ESPACIO I+D, INNOVACIÓN MÁS DESARROLLO

INDEX

Academic Papers

EDITOR'S LETTER

Dear Readers:

We begin 2021 with a new volume of the Journal of Scientific Dissemination of the Universidad Autónoma de Chiapas: *Espacio I+D Innovación más Desarrollo*, with this one we already have 26 issues at your disposal.

This year represents great challenges for the whole world, however, Science has provided enormous certainties to humanity, which is more fragile than ever, and this is to be celebrated because it redeems the civilizational advances while forcing us to trust in Science, academia, and collegiate work that has achieved the unthinkable: the development of a vaccine against COVID-19 in record time. As a university, we are no strangers to this reality, and specifically from this Journal, we will continue to support the dissemination of multidisciplinary academic and scientific work. We can proudly affirm that this publication has positioned itself in Latin America, as we receive more and more collaboration proposals from countries such as Chile, Ecuador, Venezuela, and Argentina, among others.

Proof of this in this issue which includes: *Study of the behavior of different sowing densities of fingerlings for the fattening of rainbow trout* (Ecuador); *The attitude towards the inclusion of professional education assistants of Talca-Chile's Municipal School* (Chile); *Inclusion as a knowledge project in resistance* (Chile); *Plant extracts for the in vitro control of Colletotrichum gloeosporioides P. isolated from Carica papaya L.* (Colombia-Mexico); *Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students* (SEMAR-Mexico); *Evaluation of the behavior of reinforced concrete beams and under-forced with GFRP rods* (CICCH-UNACH-Universidad Michoacana de San Nicolás de Hidalgo); *Potential factors that influence students to drop out of the Escuela telesecundaria 531 Frida Kahlo* (Chiapas); and *Prevalence and molecular characterization of Escherichia coli and Salmonella spp. in guinea fowls (Numida meleagris) in two ranches of Chiapas, Mexico* (UNACH). Also included is the document: *Photojournalism as a social field. Proposal to study journalistic photography*. Finally, we invite you to review our capsules on COVID-19 in the multimedia reports section

The entire Revista Espacio I+D team wishes you an excellent 2021; we hope you will continue to collaborate with us.

Enjoy this Space of Innovation!

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

The editors

ARTICLES

THE ATTITUDE TOWARDS THE INCLUSION OF PROFESSIONAL EDUCATION ASSISTANTS OF TALCA-CHILE'S MUNICIPAL SCHOOL

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— *Abstract*—

The attitude towards the inclusion of those professionals from different areas that support teaching and learning processes in schools is key if we want to move towards inclusive educational communities. The purpose of this paper is to analyze the attitude of professional education assistants towards inclusive educational culture, policy, and practice in schools in the Province of Talca, Chile. A descriptive study - survey, of cross-sectional, non-experimental cut, is carried out. The selection of the sample is non-probabilistic for convenience. A total of 107 professional education assistants who work in schools in the Province of Talca, Chile, were surveyed. A questionnaire with 30 questions is used to measure attitude. The main findings show that age, gender, and years of experience do not determine the favorable attitude towards inclusive education. This is not the case with the professional title. This finding highlights the important role of higher education institutions in the initial training of professionals who promote inclusion.

Keywords

Education assistants; attitude; educational inclusion.

A ccording to the latest policies framed in the Chilean educational reform, focused on moving from integration to inclusion, Chile is facing a scenario of change concerning the role that each member of the educational community plays, to ensure a quality, inclusive, and equitable education to all students, especially those who are more vulnerable or who have Special Educational Needs (Ministry of Education, 2009). One of these members of the educational community refers, for our study, to those professionals or support specialists such as psychologists, speech therapists, kinesiologists, social workers, occupational therapists, and educational psychologists who work in schools as Professional Education Assistants according to the Ministry of Education (2009).

In this framework, according to the General Education Law 20.370/2009 of the Ministry of Education, Article 34 defines criteria and guidelines for diagnosing students with special educational needs by at least one of these Professional Education Assistants. Likewise, it defines criteria and guidelines for curricular adaptation that allow schools to plan relevant and quality educational proposals for students with special educational needs. Jointly, the Social Inclusion Law 20.422/2010 of the Ministry of Development and Planning, in Article 34, indicates that the State must guarantee access to public and private establishments of the Regular or Special Education system when appropriate, contemplating plans for students with special educational needs, encouraging the participation of teachers, education assistants, and other members of the educational community, incorporating innovations and curricular adaptations to allow and facilitate access to the educational system.

Both laws give support to the Supreme Decree N°170/2009 of the Ministry of Education, whose promulgation constitutes a relevant beginning to contextualize the rules that regulate the participation of professional education assistants in the country's educational establishments.

It is of concern that, according to the National Study on Disability (ENDISC, 2015), in the implementation of this Decree, a medical, clinical, or rehabilitative model prevails and continues to be in force in response to students with special educational needs, more focused on their deficiencies and possible pathologies.

In the educational field, according to Infante (2010), the consequence of the rehabilitative model has been to consider that learning difficulties have their origin in internal factors or individual characteristics, leading to labeling and categorizing groups of so-called special children, grouping them to receive adequate teaching to their specific needs, in charge of specialists in the different disabilities. Therefore, according to Blanco (2005), the provision of support focuses on compensating for deficiencies, paying little attention to the learning established in the school curriculum

and to the modification of the environment, which has limited their development and educational opportunities.

On the other hand, the educational approach considers that learning difficulties are the result of the interaction between the student's limitations and those of the context in which he/she develops and learns, and may occur at any time during his/her school career. This model considers that, although individual differences have an important influence on learning and progress, educational practices are also determinant.

In this regard, Blanco (2011) mentions that the curricular proposal, learning strategies, school management, teacher expectations, and the relationships established, among others, can facilitate or, on the contrary, generate learning and participation difficulties. Therefore, modifying the teaching and educational context is necessary to optimize the learning process.

Sticking to a clinical model means leaving out the rest of the students who may or may not present other barriers to participation and learning, without having a basic medical diagnosis. In this sense, Infante (2010), considers that under this perspective each of the professionals who work in the establishments and participate in the learning of the children focus on isolated work, advisory to teachers, and their intervention is predominantly clinical, where even the work of the Special Education teacher is considered in the same way. Therefore, according to Blanco (2011), it is necessary to overcome the hierarchical and transmitting support model, in which the specialist fulfills the function of identifying and giving suggestions, to move towards a constructive model based on collaborative work, where solutions are jointly sought between the specialist and the teachers, each one making contributions from complementary perspectives.

Therefore, as Blanco (2011) says, the response to diversity and the development of inclusive schools requires the participation of other professionals who collaborate with teachers in responding to the educational needs of all students and not only those with special educational needs. In turn, Cramer, et al. (2010) and Rodriguez (2014), determine the importance of teamwork as an inclusive educational strategy, which grants one of the greatest effects on student learning depending on the members of the educational community involved in this process.

Based on the above considerations, the School Inclusion Law No. 20845/2015 of the Ministry of Education is enacted, which eliminates arbitrary discrimination ensuring access and participation of all students. Specifically and to provide a more effective response to the problem of access, participation, and diversification of teaching and learning, Decree 83/2015 of the Ministry of Education is established, which places its focus on the diversity of students, emphasizing collaborative work, not only

between the Special Education teacher and the classroom teacher but also with other professionals immersed in schools.

The literature highlights collaborative work as one of the most beneficial strategies for the generation of meaningful learning in students (Cramer, et al., 2010; Rodríguez, 2014; Rodríguez, Rojas, and Ossa, 2014; Castro and Rodríguez, 2017). However, according to Del Valle and Mena (2012), there are still pending challenges regarding the reality of the participation of Professional Education Assistants, since according to a study by Chinner (2012) it could be found that the perception predominates that collaborative work and co-teaching are exclusive Practices between classroom teachers and Special Education teachers, leaving the specialized support of other professionals to a consulting-type advisory level. This would be a significant departure from what the Ministry of Education (2015) would expect from the latter by considering them as educational agents who can participate directly in collaborative work by forming classroom teams supporting and developing strategies as inclusive educational practices not only in the face of special educational needs cases. According to Del Valle and Mena (2012), these conceptions do not benefit student learning, concluding that collaborative work with support professionals is precisely that of carrying out a true collaboration in the function of the students within the classroom, since it is there where "the best therapeutic effect could be produced"(p.36), which implies on the part of the professionals a real valuation of the contributions of the different actors involved in the well-being and learning of the students.

In this sense, a study by Rodríguez and Ossa (2014) describes the valuation of collaborative work among basic school teachers in the city of Tomé, who conceived the concept of collaborative work only to that performed by the classroom teacher and the specialist teacher. For this study, another relevant conclusion to consider is related to the persistence of a conception of Special Education marked by the medical-rehabilitative model, based on a diagnosis whose influence implies the elaboration of curricular adaptations and the exclusion of this use of strategies to students who are not incorporated to the School Integration Program. This background calls attention to the conception of collaborative work, not only among classroom teachers but also among other actors who can carry out this strategy.

Another edge considered for the response to diversity and the importance of teamwork is related to research on perceptions and attitudes about inclusion in the teaching staff, since, according to the literature consulted, these manifest a positive impact regarding the realization of inclusive educational practices within the classroom (Chiner 2011; Cramer, et al., 2010; Rodríguez, 2014; Rodríguez and Ossa, 2014; Castro and Rodríguez, 2017). Knowing also the attitudes towards Inclusive Education, not only focused on teachers but from the macro concept, implies that inclusion as

a gradual and continuously developing process must overcome a series of obstacles or barriers along the way. Among these barriers, which must be overcome, Blanco (2005) indicates that the main ones are found in people, in their conceptions, attitudes, and practices.

Within the empirical background collected for our problematization, a study by Chiner (2011) determines the perceptions and attitudes of teachers towards the inclusion of students with special educational needs, as indicators of the use of educational practices. This study relates the perception and frequency with which certain inclusive educational strategies are used according to a set of variables such as training, availability of resources and support for inclusion, educational stage, teaching experience, and gender. The most relevant results conclude that the perception of Inclusive Education among teachers was more positive in Pre-basic and Basic education levels. However, they state that they were not prepared to approach the use of inclusive strategies and that the support of other professionals such as the educational psychologist and the Special Education teacher did not produce significant variations in the use of certain inclusive educational practices.

Another study about teachers' perceptions of inclusion is that of González, et al. (2016), which focuses on analyzing attitudes and beliefs regarding Inclusive Educational Culture, Policy, and Practice. Their objective was to determine the differences in the perception of inclusion as a function of variables such as gender, years of experience, training in education in teachers working in Early Childhood, Primary, and Secondary Education stages. Their conclusions determine a positive perception of inclusion influenced by variables such as age, initial training, and years of experience. In general terms, it indicates that there are quite favorable attitudes towards diversity; however, there is a certain lack of knowledge of how to organize and modify the educational response to the resulting needs, which coincides with Chiner's research.

Santos Arrieta (2013), on the other hand, carried out another national study determining that a positive perception towards inclusion is related to moderate use of inclusive educational practices, taking as the most relevant point the perception of the little training and support received by teachers to deal with the diversity present in the classrooms.

These antecedents show that there are pending challenges regarding the support to teachers inside and outside the classroom, a task that underlies the functions of the specialized professionals of each school community, providing inclusive educational strategies and practices that can give an effective response and provide specialized support not only to students who present special educational needs, but that allows carrying out an inclusive, equitable and quality education, promoting the integral development of all students, in light of the national regulations in force.

Finally, it is important to mention that Núñez, et al. (2017), developed a study to determine the attitude towards Inclusive Education of teachers of Municipal Schools in the Province of Talca-Chile, leaving aside the Professional Education Assistants.

For all the above mentioned, the need to know, identify and analyze what is the attitude and training needs of the Professional Education Assistants regarding Inclusive Education Culture, Policy, and Practice arises. Together with this, to determine whether socio-demographic factors determine a favorable attitude towards Inclusive Educational Culture, Policy, and Practice.

METHOD

This study was conducted from a quantitative approach, an approach that according to Hernández, et al. (2014), uses data collection to test hypotheses based on the numerical measurement and statistical analysis establishing as a purpose behavioral patterns and theory testing.

As for the design, this obeys a descriptive, non-experimental, cross-sectional one. In this regard, descriptive studies, according to Cossio (2015), are concerned with describing phenomena, in the broadest sense, this means that they seek a verbal, numerical, or graphical representation of some phenomenon of interest.

According to Briones (2002), non-experimental investigations are those in which the researcher does not have control over the independent variable, which is one of the characteristics of experimental and quasi-experimental investigations, nor does it shape the study groups. In these investigations, the independent variable has already occurred when the researcher conducts the study.

Having said this, the fact that it is cross-sectional implies that it is a study that is characterized by investigating at a single moment different individuals, facts, events, and phenomena, which represent different stages of development. Similarly, it is Survey type, which, according to Cossio (2015), is a technique that seeks to determine present Practices or opinions of a specific population through opinion questionnaires that are applied in different contexts.

A sample of 104 professional educational assistants was obtained, considering psychologists, kinesiologists, social workers, educational psychologists, speech therapists, and occupational therapists working in municipal schools in the Province of Talca, Chile. (see Image 1). A non-probabilistic sample was selected by convenience, where participants were accessed according to their availability.
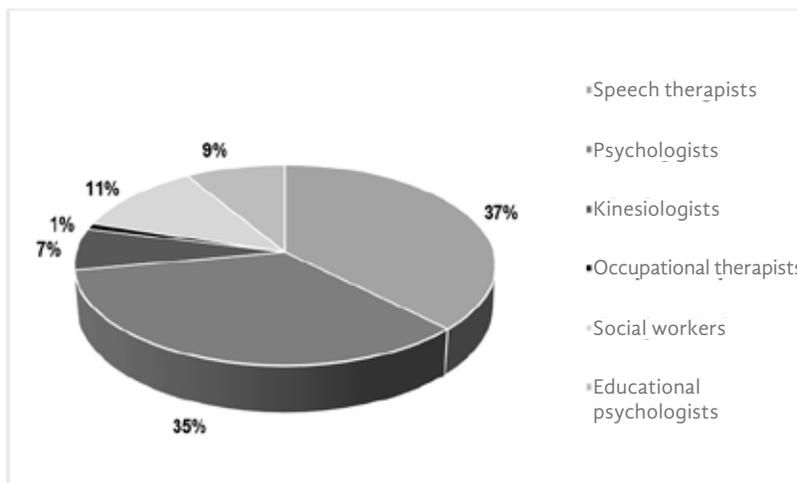
Image 1. Percentage distribution of the sample according to Degrees. Source: Own elaboration (2019)

Regarding the Gender variable, 81 women and 23 men between the ages of 23 and 46 participated. (See Table 1).

Table 1
Age of sample participants

	N	Minimum	Maximum	Mean	Desv. típ.
Age	104	23	46	30,38	5,053

Source: Own elaboration (2019)

In turn, groupings are made according to age ranges, where, as shown in Image 2, there is a greater number (80) of participants in the age range of 24 to 33 years and a smaller number (1) of participants between 1 and 23 years.
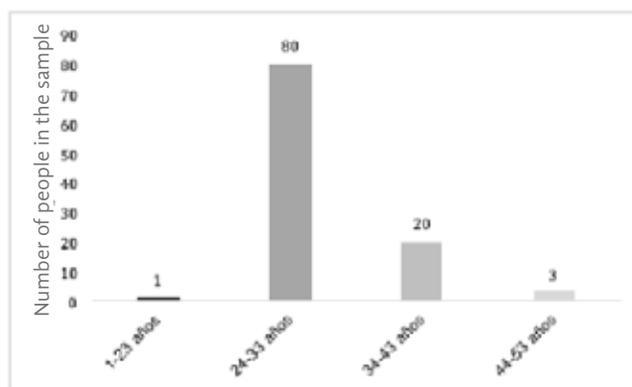
Image 2. Source: Own elaboration (2019)

In the variable Years of experience, it was observed that of the 104 participants in the study only 88 indicated how many years of work experience they have (see Table 2).

Table 2

Distribution of the sample according to years of experience

	N	Minimum	Maximum	Mean	Desv. típ.
Years of work experience	88	0	20	4,80	3,824
N valid (according to list)	88				

Source: Own elaboration (2019)

Similarly, an analysis of the frequency distribution is carried out according to the range of Years of Work Experience. (See Image 3). It is observed that the greatest number of participants have between 1 and 5 years of work experience with a total of 56 participants. The range with the lowest number of participants is 20 to 26 years of work experience with a total of 1.
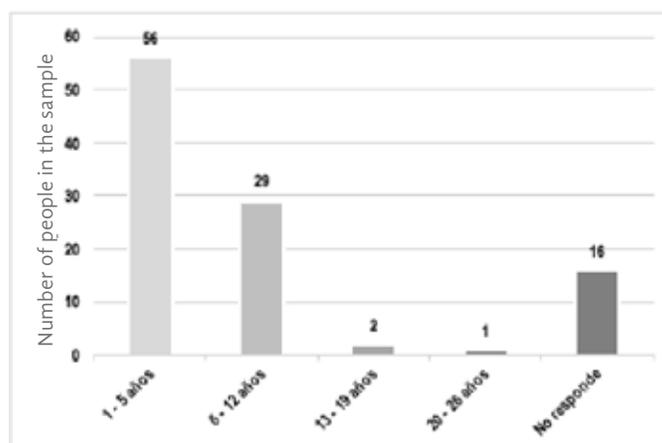
Image 3. Distribution of the sample according to the range of years of work experience.
Source: Own elaboration (2019)

The survey was used as a type of study, which aims to obtain information that can be analyzed to extract models and make comparisons. For the data collection technique, the questionnaire was used as an instrument, whose objective is to measure the presence of certain variables in the people under study (Canales, 2006). Before the application of the questionnaire, each participant was asked to register some data in the informed consent form.

For the purposes of this study, an individual self-administration questionnaire entitled "Assessment questionnaire on Inclusive Education for professional education assistants" was developed to find out the attitudes

of professional education assistants regarding Inclusive Education in the Province of Talca, Chile.

This questionnaire is theoretically based on Duk (2007), Booth and Ainscow (2015), and empirically from Questionnaire n°1 of Booth and Ainscow (2015) and CEFI-R (González et al., 2016). It is made up of 30 items or statements organizationally grouped into three areas: the first considers Inclusive School Culture; secondly, there is the area of Policy and Management focused on Collaboration and Learning and, finally, Inclusive Educational Practices for Diversity. These aspects were extracted from the Inclusive Evaluation Model of Duk (2007), theoretically based on the dimensions of Policy, Culture and Inclusive Practices of Booth and Ainscow (2015) and regarding the Teacher Evaluation Questionnaire of Educational Inclusion CEFI-R of González et al., (2016), adapted to the Chilean population (Núñez, et al., 2017).

To favor the organization and internal distribution of the statements of the questionnaire, in each area mentioned, the subdivision into 11 Dimensions proposed by the author of the Inclusive Model (Duk, 2007) was considered, whose thematic guide was used to have a final total of 10 statements for each Area.

The response format is Likert-type, with five options ranging from totally disagree to agree.

For internal and external validity, validation by the expert judgment was initially used, which Hernández, et al. (2014), point out as the degree to which an instrument measures the variable of interest, according to experts in the field. For the questionnaire developed for this study, 6 experts in Inclusive Education topics were contacted. It should be noted that, as a result of the feedback obtained from the group of experts and according to their indications, a final questionnaire of 30 items was obtained from the 35 statements.

Reliability, understood as the degree to which the instrument produces consistent and coherent results, was determined by internal consistency measures through Cronbach's Alpha coefficient. This provides information on the internal consistency of the questionnaire as a function of the number of items and the covariance between them. Once the data provided by the instrument had been collected, we proceeded to the respective statistical analysis using the Statistical Package for Social Sciences (SPSS) version 21.

According to Carvajal, et al. (2011), they propose that a Cronbach's Alpha value below 0.5 shows an unacceptable level of reliability; if it took a value between 0.5 and 0.6 it could be considered as a poor level; if it was between 0.6 and 0.7 it would be a weak level; between 0.7 and 0.8 it would refer to an acceptable level; in the interval 0.8 and 0.9 it could be qualified as a good level, and if it took a value higher than 0.9 it would be excellent.

In this regard, a Cronbach's Alpha value of 0.816 was obtained (see Table 3) at the general level of the 30 items, which is considered a good level of reliability.

Table 3

Reliability statistics of the total number of items

Cronbach's alpha	Cronbach's alpha based on typed items	N of elements
,816	,835	30

Source: Own elaboration (2019)

RESULTS

A Student's t-test was performed to establish differences in the attitude of the Professional Education Assistants towards the Culture, Practice and Inclusive Educational Policy, according to the Gender variable. Following this, an ANOVA was performed to establish differences in relation to the attitude towards the Culture, Practice, and Inclusive Educational Policy and the variable Professional Degree of the participants. Along with the above, a correlational analysis was also carried out to examine factors that influence the attitude of Professional Education Assistants towards inclusive educational Culture, Policy, and Practice. According to a literature review, two relevant factors to analyze were determined, Age and Years of Experience.

Concerning Inclusive Educational Culture, no significant differences were found between men and women with t= -1.116; *p*= 0.267, where the average of men (M=4.1106) and women (M=4.1947). For Inclusive Educational Practice, no significant differences were found between men and women with t= -0.184; *p*= 0.854, where the average for men (M=4.3087) and women (M=4.3252). Similarly, the behavior was maintained with the Inclusive Educational Policy between men and women with t= 0.148; *p*= 0.883, where on average men (M=3.9068) and women (M=3.8905), see Table 4.

Table 4

Group statistics for gender variables in terms of Inclusive Culture, Practice, and Policy

	Genre	N	Mean	Standard deviation	Standard error of the mean
CULTURE	Masculine	23	4,1106	,27955	,05829
	Feminine	81	4,1947	,32905	,03656
PRACTICE	Masculine	23	4,3087	,35918	,07489
	Feminine	81	4,3252	,38308	,04256
POLICY	Masculine	23	3,9068	,44963	,09375
	Feminine	81	3,8905	,46863	,05207

Source: Own elaboration (2019)

An ANOVA was applied to establish differences in relation to the attitude towards Inclusive Educational Culture, Practice, and Policy and the Professional Degree of the participants. Regarding the attitude towards Inclusive Educational Culture, it was obtained that speech therapists (M=4.2066), psychologists (M=4.0706), kinesiologists (M=4.0286), social workers (M=4.3259), and educational psychologists (as a professional assistant) (M=4.1761). Significant differences were observed between groups with $F_{(5.98)} = 2.570$; $p = 0.031$. In this aspect, it was recorded that those who present a more positive attitude towards the Inclusive Educational Culture are the educational psychologists (as professional assistants) and the kinesiologists have a lower attitude. (See table 5)

Table 5

ANOVA of one factor in relation to the variable professional degree and Inclusive educational culture

	Sum of squares	Gl	Root mean square	F	Sig.
Inter-groups	1,218	5	,244	2,570	,031
Intra-groups	9,290	98	,095		
Total	10,508	103			

Source: Own elaboration (2019)

Regarding the attitude towards Inclusive Educational Practice, it was obtained that speech therapists (M=4.4330), psychologists (M=4.2389), kinesiologists (M=4.1214), social workers (M=4.1687), and educational psychologists (as a professional assistant) (M=4.5111). Significant differences were observed between groups with $F_{(5,98)} = 2.508$; $p = 0.035$. In this aspect, it was recorded that the one with the most positive attitude towards Inclusive Educational

Practices is the educational psychologists and the one with the lowest is the kinesiologist. (See table 6).

