of the classrooms, as well as the existence of students studying outdoors for lack of classrooms.

In the district of Zavala, where the school is located, and which also characterizes the school itself, besides the precarious conditions of the classrooms, the existence of students studying under the open air; the level of education of the population is another element to be considered. Until 2017 in the whole country, it was estimated the average illiteracy rate among the adult population of 44.9 %, whose higher incidence was in women with 57.8% against 30.1% of men according to data revealed by Eduardo Mondlane University (2017), and in 2021 estimated about 39 % of the population illiterate, being higher in rural areas.

These data contradict the objectives of the SNE, both the resolution of 8/95, whose objective was the massification of education with the introduction of compulsory basic education up to 7^{th} grade, in order to make Mozambicans literate, and the law 18/2018 of December 8 that extended compulsory education from 7^{th} to 9^{th}grade, this because the

programs are not adjusted to the real problems and national requirements, as Feliciano (1988), Castiano and Ngoenha (2013) and Muhache (2015) stress.

The rural areas, in this sense, are the most affected by illiteracy, for example in the village of Mavila where the Mavila High School is located, most of the population is illiterate and mostly peasants without the level of education up to the second grade of elementary school. Thus, many parents and guardians are peasants who cannot afford to support their children's basic expenses for better learning.

Method

The present study as to the nature of the research is mixed. This research is mixed because it combines both quantitative and qualitative methods. According to Prodanov and Freitas (2013) this study deals in depth with the phenomenon studied, because qualitative studies, through coding, provide important, in-depth information, thoughts and feelings, and also provide information that makes it possible to adapt the methodology of a quantitative study, as well as relevant information to interpret the quantitative data. With a mixed quantitative (QUAN-qual) approach.

Research design is descriptive and case study. In this sense, the data analysis is a descriptive analysis of the phenomena based on a case study, which is the Mavila High School.

As for time, it should be noted that this is cross-sectional research. This is because, this type of study aims to collect data at a single moment and/or single time as well as its central objective is to describe and analyze the variables, their incidence and interrelationship at a particular point in time (Liu, 2008, Tucker, 2004 cited by Sampieri, Collado and Lucio (2014).

The sample consists of 145 students, characterized by motivated students, that is, students with higher academic performance, and by students with lower performance (unmotivated).

With regard to Measurement instruments and techniquesmeasurement tools, that is, resources and/or material means to approach phenomena: documentary analysis. As information collection techniques we have: participant observation and Neves and Boruchovitch's (2007) Motivation to Learn Scale (MAS).

The data collection procedures, resulted from the collective collection in the classroom, from the application of the learning motivation scale (MAS) of Neves and Boruchovitch (2007), where the instructor gave instructions to the students for the correct completion of the scale, and lasted 20 minutes.

In the data analysis the statistical package SPSS version 23 for Mac OS was used, through which the variables were crossed and the frequencies and respective percentages were extracted.

Results

In this part, the results are presented and analyzed in a logical way, based on the study's objectives.

Psychometric analyses of the EMA

The examination of the consistency of the MPE was done using the *Statistical Package for the Social Sciences* (SPSS) version 23 for Mac OS. In order to verify the factorability (adequacy of the sample for factorial analysis) of the scale, the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin Test (KMO) were performed.

Bartlett's Test of Sphericity with n=145 evidenced a correlation between the items [^{X2} (561) = 1682.916; $p < 0.000$]. The measure of sample adequacy, demonstrated by the Kaiser-Meyer-Olkin (KMO) index was 0.772.

The data obtained by these two procedures clearly elucidate that there is an adequate level of probability for the correlation between the variables and that the sample is conducive to conducting Factorial Analysis, as illustrated in table 1 below.

Table 1

KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy.		,772
Bartlett's test of sphericity	Approx. Chi-square	1682,916
	Gl	561
	Sig.	,000

Therefore, exploratory factorial analysis was used in order to obtain the factorial structure of measurement. Furthermore, the principal components method *eignvalue* greater than 2.0 and *Varimax* with Kaiser Normalization (Rotation converged in 3 iterations) were employed. To analyze and evaluate the appropriateness of the stipulated number of factors the *Scree Test*was used.

It should be noted that the result of the principal components analysis was based on a two-factor scale (intrinsic and extrinsic). A bifactor structure was used, where Factor 1 refers to Extrinsic Motivation (EM) and Factor 2, Intrinsic Motivation (IM). Factor 1, Extrinsic Motivation (EM) is composed of the sum of 15 even items (2,4,8,10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 34). Factor 2, which is Intrinsic Motivation (IM) was composed from 13 odd items, from the sum of the variables (7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31).

It should be noted that some items were eliminated for not reaching a sufficient factorial load, being below 0.30. Therefore, items 1 (I study because studying is important to me); 3 (I am eager to know and learn new subjects); 5 (I like to study challenging subjects); 6 (I study to have a job in the future); 32 (I study out of obligation) and 33 (I get interested when the teacher starts a new lesson) do not contribute to the intrinsic and extrinsic motivation factor. Therefore, Some items did not score, and others scored highly on the opposite factor.

Thus the scale built in a first phase with 34 items was reduced to 28 items after the principal component analysis. As table 2 below illustrates.

Table 2
Distribution of Items by Factor with the Factorial Load Presented

Scale Items	Factorial loadings	
	Factor 1	Factor 2
ME2. I study for fear of my parents fighting with me	,471	
ME4. i do my homework out of obligation	,415	,314
MI7.I like to study difficult subjects		,402
ME8.I study because my parents promise to give me presents if my grades are good	,644	
MI9I put a lot of effort into my homework, even though I know it won't count as a grade		,426
ME10. I study because my teacher thinks it is important	,709	
MI11I study even if my parents don't ask me to		,510
ME12I study because I am worried that people will not think I am intelligent	,713	
I try hard in class, even though I know it won't count as a grade		,545
ME14I study for fear of my parents grounding me	,620	
MI15I study because studying gives me pleasure and joy		,575
ME16I only study so I won't do badly in school	,677	
MI17I keep trying to solve a task, even when it is difficult for me		,391
ME18I study so my parents will let me go and play with my friends or do the things I like	,640	
MI19I prefer to learn in school subjects that increase my skills or knowledge		,406
ME20I only study to please my teachers	,480	,339
MI21.I do my homework at home, even if my parents don't ask me to		,378
ME22. I prefer to study easy subjects	,346	
MI23.I study because I like to gain new knowledge		,590
ME24: I study only what the teacher tells me will be on the test	,651	
MI25I like to study		,459
ME26I only do my homework because my parents think it is important	,726	
MI27I try to know more about the subjects I like, even without my teacher askingme		,422
ME28. I only study because I want to get high grades	,572	
MI29.I like going to school because I learn interesting things there		,521
ME30I only study because my parents tell me to	,497	,474

MI31I study because I want to learn more and more	,585
ME34I give up on a task when I encounter difficulty	,433

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Converged rotation in 3 iterations.

In the analysis performed it was concluded that there is a coincidence between the number of factors identified from the *Scree Test* analysis with the number of factors determined. Thus, the accuracy of the total scale reached a satisfactory index since the Cronbach's alpha coefficient was equal to 0.853. The Mean of the scale is 38.03; and the Standard Deviation is 7.25, which demonstrates the accuracy of the scale.

The final 28 items, by grouping into two factors, demonstrated the congruence of the scale with the theoretical aspects it intends to measure.

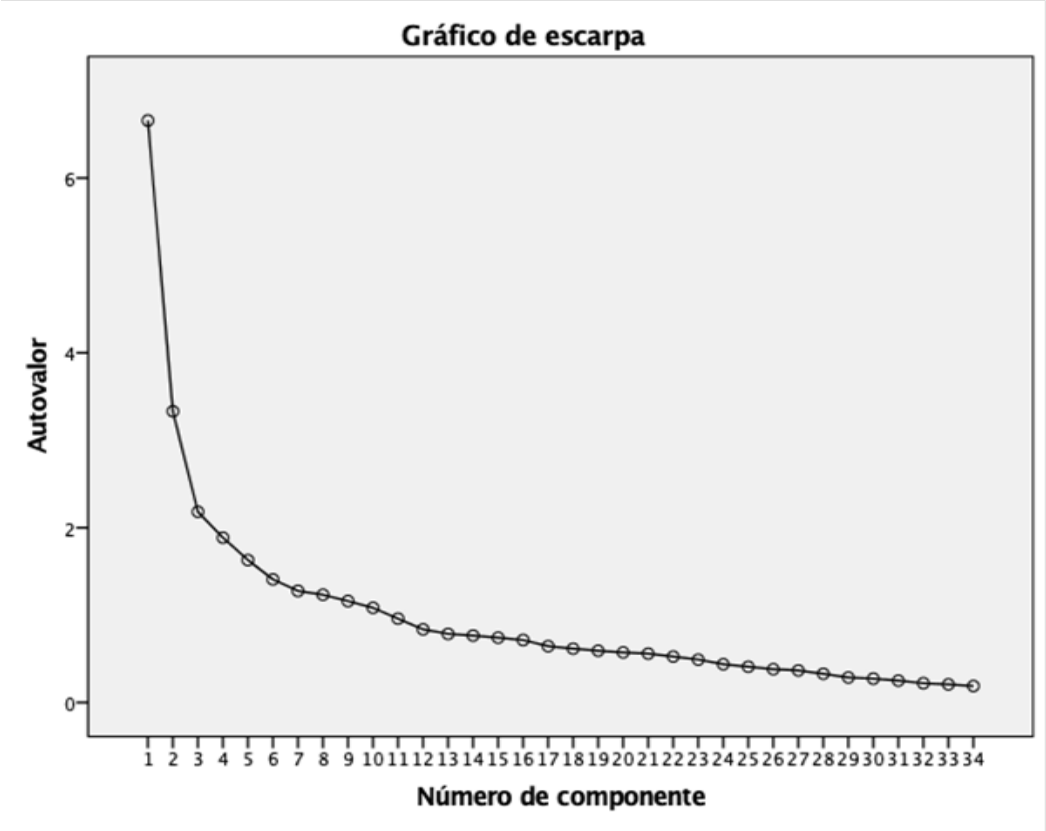
It should be noted that the items grouped in a bifactorial structure: Factor 1- Extrinsic Motivation (EM) and Factor 2- Intrinsic Motivation (IM), the 15 items of Factor 1 present the main characteristics of extrinsic motivation and the 13 items of Factor 2, contain the main characteristics of Intrinsic motivation.

As far as variance is concerned, it should be noted that the total variance explained is 29.380. This shows that the questions assess motivation, as can be seen in tables 3 and 4 below.

This factorial structure is also verified from the Scree Plot, with a remarkable curvature from the score of*eigenvalues*greater than 2.0, as seen in Chart 1 below.

Figure 1

Scarp Chart



The Cronbach's alpha was calculated for the total sample of n= 145, based on reliability statistics, and an alpha of 0.853 was obtained, which shows that the scale has an internal consistency index, as shown in table 5 below.

Table 3

Reliability Statistics

Cronbach's Alpha	Number of items
,853	28

Cronbach's alpha if item[#7] is deleted would be 0.86. However, it was not excluded despite favoring the increase in alpha because it was a small increase.

Exploratory Analysis and Testing

For exploratory analysis, normality tests were performed for the main variables of our study (student grades, intrinsic motivation and extrinsic motivation). Considering the sample size of 145 students we focused on the Shapiro-Wilk test and found that all variables do not exhibit normal distributions (the distributions of the data are different from those of a normal distribution), and all p-values are less than 0.05.

Doing an exploratory analysis of the scores, Extrinsic and Intrinsic Motivation and age, the results pointed out: Grades, Mean (8.70), Variance (7.2), Standard Deviation (2.683); Extrinsic Motivation, Mean (21.71), Variance (32.5), Standard Deviation (5.70); Intrinsic Motivation, Mean (16.32), Variance (9.8), Standard Deviation (3.124); Age, Mean (18.9), Variance (12.2), and Standard Deviation (3.497).

From the data it is found that students exhibit Extrinsic motivation 21.71 and Standard Deviation of 5.70; and Intrinsic Motivation 16.32 and Standard Deviation 3.124. This was calculated on a summation basis. Because there are differences in the number of items, no absolute comparison was made between the motivational orientations.

The other no less important data is the variable age that when presenting a Mean of 18.9 and Standard Deviation of 3.497, does not present significant correlation with the Intrinsic motivation of the students.this suggests that students with low levels of Intrinsic motivation may have a lower level of motivation than students with low levels of Extrinsic motivation ($r = - 0.191$; $p < 0.05$), suggesting that students with low extrinsic motivation tend to have higher grades. Additionally, it seems to consolidate the finding of several studies that intrinsic motivation and extrinsic motivation correlate positively (Cardoso, Fróis & Fachada, 1993), and in this study, the relationship presents the following parameters: $r = 0.197$; $p < 0.05$. These results refer to non-parametric correlations (due to the fact that there is no normality) of 4 variables, namely: Quarter I final grades, Extrinsic Motivation (EM), Intrinsic Motivation (IM), and Age, as illustrated in Table 4 below.

Table 4

Non-parametric correlations

		2	3	4
Extrinsic Motivation (2)	Sig. (bilateral)	,022	,535	,651
	N	145	145	145
	Correlation Coefficient		,197*	,064
	Sig. (bilateral)		,017	,444
	N		145	145
Intrinsic Motivation (3)	Correlation Coefficient			-,161
	Sig. (bilateral)			,053

	N		145
AGE (4)	Correlation Coefficient		
	Sig. (bilateral)		
	N		

*. The correlation is significant at the 0.05 level (two-sided).

In the hypothesis tests (comparison of scores of the variables final grades of Q1, intrinsic motivation and extrinsic motivation as a function of sociodemographic variables) we follow with table 5 and analysis below.

Table 5

Test Statistics Mann-Whitney: Quarter I Final Scores, Extrinsic Motivation, and Intrinsic Motivation Versus Gender

[Test]statistics

	Quarter I Final Notes	Extrinsic Motivation	Intrinsic Motivation
Mann-Whitney U	2264,000	2141,000	2075,000
Wilcoxon W	6920,000	3366,000	6731,000
Z	-,370	-,885	-1,174
Significance Assint. (Bilateral)	,711	,376	,240

a. Grouping Variable: SEX

From the data presented in the comparison of means presented in the tables above it was found that there are no significant differences in achievement by gender (U=2264; p.>0.05); no significant differences in extrinsic motivation by gender (U=2141; p> 0.05); no significant difference in intrinsic motivation by gender (U=2075; p> 0.05). Thus, the significance is 0.711 for Quarter I final grades; 0.376 for Extrinsic Motivation and 0, 240 for Intrinsic Motivation.

Regarding the comparison on the basis of the variable Academic level of the Parents, the data presented showed that there are no significant differences in scores,

Extrinsic and Intrinsic Motivation in relation to the Academic level of the Parents, this is because the significance is greater than 0.05, with the following evidence:

- Notes [^{X2} (4) =1.655; p>0.05];
- Extrinsic motivation [^{X2} (4) =8.066; p>0.05];
- Intrinsic motivation [^{X2} (4) = 15.059; p> 0, 05].

On the basis of the data from the comparison between the Academic Level of the Parent, the grades of the 1st Quarter, as well as the Extrinsic and Intrinsic Motivation, there is no significant difference between the Academic Level of the Parent and the grades of the students, which means that both for students with high grades and students with low grades there is no connection with the level of their parents.

In relation to the Parent's Profession and the final grades of the 1st Quarter, it should be noted that there are differences in the grades according to the parents' professions, that is, the profession has a significant relationship with the student's grades.

From the analysis done on the comparison of the students' final grades according to the Academic level of their Parents, it was found that there are significant differences, this is because the significance is 0.000, less than 0.05 [^{X2} (132) = 279.311, p <0.05].

Regarding the subgroups of the Parents' Professions, it is concluded that there is no significant difference in Extrinsic Motivation [^{X2} (242) = 187.469; p> 0.05].

When comparing Intrinsic Motivation according to the subgroups of the parents' occupations, the analysis concluded that there are significant differences [(^{X2} (132)=199.186, p<0.05].

The analysis showed that the foreman's profession has a significant relationship with Internal Motivation and grades, which demonstrates that motivation improves the learning and pedagogical performance of the students.

Thus, the lack of external motivation can lead to school failure, which can be related to the low academic performance observed in some students, that is, with low grades, because it determines in a certain way the intrinsic motivation. Therefore, the two extrinsic and intrinsic factors have a correlation in learning motivation.

Discussion and conclusions

This chapter discusses the results and the main conclusions of the work in comparison with other similar research.

Discussion of results from psychometric analyses of the EMA

The MPE, which was examined using the statistical program SPSS version 23, was crucial to verify the factorability of the scale, the Bartlett's Test of Sphericity and the Kaiser-Meyer- Olkin Test (KMO) were performed. Thus the Bartlett's test of sphericity showed that there is a correlation between the motivation items, where (^{X2} [561, N=145]= 1682.916; p<0.000). The measure of sample adequacy, demonstrated by the Kaiser-Meyer-Olkin (KMO) index was 0.772, approaching the studies done by Pereira (2001) cited by Neves and Boruchovitch (2007), where (X2 [561, N=461]= 4061.609; p<0.000) evidencing that there is a level of correlation between the variables and that the sample is adequate for factorial analysis. The measure of sample adequacy, demonstrated by the Kaiser-Meyer-Olkin (KMO) index of 0.854.

Cronbach's alpha was calculated for a total sample, n=145, and an alpha of 0.853 was obtained. This shows that the scale has an internal consistency index (Prieto & Muñiz cited by Neves & Boruchovitch, 2007), which is not far from the alpha obtained in the study by Neves and Boruchovitch (2007), which was 0.82.

These results, obtained on the basis of the two factors clearly demonstrated the correlation. Furthermore, the exploratory factor analysis was fundamental to determine the factorial structure of the measure, relating to the study by Neves and Boruchovitch (2007), who, when elaborating the EMA, was effective in the factorial analysis, in the same way with respect to the principal components method, where the *eigenvalue* is higher than 2.0 and the *Viramax*rotation was applied.

The rotated matrix was found from the minimum factorial loading of 0.30, for the inclusion of the items, this factorial loading, therefore, coincides with that used in the studies of Crocker and Algina (1986); Kine (1994) cited by Neves and Boruchovitch (2007).

For analysis and evaluation of the desirability of the number of factors the Scree Test was used, as in the study by Neves and Boruchovitch (2007).