Table 6
ANOVA of one factor in relation to the variable Professional Degree and Inclusive Educational Practices

	Sum of squares	gl	Root mean square	F	Sig.
Inter-groups	1,654	5	,331	2,508	,035
Intra-groups	12,929	98	,132		
Total	14,583	103			

Source: Own elaboration (2019)

The attitude towards the Inclusive Educational Policy determined that speech therapists (M=3.9239), psychologists (M=3.8765), kinesiologists (M=3.6048), social workers (M=3.9889), and educational psychologists (as professional assistants) (M=3.9889). No significant differences were observed between groups with $F_{(5,98)}= 0.996$; $p=0.425$. In this aspect, it was recorded that those who have a more positive attitude towards inclusive educational policies are those who work in the field of education.

Tabla 7
ANOVA de un factor en relación con la variable título profesional y Políticas educativas inclusivas

	Sum of squares	gl	Root mean square	F	Sig.
Inter-groups	1,065	5	,213	,996	,425
Intra-groups	20,957	98	,214		
Total	22,022	103			

Source: Own elaboration (2019)

As mentioned at the beginning, a correlational analysis was carried out to examine factors that influence the attitude of Professional Education Assistants towards Inclusive Educational Culture, Policies and Practices, and after a bibliographic review, two relevant factors were determined to be analyzed, such as Age and Years of Experience. Table 8 shows the means and deviation of the sample regarding these variables.

Table 8

Descriptive statistics for dependent variables (Culture, Policy and Inclusive Educational Practice) and independent variables (Age and Years of Experience)

	Mean	Standard deviation	N
Age	30,38	5,053	104
Years of experience	4,83	3,785	88
PRACTICE	4,3215	,37628	104
CULTURE	4,1761	,31940	104
POLICIES	3,8941	,46239	104

Source: Own elaboration (2019)

First, the independent variables of Age and Years of Experience were analyzed and their relationship with the attitude towards Inclusive Educational Culture (see Table 9). The result was that there is no relationship between variables with $r(102)=-0.139$; $p=0.160$ for Age and $r(102)=-0.71$; $p=0.510$ for Years of Experience. Subsequently, the independent variables of Age and Years of Experience and their relationship with the attitude towards Inclusive Educational Practice were analyzed (See Table 9). It is observed that there is no relationship between variables with $r(102)=-0.125$; $p=0.208$ for Age and $r(102)=-0.073$; $p=0.498$ for Years of Work Experience. And finally, the independent variables of Age and Years of Experience and their relationship with the attitude towards the Inclusive Education Policy were analyzed (See Table 9). On the other hand, there is no relationship between variables with $r(102)=-0.007$; $p=0.944$ for Age and $r(102)=-0.096$; $p=0.372$ for Years of Work Experience.

Table 9

Correlations in terms of dependent and independent variables studied

		Age	Years of work experience	PRACTICE	CULTURE	POLICIES
Age	Pearson's correlation	1	,680**	-,125	-,139	,007
	Sig. (bilateral)		,000	,208	,160	,944
	N	104	88	104	104	104
Years of work experience	Pearson's correlation	,680**	1	-,073	-,071	,096
	Sig. (bilateral)	,000		,498	,510	,372
	N	88	88	88	88	88
PRACTICE	Pearson's correlation	-,125	-,073	1	,551**	,590**
	Sig. (bilateral)	,208	,498		,000	,000
	N	104	88	104	104	104
CULTURE	Pearson's correlation	-,139	-,071	,551**	1	,534**
	Sig. (bilateral)	,160	,510	,000		,000
	N	104	88	104	104	104
POLICIES	Pearson's correlation	,007	,096	,590**	,534**	1
	Sig. (bilateral)	,944	,372	,000	,000	
	N	104	88	104	104	104

**. The correlation is significant at the 0.01 level (bilateral).

Source: Own elaboration (2019)

DISCUSSION AND CONCLUSIONS

The present study, which provides preliminary results, was carried out to analyze the attitude of Professional Education Assistants regarding Inclusive Educational Culture, Policy, and Practice working in municipal schools in the Province of Talca, Chile. 107 Professional Education Assistants working in Municipal Schools in the Province of Talca, Chile participated.

As can be seen, there is a favorable attitude towards Inclusive Education on the part of the Professional Education Assistants. Regarding the Inclusive Educational Practice Dimension, the item with the highest favorable responses (87%) indicates that not only the individual characteristics of the special educational needs should be considered, but also the contextual aspects. This is discussed with the Graduation Profiles of the Training Programs that were consulted and is related to the reality of the Talca, Chile, where special educational needs are addressed from a bio-psycho-social approach, based on the International Classification of Disability

and Health Functioning (ICF), giving relevance to the facilitators and/or context barriers (WHO, 2011).

On the other hand, in the same dimension, the item with less favorable responses (16.5%) shows indifference towards active participation within the classroom, performing co-teaching. This could be because the creation of classroom teams in the context of Decree Nº170/2009 does not take the expected relevance; however, lately, a greater emphasis has been given to collaborative work and co-teaching in Decree Nº83/2015. This is why Mena and Bugueño (2012) report segregated work within the communities.

Regarding the Inclusive Educational Culture Dimension, it was observed that 87% of the respondents state that they maintain and foster a close relationship with the entire educational community. This finding is similar to the literature consulted on how this favorable attitude regarding close relationships acts as a predictor in the use of Inclusive Educational Practices (Chiner 2011).

On the other hand, 40% of the respondents consider that students with special educational needs are not able to follow the planning of a class. This argues with the literature in the influence of that unfavorable belief as a predictor of acceptance of diversity, knowledge construction, and Inclusive Educational Practices, which is related to expectations about students' learning and academic performance (Aguado et al, 2008).

In the Inclusive Educational Policy Dimension, 65% of respondents believe that educational institutions should work together with community resources and 61% think that the review of internal policies should involve the participation of the entire community. The collective and dynamic construction of a network of interpersonal relationships between members of the educational and close community reflects the intentionality of learning content and school climate (Booth and Ainscow, 2015; Ministry of Education, 2015). Among the less favorable results, it is observed that 37.8% of the respondents do not have the time to carry out collaborative work with the community. This is why the creation and revision of internal Policies and Regulations should involve each educational actor in the decision-making process, based on egalitarian relationships where there are effective spaces and times (Simón, et al., 2016),

Concerning the results that refer to the sociodemographic factors and their capacity to determine attitudes towards Inclusive Education, it is possible to indicate that it could be conditioned to the amount of sample of the study, so it becomes relevant to be able to expand it.

Regarding the variables Gender, Age, and Years of Experience, it can be concluded that they do not determine the favorable attitude towards Inclusive Education, therefore, younger professionals have the same attitude as older ones. The same occurs with Years of Experience, besides, men and

women also present the same attitude, finding similarities with international studies Chiner (2011) and González, et al. (2016).

Finally, the Professional Degree presents certain aspects to observe. First, with the Inclusive Educational Policy Dimension, it was evidenced that there are no significant differences, i.e., Professional Education Assistants present a favorable attitude regardless of their Professional Degree. This statement is discussed with the literature since Del Valle and Mena (2012) indicate that it reflects scarce participation and knowledge of policies and management on their part.

Likewise, Duk (2007) indicates that management teams should mobilize and motivate other professional educational agents to create a good work climate, participate and bring about the necessary changes to move towards a more inclusive school. However, Mena and Bugueño (2012) indicate that the formative role of Professional Education Assistants is not related to professional development and training needs according to the literature consulted.

On the other hand, for the dimensions Practice and Inclusive Educational Culture, there were significant differences, observing that the Professional Degree of Educational Psychologist presents the most favorable attitude, which can be discussed with the Profile of the Formative Program of Educational Psychology at Regional Level since a common factor described in them is to value the differences regarding students' learning. Also, their functions are established concerning the specialized support that favors participation, motivation, and learning (Del Valle and Mena, 2012).

On the other hand, the professional kinesiologist presents the least favorable attitude, similarly discussed from the graduate profile, where a clinical vision predominates, focused on the deficit, with a clinical diagnostic and rehabilitative function in education.

As main conclusions, it can be mentioned that:

- Professional education assistants would evidence a favorable attitude towards Inclusive Education, being the dimension Inclusive Educational Practice the one that would present a more favorable attitude and the dimension Inclusive Educational Policy a less favorable attitude.
- Sociodemographic factors such as age, years of experience, and gender would not determine the attitude towards Inclusive Education. However, the attitude towards Inclusive Educational Culture and Practice could be determined by the Professional Degree.

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INCLUSION AS A KNOWLEDGE PROJECT IN RESISTANCE[1]

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[1] Text presenting an excerpt from the second section of the inaugural lecture given at the Interdisciplinary Congress on Education, held in 2020 at the Universidad de Azuay, Ecuador.

— *Abstract*—

This article analyzes the forms of knowledge production, which are always forms of intervention-creation-alteration, closely linked to the heuristic and the political. They carry out an open, restless, and affirmative operation of a non-dialectical nature, which has become a counter-epistemological space that builds knowledge that alters reality, embodies a heuristic-political force that subverts the conventional established in the institutional and alternative. The main objective of this work is to examine the central characteristics that define the contours of inclusive education as a knowledge project in resistance. The work uses a critical document review methodology for its development, using various databases such as Scielo, Wos, Scopus, etc. By conceiving inclusion as an alterative movement of the multiple constitutive structures of world-systems, it is possible to recognize its strength as a knowledge project that articulates a set of profound transformations that alter the intellectual, ethical and political structures that regulate education and the democratic and citizen frame. The understanding of oppression, domination, injustice, and inequality is one of its core points, along with the ideal of transformation. Another singularity of its intellectual project leaves space for a wide number of collectivities and communities of adherence and interpretations, linking a variety of specific knowledge projects. Its heuristics provide new viewing angles..

Keywords

Inclusive epistemology of education; nomadism; exteriority of theoretical work; challenging imaginations; heuristic transpositions.

INCLUSION AS AN EPISTEMOLOGICAL COUNTER-SPACE

One of the most relevant epistemological characteristics of inclusive education is its micro-political character –not in its traditional sense but in terms of a counter-epistemological and counter-enunciative analytical space-, it describes a project of knowledge in resistance, a counter-epistemological space that articulates knowledge that alters reality. It embodies a heuristic-political force that subverts established conventions in the institutional and the coordinates of the alternative – in my opinion, today, movements meant as an alternative possess qualities very similar to those of hegemonic proposals, especially those that proliferate in education. For this reason, inclusion can be conceived as an alternative movement of the structures of regulation of world-systems, an open challenge, a performative commentary, and a vector of heuristic dissipation.

Another singularity that involves the construction of a project of knowledge in resistance becomes the emergence of a new style of relationship, subjectivity, and affectivity. Inclusion –founded on Feuerebach's eleventh thesis- is a singular sign of mobilization of heuristic frontiers, penetrating new logics of thought that have become the configuration of a powerful threshold of transformations from which complex understandings and challenging imaginations proliferate to think about the construction and/or understanding of the contemporary world.

Inclusion is not a practice of assimilation, it generates differential situations of (micro)exclusion, (micro)oppression, and (micro)domination –breaks to self-development and self-determination-, but it is a powerful mechanism of reconfiguration of world-systems, a transpositional heuristic of knowledge, an epistemology of agency, a form of differential political-ethical intervention and a multi-referential, multifunctional and multi expressive domain. Its epistemological form operates outside of the absolute ontological code –a substantialist configuration-, strategically becoming "an as if, whose articulation is not in reproducing or interpreting, but in creating from the available elements in a specific position that, in turn, constitutes us" (Ávila, 2014, p.170). The epistemology of inclusive education is a constructive form closely linked to the political. The political aspect of it assumes the desire for transformation, while the epistemological aspect itself is, to a certain extent, the configuration of creative changes and alterative architectures of thought –the principle of positivity. It is an epistemic-political enterprise that goes beyond the critical and post-critical. Although the contribution of the post-critical is what regulates a large part of its constitutional matrix, the truth is that it rearticulates this threshold of production, giving way to something completely new. The epistemology of inclusive education emerges from a set of genealogical entanglements, many of them coming

from the post-critical legacy. Its heuristic field is enunciated and heard in the exteriority of these contributions.

The epistemology of inclusive education is not an eminently speculative construction; it is intimately interwoven with the political aspects of it. Its purpose is not only the recognition of its field of knowledge but rather, the transposition, mutation, and alteration of the foundations of contemporary educational theory –it is a device for the recognition of all fields and sub-fields of Educational Science. Analytically, the theory of inclusive education is synonymous with educational theory; it demonstrates an alter-epistemic effect. It provides new fields of vision and new conceptual instruments and assumes the insistence on the creation of concepts that allow us to read the present, fostering a multidimensional-complex examination of the social and educational practices and problems that restrict the emergence of an ethical and politically committed praxis with a broader project of subjective and social change.

Heuristically, inclusive education is a complex threshold of knowledge transformation. One of its raisons d'etre lies, to a certain extent, in fighting against the various forms of injustices that affect large groups of society in a relational and multilevel manner by paying attention, methodologically, to how each one of these singular forms of curbing human development generates singular regenerative and performative repercussions in the school setting. Conceiving inclusive education as an intellectual project in resistance suggests recognizing that we are in the presence of a broad-based knowledge device that configures a dynamic and unfinished assembly, in no way enjoying a stable and definitive definition, but rather intensely unstable, open, restless, and unpredictable. Its analytical nucleus is configured by a set of interdependent concerns and interests, resulting in the formation of a terrain crossed in a multi-axial way by diverse knowledge projects and informed by critical social movements, whose discussions and concerns reside in the depths of the field. When inclusion is employed as a form of social and educational justice, we are faced with the crystallization of its critical praxis.

Inclusion constitutes a new category of analysis applied to a set of diverse practices, analysis strategies, decisions and forms of political intervention, methodological exploration modes, conceptual formations, etc. We study a body of knowledge in permanent movement –the main condition for the production of the field-, an operation that follows the logic exposed by Zemelman (1989), "given-giving-to-give". However, its general contours have never been well defined. One of its definitive aspects consists in affirming that it is a theory without discipline, a post-disciplinary operation, and a heuristic device of post-critical re-articulation. While one of its most far-reaching definitive problems is reduced to the low intensity of its index

of uniqueness, that is, academics, researchers, cultural and public policy workers, and education professionals believe they know what inclusion is, while at the same time they are unable to explain it in-depth, or, many believe they know it, but encounter obstacles in defining it. Besides, their conceptualization reflects a drastically different signifier than the one that demands its authenticity, recognizing that different groups have different explanations for approaching the phenomenon. We speak then of inclusion as a metaphor.

Another definite problem of the field lies in the absence of clear analytical-methodological rules resulting from the concealment of its substance and modes of existence. Attention to its modes of legitimation is crucial since it fosters zigzag interconnections between what counts as part of its authentic epistemic center and the mechanisms of transformation of its definitive and conditional forms of the field and of the concept itself –heuristic syntax-. Inclusive education faces complex definitional dilemmas. The interest in definitions should not be understood as iterative practices whose objective is that they fix the politics of intellectuality. In the case of inclusion, it is something that is in permanent movement, it inaugurates a restless and unfinished field of the field, it is a point of departure in the analysis, never of closure, it inaugurates new points of analytical focus.

The question of the conditions that define the nature and modes of existence of inclusion as a project of knowledge in resistance is key to situating ourselves like its epistemological domain. It thus becomes an intensifier of thought, a singular political praxis, and a device for turning social and school life around. As the threshold of the world's transformation, it can create devices of singularizing subjectivity –a main axis in the ontological politics of inclusion. This affirmation leads us to the recognition that its ontological policy reaffirms a character of the minor, breaks with the substantial implications of the field, and legitimizes the halo of heterogeneity that resides in each singularity which, in turn, is multiple.

By signifying inclusive education as a project of knowledge in resistance, it becomes an epistemological counter-space, becoming the configuration of a plan to imagine education and social becoming in a completely alterative and different way than what is known. Inclusion is always synonymous with disruptive heuristics and complex understandings; it is also a deliberate political commitment and a set of ethical and aesthetic passions, a cartography of the present. What does this unique mode of mapping suggest? Inclusion is the effect of a system of a total transformation.

Is inclusion outside of education, is it education, or does it operate on top of it? Although it is essentially educational, it is not limited to this regionalization, since it is not reduced exclusively to the work of the educator –it is substantive to its work, allowing the intrinsic sense of it to be recovered – inclusion is found everywhere. It is even deployed in fields

not directly related to education because of the extra-disciplinary relationship. It is something that is not limited to what one can find in books or institutional training structures. It plays a crucial role in the organization of the world and the construction of other worlds, of culture and political life; it is a space of complex tensions and transits of a nomadic and diasporic character. It is a mechanism for reading the present, an effort to think of a new subjectivity capable of coexisting with the continuous transformations. It is a strategy to challenge global education and to imagine educational thought and its practice in a different way, committed to a broader project of subjective and social change.

Although many of the programs for change have exhausted their historical function, the desire for social justice and progressive transformation is one of the main manifestations of their ethical conscience. It is a territory that operates through the transposition of different objects, methods, concepts, theories, political projects, ethical commitments, discourses, disciplines, inter-disciplines, territories, knowledge projects, etc. It assumes a new form to imagine differently its forms of knowledge production. It is a subversive epistemological force, an itinerary that favors heterogenesis, nomadism, complexity, and multiplicity.

2. NOMADIC KNOWLEDGE, A SYNTAGMATIC FIELD

Epistemological nomadism? The forms of production of knowledge constitute complex mechanisms of intervention-creation-alteration, they are not reduced to mere speculative questions and converging legacies in this singular heuristic context. It forges a novel way of conceiving the production of knowledge, its object does not proceed by normative means, it is a device that overflows and interrogates knowledge and legitimate interpretative forms, its epistemological plot operates outside the absolute ontological code, strategically it becomes itself, whose articulation "is not in reproducing or interpreting, but in creating from the available elements in a specific position that, in turn, constitutes us. Neither subject/object nor signifier/meaning" (Ávila, 2014, p170).

It articulates a set of deep transformations that alter the intellectual, ethical, and political structures that regulate education, the democratic plot, and the citizen architectures. Heuristically, it is a field of deep theoretical, political, and ethical interests. It rescues the notion of multiple singularities –a category that impacts the theoretical and the political; it redefines the cultural, social, and educational space. So far, the subjects of mainstream and liberal inclusion are the others of modernity; they reproduce the presence of a set of classical binarisms –substantiated in the grammar of essentialism-individualism. While being conceived as a counter-discursive

space of counter-subjectivities, it takes the subject –regardless of its categorical forms – to a higher stage of realization, consistent with the forms of post-humanism proposed by Braidotti (2009). His epistemological domain is permanently armed and disarmed.

In this way, he proposes "to moderate the theoretical voice within us and to try to deal with our historical situation in a different way" (Braidotti, 2004, p.113). This emphasis on creativity "causes a shift from theoretical language to the production of cartography and political figurations or fictions" (Ávila, 2014, p.174). inclusion, being present everywhere, must be rooted in real-life events and, by extension, assume the critical desire for social justice and progressive transformation, reinventing the manifestations of our ethical consciousness.

In affirming that inclusive education possesses a complex alterative nature, I refer to a set of affirmative representations of a creative and dislocated type, a non-reproductive form of the same (Braidotti, 2004), opposed to the figurations of the alternatives that work under the logic of reiteration. It is in this that part of the epistemological nature of inclusive education is inscribed, conceived as a system of heuristic-political relocation of a strategic nature, a displacement that gives way to creation, an operation that implies the transformation and emergence of new spaces, inclusion is never a mere system of projective imagination. Its domain can be read in terms of a multi-layered space inscribed in a dynamic exterior.

Inclusive education as an area or regionalization of study provides a set of radical prototypes, it is an epistemological form that acts by complex mechanisms of re-articulation of fields crossed by the post –this prefix, in the interiority of the domain, does not follow a linear logic-, specifically, it reveals an operation close to the overturning of each one of the post-critical theories that converge in it. Although the post-critical constitutes part of its genealogical structure, its nature and authenticity crystallize beyond this. Its object, field, and method operate in the re-articulation of each of these contributions.

It is very common to think that inclusive education is a post-critical sign. Although to a certain extent it is, certainly its theoretical, empirical, and analytical object is informed by cognitive constructivism, and regulation is built beyond these. Once again, the constructive insistence of the exteriority of the theoretical works returns. The epistemological construction that I propose about inclusive education resorts to a wide corpus of knowledge located, for the most part, in the legacies of subaltern epistemologies –it shares with them a set of meta-methodological premises-; it transcends their approaches, it redoubles them by creating something completely new. Inclusive education is not a post-critical theory, it is something that is beyond its presuppositions. By confusing the special with the inclusive, we

are facing a singular form of mental monoculture whose heuristic morphology is regulated by a set of inner relationships which is what traps the phenomenon in mimesis and an extension of the special. Special education is a form of the inclusive, the inclusive is not necessarily a form of the special, it is a phenomenon of greater scope. It breaks with internal relationships that anchor it to the normative epistemological models. Let us stop for a few moments to analyze this singular interweaving.

Inclusive education, as epistemic regionalization, takes distance from traditional academic methods and disciplines, acts by diasporic, nomadism, and (de)linkage, the production of its knowledge is interwoven in the struggle to capture the present –philosophy from abroad. It constructs a new modality of codification, a new affirmative composition of subjectivities, whose relational capacity is not confined within the classical epistemic and ontological dictatorships and/or dependencies. As a product of the exodus that fosters its emergence, its constructive forces are permanently de-territorialized and re-territorialized, whose heuristic procedure takes place through singular affirmative modes, but not through reactivity in the production of knowledge –mainstream formula-. It is a field of irremediable and permanent openings, a device of dynamic multilayer nature, a knowledge that acts on incarnate subjects, on its relational and affectivities, it builds an ethical fabric coherent with Braidotti's (200) approaches, regarding the differential ethics that traces a double link between the forces of transformation and the construction of a new ethical praxis.