As can be seen from the principal component analysis, a two-factor scale was acquired, according to the study by Neves and Boruchovitch (2007). The same bifactorial scale is composed in: Factor 1- Extrinsic Motivation (EM) and Factor 2- Intrinsic Motivation (IM). Unlike the Study of Neves and Boruchovitch (2007) that in Factor 1 has Intrinsic Motivation and Factor 2, Extrinsic Motivation. Furthermore, the other difference concerns the items. While Intrinsic Motivation, which corresponds to Factor 1, in Neves and Boruchovitch's (2007) study had 17 odd items, the present study had 13 odd items. Extrinsic Motivation (Factor 1 in this study), which corresponds to Factor 2 in Neves and Boruchovitch's (2007) study, had 15 even items versus 14.

These differences were due to the fact that some items were eliminated because they did not reach sufficient factorial loading, being below 0.3. Therefore, items 1 (I study because studying is important to me); 3 (I am eager to know and learn new subjects); 5 (I like to study challenging subjects); 6 (I study to have a job in the future); 32 (I study out of obligation) and 33 (I get interested when the teacher starts a new lesson) do not contribute to the intrinsic and extrinsic motivation factor. Therefore, some items did not score, and others scored highly on the opposite factor. So in total 6 items were eliminated.

In the study of Neves and Boruchovitch (2007) 3 items were eliminated, for different reasons, i.e., item 6 (I study to have a job in the future), which did not reach the desired factorial load recommended by the literature, relating to the reason why it was excluded in the present study, this is because, in Mozambican education, there is no motivational basis in this sense, which forms cadres or competent people as in the period of colonial education and after independence, where the great current problem lies in the quality of education, as illustrated by the studies of Feliciano (1988), Castiano and Ngoenha (2013), Muhache (2015); the items 22 (I prefer to study difficult subjects) and 34 (I give up doing a task when I find it difficult), which load on both factors, with a greater factorial load on Factor 1 and not on Factor 2. Although there was something similar in the present study, these items were not eliminated because they had a recommended factorial loading.

These differences in the elimination of items were due to the application of the EMA made in different contexts, the Brazilian and the Mozambican.

Discussion of Exploratory Analysis and Testing Results

Exploratory analysis of grades, Extrinsic and Intrinsic Motivation and age, the results pointed out: Grades, Mean (8.70), Variance (7.2), Standard Deviation (2.683); Extrinsic Motivation, Mean (21.71), Variance (32.5), Standard Deviation (5.70); Intrinsic Motivation, Mean (16.32), Variance (9.8), Standard Deviation (3.124); Age, Mean (18.9), Variance (12.2), and Standard Deviation (3.497).

Thus, in this analysis it was concluded based on the grades the students' learning presents more the Extrinsic Motivation (Mean 21, 71 and Standard Deviation of 5.70) in relation to the Mean (16.32) and Standard Deviation (3.124) of the Intrinsic Motivation, this because many items were eliminated in relation to the Extrinsic Motivation and the was calculated based on the sum. Hence the comparison was not absolute.

From these results it was shown that motivation is indeed fundamental for better student learning, since it creates the desire to achieve high performances (Martins, 2007). Moreover, he also points out that external/extrinsic motivation influences the achievement of individual goals, and the very ability to achieve these goals (intrinsic motivation) which, in a way, brings satisfaction, self-esteem, self-actualization, self-efficacy, expectations, as described by the theories of Maslow (1908-1970); Herzberg (1923-2000), MacClelland (1917-1998), Bandura (1977); Victor Vroom (1932), respectively.

External motivation as that which relates to the learning context, the relationship between student-teacher, family, student-student, shows that interpersonal relationship (Goleman, 2006) is necessary for motivation. Furthermore, as far as social or external factors are concerned, it should be emphasized that the social environment in which the person or student finds him/herself is a determining factor in his/her academic success. In the external factors we can highlight: interpersonal qualities, that is, empathy, human relations (Goleman, 2006), affection (Maslow & McClelland cited by Chiavenato, 2005); the climate in the classroom, that is, student-student and student-teacher relationship (Cobrera & La Nasa, 2002); institutional, which concern, educational policies, teaching programs, curriculum, assessment, etc.

In Goleman's interpersonal qualities we find a relationship with the theories of Maslow (social needs) and Mac Clelland (need for affiliation), in that both are unanimous in stating that the associative life of the individual with other people: love, affection, participation, lead the individual to social adaptation or not. Let's see, both Maslow and Mac Clelland Goleman's affection, empathy, human relations, lead people to relate cordially and affectionately, which can create a harmonious and favorable environment for the learning process, and therefore lead to good academic achievement or better learning.

In addition to interpersonal relationships, which determines a healthy environment for better learning, or for good academic achievement, we find the institutional factors, which correspond to what Herzberg (1960) cited by Chiavenato (2005), calls hygienic factors or extrinsic factors, those that are related to the environment in which the student performs his activities; to the organization and that are part of the culture of the institution, that is, they are not under the control of the individual, depend directly on the administration of the institution: the policies, the organizational climate, the trained teaching staff; the educational conditions, the curriculum, etc. therefore, this set of elements is preponderant to motivate the student to better learning.

Regarding the correlation of extrinsic and intrinsic motivation with the variables: Grades, Age and Gender, Academic Level of the Head of Household and Head of Household Profession, it was made from Spearman's rô where it was observed that

students with high grades have less extrinsic motivation with a significance of 0.022, below 0.05, and intrinsic motivation with 0.535.

The correlation between gender and age: extrinsic motivation, intrinsic motivation, and grades, showed that there is no relationship of achievement to gender or age. Nor is there a relationship between the level of education of the Parent and the grades, but there is a correlation between the grades and the profession of the Parent, which shows extrinsic motivation.

Overall it was concluded that motivation has an influence on better student learning. Moreover, motivation as a push or lever that stimulates people to achieve goals, it becomes the key to quality performance in any situation, whether at work, leisure activities, learning, as well as personal and/or social activities (Chiavenato, 2005).

It is true that authors such as Chiavenato (2005), Junior and Oliveira (2009), Morino Jr (2005) highlight intrinsic motivation, as that which drives the individual to achieve his or her objectives or goals. However, one cannot ignore the fact that extrinsic motivation is also necessary for motivation, and it involves the educational context in its whole community, the school, the classroom (the class climate, methodological strategies used in teaching), teacher-student relationship, student-student relationship, the family, educational policies, as highlighted in the studies by Salvari and Dias (2006), Carvalho (2001), Torre and Moraes (2006), Cobrera and La Nasa (2002) as well as interpersonal qualities (Goleman, 2006), affection. Thus, the lack of external motivation can lead to school failure, which may be related to the low academic performance observed in some students at the school under study, that is, with low grades, this is because it determines in some way the intrinsic motivation. Therefore, the two extrinsic and intrinsic factors have a correlation in learning motivation.

Authors such as Cardoso, Fróis, and Fachada (1993) highlight the complementarity between the two factors, that is, the external/ extrinsic factors influence the internal/ intrinsic ones.

The study reached important conclusions, because it demonstrated that motivation influences better learning, because the EMA applied to students through factorial analysis, Cronbach's alpha normality test, proved to be applicable to both the sample and the issue raised, which resulted in the creation of two factors: intrinsic and extrinsic. The correlational analysis indicated the existence of the relationship between high grades and intrinsic motivation, as well as profession of the caregiver.

The reality of the students demonstrated the need for psycho-pedagogical intervention to create more motivation, this because, some for having learning difficulties loaded from the early grades, which concern reading, writing and accounts, influence learning. In addition, the state should give incentives and/or reinforcement to students to motivate them, such as after-school work, where students who finish grade 12 should have; as well as eliminating automatic passages in the initial classes, thus making an early intervention, which would eliminate the difficulties that then become demotivating elements and school failure of the same.

Given the results it is concluded that the hypothesis that guided the present study "There is a significant relationship between motivation and improved student learning" was proven, although more studies are needed.

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PERCEPTION OF ECUADORIAN TEACHERS ON THE INCLUSION OF DEAF STUDENTS IN REGULAR SCHOOL

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Summary. International educational practice is geared toward the inclusion of deaf students in regular school classrooms. In Ecuador, according to current regulations, deaf people can access special or regular schools. However, the access of deaf students to regular schools can generate conceptual, methodological and evaluative tensions in teachers, which must be considered. Therefore, the present research aims to analyze the perception of Ecuadorian teachers on the inclusion of deaf students in regular school classrooms. For the execution of the research process, the quantitative approach has been selected, with a non-experimental, transectional, exploratory design. The technique used was the survey and the instrument was a 5-question questionnaire, designed by the research team, applied *through Google forms*. The survey was applied to a non-probabilistic sample of 556 Ecuadorian teachers from different levels of education (except higher education); and it was conducted using the snowball technique. Among the main results, 65.8% consider that deaf students should be included in regular schools, but 75.5% confess that they do not feel qualified to do so. It is concluded that, according to the teachers' perception, the inclusion of deaf students in regular school should be accepted, but that teachers do not feel qualified to fulfill this responsibility.

Key words: perception, teachers, inclusion, deaf students, regular school.