3. INCLUSION: AN INTENSELY SENSITIVE AREA

What do you hear when you hear the word inclusion? If we look strictly at the differentiation offered by Bal (2009), it is possible to say that inclusion is today a word, not a concept as such. As a word, it fills us with hope, with strength and vigor, with intense relativity, it imposes a figuration that opens up to that which allows us to continue to struggle, it takes distance from any signifier in favor of naivety. Up to this point, its function inscribes a singular way of living life, a modality of behavior, of understanding the world that surrounds us, a way of using our mind and conscience. By affirming that inclusion fulfills the same functions of a philosophy, I sustain that is something we find everywhere, we make flesh this adjective, noun, and verb when we relate to others, we are not only inclusive in school –this is an inherent condition of the educational endeavor-, we are inclusive when interacting, walking, relating, etc., this creates permanent learning.

Although the term inclusion and the syntagm inclusive education are used in different ways by different groups, they can be described in terms of metaphor, that is, explanations developed by different groups and used

for particular purposes. It is a discourse that is not owned by anyone. So far, inclusive education can be described in terms of movement, especially when used as a slogan and, sometimes, to identify around a strange ideal of diversity that borders on the ontological enterprise that conceives this category in terms of assimilation. In what kind of manifestations is the ideal of inclusion used? Although there are no specific protests about groups and spaces that claim inclusion as such, or rather, under this denomination. It is certainly an object of permanent struggle in various critical contemporary knowledge projects and social movements, whose articulations, concepts, and developments inhabit the deepest part of their domain. Although people increasingly want to know about inclusion, the lessons and uses that surround various latitudes of the world continue to work in a negative tropism, that is, they employ a repertoire of concepts that distort the authentic object of it. It is a field that awakens people's interest. Inclusive education is a field shaped by multiple interests and complex influences. One of its many singularities lies in its capacity to be enunciated with different words, objects of struggle, and purposes of work.

Inclusion is a concept that challenges us, speaks to us about ourselves, about our existence, and, uniquely, about our life. For it to have an effect on our lives –biographies- we must dislodge ourselves from them; it suggests becoming part of something close to a global and situated political commitment. This is a domain that supposedly travels and happens in terms of a great structure that makes us part of something, but this fiction of regulation, to such an extent, tells us its history in its way. To become a weapon of a transformation of the world, it needs to take on other problems, tell other stories, legitimize other voices, etc. How does inclusion teach us to speak out for and against violence and injustice? This question invites us to reflect on the semiological devices with which we interact, as well as the spaces and people who transmit this message to us. In terms of movement, what is not clear about this approach is precisely the awareness of inclusiveness. It is the movement that seeks to end exclusion, silenced discrimination, structural violence, sexism, collective indifference, racism, and, above all, puts in tension the discourses meant in critically democratic terms, those that cover up a wide variety of forms of inequality. Above all, it is a commitment to make visible all forms of (micro)oppression and (micro)domination.

Not because we talk about inclusion, or that the policies and training programs revolve around their purposes –they are mainstream- means that this happens. Not everyone recognizes that what one wants to end or inaugurate. This approach faces the challenge of learning to recognize and act on the structure and fundamental pieces of injustice that are inherent in today's capitalism. Inclusive education reinforces their approach by continuing to emphasize these phenomena. Up to this point, in my opinion, the inclusion

of which we speak most about configures an insufficient understanding of the world fails to explain how a wide variety of chronic social pathologies, constitutive of the world-systems that we experience, are produced or continue to be reproduced at various levels of social life. It is precisely this repetition that constitutes its source of difficulty, one of the multiple limits of thought.

Inclusion is learned in micropraxis, it is described, through the metaphor of "housework" –I take this expression from Ahmed's work (2005), as it brilliantly exemplifies the configurations of the micro praxis to which I refer in various sections of this work-, it is a task that one assigns to oneself, an awareness, a deformation of our self-awareness. It invites us, as Ahmed (2005) points out, to learn about our discomfort in the world, about our intentions for change, desire production, and life experiences. Housework is an analogy around the idea of critical intimacy or reflective intimacy, in projection with the archive of images of our biography, suggests to turn to deeper areas of our life, our interactions, our relationships, etc., becomes a unique process of intimacy, which involves the reconstruction of our biographical plot, our affections, passions, and feelings. All of them are key axes in the construction of the theory of inclusive education. Theoretically, the understandings of inclusive education describe it as a great movement of social and political transformation. By going through the experience of exclusion, it helps us to discover an infinite number of forms of possible worlds. To learn about inclusion is to learn about the world.

4. ONTOLOGICAL TENSIONS: THE LEAP FROM SUBSTANTIALISM TO MATERIALISM

Inclusive education configures an intellectual program articulated in the exteriority of the theoretical work, amalgamating diverse trajectories of knowledge –degenerative genealogical networks-. It constructs an onto-logical policy of the minor that takes distance from the differentialism that emerges through identical thought –an angular piece that, in part, bases and legitimates a corpus of essentialisms-individualisms in the organicity of the field. An ontology of the minor is coherent with the principle of differentiality, it ratifies that each singularity is heterogeneous in itself, it is an expression of multiple and infinite variations. I agree with De Landa (2016), observing that the dominant ontological forms, Eurocentric, colonial, and Western-hegemonic, are the same ones that have regulated the mainstream and liberal discourse of inclusion. In it, identity becomes a restrictive factor of difference itself, even the politics of identity and otherness reproduce this failure of the analytical approach.

The epistemological field of inclusive education constructs an infinitely greater ontological figuration, property of its open character, which allows

the construction of broader, unfinished things and inaugurates new perspectives of analysis. The ontology of inclusion is something open —openness allows us to reach higher states of thought. The open is in perpetual becoming, nothing is fixed in it. These properties are key in the understanding of the structure of knowledge of inclusive education, its configuration elements reach their functioning through complex forces of deterritorialization and reterritorialization, revealing a field that is configured in diverse planes. The structure and the field of knowledge of inclusive education are configured through a corpus of "hybrids of forces folding and disseminating singularities through a multi-combinatory in constant updating" (Castillo, 2019, p.236), in permanent evolution. On this point, I agree with Braidotti (2006), since he establishes a materialistic ontology that works to destroy the faces of enunciation of a dominant human being. Let us stop for a few moments at this point- Braidotti (2009) consolidates his academic work through a positive notion of difference. This assertion is sustained by a network of individualism-essentialism that founds the ontological problem of groups —an operation also conceived as a substantialist ontology- that undermines and objectifies a large social group of people, thus justifying a corpus of public policies that do nothing more than reproduce an assimilation effect and a multi categorical problem to justify their task around the passive signifiers of inclusion,

> where a very specific idea of the human being has been imposed on others, functioning as an ideal or regulative canon to be contrasted and aspired to. In such a framework, difference loses much of the richness of its significance, being delivered to a structure of thought in which the unity or homogenization of subjectivities takes precedence, since those who do not respond or who are different from the hegemonic one, are either segregated or placed on the margins, when they are not repressed and persecuted or are awarded a position of subordination concerning that one, forming a markedly hierarchical and stratified social system (González, 2018, p.174).

The principle of identity is organized around a criterion of unity, in it, the matter of the human is one; it produces a sameness and unity that foster diverse classificatory forms of the same. The subject of inclusion -mainstream, falsified, or mimesis of the special, liberal, and capitalist- is classified around a principle of individual nature. The principle of identity acts in terms of a principle of restriction, the power of differentiality, and human variability, it is this that allows us to affirm that the subject of inclusion is the property of the multiple and the lesser, a subject with a great ontological richness. The strange articulations that define the policy of inclusive education - I mean specifically, in terms of intellectual assemblages - impercepti-

bly assume what Lacan (1970) calls the impasse of difference or in Young (2002), the ontological problem of social groups. Indeed,

> [...] the difference comes from the different, bringing to flote the differences that hide the sameness in its eagerness to mold the entities from the principle of concealment that promotes identity. For this reason, difference emerges as a great accumulation of intensities that are captured neither by the general, nor by the particular, since the differential relations of each energetic vibration bloom in varying degrees of intensity, and different temporal-spatial scales (Castillo, 2019, p.235).

The study of the conditions of epistemological production of inclusive education, not only focuses on understanding the mechanisms that create and guarantee the emergence of its knowledge but also focuses on the forces of appropriation of its elements, imprinting a particular meaning on each of them. Coinciding with Castillo (2019), such forces are conceived in terms of wills, this is what allows the field to be in constant alloy with intensely different elements - the epistemological principle of heterogenesis -, thus avoiding falling into repetition. It is a domain composed by variable intensities, by multiple assemblages that mutate towards other folds, whose structure follows the logic of:

> [...] swarms of diverse materials, scattered and folded by the multiple spaces of energetic possibilities, mutating all the time towards diverse folds. In such a way, that all interconnected dynamism are in an infinite proliferation in a game of adjustments and maladjustments in which the multiple flows live a constant metamorphosis from one to another, without stopping for a single instant (Castillo, 2019, p.237).

Inclusive education does not possess status as a preformed heuristic figuration, the same is true for education. In it, each of its elements is in permanent mutation, affected at disparate rhythms, accounting for a constellation that can be signified in terms of "cosmic hiatuses, thus propitiating all kinds of interpenetrations and contagions" (Castillo, 2019, p.237). Inclusive education as a structure, object, field, and knowledge, is loaded with constant dynamism, regulated by principles of variability, mobility, and continuity, through them, a field of great strength of analytical-methodological infinity is unveiled. It is a terrain inhabited by multiple resources and constructive singularities of different nature that can be signified in terms of "container of multiplicities in constant configuration" (Castillo, 2019, p.238).

Inclusion leads us to a materialistic onto-logic, it inaugurates a debate around the presence and recognition of singularities of a heterogeneous

nature -the founding axiom of its ontological politics and the main heuristic key to the construction of its knowledge-, whose principle of articulation is structured around the logic of integration/disintegration thanks to its differentiation. If we start from the statement: inclusion is the effect of a total transformation, what triggers such a phenomenon? While the systems of reasoning employed in the operation by falsification -effect of simulacrum, transvestisation, and mimesis with the special- impose a signifier that does not correspond to the nature of the field, giving way to a set of erroneous ideas to support its heuristic task as a result of the absence of opportune foundations.

The performative and alterative nature of inclusion reflects a singular mode of irruption in the world, similar to a political-imaginative unleashing that acts on its own. Its analytical power performs reality through a "given-giving-to-give" movement, which is something that takes place in praxis -understanding this last category, from the point of view of the philosophy of praxis posed by Marxism-. The dismemberment of the signifier of the inclusion of the special - epistemic palimpsest of the inclusion that imposes a new face of the special. However, it leads to a repetitive substantialization of entrapment, a false oedipization- merits a finished reading in the interiority of the process of falsification and of the theoretical tradition that grounds its legacy in it. While the special may be a form of inclusion, inclusion is not necessarily a form of the special. It is a device of defiant imagination in the face of the times in which we live. Inclusion is a patent and legible need in all fields of human development, it is not exclusive to education -that is, it is what makes its object ambivalent and functioning in different ways-.

In what kind of manifestations is the ideal of inclusion used? Although there are no specific protests about groups and spaces that claim inclusion as such or rather, with this denomination; it is certainly an object of permanent struggle in diverse knowledge projects and critical contemporary social movements, whose articulations, concepts, and developments inhabit the deepest part of their domain. Although people want to know more and more about inclusion, the lessons and uses that abound in various latitudes of the world continue to work in a negative tropism, that is, they employ a repertoire of concepts that distort the authentic object of inclusion. It is a field that arouses people's interest. It will be necessary, then, to distinguish its various axes of analysis around the constitutive forms of its theoretical, methodological and political interests and contours. Inclusive education is a field shaped by multiple interests and complex influences. One of its many singularities lies in its capacity to enunciate itself with different words, objects of struggle, and purposes of work. Inclusion is everywhere, it is a micro-practical event, why does it need to be everywhere, where do we find it, where does it find us?

Inclusion is a concept that questions us, it speaks to us about ourselves, about our existence, and, singularly, about our lives. For inclusion to affect our lives - biographical plots - we must dislodge ourselves from them, it suggests becoming part of something close to a global and situated political commitment. Inclusion supposedly travels and happens in terms of a grand structure that makes us part of something, but this fiction of regulation, to such an extent, tells its story in its way. For inclusion to become a weapon of a transformation of the world needs to take on other problems, tell other stories, legitimize other voices, and so on.

Inclusive education, as a theory, reaffirms Deleuze and Guattari's (1968) concept of assemblage. What is the heuristic benefit of this notion? Inclusion as assemblage brings us closer to the context of a constellation. Constellations suggest the creation of something without copying the previous. It is a philosophical task of a materialistic and dialectical order, states Buck-Morrs (1997). Constellations are a large group of ideas that assemble a certain phenomenon or figuration of it, which are intensely unstable. They are fragments of ideas, concepts, methods, theories, subjects, territories, etc., that, when juxtaposed, configure a certain constellation that analyzes and illuminates reality and its diverse systems-worlds. The great majority of these constructive singularities remain in a state of isolation, whose imbrications and connections are not always well understood in the intimacy of the systems of alloys that configure the domain of inclusive education. Their organicity is obtained "by transforming traditional concepts, dialectically inverting their relationships, and challenging the slogans of 'second nature'" (Buck-Morrs, 1997, p.199).

The epistemological field of inclusive education can be conceived under the concept of constellations since it builds, assembles, and models a singular analytical-methodological figuration from isolated elements, not always well understood or distant in their function to its object, whose imbrications and alloys reveal creative and intensely unstable links. What constellations do is to heuristically re-functionalize a given domain; they are also phenomena that have the power to unravel various problems and effects.

Inclusive education is a specific constellation from the constitutive elements of its phenomenon, encouraging its axes of the constitution to become visible in its interiority. Its domain understood in terms of constellation does not operate exclusively under the signifier of the simple regrouping of constructive resources. Although they all operate under the principle of heterogenesis, their modalities occur under the performativity of the re-articulatory. The constellations operate in terms of alterations in the forms of construction of meaning, each of them erected within the intellectual history of the latter, as well as in its genealogical trajectories and entanglements.

5. HEURISTIC ASSEMBLIES?

Taking the approaches of De Landa (2016), we will argue that the assemblages encourage the formulation of other types of non-causal explanations, it also encourages complex understandings about diverse styles of the agency that occur in the configuration of the field, accounting for the diverse heuristic dynamics of the domain, those occurring at multiple scales, according to De Landa (2016), constitute historically contingent forms whose nature describes a structure that operates at different scales, emancipating its constructive forms from the classical hierarchical dependencies imposed, preferably, by normative epistemologies. Consequently, I will argue that inclusive education is a historical, intensely contingent, multiaxial, and multiscalar field. The operations of assemblages are constructed through singular interactions with other assemblages; this heuristic mechanism is what sustains the diasporic and nomadic construction of the domain. In it, diverse diasporas converge and interact, similar to the functioning of the constellation, a space assembled by elements naturally heterogeneous among themselves, which do not coexist harmoniously, but rather intensely chaotic through alloys in determined points.

The principles of regulation and constitution of the epistemological space of inclusive education are those of diasporism - dispersion, incessant and undulating movement - and heterogenesis. Inclusive education is an assemblage since it is configured by heterogeneous elements, it is a domain whose architecture occurs in the encounter and interaction with countless different elements that denote a set of larger components through the performativity of the articulatory and singular analytical, political, ethical, cultural, economic and methodological coalitions. Field configurations "can accommodate that infinite, assembling and disassembling of which you speak by using the indefinite number of objective capacities to affect and be affected, and the relations of exteriority that allow the separation of components and their reintegration into another assemblage" (Escobar and Osterwell, 2009; cited in Castillo, 2019, p.240), regulated by a self-generating movement by itself. The buoyant is what makes a change, transformation, and the new happen.

The nature of configuration of the field of knowledge of inclusive education is a constant opening to the new, shares the statement of De Landa (2016), as an intellectual space that models a "multiverse, where the parts are assembled and disassembled, and in which it is possible to point out all pluridisciplinary, multiscalar, trans-local, non-reductionist, hetero-geneous, materialistic and processual (De Landa, 2016; cited in: Castillo, 2019, p.241). This quote confirms what Ocampo (2018 and 2019) argues, regarding that inclusive education, as a phenomenon, cannot be delimited

in the paradigms of any particular discipline, since its object overflows such heuristic forms. De Landa (2016), inspired by Morin (2008), adds that currently, no discipline stands on its own. In it, each of the knowledge projects, theories, disciplines, methods, discourses, concepts, subjects, territories, etc., interact, dialogue and adopt complex forms of mediation and negotiation, whose products are subjected to processes of epistemic translation and re-articulation to achieve the heuristic purposes designated by the exteriority of theoretical work, typical of post-disciplines. It configures a wide-ranging framework of knowledge through the rearticulating exchange of diverse contemporary (post)critical intellectual projects.

Another epistemological property of inclusive education is multiscalar, a key concept in the work of French scholars Deleuze and Guattari and the context of the Americas, De Landa. The structuring coordinates of the field agglutinate elements of a singularly heterogeneous nature, grouping entities of different scales. This is what, in various works, I have tried to show through the need to apply the topological examination to understand the place, position and degrees of proximity and relationship in scales of different types, "in which all and parts coexist as interconnected hybrids in a continuous coupling and decoupling" (Castillo, 2019, p.242). Is the structure, object, and field of knowledge of inclusive education a materialistic operation? The first aspect to relieve a character of continuous interweaving that generates its own forms.

The assemblages, as theoretical apparatuses, allow us to understand that none of their configuring elements are stable, normative, fixed, but are intensely contingent; pieces that are not always found in comfort and harmony, their organic happens in proximity to constellations and systems of external relations -a key epistemological principle of inclusive education-. Accordingly, they also denote a figuration close to the logic of displaced, replaced, and rearticulated within and among other bodies. The knowledge project signified under the denomination of inclusive education denotes an organic dynamic in which diverse dimensions of analysis are included. Its analytical terrain is articulated by a set of singularly contingent and imaginatively heterogeneous elements. Its forms of ordering are called codifications, they adopt a particular form; that is, they select, compose and complete a territory giving life to a singular heuristic figuration.

The assemblages as forms of knowledge production, like the constellations - a notion I will discuss in later paragraphs - carry out a complex process of selection of the epistemological resources that make up the field of inclusive education, thus avoiding the imposition of an anything-goes policy, a product of the elasticity of the concept. Its elasticity is materialized through a mimesis effect. Inclusive education is a space of reterritorialization of the bases of contemporary educational theory, specifically, it establishes new articula-

tions that become an intellectual network. Inclusion and inclusive education are intensely fluid and historically contingent psychic, heuristic, political, and ethical terrains.

What does it imply to think about the heuristic functioning of inclusive education through the notion of assemblage? A preliminary caveat will consist in evidencing that its field of research and heuristic domain organizes its function based on an order of production - internal laws of the domain that determine its organic - of a diasporic and nomadic character. Through these articulations, it observes the convergence and confluence of diverse territories and geographies of knowledge that, in turn, are (micro) diasporas and the result of other more complex (micro)configurations. The domain of inclusive education is the result of multiple more complex configurations, moving away from the metaphor of the simple gathering of different things, which, to a certain extent, becomes a paratactic - static - and parasitic articulation. Inclusive education as a heuristic phenomenon is the composition of many other things under the performativity of re-articulation, avoiding the passivity of simple amalgamation.

The first major characteristic of its field and object is signified through the notion of 'transient configuration', whose pattern of articulation operates in indeterminacy. It is a highly contingent and interactive constellation between each of its parts, in which each of its heterogeneous elements - the principle of heterogenesis - are related to each other, by extraordinary forms of alloy structured through the principle of exteriority. The component of heterogenesis offers an appeal to a wide diversity of elements, none of which is of the same matter. Thus, a wide infinity of elements, objects, events, sensations, expressions, signs, etc., is observed. The assemblage it forms is described under a figuration proximal to a rearticulating combination of inextricably interconnected parts. Each of its elements is contingent, not necessarily connected to each other. Their forms of connection function outside of any established series. Thus, for De Landa (2016), many of its elements

> [...] can be extracted from one whole and inserted into another. "These relations imply, first of all, that a part of a whole can be detached from it and connected to a different whole in which its interactions are different. In other words, the exteriority of relations implies a certain autonomy for the terms to be related (p.10-11).

It is an assemblage that, although regulated by complex external relations, observes, to a certain extent, the participation of the philosophy of internal relations, especially in the mimetic effect that leads to the cross-dressing of the inclusive with the special, resulting in the establishment of a false descent. In the interiority of the structure of epistemological configura-

tion of inclusive education, no element, no system, no articulation is above another, it distances itself from the dependencies and anchorages that sustain the configurations of normative epistemology. In contrast, its analytical-methodological figuration is close to the field of multiple scaling; it evidences a multi-axial crossing of diverse dynamics, expressions, and plateaus. The analytical specificity of the concept of heuristic assemblage refers us to the Guattarian notion of 'agency'. Let us now see how this notion plays a fundamental role in this examination.

Inclusive education works on multiple cutting-edge problems, not disciplines. It is a space configured from a set of sets connected at some point. De Landa (2016) will offer a preliminary precision that we cannot omit: assemblage as an agency is not fetishized to the mere act of joining or adjusting a corpus of elements of diverse nature -passive activity-, neither is it a set of well-combined parts, but they describe a multiplicity -if we attend to Rajchman's (2004) approaches, we will observe that multiplicity is synonymous of complexity product that leads us to multiple articulations-, in it, very different elements among themselves establish relationships, links, and twists to produce something completely new.

The construction of the epistemological field of inclusive education, although it explicitly states a wide variety of affiliations, many of them act through the figure of epistemic memories; the emergence of its object occurs through rearticulating alloys. Its epistemic architecture is composed of irregular and non-uniform parts; it plays various forms of alloys. In contrast, the internal relations - links by descent - are connected by function and nature of the terms, that is, if the terms are linear and intimately connected, they validate a corpus of extension systems, applicationism, and aggregate particle. This figuration is restrictive to think the field of problematization of inclusive education, especially if we attend to the forms of construction of this knowledge since none of its singularities comes into contact by its direct descent and nature -multiple-, forges an alliance of strategic-heuristic character. The internal relations -mono-centered analytical system- according to De Landa (2016), do not respect the heterogeneous nature of its components, they occur in the articulation of an analytical network of homogeneous character. In other words, they are patterns of behaviors that perform the same function, generating the entrapment of objects and their authenticity. When these are applied to the construction of knowledge, their operations become the technique of epistemic applicationism and the aggregate particle. The opening of new problems and phenomena occur in exteriority -a key epistemological principle of inclusive education-, yes, "their "role" within a larger whole is not what defines them (this would be a relation of interiority). This means that a component is self-subsistent

and can be "disconnected" from one assemblage and "connected" to another without losing its identity" (De Landa, 2016, p.11).

The epistemic architecture of inclusive education and its object follows the logic of pollination described by Deleuze (2005), an operation in which elements of different nature interact establishing contingent alloys. In it, none of the elements has an identical relationship by function or nature. It is a space assembled through a broad corpus of oppositional elements that are united through a singular alliance. In other words, each of these elements is opposed to each other as they transform each other. The forms of linkage or analytical-methodological relationships occur through coordinates that assume particular political problems and social obligations -a connection point that reaffirms its performative character-, it is a link that is created between diverse problems of regulation of the contemporary world. "Cognitive tools do not merge into a totality, but coexist and interact in exteriority" (De Landa, 2016, p.11).

The unfinished sense of inclusive education itself and its epistemological property of movement makes the diversity of heterogeneous elements that constitute it form a structure that is permanently re-territorialized and de-territorialized. Inclusion must be consolidated around a heuristic base of a critical realist character that is key to the inauguration of programs of change. It attends to the modes of the irruption of the phenomenon, alters and transforms the formations of thought. It recognizes that the ontological politics of inclusive education is consistent with the molecular revolution. Inclusion is a heterodox sign, a vector of mobilization of the frontier, a force of alteration of the structures of multiple world-systems.

In itself, a singular form of becoming is also, "an affirmative desire for transformative flows" (Cardenal, 2012, p.20); it is a vector of dislocation. Also, its signifier can be housed under the imaginary figuration of rein-vention, its mechanisms of production of desire are founded and pursue the transformation of the world -Feuerbach's thesis number eleven-. Inclusion "has to do with the desire for change and flows, as well as the dynamism of multiple desires" (Cardenal, 2012, p.20).

6. INCLUSION AS CREATIVE RECOGNITIVE FIGURATION IN RESISTANCE

The mainstream program of change called 'inclusion' demonstrates exhaustion of its function of change and intervention in the world, unable to remove the chronic social pathologies that articulate a wide variety of forms of social misery. This program of change or slogan must be analyzed within the impacts that this has for the contemporary world: a) subjectivity, b) the general construction of knowledge, c) political interventions and d) the

academic and research practice of education. Another step is to understand what is said about it. According to Braidotti (2009), at present, all programs of change have exhausted their function.

The human has always been a category linked to privilege and power -substantialist ethics-. However, the mainstream program of inclusion - ratified by all governments worldwide - defines its ontological articulations on a wide range of dualities, the question of the racialized, marginalized, and excluded others that this program of change does not address or strategically removes from its ontological policy returns here. Inclusion as a knowledge project is not exclusively an alternative appeal, but a critical-political task that configures a multi-layered and multidirectional project that displaces anthropocentrism while pursuing the analysis of the discriminatory and violent aspects of human activity and interaction wherever they occur (Braidotti, 2009).

Inclusive education is a unique strategy of analytical resistance. Its epistemological and political terrain is expressed in terms of a nodal point in permanent mutation; it is a place of encounter and re-articulation, despite its marked zigzag traveler character, it never stops. It does not pursue the paratactic activation of any theory and methodological debate visited and traversed in each of its travels. It is more interested in its transformation; its operations take place in the performativity of the re-articulatory. What defines inclusion as a resistance project? A core aspect to be rescued is the analytical power of intersectionality in each of the confluent epistemological resources, an operation that goes against the expectations of a grand theory that has become a heuristic space out of place from which we do not understand the use of theory.

The configuration of the constructive forms of this field suggests an examination of its historical and political contingencies -both notions constantly interpenetrate in the study of its conditions of production-. Inclusion as a project of resistance faces a fundamental defining dilemma, that is, it analyzes the structural power relations and cultural representations it interrogates. Another dilemma analyzes how particular bodies of knowledge establish imperceptible alliances in the service of inequality, domination, and oppression. Likewise, how knowledge influences the configuration of power relations confirms the alloy of its statements with one of its epistemic memories: critical intersectionality.

Inclusion as a knowledge project significantly addresses the power relations and social inequalities that affect and permeate the institutional rules of operation of society and the educational system as a whole. When conceived as an analytical strategy, it provides new angles of vision on the heterotopicality of phenomena housed in its interiority. It constructs a critical praxis that informs diverse projects of educational justice. Although

interest in the field has grown rapidly, its efforts remain in an imperceptible and dramatic reproduction.

The question that imposes the statement: inclusive education as a project of knowledge in resistance, analyzes the spaces and forms of interpenetration and re-articulation through which this approach has been configured 'through', 'beyond', 'outside', and even, against singular political spaces and heuristic regionalizations. Such an undertaking suggests a preliminary caveat, that is, to strengthen the levels of theoretical, political, and methodological literacy required by the domain. The constructive singularity of the domain encourages that none of its convergent fields act rigidly separated; rather, the configuration of its knowledge structure describes a centrifugal process, which travels and mobilizes through diverse places, passing through disciplinary, interdisciplinary, and post-disciplinary fields -a territory of multiple intertwined epistemological convergences-, adapts to diverse discursive and research fields, ratifying the flexible character of its heuristic operative. Interrogating the question, inclusion becomes a desire and, in turn, a critical perception that fosters new readings on the singular forms of regeneration and performative action of power; it is a phenomenon in reciprocal construction that operates by critical intimacy, that is, it establishes planes of closeness between languages and theoretical-methodological forms that participate in its construction. Despite this consensus, the definitions of what counts as 'inclusion' and 'inclusive education' are far from clear.

Currently, there is an adjustment of the mainstream signifier of inclusion to various research formats, that is, to a set of standard methodologies that, in the case of the Educational Sciences, refer to the general methods and methodologies provided by the Social Sciences. Here, another critical knot emerges: The Educational Sciences do not have their research method, with duly formalized levels and degrees. This enterprise or such degrees of decisions seek to promote the formalization and adaptation by abduction - not re-articulation - of the foundations of inclusive education - intrinsically linked to the imposition and transvestism of special education - a persistent epistemic scandal - within certain fields and regions of study and research. Such an operation works through an extensive or aggregative particle modality, extends its scope within certain fields, then we observe the presence of research that, previously uninformed of the heuristic and methodological basis of inclusive education. The qualifier operates in terms of something that walks and travels around diverse fields of study. The confluence of its structuring fields is also not so evident within the understanding of its cognitive apparatus. How is this knowledge project synthesized in diverse fields of study and research?

Inclusion as a knowledge project in resistance, despite constructing an analytical-methodological spatiality that operates and inscribes its heuristic task at the margin, is skeptical of the application of methodologies proper to disciplinary fields and is not given to the integration of conventional theories and methods applied by diverse epistemic geographies. In such a case, any methodological form may be rearticulated, rather, it seeks the integration of innovative and critically transformative ideas that allow to examine-in-another-way the reality and the diversity of problems of the world-systems. Its methodological and analytical action is close to the notion of 'over readability, that is, a position of reading and interpretation based on a multiplicity of meanings, levels, subjects, and lines of argument.

Inclusion as a knowledge project synthesizes analytical-political navigation tools to think about its nature and role in the contemporary world. This point is key since it tensions the meaning of the educational function. By constituting a broad-based knowledge project, it denotes a dynamic assemblage that provides new angles of vision on determined practices and problems that not only border the order of injustices but rather, that of challenging imaginations that erect and sustain a world-of-possibilities, evaluating whether or not its objectual network constitutes a (un)fortunate performative. It is, in turn, a singular project that informs and nourishes its analytical network through diverse frameworks provided by justice, feminist theories, Anglo-Saxon, Latin American and Asian cultural studies, post- and decolonial studies, women's studies, subaltern studies, critical race studies, political and structural intersectionality, critical interculturality, critical pedagogy, queer studies, gender studies, philosophy of difference, etc.

The question about the corpus of elements that define inclusion as a knowledge project in resistance, attends to the axes of production of new knowledge, thus, we speak of an intertwined and interpenetrated relationship between knowledge project and analytical strategy. A knowledge project in resistance is built in the analytical intimacy of the relations between knowledge and power, providing languages, concepts and theories to interpret inclusion as a counterpoint reflecting singular performative power relations. Inclusion is something that is socially and politically constructed, legitimized in micro-practice.

What knowledge and methodological forms are linked to an epistemic project of resistance? The same question could be asked in the political dimension of the project. It is the knowledge that is informed and influenced by particular power relations - hence the need to carry out a relational analysis of the problems of the field, which can be applied to the construction of public policies in the field. The object of analysis of inclusion focuses its analytical focus on the variables that condition the recursive relationship between social structures and cultural representations. It is interested in

analyzing the set of interconnected meanings situated by oppression, domination, injustice, and inequality, paying attention to what this does with the subjectivity of each citizen-subject, all of them, expressions of regenerative and performative nature, articulate specific patterns of location of diverse groups of citizens. The struggle against each of these chronic forms of social and educational regulation is at the very heart of the resistance project.

The understanding of oppression, domination, injustices, and inequality are central points, together with the ideal of transformation, in the construction of the theory of inclusive education. Another uniqueness of this project leaves room for a wide number of collectivities and communities of adherence and interpretation, linking a variety of specific knowledge projects. One of the main analytical obstructions assumes a monocentric and monocategorical analysis to study injustices and inequality, etc., neglects an analysis around the social formations and knowledge projects that reproduce such forms of inequality. Inclusion as a knowledge project operates far beyond a mono-analytical system. Indeed,

> [...]can also be profitably conceptualized as a constellation of knowledge projects that change in relation to one another in tandem with changes in the interpretive communities that advance them. The broader knowledge project provides a set of ideas that provide moments of definitional consensus. (Hill Collins, 2015, p.9).

Inclusion as an analytical strategy has a dual function. First, it constructs a particular way of analyzing problems; it manufactures an epistemological tactic for addressing a wide variety of complex educational problems. Also, it can be conceived as a matrix of "analytical inquiry, rather than a specific alignment or prescription for particular methodological approaches or techniques" (Burman, 2017, p.12). Whereas, its second function, places it in relation to the production of new knowledge about the educational, social, and political world, allowing to employ the notion in different ways.

Drawing from Hill Collins (2015), the notion 'analytical sensibility', I will argue that what makes the analysis that proliferates by way of inclusion inclusive escapes the use of the term itself, but rather creates forms of creative non-dialectal figuration that offer outlets for "thinking about the problem of sameness and difference and its relation to power" (Cho, 2013, p. 795). The analytical dimension of inclusion as a new heuristic praxis works when we see it. Undoubtedly, an examination of the patterns of production of new knowledge can be far more productive in understanding inclusion, specifically, it confronts the question of the corpus of issues that characterize inclusion -certain consensus exists that these are inscribed beyond disability and the struggle for justice-, or what concerns and interests do this

work share with other knowledge projects? The theoretical and constructive work of inclusive education has many significant nuances in the transformation of the contemporary world. For this reason, by conceiving its analytical force in terms of a 'nodal point' and a 'heuristic transposition mechanism' for contemporary educational theory, it is key to the realization of a relational approach that cuts across theoretical formats and methodological corpora. Inclusion produces other epistemological ideas, it understands that the new knowledge and methodological forms it produces are neither neutral nor outside of power relations, rather they are deeply imbricated in it.

Among the main epistemological challenges it faces, the following stand out: a) its knowledge is not politically neutral, b) its empirical work must consider the guiding presuppositions of its praxis, otherwise what the mainstream of its discourse has so far done happens, "unwittingly uphold the same complex social inequalities that it aims to understand" (Hill Collins, 2015, p.14). This has been my research objective for some years, specifically, when I refer to the need to understand how school and social structures operate, as well as the mechanisms of functioning of each of the formats of power, that is, diverse expressions of a regenerative and performative nature. Under this concept, injustice, oppression, domination, collective indifference, structural and micro-scale inequality, structured and silenced violence, etc., are agglutinated. All of them are deeply interrelated and interpenetrated. Thus,

> [...] individuals and groups differentially placed within intersecting systems of power have different points of view on their own and others' experiences with complex social inequalities, typically advancing knowledge projects that reflect their social locations within power relations (Hill Collins, 2015, p.13).

Finally, I note the coexistence of a politics of inequality about how researchers and practitioners in the field use the syntagma inclusive education, reflecting different degrees of emphasis on specific analyses, ratifying a functional use. Faced with this, the need arises to explore to what extent these analytical and working forms contribute to clarify the theoretical contours of the field and to unveil its underlying heuristic assumptions. Agreeing with Hill Collins (2015, p.16), it is highly necessary to situate the epistemological understanding of inclusive education, through

> [...] Stuart Hall's construction of articulation can be very useful in examining the dynamic patterns of how scholars use intersectionality as an analytical strategy. Hall posits that a theory of articulation is "both a way of understanding how ideological elements come, under certain conditions, to cohere

together within a discourse and a way of asking how they do or do not become articulated, at specific conjunctures, to certain political subjects." (Grossberg, 1996, p. 141-42).

6.1. Main characteristics of inclusive education as a knowledge project in resistance

The epistemological problems and challenges of inclusive education in which I am interested in try to understand the mechanisms that affect not only the use of the term but also explore its interventionist function in the contemporary world. I am interested in exploring the alternative figurations that occur outside the canonical demands of research. Inclusion as a project of knowledge in resistance pursues the desire for social justice and progressive transformation by introducing other systems of reasoning resulting from the interpenetration of the legacies of feminism, intersectionality, the philosophy of difference, Asian cultural studies, women's studies, queer and gender studies, post- and decolonial studies, etc. In the face of the exhaustion of change programs, inclusion emerges as a creative and alternative figuration of reality, a device of renewed hope, a strategy of social reform of a relational nature that operates at the zigzag intersections of the macro and microstructural. If the desire for inclusion pursues the production of the new, then it becomes a figuration that activates a spiral of profound changes. It is a sign of an open challenge and a vector of heuristic dissipation that works in the creation of a different notion of ethical responsibility that reconfigures the being, not only limited to the encounter with it. It constructs new figurations or ways of imagining different frameworks of thought about the political, the social, and the educational.

The epistemology of inclusive education executes a corpus of alterative changes in the way of reading and approaching a network of phenomena; it denotes an open, restless, affirmative operation of a non-dialectal and intensely creative character. It can also be conceived as a dynamic heuristic morphology assembled by intense flows, a network of openness, creation, and the relation of diverse heterogeneous singularities -the principle of heterogenesis-. It is something that works on the epistemic-ethical question of 'coming-to-be', a movement that leads us to a higher stage of realization is a domain in permanent construction. It rescues epistemological plurality, imputes a corpus of vanishing points that affect ways of thinking and their heuristic-political uses. Among the main characteristics that define inclusion as a resistance project, the following stand out:

- Inclusion as a category of analysis participates in the power relations and cultural and political representations it interrogates. It significantly

attends to the forms that make its knowledge comprehensible and applicable to the problems of today's world.

- Inclusion, as a political strategy, constructs unique mechanisms to decolonize the unconscious. It not only tries to put into practice different kinds of rights, but its rationality permeates people's lives and their ways of relating and subjectivity, beyond the antithetical problem of the right to redistribution and difference.

- Inclusion at the structural level claims a performative action, it is inextricably linked to the analysis of the logic of the functioning of power, whose emphasis goes beyond the study of the structures of inequality.

- Inclusion is a deconstructive-transformational-creative movement. It proposes to recognize the forms of resistance, making us see what critical work in this field has been omitted. To this end, it is essential to challenge the uncritical acceptations of the term, highlighting the set of practices in which the discourse and its argumentative plot lead to colonial and capitalist fantasies about difference and singularity.

- The epistemology of inclusive education is a performative commentary, as such, it is interested in recomposing its scope in the academic and political world. It constructs a new form of practical intervention and a device for the production of singularizing subjectivity.

- The politics of theoretical content for the most part advances through nomadic and diasporic efforts among diverse knowledge projects, methodological forms, theories, political and ethical commitments, concepts, (inter)disciplines, territories, etc. In no way does it attempt to place itself in proximity to the obscene metaphor of open fields. Inclusive education is a knowledge project that works on the margins and from the margins with each of its convergent contributions.

- Inclusion as a knowledge project in resistance undoes and transcends systems of otrification, that is,

[...] by centering and reaffirming identity in the categories of race, language, and nation, it continues to this day, sometimes in the willingness to celebrate diversity and hybridity; and others, in the 'organic' accentuation of that same difference to legitimize exclusionary and -on its darker side- racist speeches (Cho, Crenshaw & McCall, 2013, p. 789),

imposing a set of essentialisms-individualisms that obstruct access to its epistemological understanding and contextual and political singularity in today's world.

As inclusive education reaffirms a field assembled by silent forms of individualism-essentialisms, it faces the challenge of advancing in the subversion of

[...] a type of differentiation that is ultimately additive or cumulative method, requiring others to be named as other while retaining the generic term as the general intelligence grid, the morphology that has the power to account for additional, including divergent or deviant (Cho, Crenshaw & McCall, 2013, p. 792).

6.2. *Specificities in the construction of a knowledge project in resistance*

The post-disciplinary nature of inclusive education describes a phenomenon that cannot be delimited in the paradigms of any of the disciplines and knowledge projects that collaborate in its configuration. Its object, field, and domain emerge in the exteriority of theoretical work, that is, it listens and manufactures its corpus of knowledge 'beyond' and 'outside' its convergent contributions. The constructive exteriority of the territory makes many people located within the educational field as well as some outside these analytical and methodological languages and confines misunderstand its claims and contours. The same happens when it is affirmed that inclusion has no method; to infer this action completely can lead to certain errors. Its halo of unintelligibility in this regard is clear. When I affirm that the intellectual developments of inclusive education do not demonstrate a clear method, I argue that it lacks an analytical form of its own that traces the norms of research and the training of its educators, as well as the treatment of each of its phenomena. I am interested in being aware of the wide variety of confluences and epistemic-methodological conventions that intertwine, interconnect in zigzag, and disfigure -understood as an action that produces something else- the educational field as a system of transformation of experience. This multiplicity of elements does not necessarily impose a sign of erasure on the most burning issues to which inclusion draws attention in the contemporary world; it intensifies the sophistication of its forms of analysis and constructiveness.

Its multiple forms of linkage are not always apparent. Efforts to produce new knowledge cannot dispense with the apparatuses through which information is produced, classified, and interpreted. Inclusion as a knowledge project is not located within any specific framework. It is interested in opening new ways of thinking - a sign of mobilization of the frontier. Its heuristics do not work exclusively by questioning the institutional logics of knowledge and research, or against the norm. Certainly, it attends to the set of imperceptible imbrications in which its object interacts with knowledge projects inherent to inequality. As an epistemological form,

it works in the creation of its methodology of analysis. What does this mean? It creates an analytical, political, and discursive space in another way, which operates outside the usual -heterological-, avoiding the hindering of an insurgent field such as the one analyzed here. Another critical point is its lack of methodological and epistemic literacy; it is a field of radiality whose heuristic operation does not occur through each of its confluent constructive resources, but in a singular non-Hegelian, complex, and restless dialectal action. It is a field that informs other fields and is informed by many divergent territories -assemblage-.

In keeping with the uniqueness of the nature of inclusive education knowledge, it is possible to define its methodological contours in terms of 'analytic sensibility'-a concept I borrow from Cho, Crenshaw & McCall (2013) and Hill Collins (2015). What are the implications of analytic sensitivity in this constructive terrain? Fundamentally, it fosters an understanding of the phenomenon as a disposition of thought; it is a vector of imagination and alterative intervention in world-systems, relations, forms and coordinates of equality, and equity with the problem of difference. It can also be described in terms of a permeable and restless analytical form, constantly searching.

The epistemology of inclusive education is an effort to think and specify educational relations, their passions, and affectivities in a different way. A sensibility that clashes with the legitimized forms of theoretical-methodological educationism. It is also conceived as a theoretical-political effort to think critically about certain conditions that often imply an active engagement with analytical conventions and their categories, many of them embedded in language, their methodological formations, relationships, passions, etc.

One of its methodological concerns is to dissociate epistemic reductionism from its weakly established approaches. It also proposes to construct a methodological form capable of capturing the complexity and multidimensionality of the expressions of power and its mark on the subjective fabric of people. Its political commitments go beyond the implementation of rights; it inaugurates unique rationality to understand the performances of equality, justice, equity, etc. It advocates for an alternative vision of subjectivity, ethics, and emancipation while opposing the principles of liberal individualism.

The potential of inclusion in the contemporary world lies in its brilliant and rigorous application on each of its topics of analysis, rather than in theoretical rejection, replacement, reduction, and remediation, all of which are canonical analytical forms. The construction of the epistemological field of inclusive education does not focus on any particular theoretical and methodological form, nor does it inscribe its workforce in an antithetical action. Rather, it rescues its legacies and traditions conceived as powerful forms of the alterative intervention of the world and its structures. My research

interest devoted to the theoretical and methodological study of inclusive education can be conceived as an attempt to de-habituate and delineate the figurations and their signifiers that situate its task in terms of a general affirmation and a simplified political conception extremely rooted in the contemporary world.

Inclusion, despite traveling through diverse spaces and discourses demonstrating that its politics of knowledge production is far from being considered an insurgent and transformative project, faces the challenge of clarifying "the way such projects are received, historicized, and engaged. Both the ideas at issue and the responses that insurgent ideas engender reflect structural relations that are dynamically constituted by the very forces being interrogated" (Cho, Crenshaw & McCall, 2013, p. 798).

Undoubtedly, the question of the conditions of production -imbrications between the political, the historical, and the social- foster an understanding of its multiple critical points of inter-referentiality established within and outside its institutional formations that impact the production of meanings about what is meant by inclusion, as well as, by its fixers of discursive conventions and recognizable methods.

It also encourages an examination of the intellectual forms adopted in the field in its evolution, understanding how it has been used to think about different issues in its passage and linkage with various epistemic regionalizations. Inclusion is a highly productive concept applied to an infinite number of contexts and fields of work. As a knowledge project, it operates in an expansive way establishing diverse forms-of-what-is-possible; it becomes a device of challenging imaginations that interfere and break into diverse intellectual commitments. It is a territory composed of diverse theoretical segments, shaped by diverse political questions. How is inclusion put into practice? Inclusion raises a myriad of questions about various critical issues that touch and stress our present.

7. "TRANSPOSITION" AND "MOVEMENT" AS CONDITIONS OF KNOWLEDGE PRODUCTION IN INCLUSIVE EDUCATION

The theoretical force that resides in 'transposition' as a heuristic tool denotes a singular constructive operation of analytical-methodological transference of a cross-border nature. For Braidotti (2002) transpositions foster a leap of code, language, field, and methodological apparatus to another place or direction. From my theoretical position, it is not a leap that gives rise to a plurality of things, but rather it is an operation founded on heterogenesis, which trans-codes, moves elements, decenters them, superimposes them, and translates them to configure a new form. Heterogenesis in this regionaliza-tion operates in terms of complex multiplicities of convergent resources,

distancing itself from the mere palette of colors imposed by the sign of the diverse -artificiality and analytical instrumentalism-.

Transpositions as epistemological tools applied to the recognition of the domain are not reduced to the mere matter of weaving different threads, variations on a theme, but, rather, suggest a scale of variations and changes in a discontinuous and harmonious pattern. The domain of inclusive education becomes the creation of "an intermediate space of zigzagging and crossing: non-linear, no, but chaotic; nomadic, but responsible and committed; creative, but also cognitively valid; discursive and also materially embedded, it is coherent without falling into instrumental rationality" (Braidotti, 2002, p.13).