PERCEPCIÓN DE LOS DOCENTES ECUATORIANOS SOBRE LA INCLUSIÓN DE ESTUDIANTES SORDOS EN LA ESCUELA REGULAR

Resumen. La práctica educativa internacional se orienta a la inclusión de los estudiantes sordos en las aulas de la escuela regular. En el Ecuador, según la normativa vigente, las personas sordas pueden acceder a escuelas especiales o regulares. No obstante, el acceso de estudiantes sordos a escuelas regulares puede generar tensiones conceptuales, metodológicas y evaluativas en los docentes, que deben ser consideradas. Por ello, la presente investigación se propone analizar la percepción de los docentes ecuatorianos sobre la inclusión de estudiantes sordos en las aulas de la escuela regular. Para la ejecución del proceso investigativo se ha seleccionado el enfoque cuantitativo, con un diseño no experimental, transeccional, de nivel exploratorio. La técnica utilizada es la encuesta y el instrumento un cuestionario de 5 preguntas, diseñado por el equipo de investigación, aplicado por medio de *Google forms*. La encuesta fue aplicada a una muestra no probabilística de 556 docentes ecuatorianos de diversos niveles de educación (excepto educación superior); y se conformó por medio de la técnica de bola de nieve. Entre los principales resultados se destaca que el 65,8% considera que los estudiantes sordos deben ser incluidos en la escuela regular, pero el 75,5% confiesa que no se siente capacitado para ello. Se concluye que, según la percepción de los docentes, se debe aceptar la inclusión de estudiantes sordos en la escuela regular, pero que los docentes no se sienten capacitados para cumplir con esta responsabilidad.

Palabras clave: percepción, docentes, inclusión, estudiantes sordos, escuela regular.

Introduction

A quick review of the history of Western education reveals that the deaf have been described as imperfect beings in ancient times, victims of divine punishment in medieval times, individuals who must be subjected to oral language learning in modern times, or as a person with special educational needs, requiring assistance or integration or inclusion, depending on the theoretical model that supports it, in the current era. An important moment in that history is represented by the opening of special schools for the deaf, whose methodology has oscillated between oralism and bilingualism. At present, those institutions are characterized by the preferential use of the sign language in force in each country, by the transition from a monolingual to a bilingual model and by the progressive incorporation of deaf people to the teaching staff.

The road leading to educational inclusion has gone through several stages that can be summarized as follows: many centuries of exclusion, dozens of years of segregation, several years of integration and few years of inclusion. This last stage is marked by the prominent role of UNESCO, which has been one of the international institutions that has most promoted processes aimed at educational inclusion. Through it, UNESCO aims to remove barriers that prevent equal access for all people to inclusive, equitable and quality education (UNESCO, 2016). Such work, which should start from early childhood (UNESCO, 2021), aims to achieve more equitable societies (UNESCO 2017) and should be guaranteed throughout life (UNESCO, 2016).

In Ecuador, the third section of the *Organic Law on Disabilities* (2012), articles 27 to 41, addresses the issue of education. It establishes that the State must ensure that persons with disabilities can "access, remain in and complete" (p. 11) their studies within the National Education System and the Higher Education System. In the same document, it also provides for the inclusion of students with special educational needs in school education and the parallel existence of special and specific education schools (p. 11) in which intercultural and bilingual-bicultural education models must be implemented. As a complement to the law, the *National Bilingual Bicultural Educational Model for the Hearing Impaired* has been published (Republic of Ecuador, 2019). It distinguishes and contrasts two approaches to the care of deaf people, the clinical and the socio-anthropological. The first conceives deafness from what Aristotle calls "deprivation"

(n/d), and the second as a condition that characterizes a group of people who are part of a community, with their own culture and language (Republic of Ecuador (2019). Unfortunately, although the regulations establish the responsibility of the Ecuadorian state in relation to persons and groups with disabilities, the evaluation of inclusive education programs demonstrates a deficit in the implementation phase of public policies in the country (Villacís, 2019).

Currently, the National Council for the Equality of Disabilities (CONADIS, 2023) registers 66,538 people with hearing impairment. Of the total number of deaf people of school age, only 4,679 are enrolled in the different levels of basic education and high school, 851 in special schools, 3,705 in regular schools and 123 in permanent popular education; and 947 in higher education. The number of deaf students attending regular school is a challenge for teachers because their care requires specific training. In relation to this field, and as a small sample, the curriculum of initial education and basic education of the Pontificia Universidad Católica del Ecuador has been reviewed, which includes two theoretical subjects that address the problems of inclusive education and special educational needs, but there is not, for the moment, a subject that offers specific training for the care of deaf students. Such training is likely to be found in graduate programs with an emphasis on inclusive education or special education. However, one may ask whether teachers in regular schools that have taken in deaf students are prepared to carry out this activity. Therefore, it is imperative to know the perception of Ecuadorian teachers about the inclusion of deaf students in regular school classrooms.

A review of the recent literature reflects the existence of two distant positions regarding the inclusion of deaf students in the regular school classroom. Most of the current studies point to the existence of a certain favorable disposition of teachers for the inclusion of deaf children in the classroom, although in practice they express a lack of systematic training in this field, lack of commitment and even opposition to this type of actions. On the other hand, there is no lack of studies that underline the existence of processes contrary to inclusion, such as exclusion and simple educational integration, and even a certain underlying tendency that is oriented towards the re-powering or return of special education. The following are some studies that reflect the aforementioned trends.

Salazar, Flórez-Romero and Cuervo-Echeverri (2010) highlight the opposition of parents and teachers in certain traditional schools to educational inclusion processes. Above all, the teachers reflect little confidence in relation to the mechanisms of evaluation and adaptation of the academic program. The same study establishes that, in some cases, deaf students are often treated with negative attitudes such as indifference and pity. Caroca and Yépez (2010) describe the perception of several Chilean teachers during the process of inclusion of deaf students in the classroom. While some focus on the slower pace of learning and the volume of information that deaf students can retain in long-term memory; others mention the existing "integration" problems, due to the lack of openness of members of the educational community or of the deaf students themselves, or the lack of responsibility of the deaf students themselves for the delivery of work. According to Díaz (2011), Amaro (2013), Gamboa (2015), Valencia (2020), Larrazábal, Palacios and Espinoza (2021) and Zamora (2021) teachers confess that they have not received training on sign language and didactic foundations to teach and evaluate deaf students. For his part, Acevedo (2012) considers the labels that deaf people receive based on the opposition between normal and abnormal and the academic difficulties that deaf students may suffer during their university career. Along the same lines, Hernández (2015) states that educational inclusion is reduced to integration processes in the classroom, characterized

by various negative attitudes towards deaf people, which reflect the predominance of a homogenizing, oralist and rehabilitative model. On the contrary, based on the role of a deaf community, as a constructor of meaning, Peluso-Crespi and Vallarino (2014) are in favor of strengthening the four bilingual schools (LSU - Spanish) in the Oriental Republic of Uruguay with a boarding system and the concomitant suppression of inclusion of deaf students in regular schools. Paradoxically, Vulcano (2017) states that, despite the fact that two thirds of the research participants are inspired by the socio-linguistic model, which considers deaf people as part of a specific community with its own culture and language; one third of them still value them from the medical model, which insists on the components of lack and disability. The research of Perdomo, Velásquez and Bravo (2019) reflects the tensions of an educational community in which most teachers pronounce themselves in favor of inclusion, but in practice oppose it through words and actions that have generated two communities within the same school, the deaf and the hearing. Similar results are found Maldonado, Ríos and Araujo (2019) who conclude that the majority of students and teachers accept the inclusion of deaf students in the classroom, a figure that contrasts with the high percentage of discrimination that deaf students have suffered in daily life, and with the scarce attention offered to them by teachers. On the contrary, after the application of the Educational Inclusion Questionnaire to a sample composed of fourteen teachers, Hernández, Loaiza and Salazar (2020) determine that the majority of teachers in an educational institution are in favor of the inclusion of deaf students in regular school. A similar conclusion is found in the research of Zamora (2021). In summary, there is some tension between the theoretical and practical components of educational inclusion of deaf students in the classroom, which require analysis and reflection.

The following paragraphs explain some fundamental concepts that facilitate the understanding of the subject. In education, segregation or exclusion is the artificial separation or isolation of students for various reasons. In some cases, segregation occurs for religious, ideological, social, economic, political, cultural, physical, and other reasons (Matossian, 2020). Segregation produces deep wounds among members of the educational community and undermines the principles of democratic education and human rights (UNESCO, 2012). On the contrary, integration is a step forward that seeks to overcome the mechanisms of segregation, although in essence it only establishes the need to incorporate previously excluded individuals into a community that had previously excluded them (RAE, 2001). Currently, most authors are in favor of educational inclusion, which implies overcoming segregation and integration, to the point of approaching the constitution of ideal spaces, in regular schools, in which all types of students should be included, including people with special educational needs (UNESCO, 2020; 2021). However, most regular school teachers have not received specific training to serve all students who enroll in their classrooms, because that would imply attending numerous training courses. Until a few years ago, most national states allocated resources to support special schools in which education was provided for students with specific disabilities, for example, blind, deaf, Down syndrome, among others (Sánchez-Manzano, 1992). As a counterpart, at present, state public policies lean towards the inclusion of students with special educational needs in regular school (Serrano and Camargo, 2011; Vásquez-Orjuela, 2015; Paz-Maldonado and Silva-Peña, 2021). In it, students with special educational needs should receive the same training and have the same opportunities as other students.

As a starting point for the research, the team asks what is the perception of Ecuadorian teachers about the possible inclusion of deaf students in regular schools? In

response to this question, we propose to analyze the perception of Ecuadorian teachers on the inclusion of deaf students in regular school classrooms.

Method

For the execution of the research process, the quantitative approach was selected, with a non-experimental transectional design, at an exploratory level (Hernández, Fernández and Baptista, 2014). The selected technique is the survey and the instrument is a 5-question questionnaire, designed by the research team, applied through *Google forms*.