Transpositions in heuristic terms allude to a singular process of mutation, transformation, and alteration of the everyday order of things. The object and domain of the inclusive is a transpositional phenomenon, a space regulated and constructed by diverse forms of information transfer that do not occur in a linear, random or arbitrary manner, but "in opposition to the dominant scientific vision that tends to define the gene as a stable entity that transmits fixed units of inheritance in an autonomous and self-sufficient manner" (Braidotti, 2002, p.14).

The power of transpositions in knowledge construction occurs in terms of multiplicity and complexity; they articulate a spiral of levels of constructiveness, their strength expands a repertoire of ideas, actions, and constructive resources, decentering and trans-coding each one of them. Its marked transpositional character does not deny the multiplicity of convergent epistemological forms, rather, it keeps them interconnected in reticular planes and multiple layers, attending to their singularity.

7.1. Inclusion as theory and nomadic epistemology: becoming as a constructive and emergent point

Inclusion as a nomadic theory suggests the configuration of an episte-mological counterpoint. It is a singular theoretical form in becoming; its transformation depends on processes of subjectivation that go through its mechanisms of enunciation of knowledge. The constructive force of the nomadic according to Braidotti (2004)

> [...] refers to a type of critical consciousness that refuses to situate itself in codified social modes and practices" (p.216). For the famous Italian-Australian philosopher, Rosi Braidotti, such mechanisms can be conceived "as a figuration of contemporary subjectivity, the nomad is thus a post-metaphysical, intensive, multiple entities that unfolds in a network of interconnections [...]. One of its historical tasks is to discover how to recover a sense of intersubjectivity

that allows the recognition of differences to create a new type of bond in an inclusive (i.e., non-exclusive) way (Braidotti, 2000, p.78).

Its heuristic is based on the interweaving and interconnection of diverse theories and knowledge projects; it gives life to a sign of permanent becoming. What defines inclusion as a knowledge project in resistance is the set of counter-knowledge that it agglutinates in its passage through diverse regionalizations.

The epistemology of inclusive education crosses a wide variety of knowledge projects, contributes to the affirmation of a new mode of subjectivation that involves the interweaving of the epistemological and the political -a key aspect in this heuristic understanding-. Nomadic thought generates new interpretative practices that become new subjects and cartographies of knowledge. Although it goes through different critical knowledge projects, it does not stop there; its cognitive operation takes place in the turn and the re-articulation. One of its ontological options consists in conceiving the subject of the inclusive as part of the anti-essentialist and post-humanist. Nomadic theories conjugate a series of political elements and a set of becomings and other places for the construction of knowledge. They inaugurate an intellectual space in permanent contradiction. The heuristic horizon of the nomadic inscribes its creative power beyond the established, centralizes its force in dispersion, the multiple, the interconnected, etc., that operates in constant flux between each of its diverse constructive elements.

The domain of the inclusive is a space in which diverse worlds are incardinated, each of which is superimposed between various plateaus of reality. It is a sign whose unfolding takes place in exteriority; it is a mobile entity that endures through diverse sets of discontinuous variations. Educational thought is always nomadic; it is in permanent becoming. What interests this type of theoretical construction is the process of becoming a theory. For Braidotti (2006), nomadic theories establish a non-hierarchical analytical network, basing their activity on the construction of counter-senses and counter-knowledge. The section of the syntagma 'against' does not suggest a negative operation, rather, it proposes to create new social practices and a new cartography of knowledge. In this understanding, the subject and knowledge are actions of power. All this suggests new modalities of heuristic construction that force us to draw new cartography, it leads us not only to the clarification of its knowledge body but also to a new politics of epistemic imagination, to a form of appropriation of the being and to an affectivity that deforms the world.

The production of knowledge of inclusive education is closely linked to the intersubjective fabric; it is a knowledge and a comprehensive framework towards the creation of a singular process of creation of the possible.

Nomadic theories are the result of a set of analytical, methodological, political, ethical, and discursive practices, which, in trying to find their index of singularity, do so through re-articulation. The knowledge of education is always situated, dynamic, intersubjective, and complex. The devices of singularizing subjectivation include history. In it, the challenge for inclusion is to turn its critical spatiality into different kinds of disruptive hegemonies that follow the logic of the point-of-fugue. Movement as an epistemological property of inclusive education is conceived in terms of an unstable determination, it is not exclusively delimited to the changing, but rather, it institutes a process of construction of powers that adapt to the context of subjectivation.

The field of production of inclusive education can be described in terms of crack, that is, a set of displacements in various directions, whose transitivity is analogous to Braidotti's (2006) operation, in respect to the journey "from anticolonial theories and movements towards a postcolonial critique; then, from heterosexual and colonial hegemonic feminism towards a critique of the transversal construction of race, sex, gender and sexuality" (Cabrera and Vargas, 2014, p.28). Its heuristic architecture is signified as a space of deep contextual specificities, fostering according to Braidotti (2006).

> [...] recognizing the partiality of scientific enunciations, their necessary contingency, their dependence on concrete mechanisms that are very much determined by historical and socioeconomic factors, has nothing to do with relativism. On the contrary, it is an attitude that marks a significant change in the ethics of discursive and intellectual style. The repudiation of old-fashioned universalism to pay greater attention to the complexity of "situated knowledge" augurs greater flexibility in research, especially in the humanities, as well as new sensitivity to differences (Braidotti, 2000, p.209).

By conceiving inclusion as a nomadic theory, its analytical force imposes a project of critical and creative intensities; it places people in positions of discursive-political subjectivity. Its epistemological nomadism suggests a substantial transformation of four of its core characteristics of its territory: a) replacing the idea of difference with multiple singularities, b) recognizing the intrinsic sense of inclusion as a category of analysis and contingent political apparatus that outlines the structures of the configuration of world-systems, c) its epistemic architecture is composed of mutant, unstable and constantly evolving knowledge. Inclusion as a nomadic theory "moves in the interstices, the intervals, at the frontier between all structured spaces. It is a bridge capable of creating analogies, bridges between several different plateaus. It rejects the idea of all that is established, fixed, immutable and coming from a uniformizing power" (Palaisi, 2018, p.66).

7.2. Inclusion as a theory in permanent journey and transposition

To which metaphor of the journey does inclusive education ascribe? The metaphor of the journey does not only concern the singularity of the movements that define part of its migratory space, but rather, its heuristic potential is played in the creation of critical categories that foster the emergence of new practices, ideas, senses, and feelings. Understanding the domain of inclusive education requires attending to how theories and ideas travel within it. In this incessant movement, each one of them mutates, transforms, dislocates, and resignifies its constitutive and alloying elements. The basis of the traveling theories is housed in a set of alterative micro-movements, orchestrated trans-relationally. The convergence of each of these in their surface structure appears to be interconnected, mediated, informed, and affected by singular historical circumstances. Within the interiority of the field, I observe the circulation of epistemic palimpsests, that is, elements that can never be erased, residues, and mutating forms of originality. None of the strategic forms of the field, in transforming itself it replaces its originality, it does not become docile but bursts with greater force destabilizing a falsified or mimetic apparatus.

The domain of inclusion does not domesticate any theory, but rather translates and redoubles them creating an effect of multiple and trans-relational co-production. It is difficult to reach a consensus about the theories that converge in the structuring of its domain, especially as it is regulated by the principle of heterogenesis. It is a dynamic and a-centered domain, whose theoretical forms are used to subvert and disrupt the language of cognitive patriarchy, especially in its oppressive and essentialist forms. The heuristic work takes place in a clearly defined place 'in relation', 'beyond' and 'outside' diverse fields of study that converge in the configuration of its domain. It is conceived as an agreement that inaugurates an accepted place, offers distinct challenges to many established positions in and around inclusive education studies. It assumes a complex, intimate, and highly sensitive epistemic awareness to a variety of complexities to diverse interconnected problems of class, feminism, ethnicity, history, injustice, politics, ethical relations, traversed by a web of imbricated genealogical entanglements and the lines of force that have constituted and structured its relationship to each of these fields.

The transfer from one theory to another can cause unique forms of contamination and even distortion of its meaning. Indeed, as Said (2000, p.12) points out, "the critical recognition that there is no theory capable of covering, closing, predicting all the situations in which it could be useful." At this point, it seems opportune to me to turn to the forms of translation. How to understand this mechanism? The epistemological field of the inclusive is

made up of elements that travel of their own free will and others that do not. It is not only these elements that allow us to develop a situated understanding of the constructive regulatory function of the field. A large part of each of the resources that draw its authentic domain are the object of a complex action of epistemic violence. Security in displacement is always given by complex and singular forms of translation, mediation, negotiation, among others, that operate in terms of a complex system of intermediation and a zone of contact. Displaced or travelers? The epistemological resources of inclusive education cannot be strictly conceived in terms of displaced since they possess a marked sense of identities, movement is not meant in terms of flight, but of a journey, of something that is driven to see other forms of visuality, understanding of the phenomenon and its regulation strategies.

The premises of the journey is what lead me to the affirmation of the order production in terms of a diasporic field. Here the diaspora is not lost in the kaleidoscope of the multiple, nor does it allude to a mere system of gathering and accumulation, but rather, to an incessant movement, regulated by diverse forms of work. A space of diaspora is that which allows for permanent construction, an unfinished sign, a set of disturbing questions that are always open and unfinished. It is a territory of complex genealogical entanglements of dispersion. Inclusion and its intellectual domain are not something elusive but rather, something that emerges from the contact, interaction, imbrication and translation, and twist of diverse epistemological forms. It is the result of a collision of critical and post-critical knowledge projects in resistance scattered across diverse regionalizations of study. The identity of inclusion is restless, unfinished, and fluctuating. Its field does not proceed systems of framing, delimiting what can be or not, inside or outside -it works in de-limitation. This binomial seems to me frankly reductionist and instrumental. The epistemological field of inclusive education is an 'extopia', that is, it is an operation based on exteriority as an epistemic principle and exteriority of the theoretical work; it is something that is not discovered in the object but in the construction of the project.

8. INTERRUPTING LIMITS, CONFIGURING TRANSFORMATION THRESHOLDS

As inclusive education constitutes a singular critical disposition, it becomes a powerful threshold of knowledge transformation and a meaningful political intervention strategy for diverse world-systems. Also, it can be considered as a mechanism of audibility, an activating force of consciousness, a creative figuration in constant becoming. The uniqueness of the heuristic-political force of the threshold it builds has, among other functions, transcoding a series of highly significant contributions to educational transformation. At

the same time, it fosters the emergence of new codes that show us funda-
mental positions through which its intellectuality and conceptual forms
are transformed. The notions of 'threshold' and its 'transformative ways
of thinking' operate through a (trans)relational nature; that is, they work
by zigzagging, interconnecting, and opening up new ways of thinking and
imagining each of their world-systems.

The heuristic power of the threshold acts in terms of a vanishing point,
opens perspectives, creates new categories, and so on. It is an operation that
proceeds by the logic of de-foundation, it accepts the challenge of constructing
new theoretical frameworks, in it, the socio-political is part of knowing,
it is an operation of turning the usual ways of thinking and producing
knowledge. Thresholds are key in epistemological work since they allow
us to rediscover the strength of its task, they become a vanishing point, in
distinctive forms of thought. Their critical center agglutinates the dislocating
force of the event, of performativity, and of challenging imaginations.

The knowledge of inclusive education is not exclusively cognitive, but
also deeply imaginative, affective, and volitional. Its epistemological work
coincides with Chen's (2010) approaches by pursuing the construction of a
heuristic plot that dislocates the subjectivity production devices, it creates
new categories that emerge by way of such injection. Its concepts should
help to deeply read the present. These are, undoubtedly, some of the most
far-reaching implications that arise from the task of knowing through the
epistemological lens of inclusive education. It is an operation that proceeds
by way of incorporating novel scopes. Its constructive forms work to make
apprehensible the openness, the new, the emergence of a knowledge that
disrupts forms and functions, which according to Zemelman (1989, p.89),
"is the content of reality is an articulation between the limit of the given
and the possibility to be given", it is a sign of construction of the possible,
it is a knowledge that works in the dialectic opening/breaking of reality and
its phenomena, enhancing the unknown and activating the networks of the
transformation of the world.

Inclusion is, in itself, the elaboration of a method, what does this imply?
Fundamentally, the assumption of an inventive task and a platform in the
interiority of the field. Sharing the assertion of Bal (2009), in his brilliant
work published in Spanish by Cendeac, entitled: "Conceptos viajeros en las
humanidades: una guía de viaje", he argues the need to replace methods by
concepts in emerging fields such as the one analyzed here, especially when
the analyst has nothing to rely on. Concepts are forms of heuristic and
political regulation, singular forms of linking with reality. For Zemelman
(1992, p.45), "the productivity of posing the methodological question on the
categorical plane lies in rereading the conceptualizations of reality, starting
from the incidence of social and political forces, considering possible latent

directions in the present." Working with concepts is always problematic. As an open theoretical figuration, it works from multiple levels of analysis, fostering a more complex illustration of reality by capturing in its complexity the totality of its phenomena.

The field of knowledge of inclusive education can be understood in terms of a dispersed, nomadic, non-unitary, and dynamic totality structure, in which not only diverse singularities converge, but also complex practices driven by its actors. The construction of its knowledge follows the logic "given-giving-to-be-given" which allows us to conceive its heuristic task in terms of incompleteness. Inclusion, as an open field of alterations, is signified in terms of a heuristic and political force that creates out-of-the-ordinary realities, a challenging imaginative device in the intervention of the contemporary world. Its constructive forms operate in 'structure' and 'action'; it is a knowledge traversed by a set of practices that crosses, transgresses, and transforms the social, the political, and the ethical, multiaxially.

The structure concept adopted in this singular regionalization assumes a mechanism of adaptation to the needs of movement of the social reality and its problems in permanent becoming. For Zemelman (1992, p.93-94), it constitutes "a process of condensation of a determined tempo-spatial dynamic." It becomes a mode of concretion in zigzag, in permanent overturning and turning, never something closed, but construction and constellation that allows in its dynamics the inclusion of new levels and processes of analysis and constructiveness -thus, the field is assembled by diverse epistemological convergences-, harboring multiple modes of concretion. In this sense, Zemelman (1992, p.67) proposes "to consider reality as historical, an open field of alternative actions and social forces capable of creating realities, as possible directions of the movement of reality." It is a sign of "reinvention of a critical utopia, against resignation and conformism, it must overcome two key problems within a modern knowledge, in itself colonialist, for its realization: "silencing and difference" (De Sousa, 2006, p.46).

The task of knowing in this field is defined from the (re)articulation of problematic, figurative, and imaginative categories of production. Its epistemological function "assumes a dialogue between diverse theoretical schemes, in order to capture the multidimensionality of the problems to be known and in coherence with the complex form of social reality" (Zemelman, 1996, p.119). The study of movement as a condition of production assumes that the understanding of reality is always unfinished. Indeed, as Paredes (2014, p.127) indicates.

> [...] the epistemological function assumes a logic of inclusion, consistent with a vision of openness to the complexity of social reality, while the theoretical function works exclusivity. That is to say, a logic based on an articulating movement, which

includes different times, spaces, processes, towards a moment of condensation called "present". For Zemelman, "since reality is conceived as an articulated movement of heterogeneous processes, the first structure of possible relations must be based on the logic of inclusion, which allows us to link concepts without necessarily resorting to a theoretical hypothesis" (Zemelman 1987, 41). In other words, the epistemological function of knowledge appeals to problematic openness, and the theoretical function to its closure (Zemelman 2005, 70-71).

As inclusive education inscribes its work of intellectual production in exteriority, it becomes a peculiar predicative and attributive form, a way of thinking in terms of possibilities.

The epistemological field of inclusive education proceeds along multiple paths that disrupt the usual order of things, multiple paths that lead to a series of alterative confrontations, affected and unexpectedly realigned by multiple trajectories that inscribe its heuristic force beyond its confluent denomina- tions. It is a field that not only possesses the theoretical possibility of deter- ritorialization and movement but rather, continually submits to this process.

The configuration of its domain does not proceed through a single synthesis, but, through a restless dialectical action, it assumes the critical impossibility of a fusion since we are forced to think beyond theory due to the characteristics of the field. I am mostly attracted to think 'beyond' the prevailing critical forms of education, an action that becomes an enterprise aimed at extending our languages of understanding, affecting their networks of objectualization, systems of reasoning, and degrees of intelligibility.

9. CONCLUSIONS: CHALLENGING AND UPLIFTING IMAGINATIONS

In the interiority of the field of inclusive education, the special acts in terms of a placeholder for the global domain - mental monoculture - while, in heuristic terms, it assumes a position of palimpsest, that is, that which cannot be erased. This idea confirms the presence of a rather normative movement. However, its domain becomes a network of innumerable interrelationships that foster multi-axial understandings about its web of intelligibility, this operation traces a web of analysis that has clouded the question of authenticity. It is necessary to destabilize and dislocate to find other kinds of intellectual, ethical, political alloys.

Another aspect to highlight is the epistemic, methodological, and lexical non-equivalence between each of its constructive parts. While the special may be a form of the inclusive, the inclusive is not necessarily a form of the special, it is a much broader operation. The pairing of the theoretical-methodological forms of the special as part of the inclusive unveils an analytical operation that proceeds by *way of precarious directionality*.

In part it justifies the search for forms of analytical precarization sustained in instrumental forms of approximation to each other, revealing a non-transformative crossing. This transference of the special as rostricity of the inclusive constitutes a homogeneous set that acts in terms of a parodic identity. The special becomes the grounded place of the aesthetics of the pseudo-inclusive. For this, it is necessary to institute a process of suspension and delegitimization of its premises of enunciation.

The transvestization of the special as the face of the inclusive acts in terms of a 'turn inward', that is, a kind of turn in the same language, what would one call this strategy? This theorization ratifies an ontological politics of the subject that is trapped through the signifier of sub-alternity, unveiling a tortuous linguistic relationship. This regionalization advances through systems of mutation, convergence, and other forms of analysis through an infinity of knowledge projects, situated within area studies and the subjects of inclusion. A strategy of de-subjugation of the special in the inclusive must be promoted since they are two different heuristic forms. Although the special is recast through the epistemology of the inclusive, the special does not have the power to redefine all the domains of education and the world-system.

Inclusion inaugurates a new way of thinking, assumes a device of recognizing the educational task and all the fields of educational sciences, assumes a transforming enterprise of understanding and representing reality and its corpus of problems, articulates a new vision of the world, a complex interactive system. The question of the place of inscription and residence of inclusion confronts us with the dilemmas of socio-spatial pedagogy, opening up to the discussion of new contemporary relations; at this point, it connects with the critical tasks of inclusive education. It inaugurates a network of new ethical commitments.

Imagination plays a fundamental role in the constitution of an ontology of the lesser - molecular revolution. The affective and imaginative force imposed by the sign of inclusion fosters the construction of an intensive becoming. It inaugurates a counter-space of creation in the diverse world-systems. It is a process of permanent reinvention. Its intensely creative figurative force possesses the capacity, differs, and alters the course of things. Inclusion does not adapt to the figurations of the established world, whose desire does not pursue the preservation of things, but tends to change, to deep transformation. The domain meant as inclusive education when conceived as a challenging imagination harbors a plurality of desires builds a new affective and language politics. Inclusion is not a mere system of projective imagination, rather it recombines contents, languages, and ways of thinking, attuned to the complexities of the field.

The nomadic sense that entails the knowledge project in resistance of inclusive education reflects a powerful political sign; it is a "commitment to a critical and political praxis in terms of counter-memory, resistance, responsibility, situated knowledge and a politics of localization" (Braidotti, 2004, p.66). The heterotopic space of which I speak in my texts is precisely a counter-space, which

> [...] needs to build and preserve utopian and uchronic spaces that serve to define and consolidate all the other spaces in which individuals live and socialize. Places, he says, that oppose all others that have as their destination the erasure of all others, their neutralization or purification. They are like counter-spaces, localized utopias that children know perfectly well (for example, the parents' bed when they are absent or the basement). They are transgressive and harbor a space of free expression where everything that is against the established order, the rules, everything that does not follow the laws, finds a possibility of existence (Gonzalez, 2018, p.181).

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STUDY OF THE BEHAVIOR OF DIFFERENT SOWING DENSITIES OF FINGERLINGS FOR THE FATTENING OF RAINBOW TROUT

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— Abstract—

The behavior of different planting densities of fingerlings (40, 60, 80, and 100 fish/m^2) was studied for the fattening of Rainbow trout (Oncorhynchus mykiss). The fish used were 840 fingerlings of 4 months of age and with an average weight of 24.20 g; and an average size of 2.92 cm in total body length; the same ones that were distributed in a completely randomized block design with three replications per treatment, having a total of 12 experimental units. The average weights at the beginning of the research were 24.20 g and, after seven months, they were 253.75 g. While the total food consumption was 316.81 g during the seven months of evaluation. At the same time, the fish gained 229.55 grams in total. Trout were good food converters since they required between 1.11 and 1.71 kilos of balanced to convert one kilo of meat. Regarding height, there were no significant statistical differences in the treatments, starting with 12.92 cm and finally reaching a total body length of 26.95 cm in the last evaluation (the seventh month).

Keywords

Fingerlings; Rainbow trout.

Rainbow trout (Oncorhynchus mykiss) are native to the watersheds draining the Pacific in North America, ranging from Alaska to Mexico. Since 1874 it has been introduced into the waters of all continents except Antarctica for recreational purposes for sport fishing and aquaculture (FAO, 2020).

The trout is an anadromous species but also sedentary (non-migratory). In the wild, it lives in Mountain Rivers with cold water (Flores, 2018). The Republic of Ecuador has a diversity of climates that encourage productive agricultural and aquaculture activities. It is classified as an agricultural country for being a producer of bananas, flowers, and shrimp. The cultivation of rainbow trout is an option to encourage, due to the favorable conditions offered by the country. This activity has been developed in the inter-Andean region because it has water temperatures between 5ºC and 18ºC and greater water resources (Gallardo Domínguez, 2015).

Imaki (2003) indicates that starting in 1930, hatcheries and fingerling rooms were built in the provinces of Imbabura, Cotopaxi, and Azuay, respectively, with the introduction of embryonated trout eggs whose fry were used to populate the river and lake systems of the Inter-Andean region.

The province of Chimborazo presents in its geographic diversity a great potential of water resources in the different altitudinal floors, helping fish farming to develop with great productive and economic advantages. According to the Ministry of Agriculture, Livestock, Aquaculture, and Fisheries (MAGAP), this type of enterprise has increased substantially in recent years (Morales, 2019).

Trout is a demanding fish in terms of water quality and quantity; they are raised in clean, cold, and well-oxygenated waters (Calle & Calle 2017). In this context, the efficient use of feed would reduce production costs and would have an important impact on profitability, mainly in advanced and larger-scale production systems (Carpio & Tito, 2017).

This research aims to optimize the useful space for trout farming, through the use of an adequate density of fish per square meter, since it is known that in our country this parameter is not taken into account as a technical criterion.

MATERIALS AND METHODS

Location and duration of the experiment

The present investigation was carried out in the fish production program of the Nacional Técnico Autachi, Nitiluisa community, Calpi parish, Riobamba canton, Chimborazo province, Ecuador. This experiment lasted 270 days,

distributed in 30 days for pond preparation and fish adaptation; 210 days for trout production, and 30 days for data tabulation, interpretation, and publication.

Experimental Units

In the present investigation, we worked with 840 fingerlings, for which 12 experimental units (ponds) of 1 m² by 1 m depth were used, in which the respective treatments were distributed (40, 60, 80, and 100 fingerlings/m²).

Materials

12 ponds of 1 m², 840 fingerlings, balanced feed, thermometer, tape measure, rakes, desk material, pots, methylene blue, antibiotics, formaldehyde, chlorine, common salt, sodium hypochlorite, and necessary cleaning supplies.

Equipment

Precision balance, photographic camera, calculator, hygrometer, ph meter, thermometer.

Facilities

Fattening ponds.

Treatment and experiment's design

The treatments applied in this research were: T1: 40 fingerlings/m², T2: 60 fingerlings/m², T3: 80 fingerlings/m², T4: 100 fingerlings/m². They were distributed in a Completely Randomized Block Design (CRBD).

Statistical analysis

The results of the present study were subjected to the following statistical analyses: Analysis of variance (ADEVA), Separation of means test (Duncan, $\alpha \leq 0.05$), and linear regression analysis.

Experimental procedure

Before the beginning of the research, the ponds were prepared and disinfected to form the experimental units of 1 m². The fish were distributed according to their weight in each of the blocks, and the treatments were randomly

drawn or distributed. All the experimental units had the same treatment and feeding management, and the fish were fed twice during the day.

Fish weight was taken biweekly to calculate weight gain by analysis of variance, as well as feed conversion, which was calculated with feed consumption. We took data on the size at 15 days and at the end of the experiment, the cost of feed per kilogram of weight gain at the end of the fattening phase, as well as the profit/cost.

A necropsy was performed on the dead fish to determine the cause of death, and the weekly and final mortality percentages were taken. At the end of the experiment, 30% of the fish were weighed to analyze the weight gain from the beginning to the end of the fattening phase.

Sanitary program

Fifteen days before starting the experiment, the ponds were cleaned and disinfected with formalin; and three days before the fingerlings' arrival, they were disinfected with methylene blue. The fish underwent a 15-day adaptation stage before starting the experiment, for which they were placed according to the draw of the treatments (40, 60, 80, and 100 fingerlings/m²), and initial weight and size data were taken. During the research, the study variables continued to be evaluated to determine the benefit/cost. The amount of feed supplied was calculated according to the number of fish, weight, size, and water temperature according to the recommendations of the commercial company.

The ponds were cleaned once a week. Formaldehyde and chlorine were used as disinfectants, and sodium hypochlorite was used to neutralize the chlorine.

RESULTS AND DISCUSSION

Evaluation of weight

In the evaluation at 210 days, the different treatments used did not present significant statistical differences, although the numerical weights were in the following order: 245.93 g for 40 fish/m²; 258.68 g for 60 fish/m²; 257.72 g for 80 fish/m²; and 252.65 g for 100 fish/m² (Table 1), which finally proved that the weight variable was not affected by the density of animals per square meter.

From this analysis it was deduced that statistically, the weight was not influential in the fish densities used for the research; this is advantageous, since in most cases, traditionally in reinforced concrete ponds in the Ecuadorian highlands, densities of a maximum of 70 fish/m² are used, while if there is sufficient water dosage, 100 fish/m2 could be included (Blanco, 1995) and (Stevenson, 1985). Similarly, Imaki (2003) indicates that, if the

water supply conditions are favorable, the ponds can deliver up to 25 kg of fish/m² of surface area, if we consider that each animal can reach 250 grams at the "plate type" we would be talking about 100 fish/m².

Table 1

Weight behavior in trout fattening using different fish densities

VARIABLE Weight	TREATMENTS				MEAN	CV (%)	
	40 fishes/m²	60 fishes/m²	80 fishes/m²	100 fishes/m²			
Initial (gr)	24,95 A	24,02 A	24,02 A	21,73 A	24.20	30.76	ns
At 30 days (g)	43,43 A	47,48 A	47,48 A	38,73 A	44,98	22.26	ns
At 60 days (g)	66,043 A	70,3 A	70,3 A	61,673 A	65,958	20.89	ns
At 90 days (g)	99,05 A	89,767 A	89,767 A	80,237 A	89,741	19.34	ns
At 120 days (g)	142,05 A	138,13 A	138,13 A	132,59 A	138,45	10.62	ns
At 150 days (g)	175,52 A	170,64 A	170,64 A	165,32 A	171,38	9.19	ns
At 180 days (g)	208,98 A	203,39 A	203,39 A	198,07 A	204,37	8.24	ns
At 210 days (g)	245,93 A	257,72 A	257,72 A	252,65 A	253,75	4.89	ns

CV: Coefficient of variation
ns: No statistically significant difference (P > 0,05)
Averages with equal letters do not differ statistically according to Duncan's test.

Source: Own elaboration

Evaluation of feed consumption

In the last evaluation at 210 days, the different treatments applied did not present significant statistical differences; however, the feed consumption in numerical form was staggered in the following order: 68.963 g of 40 fish/m²; 68.325 g of 60 fish/m²; 67.119 g of 80 fish/m2 and 65.362 g of 100 fish/m² (Table 2). This would experience us that until the end of the evaluation the variable feed consumption is not affected by the different treatments applied.

Table 2

Feed consumption in trout fattening using different fish densities

VARIABLE Feed consumption (g)	TREATMENT				MEAN	CV (%)	
	40 fishes/m²	60 fishes/m²	80 fishes/m²	100 fishes/m²			
At 30 days (g)	26,946 A	28,188 A	25,942 A	23,472 A	26,137	30.77	ns
At 60 days (g)	25,727 A	25,645 A	29,959 A	24,976 A	26,576	22.02	ns
At 90 days (g)	42,882 A	33,567 A	35,853 A	30,477 A	35,695	17.87	ns
At 120 days (g)	48,204 A	57,172 A	54,134 A	57,134 A	54,161	14.86	ns
At 150 days (g)	49,258 A	46,544 A	58,894 A	46,277 A	50,243	26.70	ns
At 180 days (g)	57,921 A	57,435 A	56,312 A	54,557 A	56,556	9.19	ns
At 210 days (g)	68,963 A	68,325 A	67,119 A	65,362 A	67,442	8.24	ns
Total	319,9 A	316,88 A	328,21 A	302,25 A	316,81	9.48	ns

CV: Coefficient of variation
ns: No statistically significant (P > 0,05)
Averages with equal letters do not differ statistically according to Duncan's test.

Source: Own elaboration

According to the statistical analysis, it was determined that the density of fish per square meter is not influential in the fattening of rainbow trout, i.e. consumption is relatively normal with or without overcrowding, so that sustained management of the trout pond is possible, as long as the flow rates are accurate. According to FAO (2014), the amount of feed to be supplied to each group of trout depends on the type of feed, water quality, temperature, condition, and size of the fish. Similarly, Gómez (2017) mentions that feed should be distributed spreading it to the air, according to the daily ratio that corresponds to each of the ponds, to ensure uniform growth.

Evaluation of weight gain

At 210 days after the last evaluation, the different treatments applied showed no significant statistical differences, therefore the weight gain parameter was scaled as follows: 54.583 g of 100 fish/m²; 54.327 g of 80 fish/m²; 51.637 g of 60 fish/m² and 36.953 g of 40 fish/m² (Table 3). This shows that until the last evaluation, the weight gain variable was not statistically significant due to the treatments.

Table 3

Weight gain in trout fattening using different fish densities

VARIABLE Weight gain (g)	TREATMENT				MEAN	CV (%)	
	40 fishes/m²	60 fishes/m²	80 fishes/m²	100 fishes/m²			
At 30 days	18,483 A	24,183 A	23,463 A	17 A	20,783	15.87	ns
At 60 days	22,61 A	15,533 A	22,817 A	22,94 A	20,975	28.37	ns
At 90 days	33,007 A	24,093 A	19,467 A	18,563 A	23,783	30.81	ns
At 120 days	43,00 A	51,133 A	48,367 A	52,35 A	48,713	14.77	ns
At 150 days	33,467 A	33,003 A	32,51 A	32,737 A	32,929	4.15	ns
At 180 days	33,463 A	33,00 A	32,747 A	32,743 A	32,988	4.08	ns
At 210 days	36,953 AB	51,637 AB	54,327 A	54,583 A	49,375	13.30	*
Total	220,98 A	232,58 A	233,7 A	230,92 A	229,55	2.89	ns

CV: Coefficient of variation
ns: No statistically significant difference (P > 0,05)
*: Statistically different (P ≤ 0,05)
Averages with equal letters do not differ statistically according to Duncan's test.

Source: Own elaboration

The present research shows that the weight gain in each evaluation, and even in the total period, had no statistical influence on the management of the different fish densities. In this regard, Blanco (1995) and Imaki (2003) mention that as long as there are an acceptable flow rate and complete prophylaxis, it is possible to keep up to 100 fish of 250 g/m² or 25 kilos of plate trout/m² of the pond, without interfering with weight gain.

Evaluation of feed conversion

At the end of the evaluation at 210 days, the four treatments used did not show significant statistical differences, however, the intakes were in the following order: 2.08 of conversion in the experimental unit containing 40 fish/m²; 1.33 of feed conversion for the 60 fish/m² of surface area; 1.24 grams of feed used to gain one gram of meat by the animals, supporting a density of 80 fish/m² and 1.2 of conversion in fish included at the rate of 100 fish/m² (Table 4). This indicated that until the end of the experiment, feed conversion was not affected by animal density under the detailed treatments.

Table 4

Weight conversion in trout fattening using different fish densities

VARIABLE Weight conversion	TREATMENT				MEAN	CV (%)	
	40 fishes/m²	60 fishes/m²	80 fishes/m²	100 fishes/m²			
At 30 days	1,41 A	1,16 A	1,11 A	1,40 A	1,27	25,23	ns
At 60 days	1,15 B	1,73 A	1,32 AB	1,09 B	1,32	12,50	**
At 90 days	1,36 A	1,39 A	1,98 A	1,71 A	1,61	25,47	ns
At 120 days	1,12 A	1,12 A	1,12 A	1,09 A	1,11	1,76	ns
At 150 days	1,47 A	1,41 A	1,80 A	1,41 A	1,52	25,54	ns
At 180 days	1,72 A	1,74 A	1,72 A	1,67 A	1,71	6,39	ns
At 210 days	2,09 A	1,33 A	1,24 A	1,20 A	1,46	37.39	ns
Total	1,44 A	1,36 A	1,40 A	1,31 A	1,38	7.82	ns

CV: Coefficient of variation
ns: No statistically significant difference (P > 0,05)
**: Highly statistically different (P ≤ 0,01)
Averages with equal letters do not differ statistically according to Duncan's test.

Source: Own elaboration

This analysis indicates that all experimental units had the same attitude to convert feed, so the increase in fish density was not influential in the fattening of rainbow trout, which may indicate that in the climatic conditions of the province of Chimborazo, Ecuador, up to 100 fish/m2 or more could be maintained depending on the ponds, without altering the consumption, weights and feed conversions, of course maintaining optimal water conditions (quantity and quality) and adequate environmental temperature.

Colque (2020) mentions that up to 19.62 kg/m² can be maintained, equivalent to 80 fish per m² of surface area; widely surpassed to that stated by Calle & Calle (2017) where they indicate that in the production process of rainbow trout produced based on natural food (organic cereals and fishmeal) 25 to 30 trout/m² can be kept.

Similarly, Morales (2004) in his research on the growth and feed efficiency of rainbow trout in cages, states that the optimal daily ratio found corresponded to 2.9% of body weight.

Size evaluation

At the end of the research, at 210 days the length variable, the four treatments used did not show significant statistical differences, although these lengths numerically were shown in the following order of treatments: 27.35 cm by the 60 fish stabled in one square meter; 27.28 cm length of the fish that supported a density of 80 per unit area; 26.93 cm total body length of the

fish that resisted an animal load of 100 per unit area, and 26.25 centimeters the trout with a stocking density of 80 per square meter (Table 5). This evaluation indicates that, until the end, the size is not differentiated by the treatments used.

Table 5
Length behavior in trout fattening with different fish densities

VARIABLE Length	TREATMENT				MEAN	CV (%)	
	40 fishes/m²	60 fishes/m²	80 fishes/m²	100 fishes/m²			
Initial (cm)	12,97 A	13,42 A	13,17 A	12,15 A	12,93	14,28	ns
At 30 days (cm)	15,42 A	15,87 A	14,77 A	14,30 A	15,09	10,12	ns
At 60 days (cm)	16,82 A	17,05 A	16,65 A	16,44 A	16,74	8,45	ns
At 90 days (cm)	18,49 A	18,55 A	17,85 A	18,06 A	18,24	8,42	ns
At 120 days (cm)	20,54 A	21,00 A	20,52 A	20,42 A	20,62	6,43	ns
At 150 days (cm)	22,37 A	22,89 A	22,51 A	22,51 A	22,57	5,53	ns
At 180 days (cm)	24,21 A	24,79 A	24,49 A	24,60 A	24,52	4,82	ns
At 210 days (cm	26,25 A	27,35 A	27,28 A	26,93 A	26,95	4,03	ns

CV: Coefficient of variation
ns: No statistically significant difference (P > 0,05)
Averages with equal letters do not differ statistically according to Duncan's test.

Source: Own elaboration

This research shows that size is not influential on the fish density and growth of rainbow trout. According to Bustamante, Araníbar, Huanca, & Rodriguez (2016), and FAO (2014) the most important factor that regulates fish growth is water temperature since fish do not have their capacity to regulate their body temperature. The higher the water temperature, the higher the metabolic rate.

The species can withstand wide ranges of temperature variation (0-27 °C), but spawning and growth occur in a narrower range (9-14 °C). The optimum water temperature for rainbow trout (Oncorhynchus mykiss) breeding is below 21 °C (FAO, 2020). Thus, in the present investigation, with an average water temperature of 10-11 ºC, plate type trout (250 g) were fattened in 7 months (from fingerling to commercial size); while in waters with an average of 16ºC, fish of the same productive condition would be obtained in 3 or 4 months; therefore, it is convenient to continue investigating the effect of water temperature and climatic conditions on the development of trout, since fish are poikilothermic animals and depend on environmental temperature for their metabolism.

Mortality

Table 6 shows the mortality parameters that could occur in the fattening of rainbow trout under different stocking densities.

Table 6
Mortality of fish reared at different densities

Treatment	Mortality	
	Nº	%
40 Fishes / m²	1	0,12
60 Fishes / m²	1	0,12
80 Fishes / m²	5	0,60
100 Fishes / m²	7	0,83
Total	14	1,67

Source: Own elaboration

It can be seen that the total mortality was 14 specimens out of 840, i.e. 1.67%, of which the experimental units where 100 trout/m² were housed were the ones with the highest rate (0.83%); however, Zapata (2015) states that the low mortality is because there was no excess stress on the fish and the ponds were kept clean and protected from predators.

Similarly, Zambrano (2013) mentions that the percentage of mortality during the entire growth process has been calculated by phases: 6.50% in the fingerling stage, 3.60% in the rearing stage, and 5.40% in the fattening stage, a total of 15.50% during nine months in concrete ponds, a parameter that is higher than our data. With this particular data, it is very advantageous to have a good technological alternative to undertake fish farming in the Ecuadorian highlands.

Economic evaluation

According to this analysis, we can indicate that as the density of fish in the ponds increases, the net income also rises from 0.75 dollars with 40 fish/m²; 3.62 dollars with 60 fish/m²; 5.11 dollars with 80 fish/m²; up to 8.68 dollars in trout that were kept at a rate of 100/m² (Table 7).

Likewise, the Profit/Cost, although positive in all treatments, always the highest density (100 fish/m²) obtained the most optimal indicator, since, for each monetary unit invested, 16 cents of profit or 16% of profitability is obtained in seven months of productive-economic exercise.

Table 7

Economic analysis of trout raised at different densities

DETAIL	Unit.	Amo.	UV	TREATMENTS (TROUTS / M²)			
				40	60	80	100
Ponds (depreciation)	m²	1	2,33	2,33	2,33	2,33	2,33
Divisions (mesh) - deprec.	u	1	0,23	0,23	0,23	0,23	0,23
Supplies	u	1	-	0,20	0,30	0,40	0,50
Medicines	u	1	-	0,10	0,15	0,20	0,25
Food (according to consumption)	kg	-	0,72	9,21	13,69	18,90	21,76
Labor (3 Days/month)	day	-	4	11,76	18,48	24,36	29,4
TOTAL EXPENSES				**23,84**	**35,19**	**46,43**	**54,48**
Average Weight	Kg/fish			0,25	0,26	0,26	0,25
Weight / Experimental Unit	Kg			9,84	15,52	20,62	25,27
TOTAL GROSS INCOME	**$**	**1**	**2,5 / Kg**	**24,59**	**38,80**	**51,54**	**63,16**
NET INCOME				**0,75**	**3,62**	**5,11**	**8,68**
PROFIT / COST				**1,03**	**1,10**	**1,11**	**1,16**

Am: Amount
VU: Unit value

Source: Own elaboration

CONCLUSIONS AND RECOMMENDATIONS

Throughout the research, no significant statistical difference was found in the different variables, which means that it is convenient to raise to 100 fish/m², as long as there are optimal water conditions (quantity and quality) and adequate environmental temperature.

Trout weights averaged 44.98, 65.95, 89.74, 138.45, 171.38, 204.37, and 253.75 grams from the first to the seventh month of evaluation, respectively. The trout were good feed converters since they required between 1.11 and 1.71 kilos of feed to convert one kilo of meat.

In the size aspect, there were no statistical differences between treatments, although the general averages were: 15.09 cm in the first month, 16.74 cm in the second month, 18.24 cm in the third month, 20.62 cm in the fourth evaluation, 22.57 cm in the fifth month, 24.52 cm in the sixth month and finally 26.95 cm in the last evaluation (the seventh month).

According to the economic analysis, it is possible to recommend the management of up to 100 fish per square meter of pond surface for the breeding of rainbow trout in the Ecuadorian highlands, depending on the availability of water (flow) and its quality, since in this particular case space and the investment are optimized.

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PLANT EXTRACTS FOR THE IN VITRO CONTROL OF COLLETOTRICHUM *GLOEOSPORIOIDES* P. ISOLATED FROM *CARICA PAPAYA* L.

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Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

83

— *Abstract*—

Papaya is a crop of great importance worldwide; Mexico and Colombia are world leaders in its production. One of the main limitations for this crop is the diseases that include the anthracnose that affects pre and post-harvest, which is why the search for efficient, sustainable, and harmless alternatives in crop health is essential to reduce losses in production and thereby improve the income and quality of life of the producer and those involved in the production chain to the consumer with quality products and without contaminants that affect their health. The objective of this study was to evaluate plant extracts under two forms of extraction in the *in vitro* control of *Colletotrichum gloesporioides*. Therefore, the antifungal effect of plant extracts of oregano leaves (*Oreganum vulgare*), pepper fruits (*Pimienta dioica*), neem leaves (*Azadirachta indica*), and dried matarraton leaves (*Gliricidia sepium*) obtained from distillation and microwave methods was evaluated on *C. gloesporioides* isolated from *Carica papaya*. We used the technique of poisoned medium in Petri dishes with PDA medium; in the first phase, the concentration of 60% was tested for all extracts. Subsequently, the minimum inhibitory concentration was determined for those who in the first phase inhibited 100%. The antifungal effect was determined by mycelial growth, the number of total and germinated conidia. The results indicated that the extract of pepper fruit obtained by microwave in a concentration of 40% and M2 UNACH patent of 20 % inhibited *C. gloesporioides*. The extracts obtained by the microwave had a better antifungal effect than those obtained by distillation.

Keywords

Anthracnose; Pimienta dioica; microwave; antifungal.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

84

Papaya is also called *lechosa* in Venezuela, *fruta bomba* in Cuba and *Mamao* in Brazil. It is one of the most popular tropical fruits because of its mild and pleasant flavor and the nutritional properties attributed to it. It is highly sought after by consumers who have a preference for fruits that are not only pleasant but also have a high nutrient content (Corporación Colombiana de Investigación Agropecuaria [Corpoica], 2000). The production of papaya (*Carica papaya L.*) is of great economic importance; Mexico ranks fifth as a world producer and first as an exporting country, while Colombia is in eighth place as a world producer (Evans, 2015). There is a relevant production volume for papaya cultivation in Colombia, according to the National Agricultural Survey (ena) published by the National Administrative Department of Statistics (dane, 2016), during 2015, Colombia produced 105,459 tons of papaya. The papaya crop is subject to various diseases during rainy periods; the most important of these are considered to be: papaya ringspot, followed by anthracnose, root and foot rot, and black spot (dane, 2016). *Colletotrichum gloeosporioides P.*, is the pathogenic agent causing anthracnose on *Carica papaya L.*, a disease found in all areas where papaya is grown and becomes the main cause of postharvest fruit losses (Instituto de Investigaciones Agropecuarias [inia], 2016), with estimated losses of 25-40% (Quiroga, 2016) and occurs in all producing regions of the world, causing huge losses in Brazil, Hawaii (usa), and Mexico (Ventura, et al., 2004).

Colletotrichum gloeosporioides (Penz.) Sacc. is a ubiquitous, prolific, and economically important pathogen, as it induces substantial yield losses by affecting vegetative parts and causing postharvest deterioration of fruits in temperate, subtropical, and tropical climates. In addition to affecting fruit, the pathogenic fungus also attacks other parts of the plant such as roots, flowers, and stems (dane, 2016). Once in the fruit, the fungal spores germinate, and after 48 hours, they form a germ tube that directly penetrates the cuticle of the unripe fruit, where it remains dormant but the invasion is reactivated during fruit ripening (Zavala et al., 2011). One of the outstanding characteristics of *Colletotrichum sp*. is its ability to survive in dormancy or quiescence when environmental or physiological conditions of the host prevent it from developing (Parra, 2008), the fungus produces an appressoria that penetrates the fruit, degrading the cuticle and producing a dormant subcutaneous hypha that does not develop until the fruit ripens. The pathogen is activated in conditions with the prevalence of rainy seasons or high relative humidity (Rodriguez et al., 2009). It has been considered as one of the main pathogens attacking fruit tree plantations during pre-flowering, the disease remains asymptomatic until the degree of fruit ripening is such that the pathogen performs an intercellular invasion and the disease is expressed, such phenomenon is known as quiescent infection (Montaño and Lemus, 2015). For the control of anthracnose, integrated crop management

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

85

measures must be established, based on preventive and curative actions, oriented both in the field and postharvest stages (DANE, 2016). Chemical control is the most common due to the economic importance of the crop. Many chemicals are available, among the most used are compounds such as dithiocarbamate, benzimidazole, and triazoles; and other fungicides such as chlorothalonil, imazalil, and prochloraz (Parra, 2008).