The population consisted of 556 Ecuadorian teachers, direct and indirect beneficiaries of two sensitization workshops held in 27 training centers, located in different cities and provinces of the country, which were attended by 46 second level students of cohorts II and III of the Master's Program in Education, Mention in Socio-Critical Pedagogies of the Pontificia Universidad Católica del Ecuador, during the execution of a community service project. The planning of the project was carried out in accordance with the guidelines of the University's Virtual Education Center for virtual master's degrees. The *project to raise awareness about the communication needs of the deaf community in Ecuador* aims to generate spaces for raising awareness among the Ecuadorian population about the communication needs of deaf people. The procedure was developed according to the following phases: 1) project design, 2) workshop preparation, 3) training of master's program students, 4) project implementation, 5) survey application.

During the design phase, the project was prepared in accordance with the guidelines of the Virtual Education Center of the Pontificia Universidad Católica del Ecuador. Once the project was approved, the planning of the awareness-raising workshops included the selection of the subject matter, the formulation of objectives, the selection of specific content, and the definition of the time and resources required. The workshops dealt with 1) the communication needs of the deaf people in our country, 2) the lines of action to address the communication needs of the deaf people in our country. The objective was to analyze the communication needs of deaf people in our country and to define possible lines of action to address the communication needs of deaf people in our country. The workshops were organized according to the following structure: welcome, integration activities, projection of a previously selected video, questions for reflection and evaluation. The recipients were teachers from elementary and high school institutions, high school students, parents of the educational institutions and members of the community. The training of the 46 students of cohorts II and III of the Master's program in Education with a specialization in Socio-Critical Pedagogies was carried out virtually. It consisted of an explanation of the purpose of the project, the structure, the contents, the selection of resources, the collection of evidence and the way in which the online questionnaire was applied to a group of practicing teachers.

The survey was applied to a non-probabilistic sample of 556 Ecuadorian teachers from different levels of education (except higher education); and it was formed by means of the snowball technique, who were invited by the students who participated in the master's program linkage project. All participants are over 18 years of age and agreed to fill out the questionnaire on a voluntary basis. The *Google forms* were available in two different periods, for the participants of the second cohort, from October 24 to November 30, 2022; and, for the participants of the third cohort, from January 6 to February 18,

2023. The questionnaire did not ask for the identification of the participants and is preceded by two items related to the length of teaching experience and the level of education at which the teachers work. The five questions in the questionnaire address 1) the relationship between deafness and disability, 2) the need for deaf people to attend a special school, 3) or a regular or "normal" school, 4) the learning ability of deaf people, and 5) whether teachers feel able to receive deaf students in their own classrooms. The data analysis was based on the graphs and percentages extracted from *Google forms*, from which the tables summarizing the results were constructed.

Results

The results obtained are detailed below.

Table 1
Years of experience of participants

Years of teaching experience	0-5	6-10	11-20	+ of 21
Percentage	21%	23,2%	29,9%	25,9%
Quantity	117	129	166	144

Table 2
Scope of work of the participants

Scope of work	Initial education	Basic elementary	Middle school	Higher basic	Baccalaureate
Percentage	9,4%	16,5%	22,5%	18,7%	32,9%
Quantity	52	92	125	104	183

Table 3
Questionnaire results

Ask	% yes	number	% no	Number
1. I consider deaf students to be disabled	61,9	344	38,1	212
2. I believe that deaf students should attend a special school	59,2	329	40,8	227
3. I believe that deaf students should be included in regular school	65,8	366	34,2	190
4. I believe that deaf students are less able to learn than hearing students	9,2	51	90,8	505
5. I feel qualified to receive deaf students in my classroom	24,5	136	75,5	420

The first analysis of the results shows that the respondents come from the four predefined categories of experience. In relation to the work environment, there is a greater participation of teachers in general basic education and high school than in pre-school education. On the other hand, the results of the questionnaire yield the following results that deserve the researchers' attention. While 61.9% consider deaf students to be disabled, 38.1% indicate the opposite. A priori, the team defined the dependence of questions 2 and

3 of the questionnaire, since a distinction is made between a special school and a regular school. So the results of both questions had to confirm each other. Therefore, it is contradictory that 59.2% affirm that deaf students should attend a special school and a higher percentage, that is 65.8%, a regular school, which could reveal a misunderstanding of the terminology used in the questionnaire. 90.8% recognize that deaf students have the same learning ability as hearing students. Finally, 75.5% of the teachers surveyed confess that they do not feel qualified to receive deaf students in their classrooms, which is interesting information for the development of further research.

Discussion and conclusions

At the beginning of the research we asked about teachers' perceptions of the inclusion of deaf students in regular schools. A first answer to this question can be obtained from the results of the present research, since the questionnaire applied inquires about the perception that teachers have about the relationship between deafness and disability, the attendance of deaf students in special or regular schools, the learning ability of deaf students, and the professional competencies that teachers have to admit deaf students in regular school classrooms.

The results indicate that 61.9% establish a connection between deafness and disability, which can be explained in light of two opposing anthropological paradigms, the clinical and the socio-anthropological (Republic of Ecuador, 2019). While the clinical model evaluates deafness in light of deprivation or lack, the socio-anthropological model does so based on the consideration of deaf people as part of a culture and with their own language and identity (Republic of Ecuador, 2019). Regarding the first model, some current research gathers evidence of teachers who still value deaf people based on impairment and abnormality (Hernández, 2015); while, at the opposite pole they are recognized as people who should receive equal and respectful treatment (Divito, Pahud & Barale, 2003).

The need for deaf students to attend a special school is supported by 59.2%. At present, most special education institutions for deaf people are inspired by bicultural and bilingual models, although some of them may retain certain conceptual and operational shortcomings, such as the management of attitudes that would reveal a clinical conception of the deaf person, as pointed out by Carranco, Martínez, Márquez and Realpe (2021), based on an in situ observation. Other research conducted in the field of special schools emphasizes the importance of sign language and the mastery of teaching and assessment strategies that consider the specific characteristics of deaf students (Díaz, Nieto, & Hincapié, 2018; Morales-Acosta, 2019; Valencia, 2020). Although there are cases in which the existence of special schools is radicalized to the extreme in which the strengthening of this type of special schools for the deaf and the elimination of inclusion processes in regular schools is requested, due to underlying theoretical considerations, related to the real levels of inclusion that are currently achieved (Peluso-Crespi and Vallarino, 2014).

The intention expressed by 65.8% of teachers for the acceptance of deaf students in regular schools must be translated into concrete actions that allow for the true inclusion of this population in their classrooms and implies the adjustment of national regulations and current university curricula. Along these lines, the Pedagogical Guidelines for the Educational Care of Students with Hearing Limitations (2006), the *Organic Law on Disabilities* (2012), the Guidelines for the Educational Care of Students with Hearing

Disabilities (2013) and the National Bilingual Bicultural Educational Model for Persons with Hearing Disabilities (2019) should be interpreted; and the statements of authors such as Serna (2015), who advocates for the modification of the Institutional Educational Project so that the inclusion of deaf students can be achieved; Rodríguez-Hernández, Muñoz, Sánchez-Bravo and Sastre (2019) point out the importance of interdisciplinary studies that allow to deepen the own characteristics that occur during the communicative and cognitive processes with deaf people; Pereira (2020) is convinced that deaf students can learn historical contents in regular school with the support of visual elements and the interpreter; Trejo-Muñoz and Martínez-Pérez (2020) highlight the role of digital resources during the teaching of deaf people. On the contrary, authors such as Salazar, Flórez-Romero, and Cuervo-Echeverri (2010) state that one of the main obstacles to inclusion is the rejection that teachers express in front of disabled students; Hernández (2015) consider that inclusion has remained an empty statement, which does not coincide with the homogenizing reality experienced by deaf people; Vulcano (2017) mentions that at least one third of the teachers consulted still conceive deaf people from disability, an attitude that negatively conditions the valuation of long-term memory; Perdomo, Velásquez and Bravo (2019) denounce the existence of two communities or schools within the same institution, one for deaf and one for hearing; Maldonado, Ríos and Araujo (2019) conclude that many deaf students feel discriminated against by teachers; Larrazabal, Palacios and Espinoza (2021) state that deaf students who are admitted to regular schools oscillate between integration and inclusion and that they do not always achieve the minimum learning objectives; Perea (2022) advocate the incorporation of curricular adjustments in education majors who receive deaf students.

In view of the fact that 90.8% of the teachers surveyed consider that deaf students have the same learning capacity as hearing students, this should be reflected both in the teaching methodology in the classroom and in the learning outcomes achieved. This general statement coincides with the conclusion of Ortiz-Guzmán (2022) that deaf and hearing students possess similar learning abilities, although nuanced by the visual predominance of deaf people. In relation to the teaching-learning processes of deaf people, Ortiz-Flores (2006) has established a relationship between the representations that the teacher has and the process of teaching written language to deaf students; Larrinaga and Peluso (2007) suggest that undergraduate teachers should develop a methodology that focuses on the teaching of language and scientific vocabulary; Caroca and Yépez (2010) mention the importance of visual materials, limited vocabulary and the slower pace of learning of deaf students; Herrera, Esquea, Serje, De la Cruz and Barros (2021) highlight the use of the blog as a resource that can stimulate the reading skills of deaf students; Prieto and Torres (2023) state that physical materials and resources should be offered that enable learning for both deaf and hearing students.