According to Dirzo (2008), "The plant world is loaded with a surprising diversity of metabolites, most of which have no obvious involvement in the primary metabolic processes of the plant (photosynthesis, respiration, etc.). These compounds have therefore earned the name "secondary metabolites." It is estimated that more than 100,000 are produced by plants (Perez and Jimenez, 2011). Secondary compounds have no apparent function in primary metabolism but do have an ecological implication as a defense against herbivores, viruses, fungi, bacteria, as well as allelopathic substances (Echeverría, 2012).

Plants produce compounds with antimicrobial properties that can be used to control different diseases in fruit and vegetable products. The obtaining of plant extracts and the study of their active compounds allow their use against different phytopathogens. Under in vitro conditions, extracts inhibit pathogen growth, as well as sporulation and spore germination, thus helping to control fruit and vegetable diseases (Hernández et al., 2007).

The obtaining of vegetable extracts can be done by different methods, which allow the separation or purification of multiple substances, some commonly used are distillation, which is one of the oldest and most used methods to separate and purify liquids; the method consists of applying heat to a mixture of substances until one of them passes to the vapor phase, then the vapor is cooled by passing through a refrigerant where it condenses and the liquid is collected in a suitable container. Less volatile substances or impurities will remain in the initial vessel (Quercuslab, 2015). There is also the microwave technology, which has become during the last years a tool that improves the productivity of the processes; it works with electromagnetic radiations that are in the range of 0.3 to 300 GHz (λ = 1 to 0.001 m) (Martinez et al., 2010). Recently, the microwave-assisted method has been used as an alternative method of extraction at laboratory scale and has represented great advantages such as energy savings, short process times, higher yield, economical and environmentally friendly processes (Puertas, et al., 2013).

The objective of this research work was to determine the effectiveness of the use of plant extracts in the in vitro control of the pathogen causing anthracnose, to offer a sustainable alternative to this problem.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

86

METHODOLOGY

The research was carried out at the Laboratorio de Agrotecnologías de la Agencia Universitaria para el Desarrollo (AUDES) Cacao-Chocolate of the Universidad Autónoma de Chiapas, located in Ciudad Universitaria, Tuxtla Gutierrez, Chiapas, Mexico.

The present research was developed in two phases: the first phase evaluated the antifungal effectiveness of extracts at a concentration of 60% on *C. gloeosporioides P.*; the second phase corresponding to the determination of the minimum inhibitory concentration (MIC) of extracts on *C. gloeosporioides*. In each phase, we worked with a strain of *Colletotrichum gloeosporioides P.* isolated from papaya fruits (*Carica papaya L.*) supplied by the Laboratorio de Agrotecnologías de la AUDES Cacao-Chocolate of the Universidad Autónoma de Chiapas, which was isolated from *C. papaya* fruits obtained directly from the field in the municipality of Villaflores, Chiapas in January 2018 and multiplication of the pathogen was carried out in this same laboratory through repotting in potato dextrose agar (PDA) culture medium, which was incubated at a temperature of 23°C ± 2°C for 12 days.

The research was carried out using a Completely Randomized Design (CRD), starting in phase one with 11 treatments, each with four replicates. The treatments were distributed in eight plant extracts and three controls: one negative (PDA medium or absolute control) and two positives; the chemically synthesized fungicide (I.A. Ciprodinil 37.5% + Fludioxonil 25%) and a fungicide in the patent process (M2 UNACH). In phase two, the pepper fruit extract obtained by microwave and the M2 UNACHproduct were evaluated.

The experimental unit (EU) in phases I and II consisted of a Petri dish and there were four replicates for each treatment evaluated. For the first and second phases, a total of 44 EU were established.

Collection of plant material

Fresh oregano (*Oreganum vulgare*) leaves were collected from the municipality of Copainalá, Chiapas, dried pepper (*Pimienta dioica*) from Comalcalco, Tabasco, fresh neem (*Azadirachta indica*) leaves from Tuxtla Gutiérrez, Chiapas and dried leaves of matarratón (*Gliricidia sepium*) from the locality Emiliano Zapata in the municipality of Tecpatán, Mexico. The plant material was collected in August 2018 and taken to the Agrotechnology Laboratorio de Agrotecnologías de la Agencia Universitaria para el Desarrollo (AUDES) Cacao-Chocolate of the Universidad Autónoma de Chiapas, for selection and classification, avoiding those that were affected by insects and diseases. The leaves and fruits used were dried in the greenhouse and stored in a dry place to avoid wetting and contamination by insects or fungi.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

87

Obtaining plant extracts

The plant extracts were obtained by two extraction methods, which are described below:

Distillation: we used the methodology described by Ramírez, et al., (2016), for which the plant material was used, either chopped or crushed and as solvent distilled water and ethyl alcohol (9:1). For this purpose, we used a distiller adapted to obtain the extract. The plant material was placed inside the distiller's kettle together with the solvent, it was hermetically covered to make the extraction process continuous by applying heat and constant pressure, the vapor was conducted to a condenser, and by cooling with running water, the distillate was obtained.

Microwave: the crushed plant material or in small pieces was placed in a cloth bag, which was immersed in a beaker with sterile distilled water and ethyl alcohol (9:1). Subsequently, the radiofrequency of a microwave was used for the extraction of metabolites, under the following conditions: 220 KW of power, a period of 150s, and 2,450 MHz (Ramírez, et al., 2016).

PHASE 1. **Antifungal effectiveness of extracts at a 60% concentration on *C. gloeosporioides***: Petri boxes were prepared with Potato Dextrose Agar (PDA) culture medium, added with the extract at 60% (v/v) and the inoculation of the pathogen was performed. The cultures were maintained under controlled conditions (incubator) of 23°C ± 2°C. Eight plant extracts were evaluated using two extraction methods (distilled and microwave) and three controls; PDA was the negative control and the positive controls were the chemically synthesized fungicide (A.I. Cyprodinil 37.5% + Fludioxonil 25%) and the patented product M2 UNACH. The inhibitory effect was quantified every 24 hours for 12 days by mycelial diameter growth. The fungus was scraped superficially and washed with distilled water using the appropriate dilution. The production of total and germinated spores was quantified.

PHASE 2. **Determination of the minimum inhibitory concentration on the *C. gloeosporioides* fungus strain**: the extracts that presented total inhibition of the growth and development of the pathogen at a concentration of 60% (v/v) were used for the tests corresponding to this stage, in which the minimum inhibitory concentration (MIC) was determined; these products were evaluated at concentrations of 50%, 40%, 30%, 20% and 10% (v/v). A negative control (PDA) was included in all tests.

The culture medium was prepared with PDA to which each of the extracts was added at the concentrations to be evaluated. Subsequently, the pathogen was inoculated. As an indicator variable of the inhibitory effect, the mycelial growth diameter of the pathogen was measured every 24 hours for 12 days, and the production of total and germinated spores was also quantified using the Neubauer spore counting chamber, as described in Phase 1.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

88

The experimental design was completely randomized, to determine the effects of the treatments studied, an analysis of variance (ANOVA) was performed and in the cases where significant differences were found, Tukey's mean comparison test (P≤ 0.05) was applied, using the SPSS software version 17.0 for Windows.

RESULTS AND DISCUSSION

PHASE 1. Effectiveness of plant extracts at a concentration of 60%

The results obtained are shown in Table 1 and Image 1, where it can be seen that the treatments of pepper obtained by microwave and the M2 UNACH treatment were the only ones that did not allow the growth of the pathogen. The ANOVA performed indicated statistical differences between treatments for the variables growth and a total number of conidia. Tukey's test of means for the growth variable registered significant differences between pepper obtained by microwave and M2 patent, with all treatments including the positive control where the chemical synthesis product was used, which registered growth, as well as with the negative control, but this did not register differences with the extracts obtained from *matarraton* and oregano, obtained by the two methods and with neem obtained by distillation.

Image 1. In vitro effects of 60% plant extracts on *Colletotrichum gloesporioides* of *C. papaya*

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

89

It is observed that for the number of total conidia, the extracts of oregano (distilled and microwaved), neem obtained by microwaving, pepper obtained by distillation and the chemical control, although they registered growth, reduced the production of conidia between 96.08 and 99.9%, while the treatments of pepper obtained by microwaving and patent M2 did not register conidia formation, treatments that among them did not register statistical differences but did with the negative control and all with the *matarraton* obtained by distillation, which obtained the highest value surpassing the negative control in 21.55%, which indicates that the extract stimulated the development of the pathogen, which could make it potential as a culture medium in the in vitro production of the pathogen for future research, as did Verastegui (1995), who from his research on the analysis of the antifungal effect of 20 plant extracts concluded that some essential oils can inhibit growth, but others can stimulate it. Likewise, the chemical synthesis product control showed a slight mycelial growth of 13.75 mm and spore development, however, when observed under the microscope they were dehydrated or affected in their physical structure, as shown in Image 2, which showed the action of the product on the pathogen.

Regarding the number of germinated conidia, all treatments showed lower values than those recorded by the negative control, reducing between 10.86% and 100% the amount of this type of structures; in the treatments of oregano and pepper obtained by microwave and patent M2 UNACH, they still exceeded the effectiveness of the positive control product of chemical synthesis, which allowed the germination of spores (1.04 x 103), while these three treatments inhibited it completely. In the case of microwaved oregano, no germinated conidia were found, although there was mycelial growth and the number of total conidia mostly showed damage to their structure when observed, which indicates some antifungal effect for *C. gloesporioides*, which reaffirms that it is a plant with fungal potential which in turn is corroborated with what was stated by Valverde (2017) who refers to Arcila, et al. (2004) and Tanackov (2013), which indicated that oregano essential oil has antifungal capacity against several microorganisms, among which the following stand out: *Candida albicans, C. tropicalis, Torulopsis, Glabrata, Aspergillus niger, Geotrichum*, and *Rhodotorula*. Verastegui (1995) stated that Davidson (1993) conducted a review of species and food flavorings with antimicrobial activity. Among those that demonstrated antifungal activity were cinnamon, cloves, oregano, garlic, and onion. In turn, the mechanism of action of oregano was studied and it was found that it produces alterations in microbial metabolism, particularly in respiration and sporulation, and it was established that this is due to the decrease in cellular energy.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

90

(A)   **(B)**   **(C)**
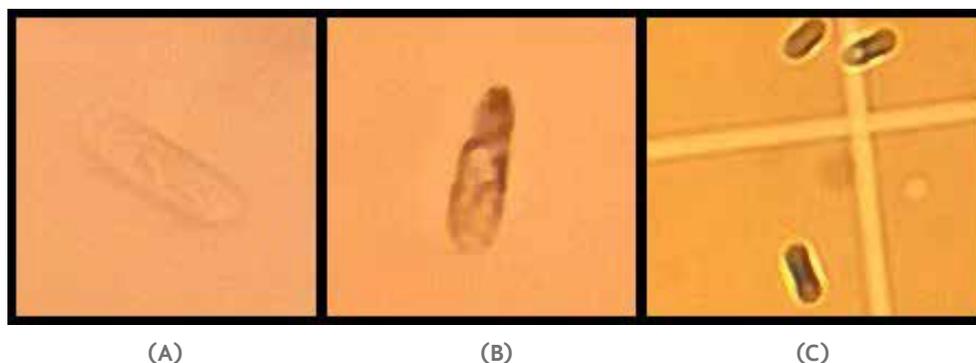
Image 2. Effects exerted by Oregano Microonda extract and A.I. Ciprodinil 37.5% + Fludioxonil 25% on *C. gloesporioides* isolated from *C. papaya*. A) normal spore, B) spore dehydrated by exposure to plant extract C) hyaline spore caused by the effect of A.I. Ciprodinil 37.5% + Fludioxonil 25%.

The above results corroborate the research of Joya, et al. (2017) and Tamayo, et al. (2016), who found the antifungal activity of oregano both in the reduction of growth and in the formation and germination of conidia of *Moniliophthora roreri*, besides, the present research shows that the form of extraction used is of high importance because it can express in greater or lesser amounts the secondary metabolites and vary the percentage of phytopathogenic inhibition, likewise Ospina (2012) who cites Mahmoud, et al. (2011) documents a 50% decrease in antifungal activity when nimonol is extracted from the organic extract of neem leaves in evaluations with pathogenic fungi such as *Microsporum canis, Candida albicans*, and *Aspergillus sp*, concerning other types of extraction evaluated. Likewise, Ramirez, et al. (2016) reported that obtaining extracts assisted by microwaves allows obtaining a higher concentration of them, which managed to reduce the MIC in which they affect pathogens compared to the traditional distillation method.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

91

Table 1

In vitro effects of 60% plant extracts on C. gloesporioides, isolated from C. papaya

Treatments	Mycelial growth (mm)	Total conidia (x 10^4 mL^{-1})	Germinated conidia (x $1 \cdot 10^3$ mL^{-1})
Distilled Oregano	47.75[d]	41.14[a]	1.04
Microwave Oregano	43.75[d]	7.29[a]	0
Distilled Neem	50.00[d]	2080.72[ab]	568.75
Microwave Neem	29.25[c]	15.93[a]	9.37
Distilled Matarraton	50.00[d]	6261.87[c]	1059.37
Microwave Matarraton	42.00[d]	4.58[a]	1.04
Distilled Pepper F	40.25c[d]	201.56[a]	26.041
Microwave Pepper F	0[a]	0[a]	0
Positive Control Patent M2 UNACH	0[a]	0[a]	0
Positive (Chemical) Control	13.75[b]	20.41[a]	1.04
Negative control (Absolute control)	50.00[d]	5151.66[bc]	1188.54

*Different letters in columns show significant differences (Tukey, $P \le 0.05$)

PHASE 2. Determination of the minimum inhibitory concentration (MIC)

For the determination of the minimum inhibitory concentration, those treatments that completely inhibited the development of the pathogen at a concentration of 60% were taken into account; subsequently, concentrations of 50, 40, 30, 20, and 10% (v:v) were evaluated on *C. gloeosporioides* isolated from papaya, these treatments were those corresponding to the pepper fruit extract and M2 UNACH patent in phase 1, the results obtained in this phase can be seen in Image 3 and Table 2, from the realization of the test it was found that there is an effect of fungal inhibition of the two products, it was observed that as the concentration of the plant extract or the patent decreased, the mycelial diameter increased at a faster rate, respectively, the coloration of the mycelium changed with the products used because as the concentration of the products decreased, a darker color was observed in the mycelium. This is directly related to the sporulation of the pathogen, that is to say, to the number of spores of the variable.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

92

Image 3. Effects of pepper fruit extract and M2 UNACH patent at 50%, 40%, 30%, 20%, and 10% on *Colletotrichum gloesporioides* of *C. papaya*

Upon determining the MIC for the M2 UNACH patent, it was found that it inhibited the pathogen up to a concentration of 20%, in turn presenting significant differences concerning the 10% concentration and the negative control, according to Tukey's test of means (P≤0.05), as shown in Table 2. Regarding MIC, for the pepper fruit extract obtained by microwave on *C. gloesporioides*, it was found that it only inhibited completely at a concentration of 50%, from 40% mycelial growth was observed progressively approaching the negative control, likewise, in terms of spore formation, from 40% it was increasing, being statistically different from 20%, and this respectively different from the negative control, these results obtained differ to those presented by Jimenez (2018) who stated that the pepper fruit extract presented partial inhibition of 21.34% on the radial growth of the same fungus, while in total and germinated conidia recorded 66.80 to 91.49% inhibition respectively. In

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

93

turn, they are similar to the results presented by Ramírez, et al. (2016) who state that pepper fruit extracts obtained by the distillation and microwave-assisted method inhibited in vitro *C. gloeosporioides* isolated from papaya at concentrations of 30 and 20%.

Although spore production was observed, as the concentration increased, the pathogen was progressively inhibited, which makes the patented product M2 UNACH and the vegetable extract of pepper fruit obtained by micro-waving, potentially effective products for the control of the pathogen at the appropriate concentration. Likewise, in the treatments that presented mycelial growth, conidia formation and germination were recorded, which showed statistical differences for the control, inhibiting the formation of conidia between 47.09 and 100% and germination between 72.54 and 100%, besides, in observations made under the microscope, it was observed that in the treatments with high concentrations of product, conidia were observed with damages in their structure or form.

Barros, et al., (20 20), identified by gas chromatography coupled to mass spectrometry (GC-MS) the compounds of *P. dioica* oil obtained by hydrodis-tillation, obtaining that it contained 76.88% of eugenol, which inhibited the mycelial development of fungi up to 97.78%.

Padrón (2010) reports that in general, essential oils possess strong antibacterial properties because they contain a high percentage of phenolic compounds such as eugenol. This suggests that their mechanism of action is similar to that of other phenolic compounds by altering the cytoplasmic membrane, disrupting the proton motive force (PMF), electron flow, active transport, and coagulation of cellular contents.

Sublethal concentrations of eugenol have been found to inhibit the production of *B. cereus* amylase and proteases, impairing the cell wall, leading to cell lysis. It is believed that the hydroxyl group of eugenol, to which certain proteins bind, prevents enzymatic action in *E. aerogenes* (Denyer & Hugo, 1991b; Sikkema, et al., 1995; Davidson, 1997; Wendakoon & Sakaguchi, 1995 cited by Padrón), so the action shown by the extract obtained by microwaving *P. dioica* on *C. gloesporioides* isolated from papaya may be due to this compound.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

94

Table 2

In vitro determination of the MIC *of pepper fruit and Patent* M2 UNACH *on the growth and development of Colletotrichum gloesporioides isolated from C. papaya*

Treatments	Mycelial growth (mm)	Total conidia (x 10^4 mL^1)	Germinated conidia (x 1 10^3 mL^{-1})
Patent t. 50%	0^a	0^a	0^a
Patent t. 40%	0^a	0^a	0^a
Patent t. 30%	0^a	0^a	0^a
Patent t. 20%	0^a	0^a	0^a
Patent t. 10%	50.00^c	70.52*	6.25^a
Micr Pepper F 50%	0^a	0^a	0^a
Micr Pepper F 40%	42.50^b	524.58^{ab}	34.37^a
Micr Pepper F 30%	50.00^c	910.52^{abc}	16.35^a
Micr Pepper F 20%	50.00^c	3636.61^c	76.4^a
Micr Pepper F 10%	50.00^c	3088.22^{bc}	92.18^a
Negative control	50.00^c	6873.43^d	335.72^b

*Different letters in columns show significant differences (Tukey, P≤ 0.05)

CONCLUSIONS

The extract obtained from fruits of *Pimienta dioica* by the microwave method at a concentration of 50% v/v proved to be effective in the *in vitro* control of *C. gloesporioides* isolated from *Carica papaya*.

The microwave extraction form of *A. indica, O. vulgare, G. sepium*, and *P. dioica* proved to be more efficient than by distillation since at the same concentration they inhibited the growth and the formation and germination of conidia of *C. gloesporioides* isolated from *C. papaya*.

The extract obtained by microwave of *P. dioica* and the M2 UNACH patent product has the potential to be an alternative for the control of papaya anthracnose, by reducing the growth and development of the pathogen.

Plant extracts for the in vitro control of *Colletotrichum gloeosporioides* P. isolated from *Carica papaya* L.

95

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POTENTIAL FACTORS THAT INFLUENCE STUDENTS TO DROP OUT OF THE ESCUELA TELESECUNDARIA 531 FRIDA KAHLO

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— Abstract—

The compulsory incorporation in basic education in Mexico has been considered a great advance in educational matters, although the effort made has implied solving a series of challenges, such as the permanence in schools. Under various modalities, attention to coverage in secondary education has been sought, as is the case of this research on dropout in telesecundaria education in indigenous contexts in Chiapas, which constitutes an approach to understand the dynamics that are lived in these scenarios. Its objective is to identify the potential factors that may influence the drop-out of students in *Telesecundaria* 531. The case study was used to find the causes through a series of instruments that collected information from various authors who are part of the context. In this case, the participants were 40 third-grade students, 20 parents, and 5 teachers.

The main potential factors were the influence of the family around the fulfillment of the uses and customs related to marrying at an early age, strong patriarchy concerning the conception of women and gender violence in determining what they must do with their future life, low interest in their studies and the lack of financial resources to continue in school. The existence of these factors requires a serious reflection on the part of the teaching staff and the educational authorities for the planning of strategies that allow permanence and quality graduation in this context of indigenous education. Likewise, it is important to carry out comparative studies with other realities similar to this one to fully understand the problems related to equity in education.

Keywords

School drop out; potential factors; drop out; education; indigenous education.

Addressing secondary education among indigenous peoples means dealing with the complexity of a reality that is different in many aspects from what is usually known from the Westernized vision. We have witnessed the presence of assimilationist projects, characterized by the imposition of a hegemonic educational model that does not take into account the culture and cultural diversity of these peoples. Hence, recently, there was a talk about the introduction, in education, of an approach based on interculturality.

In the case of *telesecundaria* education, this is offered in communities with high marginalization and it is intended that, through it, there will be a change in the way of thinking about educational processes. However, it is recognized that there are a series of problems, from those related to bilingualism and the poor preparation of teachers to the very limited access to connectivity and school dropout.

It has been recognized that the historical phenomenon of dropping out of school has multiple factors, so it is important to know the causes in both graduates and those who are still in the classroom. The latter will be known as potential factors. In this situation, the Escuela Telesecundaria 531 Frida Kahlo school has a high dropout rate detected in the last three school years, there is a higher percentage of dropouts in the classrooms, as described below, so we will present the results of the research that aimed to identify the potential factors that may affect the dropout of students in the Escuela Telesecundaria 531.

This problem is approached from a theoretical background that supports the study conducted by different authors, who investigate the factors of school dropout and interculturality that is present in most of the country's institutions, such as the case of Telesecundaria 531, which is located in a rural area of the Tzotzil indigenous language, with a form of government according to customs and traditions.

With respect to the use of the results of this research in its social impact, it is expected that the expectations and needs of indigenous education in an intercultural context can be met with quality. It also leads to rethinking the strategies of attention to coverage, which has always been homogeneous without taking into consideration the value that indigenous communities give to the practices of daily life over compulsory education, such as secondary education.

On the other hand, unlike the classic studies on school dropouts that focus on students who did not manage to complete their studies, this research is characterized by being an exercise that places the student who is still in school spaces and takes up his or her way of perceiving his or her formative process, thus contributing to the disciplinary field, from a methodological approach in which the research subjects are still in the classrooms. However, as

the work tends more to a qualitative approach and helps to understand the problem, it is expected to carry out comparative studies with other realities similar to this one, to understand in-depth the problems related to equity in education.

To carry out the research work, a case study is considered pertinent, with a sample of teachers, students, and parents, using as research instruments surveys, employing questionnaires, to students, as well as collective interviews to parents and teachers, to gather information regarding how the culture of parents, the economic situation and the understanding of the contents influence school dropout. It is important to know the factors that generate it, to create an inclusive, integral, and intercultural education for students.