Likewise, a high percentage of participants (75.5%) state that they do not feel prepared to receive deaf students in regular school classrooms, which is an important indicator that points to the academic preparation that current teachers have received during their undergraduate training, i.e. the curriculum. Along the same lines, different authors agree in pointing out the inexistence of systematic training that adequately prepares future teachers of the deaf (Domínguez, 2009; Díaz, 2011; Amaro, 2013; Córdova, Gómez, & Zúñiga, 2013; Gamboa, 2015; Torres, 2015; Flores, 2019; Morales, 2019; Trejo-Muñoz & Martínez-Pérez, 2020; Rodríguez-Marín, 2021; Zamora-Jiménez, 2021; Ortiz-Guzmán, 2022).

From the results of the research it is established that a high percentage of respondents consider deaf people to be disabled, have the same learning capacity as hearing people, accept their inclusion in regular school and have stated that they do not feel qualified to develop teaching-learning processes with them. Therefore, it is concluded that teachers reflect a favorable attitude towards the inclusion of deaf students in regular school, although, contradictorily, at the same time a similar percentage considers that they should attend a special school. In addition, in light of the results of the last research question, it is concluded that a comprehensive curriculum reform is required, which allows for the adequate training of future teachers, accompanied by systematic training of practicing teachers for the care of students with disabilities.

On the other hand, further research should be conducted on the actual pedagogical and didactic difficulties experienced by regular school teachers with deaf students during the educational process.

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NEUROMETHODOLOGY AND TEACHER TRAINING: EMERGING INCLUSIVE METHODOLOGIES

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Abstract. The main objective of this exploration is to analyze the relationship between teacher training and the new inclusive methodologies with the neuromethodology of school education. Therefore, a literature review was carried out, with a correlational research design and the methodology used was qualitative and quantitative; the research paradigm followed was interpretative, the contextualization of Jaén capital, which is where the population and sample were extracted, the research problem to be solved is: What is the relationship between neuromethodology, teacher training and emerging inclusive methodologies? The results show that the median values are 4,000 each. Therefore, respondents intuitively reported the mean value of the variable. Even in this activity the idea of distraction arises in a simple way. Whether per run or 50 median cases, the 50 median cases occur at intervals (4-5), and greater variation is observed in the real sequence with 40 runs, while in the simulated sequence there are 50 central cases. Decrease the value (3-4), the range is 50. In conclusion, the respondents adequately assess the value of the methodology as a training method, since most of them agree with its use. However, the variability in emerging methodologies is not recognized, as it is assumed to have greater variability than existing methodologies.
Key words: methodology, neuromethodology, inclusive emergent methodologies, training models.

NEUROMETODOLOGÍA Y FORMACIÓN DOCENTE: METODOLOGÍAS INCLUSIVAS EMERGENTES

Resumen. El objetivo principal de esta exploración, es analizar la relación entre la formación docente y las nuevas metodologías inclusivas con la neurometodología de la educación escolar Por lo tanto, se efectuó una revisión bibliográfica, con un diseño de investigación correlacional y la metodología utilizada ha sido cualitativa y cuantitativa; el paradigma de investigación seguido fue el interpretativo, la contextualización de Jaén capital, que es de donde se ha extraído la población y muestra, el problema de investigación a resolver es ¿Qué relación existe entre la neurometodología, la formación docente y las metodologías inclusivas emergentes?, entre los resultados destacan que los valores medianos son 4,000 cada uno. Por lo tanto, los encuestados informaron intuitivamente el valor medio de la variable. Incluso en esta actividad surge la idea de distracción de manera sencilla. Ya sea por corrida o por 50 casos medianos, los 50 casos medianos ocurren a intervalos (4-5), y se observa una mayor variación en la secuencia real con 40 corridas, mientras que en la secuencia simulada hay 50 casos centrales.

Disminuya el valor (3-4), el rango es de 50. Como conclusión, los encuestados valoran adecuadamente el valor de la metodología como método de formación, ya que la mayoría está de acuerdo con su uso. Sin embargo, no se reconoce la variabilidad en las metodologías emergentes, ya que se supone una mayor variabilidad que las existentes.
Palabras clave: metodología, neurometodología, metodologías emergentes inclusivas, modelos de formación.

Introduction

We live in a society immersed in technological development characterized by the free flow of communication and information. In such a condition, school is considered a place of communication, where group work, cooperation or collaboration are the main principles, so active learning methods should be used in the classroom, which favor communication among the students themselves. Methodology is a fundamental aspect of any research, and the field of education is no exception. In this sense, learning methodology, teaching methodology, emergent methodology and neuromethodology are areas of study that have received great importance in recent years.

Current educational forms demand teaching-learning methods that are compatible with the changes taking place in our country: social, cultural, economic, labor and technological. At a time when innovation cycles are shortening, educational institutions must be more versatile and flexible. Therefore, the information society needs not only content or skills information, but also process information, i.e., people must learn how to learn. The social and educational changes of recent years and decades require innovative teaching methods.

The methodology arises in accordance with the scientific development of science. For Yuni and Urbano (2020), it is a field of specialized knowledge that studies the methods used to generate "valid knowledge of the real world" (p.5); in addition, it implies the use of criteria of decision, order and gradualness of the way to proceed to achieve a purpose, build or justify new findings or scientific conclusions. In synthesis, it would be the set of techniques and experiments required for the demonstration of a hypothesis, or for the achievement of some goal.

In contrast to this, the methodology of participatory action research, according to Rodriguez (2020) has been awakening souls, feelings, communities and renewed participation in the field study of research, to "break the monopoly of knowledge" (p.3). According to this author, since 1946 with the works of Kurt Lewin, it began to go through important moments with Fals Borda (1974) and Elliot (1981) to validate itself in its own precepts rooted in the theory of complexity, becoming undisciplinary for being against disciplinary and parceled research; therefore, it insurges accompanied by the communities and in the context of epistemic crisis, it becomes a transcomplex decolonial project, "not to search for finished truths, but to build trans-epistemes, which can be rethought every time reality merits it"(p.5), this makes it dynamic, in constant innovation, renovation and socially relevant.

Regarding teaching methodology, Builes et al. (2022) state that being a teacher implies planning, recreating and transforming classroom practices using digital technologies and, at the same time, developing this competence in their students, dynamically providing learning opportunities. This will be possible, according to the cited authors, with the implementation of the Digital Education Action Plan: 2021-2027, designed by the European Commission, since its objectives include "enhancing the ability of teachers to use digital technologies skillfully, equitably and effectively" (p.135), to improve the quality of education.

From the students' perspective on the teaching methodology, there is also a research carried out by Chinche (2022), referring to the similarities granted by the students to them. Before approaching these contributions, the author points out that teaching methodology is not limited to techniques, strategies and instruments for measuring the educational process; it goes beyond that, as it encompasses, by the same daily contact with students, personal dimensions, since it is a person who responds according to the context; he/she also has the responsibility of educating others under diverse and changing situations and, therefore, must provide the most pertinent academic and personal responses.

Seen in this light, the author suggests that it is worthwhile to examine the meaning given by students to teaching methodologies, as this is a way of discovering the visible and invisible pedagogies of the educational process. The students revealed that it is necessary to consider them in the planning of contents, tasks and in all the pedagogical action, since they are the recipients of the successes and failures of the teaching-learning process. For this same reason, the educational process must be adjusted to the needs and possibilities of the students, in order to put an end to the passivity that prevails in class sessions and motivate them to rehearse, question and create new interpretations of the contents and not to wait for an expository class from the teacher. Chinche's research makes it clear that students are aware of their own educational process, of the role they play when a traditional teaching methodology is applied, and are capable of questioning it in order to generate some change.

For Espinoza (2022), teacher training should aim at the transformation of students in a comprehensive manner; but at the same time, it should contribute to professional training itself, since without it, little would be done. After the second half of the 20th century, the behaviorist or traditional training model was almost entirely relegated to give way to alternative models; according to Mosquera & Pérez (2022), training models have derived from approaches on meaningful learning by Ausubel (1983); by discovery, according to Bruner (1988); the situated model proposed by Lave & Wenger (1991); the expansive learning of Engentrom (2001); but they can also derive from national educational policies; and even, if considered within the framework of modernity and postmodernity, a long list of training models will also emerge, and it would be worthwhile to review the contributions of Lyotard (1987) and Harvey (1998), but the postmodern movement was articulated to everything that would come with technology and the globalization process.

what is expected from the relationship between methodology and training models? That there is coherence in the implementation of both and that the academic training intentions of citizens are clear, together with their planet and other forms of natural life. This is what it is all about, aiming towards an inclusive, respectful, autonomous, consensual, integral, ubiquitous and planetary education that responds to current social demands. Hence, innovative, emerging and current training models are holistic in nature. This perspective is shared by López et al. (2022) when they state that teacher training models require greater commitments from teachers to achieve a comprehensive education, in which there is harmony between methods, methodology, applied didactic strategies; in short, a corpus of theory and praxis consubstantiated with pedagogical practice.

Inclusive emerging methodologies focus on creating inclusive learning environments by combining emerging methodologies for students with special needs, so that the development of their learning will propel them to achieve educational objectives, develop effective social interactions, as well as their own personal development. Addressing diversity is a goal that, in

Spanish legislation, has been bearing fruit since the Salamanca Declaration in 1994. More recently, according to González and Carrascal (2022), the 2030 Agenda includes among its goals "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (p.37).

To this end, the authors propose co-teaching, understood as the collaboration between two teaching professionals to address diversity. It consists of one teacher in general education and one teacher in space education to share responsibilities in the educational process. This type of emergent and inclusive methodology promotes recognition among professionals, they feel accompanied and share the concerns of the complex process of teaching students from diversity. The practice of this methodology also increases the number of didactic strategies employed in the classroom.

Inclusive methodologies are not only for students with special conditions, they are also necessary when migration processes occur and students need to be treated with equal rights, as well as to create an inclusive and respectful educational environment for all, whether they are natives or foreigners.

Neuromethodology has opened the way to other valid and relevant concepts in education, but it has also been found to be used inappropriately, with which care must be taken. According to Pherez, Vargas & Jerez (2019), research and data obtained from the confluence of cognitive psychology and pedagogy are creating a new scenario for teaching and learning called "neuroeducation", based on how the brain learns and how to stimulate it through pedagogical processes. It has been insisted that the teaching professional is called upon to familiarize himself with new knowledge, to appropriate and contribute to the learning of his students, since the issue now lies in the fact that, in addition to having to know how the brain works, he must consider methodological and pedagogical ways to enhance creativity in the compromise, in the choice of decisions, in the construction of relevant and innovative knowledge, among other processes.

According to the aforementioned authors, neuroscience has created a whole system that will have a positive impact on education, since, together with neuroeducation, there is the "neuroeducator", as a mediator between neuroscience and pedagogy; "neuromethodology", based on the fact that the brain learns progressively from the simple to the complex according to the age of the person, since it understands the world permanently through "perception, attention, thought, memory and language" (p. 151); "neurolearning", which involves learning with emotionality, especially using emotional intelligence; "neurodidactics", which articulates the student's skills with the functioning of the brain; and "neurolearning", which involves learning with emotionality, especially using emotional intelligence); "neurolearning", which involves learning with emotionality, especially using emotional intelligence; "neurodidactics", which articulates the student's skills with the functioning of the brain; and "neuroassessment", which aims to excite brain neurons to produce "multisensory learning" (p.152).

From this perspective, reflections derived from pedagogical experiences around specific cases emerge, as an example: distraction in the classroom, a behavioral attitude so common in many students is associated with neurocerebral functioning, because attention in the course of content acquisition is key to stimulate the brain; according to Doardi & Limiñani (2020), attention allows filtering the information of interest, thanks to this "nervous excitement is kept in short-term memory" (p. 24) and will be the basis that will concatenate other long-term stimuli, generating the interest of the learner. 24) and it will be the basis that will concatenate other stimuli in the long term, generating the interest of the learner. otherwise, the student will

fix his interest in other situations, also valid because it is the development of attention; but, what is sought is attention in school learning. With these studies, the distraction of children in the classroom can be addressed, not as a behavioral problem, but from the understanding of the brain and an appropriate neuromethodology.

It is worth noting that the teacher can stimulate attention in other extracurricular environments, but always with an educational, integrating and positive growth purpose for the students. According to Casasola (2022), "learning is processed in the brain" (p.9), consolidating the memory progressively until it creates a data bank or storage that will be used throughout life and according to the situations that the person will experience.

The educator's challenge lies in creating neuromethodological strategies with which to help stimulate the brain to produce meaningful learning; it turns out that the brain-learning link is a reciprocal process, on the one hand, memory is the result of the learning process, and on the other, learning modifies the neuronal synapses, constantly stimulating the brain to produce intentional learning. This dialectical relationship is known as neuroplasticity, by which the brain learns to modify its behavior through active learning and manages to produce new neurons, this is called neurogenesis, which so far has no age limits to produce them; hence it is especially interesting its application in the educational field from early stages to university.

An interesting contribution on neuromethodology is provided by Quílez (2019), when he explains that physical exercise is a great stimulator of the prefrontal lobe where executive functions such as decision making, attention, planning, among others, are developed. He adds that the natural state of man is to be in motion, and that this has a decisive role in mental development.

Now, with the development of neuroscience, the approaches on psychomotor skills exposed by Piaget become more relevant, especially the one carried out in Physical Education at school, since it has a strong impact on the development of logical-mathematical thinking, the student's emotional state, long-term memory, among other benefits. For these reasons, education in the sports field should be aimed at visual, auditory, tactile and balance stimulation, which would enhance the processes of attention, verbal and auditory memory, among others.

The referenced author also explains that research on the functioning of the brain, the methodologies associated with this and the participants in the educational act, are pointing towards the protagonism of parents, in a new way of seeing the education of their children and the ways to participate. The bond between parents and children is both biological and emotional, since humans are the most dependent species in the animal kingdom. From this natural genesis, spouses can support their children by understanding how the brain works and making better use of the interests they show. However, neuromethodology is not only implemented in primary school students; it also has scope at the university level because the brain always learns and can be trained to do so.

In this regard, Tacca, Tacca & Alva (2019), propose three principles for this type of methodology: "interaction, balance and holistic vision" (p.17), the first being the result of the active state of all sensory resources for learning, since true interactions are generated. Balance would be achieved by activating both hemispheres through the selection of didactic contents that involve analysis and metaphors; finally, the holistic vision would be produced when the students' attitudes are valued, enhancing self-esteem, multiple intelligences, affective processes and learning for life development.

Warnings are not superfluous when dealing with new terms in the scientific field, since the use and abuse of the term neuroscience and its derivations can lead to erroneous or self-interested interpretations. Cumpa (2019), has been dedicated to investigate in the Scielo database of scientific articles, how this term has been used with relevance and other times in a not very assertive way to conceptualize the field of action of the same.

In this order, Cumpa (2019) points out that the term has been used to propose programs of "dubious scientific quality" (p.34) for example neuroastrology, neuromagic, among others. Within this broad review, the neuromethodology associated with neuroeducation registered a broad scientific relevance since it deals with the interconnection between "the biology of the central nervous system, cultural stimuli and pedagogical strategies" (p.35). After all, it has been proven that there is a connection between the brain, the ways it learns and the educational stimuli it receives.

Method

The design followed in this research is non-experimental, descriptive, explanatory and correlational. The interpretive paradigm has been followed. In accordance with the proposed objectives and this research, our geographical context is based on a province of the Autonomous Community of Andalusia, in particular, Jaén. It has ninety-seven municipalities. It is going to be carried out to active and non-active teachers of these municipalities and also to the fourth year teachers of the Degree in Primary Education of the University of Jaén.

In accordance with the above, the members we have surveyed belong to the province of Andalusia. It should be noted that this leads to a very limited selection, due to the fact that not many teachers from each province have answered and that these teachers do not only belong to the province of Jaén but also come from outside the province. It is also important to point out that the results may be more enriching since they are not only from Jaén. This means that its validity is not useful to carry out an exploration at regional or even national level.

Sampling was carried out using the probability sampling technique used in sampling, which was simple random. Otzen, T. and Manterola C (2017,) commented that this method ensures that the population has equal chances of being included in the mentioned sample, this means that the probability of choosing subject "x" does not depend on the probability that other subjects belong to the target group. The population of this research is the practicing and non-practicing teachers (active and non-active) of the province of Jaén and the fourth year students of Primary Education of the University of Jaén, the sample has been carried out by convenience. The students are fourth year undergraduate students of Primary Education and belong to the University of Jaén, have an average age of 23 years, are male and female. The number of teachers (from the whole province of Jaén) is 10,532, and the sample is 61. The number of students (4th year of primary education) is 300, and the sample is 30.

The research problem is: what is the relationship between neuromethodology, teacher training and emerging inclusive methodologies, the hypotheses: H0.- There is no relationship between teacher training and emerging inclusive methodologies with neuromethodology. H1.- There is a relationship between teacher training and emerging inclusive methodologies with neuromethodology. Independent variables: Training models, inclusive emerging methodologies, and teaching methodologies. Dependent variables: Neuromethodology. The

research dimensions are: Methodology, Teaching Methodology, Training Models, Inclusive Emerging Methodologies and Neuromethodology.

As for the instruments and data collection process, the Likert scale was used. The parts we have used for the elaboration of this scale have been the following: Bibliographic review of the topics to be investigated, selection of dimensions, battery of items, item forms for each dimension and focus group. It has an operationalization table, which is answered with: strongly disagree (1), disagree (2), indifferent (3), agree (4), strongly agree (5). It is composed of five specific objectives, each with one dimension and five items for each dimension. Validation and reliability have been based on expert judgment. This is a method that serves to validate the instrument of the research carried out, for which a questionnaire has been carried out where all the proposed items are evaluated in order to observe their coherence. A pilot test was then carried out and the result was favorable. Reliability, as a criterion estimates Cronbach's alpha coefficients as: Coefficient alpha >.9 is excellent; Coefficient alpha >.8 is good; Coefficient alpha >.7 is acceptable; Coefficient alpha >.6 is questionable; Coefficient alpha >.5 is poor. The Cronbach's Alpha coefficient shows an excellent internal consistency of the set of 25 variables since it presents a value of $\alpha = .949$.

Results

Regarding Methodology. The total number of observations is 90 (89 valid and 1 lost). The mean is 3.3483 and the median is 4.0000, suggesting a distribution skewed to the left, as the median is greater than the mean. This is confirmed by the skewness of -0.492, indicating negative skewness. The kurtosis is -0.938, suggesting a relatively flat distribution compared to a l-norm distribution. The standard error of skewness is 0.255 and the standard error of kurtosis is 0.506. Overall, these data suggest that there is a concentration of higher values in the distribution, but there is also a significant amount of lower values. The distribution is relatively flat and skewed to the left.

In this second item, respondents were asked whether the methodology serves to achieve the goals planned in a scientific investigation. With the data provided, it can be seen that the total number of observations is 90 (89 valid and 1 lost). The mean is 4.2697 and the median is 4.0000, suggesting a distribution skewed to the right, as the median is smaller than the mean. This is confirmed by the skewness of -1.316, indicating negative skewness. In addition, the kurtosis is 3.404, suggesting a leptokurtic distribution (with a concentration of values in the center) compared to a normal distribution. The standard error of skewness is 0.255 and the standard error of kurtosis is 0.506. Overall, these data suggest that there is a concentration of higher values in the distribution, but there is also a significant amount of lower values. The distribution is leptokurtic and skewed to the right.

On Teaching Methodologies. In this item, the respondents were asked whether the teaching methodology stimulates the active knowledge of the student from the information search activities and their implementation in the classroom together with the presentation of the same. The mean of the distribution is 4.1236 and the median is 4.0000, suggesting a distribution skewed to the right, since the median is smaller than the mean. This is confirmed by the skewness of -1.476, indicating negative skewness. The kurtosis is 2.824, suggesting a leptokurtic distribution (with a concentration of values in the center) compared to a normal distribution. The standard error of skewness is 0.255 and the standard error of kurtosis is 0.506. Overall, these data suggest that there is a concentration of higher values in the distribution, but

there is also a significant amount of lower values. The distribution is leptokurtic and skewed to the right.

Respondents were also asked whether teaching methodologies help build meaningful knowledge for students to develop their own skills and abilities. The median of 5.0000 suggests that there are higher values in the distribution, which is confirmed by the skewness of -1.821, indicating a strong negative skewness. In addition, the kurtosis is 4.188, suggesting a highly leptokurtic distribution (with a concentration of values in the center) compared to a normal distribution. The standard error of skewness is 0.255 and the standard error of kurtosis is 0.506. Overall, these data suggest that there is a concentration of higher values in the distribution, but there is also a significant amount of lower values. The distribution is highly leptokurtic and skewed to the left.

About Training Models. In this item, respondents were asked whether training models involve considering the content to be taught, strategies, resources, methods, methodology and evaluation. A skewness of -1.404, indicating a negative skewness. In addition, the kurtosis is 3.770, suggesting a leptokurtic distribution (with a concentration of values in the center) compared to a normal distribution. The standard error of skewness is 0.255 and the standard error of kurtosis is 0.506. Overall, these data suggest that there is a concentration of higher values in the distribution, but there is also a significant amount of lower values. The distribution is leptokurtic and skewed to the left. The training models promote various dimensions of the human being. In this item, respondents were asked whether the training models promote various dimensions of the human being. Statistical analysis yielded a ratio of valid to missing numbers. We have 89 valid numbers and 1 missing number, which equals a ratio of 98.9% valid numbers. Then, we can analyze the measures of central tendency. The mean is 4.1236 and the median is 4, suggesting that the distribution may be somewhat skewed to the right. The skewness is -1.235, which confirms this hypothesis. In addition, the standard error of skewness is 0.255, indicating that the coefficient of skewness is statistically significant. As for kurtosis, we have a value of 2.955, suggesting a leptokurtic distribution, i.e., with a concentration of values at the mean and heavier than normal tails. The standard error of kurtosis is 0.506, indicating that the kurtosis coefficient is also statistically significant. In summary, the data appears to have a right-skewed and leptokurtic distribution, with a very high proportion of valid numbers and a single missing number.

About Neuromethodology. In this item, respondents were asked whether inclusive emerging methodologies are those that focus their attention on creating inclusive learning environments. It can be said that there are a total of 90 numbers, of which 89 are valid and 1 is missing. The sample mean is 4.1685, indicating that the average value of the numbers is close to 4.2. The median, which is the central value of the sample, is 4.0000, indicating that half of the numbers are less than or equal to 4 and the other half are greater than or equal to 4. Skewness is an indicator of the symmetry of the data distribution, and in this case, the skewness is -1.341, indicating that the distribution is skewed to the left. The standard error of skewness is 0.255, indicating that the measure of skewness is reliable. The kurtosis is an indicator of the shape of the data distribution, and in this case, the kurtosis is 1.867, indicating that the distribution is leptokurtic, i.e., it has a high peak and heavy tails. The kurtosis error is 0.506, which indicates that the kurtosis measure is reliable.

Inclusive start-ups are based on two fundamental principles: equity and integration. In this item, respondents were asked whether inclusive emerging methodologies are based on two fundamental principles: equity and integration. It can be said that there are a total of 90 numbers, of which 89 are valid and 1 is missing. The sample mean is 4.2022, indicating that the average

value of the numbers is close to 4.2. The median, which is the central value of the sample, is 4.0000, indicating that half of the numbers are less than or equal to 4 and the other half are greater than or equal to 4. Skewness is an indicator of the symmetry of the data distribution, and in this case, the skewness is -1.226, indicating that the distribution is skewed to the left. The standard error of skewness is 0.255, indicating that the measure of skewness is reliable. The kurtosis is an indicator of the shape of the data distribution, and in this case, the kurtosis is 1.602, indicating that the distribution is leptokurtic, i.e., it has a high peak and heavy tails. The standard error of kurtosis is 0.506, indicating that the kurtosis measure is reliable.

On Inclusive Emerging Methodologies. In this item, respondents were asked whether neuromethodology is a discipline that unites psychology, pedagogy and neuroscience. It can be said that there are a total of 90 numbers, of which 89 are valid and 1 is missing. The sample mean is 4.1573, indicating that the average value of the numbers is close to 4.2. The median, which is the central value of the sample, is 4.0000, indicating that half of the numbers are less than or equal to 4 and the other half are greater than or equal to 4. Skewness is an indicator of the symmetry of the data distribution, and in this case, the skewness is -0.741, indicating that the distribution is slightly skewed to the left. The standard error of skewness is 0.255, indicating that the measure of skewness is reliable. The kurtosis is an indicator of the shape of the data distribution, and in this case, the kurtosis is 0.419, indicating that the distribution is platykurtic, that is, it has a more flattened shape than a normal distribution. The standard error of kurtosis is 0.506, indicating that the kurtosis measure is reliable.

Neuromethodology serves to express the functioning of the brain while acquiring content. In this item, respondents were asked whether neuromethodology serves to express the functioning of the brain while acquiring content. It can be said that there are a total of 90 numbers, of which 89 are valid and 1 is missing. The sample mean is 4.1461, indicating that the average value of the numbers is close to 4.15. The median, which is the central value of the sample, is 4.0000, indicating that half of the numbers are less than or equal to 4 and the other half are greater than or equal to 4. Skewness is an indicator of the symmetry of the data distribution, and in this case, the skewness is -1.039, indicating that the distribution is skewed to the left. The standard error of skewness is 0.255, indicating that the measure of skewness is reliable. The kurtosis is an indicator of the shape of the data distribution, and in this case, the kurtosis is 1.699, indicating that the distribution is leptokurtic, i.e., it has a high peak and heavy tails. The standard error of kurtosis is 0.506, indicating that the kurtosis measure is reliable.

Discussion and conclusions

In the field of education, there are various methodologies used for learning, teaching and research. Learning methodology focuses on how students acquire knowledge and skills, while teaching methodology focuses on how teachers teach and facilitate learning.

Emerging Methodology, on the other hand, refers to new methodologies that emerge in response to changes in society and technology. These methods try to adapt to the needs of the learners and to new learning methods, such as online learning and project-based learning. In addition, neuromethodology is a methodology focused on studying the relationship between the brain and learning. This methodology uses neuroscience techniques to understand how the brain processes information and how it can improve the teaching process.

From the statistical analysis of the surveys, we obtained considerations regarding each type of methodology.

- Regarding Methodology in general, they said that it is a set of methods known to all; in addition, it serves to achieve the goals that are planned in a scientific investigation.
- As for the teaching methodology, it stimulates the active knowledge of the student from the activities of information search and its implementation in the classroom together with the exposition of the same. They help students build meaningful knowledge to develop their own skills and abilities.
- Of the training models, these involve considering the content to be taught, strategies, resources, methods, methodology and evaluation. They also promote various dimensions of the human being.
- Emerging inclusive methodologies are those that focus on creating inclusive learning environments and are based on two fundamental principles: equity and integration.
- Neuromethodology is a discipline that unites psychology, pedagogy and neuroscience. It serves to express the functioning of the brain while acquiring content.

In conclusion, the current forms of study require teaching-learning methods that are in line with the processes of change that are taking place in the social, cultural, economic, labor and technological spheres of our country. In the field of education there are various methodologies used for learning, teaching and research. The need to adapt to the new times of change with changes in the markets, in the organization of work, in technology and in the values of society demands a polyvalent, multifunctional and flexible training.

The general conclusion with respect to the answers given by the respondents and statistically analyzed is that they adequately assess the value of the methodology as a training method, since most of them agree with its use. However, variability in emerging methodologies is not recognized, as it is assumed to be more consistent than existing methodologies.

Among the limitations were the lack of economic resources and the time dedicated to each interviewee. Further research is needed, especially in the field of new technologies. With respect to the social context of the research, the members we have surveyed belong to the province of Andalusia. It is worth noting that this leads to a very limited selection, since not many teachers from each province answered and that these teachers do not belong only to the province of Jaén but also come from outside the province. It is also important to point out that the results may be more enriching since they are not only from Jaén. This means that its validity is not useful to carry out an exploration at regional or even national level.

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