DEVELOPMENT

Dropping out of school is an educational problem that has many repercussions at both the personal and social levels. One of these negative consequences has to do with the risk of having low-quality human resources in the future. This research seeks to understand the reasons for this problem by reviewing the concept of school dropout from different theoretical perspectives while identifying how this problem has been studied and the factors that have been found and that influence it, according to the authors who have researched the subject.

Zúñiga (2006), Navarro (2001), Espíndola and León (2002), among others, have studied the problem of school dropout at different educational levels, coinciding in the conceptualization of the action of abandoning studies at any educational level, either definitively or temporarily. This is pointed out because the decision of whether or not to enter the educational system again will depend on many conditions, including the schooling needs required by jobs, the ease of rejoining the studies, personal or family support, among others.

Estrada (2018) coordinates a text on school dropout in upper secondary education in Mexico, focusing on policies and actors from a case analysis. In his text, organized in three parts, he brings together a series of chapters to analyze the phenomenon from policies, programs, and institutions, as well as from personnel, teachers, parents, and young people. Ibarra (2018), from the paradigm of action research, asks why do they leave school, noting that, although most young people indicate that they do so for personal reasons, there are other reasons such as curricular, personnel, and even teachers, which may be generating risk of exclusion.

Concerning the factors or causes, Espíndola and León (2002) point out that they may come from extra-school factors related to the student's personal and contextual conditions and others that may be associated with the inadequacies of the educational system, which they call intra-school

factors. They consider that the causes of school dropout can be classified into a) economic reasons, b) problems related to the educational offer in the region, c) family problems related to the way domestic life is organized, d) lack of interest, e) low performance and f) behavioral problems.

It should not be forgotten that context is an element that largely determines student behavior, especially when there is little coincidence with the cultural practices and institutional dynamics of the educational institutions. For example, the use of uniforms, daily attendance, or homework compliance is not understood in the same way in a vulnerable population and communities far from all services, as in one where such services are guaranteed.

It is worth mentioning that these causes may not be a single cause but a combination of them. For example, unwanted pregnancy can lead to performance problems, family problems, behavioral problems, among others. Hence the complexity of understanding the dropout problem at each educational level.

Leiva (2013), suggests, due to the causes, that when the needs are addressed and the diversity of student characteristics is responded to, exclusion in educational systems can be reduced, since it is possible to identify the possible origin of the problem, as long as it is addressed in a timely and effective manner. This may be the case of the response to this problem with a westernized vision that does not understand the culture and the value of education in a context with native cultures and that tries to establish school routines and rituals that are alien to the context. An example of this can be found in rural indigenous schools that clash with a homogeneous curriculum, generating conditions that can lead to school dropout, as pointed out by the National Institute of Indigenous Languages, inali (2008, p.39), which emphasizes that:

> Currently, basic education curricula are the same at a national level, with few variations to adapt them to the specific needs of the target population; likewise, the homogenizing criterion persists, which does not consider respect for diversity, cultural plurality, and multilingualism. Linked to the above, there is insufficient development of didactic materials in indigenous languages with an intercultural and multilingual approach.

This is something that educational planners and administrators should reflect on when they have only one view, the westernized one, to educate everyone in the same way. Not taking into account the characteristics and needs of students is a situation that could put them at risk and cause exclusion from the educational system, despite good intentions. The problem of school exclusion has been widely studied from various theoretical perspectives, such as the case of sociologists of education, who conceive of school as

space to which not everyone can have access, either because of its restricted linguistic code (Bernstein, 1975, as cited in Usategui, 1992) or because of poor cultural capital (Bourdieu & Passeron, 1981).

School dropout has also been studied by Sandoval (2018) who inquired the factors that influence school dropout in students of basic secondary, and upper secondary education at the Técnica Félix Tiberio Guzmán school in El Espinal Tolima, using the case study as a method. It was found that the most common reasons for cancellation of enrollment were the change of address or change of city since the economic situation of families is becoming more difficult every day, especially with the importation of rice and informal work on the rise.

It was also found that child labor is very common in low-income families and many of these are dysfunctional, so young people must help by working to support the family. According to Sandoval (2018) in his results, he observed that the highest dropout is in basic secondary education with 38 students. He also found that the dropout in primary education was 24 students. A factor he identified in his study is related to apathy towards schooling among students, who stated that they did not like the way teachers responded to their doubts and preferred to remain silent, thereby generating conceptual problems, which was therefore reflected in poor academic performance.

In the case of González, et al. (2016, p.8) who researched the social factors that influence early school dropout, through review and analysis they were dedicated to exploring the problem in compulsory education. The results they found in this review, covering a period of studies on dropout for the last hundred years, allows them to conclude that:

> The factors that influence early school dropout to respond to a complex model, in which the causes are not independent, but interact with each other. An example of this can be found in low income, job loss, family stress, or parental education, all of which have a direct relationship with early school dropout. Therefore, for a correct diagnosis from which solutions can be proposed, it is necessary for the family-school environment to have a global vision of this complexity, since it is essential to be able to see the problem from all possible perspectives.

Hernández, et al. (2019) researched the factors of school dropout in IEBO 40 San Mateo del Mar in Oaxaca, finding that most of the students of that school stated that the socioeconomic factor is the most important factor that forces them to abandon their studies. Another fact is the family factor (disintegration) that intervenes in school dropout, where there is not a good relationship between family members, where there is a greater degree of an

unpleasant environment. If there is no support among family members, or when it is a dysfunctional family, it can cause the student to drop out of school.

In the same research, it was identified that there are students who express the lack of a father figure and, in general, the male children are the ones who have to leave school to work and support the household. Another important aspect is related to the way students value and perceives themselves. Additionally, they may have few strategies to cope with academic or personal tasks, and some may even have problems related to their personality.

Hernández, et al. (2019) identifies as another cause of the lack of clarity in the goals that students set for themselves, which does not allow them to define where they should go or what they should do to achieve what they want in life. The researchers suggest the institutional need to design a control card for each student, to follow up on their behavior that includes the following: a) reasons for dropping out, b) parents' schooling, c) economic support from the school, d) parents' type of work; they also propose an econometric model that measures the probabilities of dropping out given the factors previously discussed and finally develop a support program.

González (2016) investigates motivation and dropout in high school education with the main objective of expanding the understanding of the factors associated with this problem from the contributions of the psychology of motivation. The results showed the influence of endogenous factors in the dropout phenomenon, as well as in the permanence of young people in the educational system. Among these factors, they highlighted the mismatch between the expectations of young people and the rigidity of curricular plans and academic content, the classroom climate characterized by control and extrinsic pressures, and the negative relationships that students have with their teachers and peers. They also found that there is perceived dissatisfaction on the students' part in the fulfillment of their expectations and needs about educational institutions. In some cases, another related factor was the distance from the educational centers in secondary education and the lack of adaptation of the students concerning the content taught, in addition to unsatisfactory relations with teachers and peers, which caused them great demotivation.

As a factor that may have an impact on school dropout, Leiva (2017), studies the phenomenon of interculturality as an educational value and also as a praxis for the improvement of social and emotional inclusion of all agents of the educational community. In this sense, the importance of identifying the value of individual differences in pedagogical practices has been considered. It points out that cultural aspects have been minimized in the pedagogical factor with teaching teams that do not consider cultural diversity as an element of interest and relevance in education,

resulting in the deepening of stereotypes about students and families of diverse cultural origins.

When starting from the principle of interculturality in the classroom, it should serve to promote the relational and emotional component of learning and the processes of critical internalization of the key questions of education of all times: the what, the why, the how, the why, the when, and the where to give meaning to education. Recognizing the value of individual differences based on the cultural traits of each student is an important factor to learn from each one in the classroom and to co-construct knowledge, giving value to the knowledge of each one.

Telesecundaria education in Chiapas

Núñez and Jiménez (2016) found that, of the three service modalities, which offer secondary education, *telesecundaria* has experienced the greatest growth in recent years, given the ease of the system to be implemented in rural areas. In the case of Chiapas, these authors point out that more than 46% of secondary enrollment is served in this modality. However, they argue that although *telesecundarias* have allowed this substantial increase in coverage, they are not an adequate response to promote continuity in the education system, since they recognize that there is a high dropout rate. In many cases, secondary school is the last level of education they attend and this has repercussions on their reduced entry to the upper secondary level.

According to data from the National Institute of Indigenous Languages (INALI, 2008), in Chiapas, the dropout rate in elementary school in 2013 was 1.3%. This figure was more than double the national figures, which is worrisome because of the negative consequences on both personal and state development. Among the causes for dropping out, it is mentioned that 91.4% did so because they performed another activity, either because they joined the labor market 64.1%, or devoted themselves to housework 24%, according to this study.

On the other hand, the constitutional recognition of Mexico as a multicultural country in 1992, put on the table a series of problems to be addressed for inequality in economic, political, social, and cultural aspects, which is a pending issue for indigenous peoples. Since 1993, both the national education system and the Mexican state have developed strategies to favor equity and the human right to quality. This is expressed in the General Law of Education, article 7, section IV, which ratifies: "To promote through education the knowledge of the linguistic plurality of the Nation and respect for the linguistic rights of indigenous peoples. Speakers of indigenous languages will have access to compulsory education in their language and Spanish" (1993, p.2).

In Chiapas, eleven languages are officially recognized: Tzeltal, Tzotzil, Chol, Zoque, Tojolabal, Mam, Q'anjob'al, Chuj, Akateco, Zapoteco, Lacandón; the most numerous being Tzeltal, with 39.5 % of the total number of speakers and the least Lacandón with 0.1 % (INEGI, 2015). However, there are many variants of these languages, which makes it very difficult to make effective the right to education, which implies having prepared teachers who speak indigenous languages.

METHODOLOGY

The general objective of the research was to identify the potential factors that may have an impact on school dropout among students of the Escuela Telesecundaria 531 Frida Kahlo in the 2019-2020 school year.

The method used for the research is the case study, which is understood as a method characterized by knowing and understanding the particularity of a situation to identify its functioning. This case study methodology is a qualitative research technique since the development focuses on the study of a phenomenon not to generalize its results, but to analyze the complexity of the object of study, from all possible angles and most of those involved in it.

In the words of Diaz, et al. (2011, p.21), "the essence of the case study is the description, explanation or understanding of an inter/subject/object, an institution, an environment or a unique situation and in as intense and detailed a manner as possible."

This allows for an in-depth investigation of a problem under study through various instruments such as those used in this research: interviews with parents and teachers, as well as surveys of students, to identify what are the potential factors that may influence school dropout among students at Escuela Telesecundaria 531.

As Ceballos-Herrera (2009) points out, research based on the case study belongs to the interpretative qualitative paradigm in that reality is constructed by the people who are involved in the situation being studied.

Taking into account what Morse and Rojas (2001) suggest, cited by Hernández, Fernández, and Baptista (2018), it is necessary to establish the spatial and temporal limits of the research, in this study it refers to students of both genders of the Escuela Telesecundaria 531 Frida Kahlo, located in the Carmen Zacatal community, belonging to the Municipality of Jitotol, Chiapas. Regarding the temporal delimitation, this research covers the period from August 2019 to June 2020, a school cycle for the observation of the factors that influence school dropout, as mentioned before in the context of Escuela Telesecundaria 531.

The research was carried out with a sample of 5 teachers who work in front of groups in the institution, representing 55.5%, three female teachers

and two male teachers, with a seniority of 17 years of teaching, at an approximate age of 40 years. Three female teachers are in charge of the three third grade groups and the male teachers of the second grade.

The sample consisted of a total of 40 students who, at the time of the study, were in the third grade and who voluntarily agreed to answer the instrument, so the sampling was of a deliberate type, the third grade students were chosen because they were in the last year of basic education, with an approximate age of 15 years, it is the school grade in which we can appreciate the dropouts occurred since their entry to the telesecundaria in 2017 to date, of which 60% belong to the female sex and 40% belong to the male.

The sample of parents was constituted by 20 parents, with ages between 30 and 35 years old whose occupation is farm work in agriculture, they are dedicated to the cultivation of corn and coffee, they are of Tzotzil indigenous origin.

The telesecundaria is a basic education service, public and school-based, aimed at educating young people from rural and indigenous areas, as well as urban-marginalized areas. In addition, it takes as a reference the marginalization indexes established by the National Population Council (conapo, 2015), related to lack of access to education, inadequate housing, insufficient monetary income, and small towns with less than 2,500 inhabitants.

In the case of the study presented, the Escuela Telesecundaria Frida Kahlo has a teaching staff of 9 teachers in charge of 9 groups and a principal. According to the data provided by its director, the school dropout rate in the 2017-2018 school year was 40 students, which represents 14% of the total school population. In the 2018-2019 school year, 39 students dropped out of a total of 279 students enrolled at the beginning of the school year, 22 are male, and 17 are female. There is a 13.97% dropout rate.

The data in the educational administration system of Chiapas indicate that at the beginning of the 2019-2020 school year, according to the records of students who finished the first and second grade of middle school, there were 171 students, of which only 134 students were enrolled, 37 students dropped out, which represents 21.63%, plus 30 dropouts as of March of this year, as can be seen, there is a high dropout rate in this educational institution.

A questionnaire with 5 open questions and 5 closed questions was used as an instrument for data collection. Interview of 5 open questions to the teachers of the institution, interview of 5 open questions to the parents to explore the following factors: a) Uses and customs; b) Gender violence; c) Economic situation; d) Understanding of school contents; e) Didactic strategies. These categories were identified throughout the school year, in informal talks with students and teachers of the Escuela Telesecundaria, which served as a reference to be used in the instruments.

The interviews and the questionnaire were applied during four months, from November 12 to March 12 of the 2019-2020 school year, in the facilities of the institution with students and teachers, with parents in formal meetings. The open-ended questions were coded for analysis and processing. The Statistical Package for Social Sciences SPSS version 21 was used to process the rest of the data.

RESULTS

This research is the first approach to a series of problems that are much more complex than what is assumed at first glance. It goes beyond school dropout and uncovers problems related to school management, the right to education, and interculturality, among others. For methodological reasons, attention will be focused on the potential factors found from the voice of the educational actors as answers to understand the school dropout of the students of Telesecundaria 531 Frida Kahlo. They are presented in the following categories:

a) Uses and customs of native peoples.

Uses and customs are conceived as the particular rules that govern the politics of the native peoples, characterized by their form of government, per their customs and way of life. In 1992 the rights of indigenous peoples were recognized in the Political Constitution of the United Mexican States, in its 2nd article :

The Nation has a pluricultural composition originally sustained by its indigenous peoples who are descended from populations that inhabited the current territory of the country at the beginning of colonization and who conserve their own social, economic, cultural, and political institutions, or part of them... This Constitution recognizes and guarantees the right of indigenous peoples and communities to self-determination.

During the collective interviews conducted with parents during the meetings to learn about their children dropping out of school, they coincide in pointing out that, by custom, women get married at an early age.

According to the interview, 86% of the parents responded that the reason why secondary school students do not finish their basic education was that most of the students at that age get married following the traditions of the community that are transmitted from parents to daughters, in which they must marry someone in order not to remain single after a certain age.

In the interview, a parent mentions "our daughters stop attending school because according to our customs they take care of household chores, they get married very young just like all the women in the community, if someone asks for their hand, even if they are at school they have to leave".

When the teachers were interviewed, they agreed with this being the main reason for dropping out, since they consider that 80% of the female students leave school because they get married, according to data from the school's dropout form.

b) Gender violence

In the responses to the open-ended questions to parents, it can be seen that 78% of the parents reported gender violence, stating that they support their sons more than their daughters, because women belong in the house and are not allowed to go elsewhere to study, and daughters have to submit to what their parents say. One parent mentioned during the interview that: "Women belong in the house, we no longer allow them to go out to study outside, they have to obey me when they are no longer going to go to school".

When teachers were interviewed, 80% of them stated that in terms of gender violence, women are not taken into account in their opinions and they are not allowed to go out to carry out extracurricular research tasks.

c) Home economics

In this school year, they stopped receiving economic support from the government, which has caused students to stop attending school and in some cases to drop out. When parents were interviewed about support for their children to continue their academic studies, 80% of them said that, due to their limited economic resources and their work in the fields, they are limited in supporting their children in school, and sometimes the students have to work to support their studies, causing absenteeism and in some cases dropping out of school. In the interview, one parent said: "Since my son no longer receives the Prospera scholarship, he has to help me in the fields or go earn money with others to buy his notebooks and he misses school, he no longer wants to continue studying because he sees that there is no money at home".

When answering the questionnaire 78% of the students mentioned that they do not have the support of their parents to continue their

studies, they do not have a government scholarship, and are likely to drop out of school due to lack of economic resources. They perceive themselves to be at a kind of crossroads with very few opportunities that can be considered successful, in communities with few opportunities for development at both the community and personal levels.

d) Teaching

When interviewing the teachers, they agreed that 78% of the students find it difficult to understand the curricular contents, causing a lack of interest in their studies, together with the low schooling of their parents and the culture that prevails in the community, which greatly influences school dropout. A teacher of this institution, when interviewed, says: "It is difficult for students to understand the contents of the curriculum because of their mother tongue, Tzotzil, which leads to lack of interest in their classes, I also see that the lack of parental support for their children influences, as well as the customs rooted in the community that is reflected in the dropout of students."

In this way, the few opportunities they have to access content written in their mother tongue are observed, which would probably cause fewer problems in the comprehension to which the teachers allude.

In the questioning of the students about the importance of attending school, 68% stated that for them it is a place for socializing more than the importance of learning, they find it boring and of little importance to finish their basic education, most of the students stay in their community and dedicate themselves to farm work, in one of the open questions of the questionnaire a student answered: "I like school because I can have fun with my friends and I can flirt with my classmates, I will not continue studying because I have to support my father in the field".

Once again, among the students' answers, we found the one referring to the economic problem and the way of coping with what they have to live with: living with others while they have to carry out other activities related to their situation at home.

e) Didactic strategies

When teachers were surveyed, it was found that 90% of them try to adapt to the contents according to the context of the community, the students are not very participative and progress is at the pace

of the students' understanding. One teacher commented: "Students hardly participate. We have to find strategies for them to work in class, they communicate in their mother tongue, they do not participate in their classroom activities, they do not complete their homework, so we advance at the pace of the students' understanding according to their context".

To know the opinion of the students when answering the questionnaire, 85% stated that they find the load of homework and school work complicated, they feel that class hours are heavy because some subjects are difficult for them. One student mentions: "They want us to research but the internet is slow, we don't have money for printing, some assignments we don't understand, that's why we get bored in class, math is almost impossible to understand."

In the results, two major problems can be seen as potential factors that can lead to school dropout, the first related to the economy, in a population that from the point of view of Terigi (2014) is vulnerable and the second related to the absence of an intercultural look to address the characteristics and cultural diversity of students. This means that addressing the problem of school dropout is a complex task because as Espíndola and León (2002) rightly pointed out, the factors are both out-of-school, as in this case those related to uses and customs, and within-school, related to the lack of this intercultural approach, which has been highlighted by Leiva (2017).

Vulnerable populations are conceived in a condition that affects vast sectors of the population not only urban but also rural, given that they are placed in situations of vulnerability and that is expressed in situations of inequality. It is not possible to speak of education with equity when these populations have to obtain resources from government programs that are currently in transition and the *Prospera* program has ceased to exist to make way for the Benito Juárez Scholarships for young students. In the case of this rural population, access to all services necessary for education, such as electricity or the internet, is unequal compared to other populations.

Another important aspect has to do with the lack of recognition of their cultural diversity, among other things related to the use of Spanish as a second language to which they have not had full access and which limits not only teacher-student interaction but also student-content interaction. From Muñoz's (2004, p.11) point of view, intercultural learning "should encompass the skills, attitudes, and cognitive characteristics necessary to deal adequately and flexibly with diversity."

This raises an additional problem related to the training of the teachers in charge of the groups, as it seems that dropping out is only a matter of the student when the didactic strategies and the way of organizing the content are also important when deciding whether to continue when they find it difficult and incomprehensible. Paying attention to this aspect could also contribute to understanding the dropout phenomenon from the perspective of teacher training. Therefore, it is important to emphasize that these problems are like the tip of the iceberg, indicating that there are a series of problems that are important to identify to adequately address the search for effective solutions to appropriately address school dropout.

CONCLUSIONS

Usages and customs, especially when applied to female students, place them at a disadvantage by failing to comply with them and dropping out of school, which may imply a challenge in research to identify the impact this has on the student body. Both men and women must make decisions about their future in the fulfillment of responsibilities that they must assume as adults, a situation not foreseen by the educational system, which conceives them as adolescents.

These factors considered to be interpersonal are not the only ones identified as potential factors for dropping out. There are underlying problems that require reflection on the purpose of secondary education in this rural indigenous context. Although education is a right, there may also be people who give it up for other survival strategies because they are considered vulnerable.

The research provided a close look at both interpersonal and institutional factors that can potentially be triggers for students to drop out of school without having completed formal courses. Orozco-López (2018) points out that the change for students from native peoples to have a certificate until they have completed secondary education by statement 047 issued by the Ministry of Public Education, caused confusion and discouragement among villagers in the Altos de Chiapas region, particularly in the municipality of Chenalhó where he narrates the experience of alternative education.

From their point of view, this educational approach to secondary education poses a series of conflicts due to the lengthening of basic education, since primary education was contemplated at the end of the cycle for indigenous children/youth. From this perspective, it is possible to understand the phenomenon of school dropout among the students of the *telesecundaria* where the research was carried out, which although it is not the only explanation, does raise fundamental problems regarding the right to education, especially given the autonomy achieved by these groups for

the rights of indigenous peoples under Convention 169 of the International Labor Organization and the rights of indigenous peoples, according to the agreement signed by the UN.

The reluctance and renunciation of secondary education from an intercultural perspective could explain the weight of uses and customs to such a degree that there are cases of students who do not enroll in the next grade. Interculturality is not related to respect for diversity in the classroom but goes beyond that in the recognition of the needs and worldviews of specific groups, as is the case of the inhabitants of native peoples who face contents that do not address their reality because they are constructed from a westernized vision.

Although this imposition of westernized knowledge has become naturalized for the vast majority of students in the Mexican educational system, it must be recognized that it exposes a series of challenges ranging from the discrimination to which some students from indigenous peoples are subjected, having to accept the truth of the texts as opposed to their knowledge. The discussion on bilingualism versus Spanish is also something pending on the agenda that should be discussed, from what was observed in the research there is a predominance of the latter in the face of ignorance or little appreciation of the languages of native peoples.

Martínez (2016) suggests from the analysis of indigenous education in Ecuador that there are still many things to be done at a structural level to face the challenges of a truly intercultural education that recovers the knowledge and practices of each native people without stigmatizing them or considering them failures, in an education system that in the search for coverage does not address the underlying problems.

This is why the problem of school dropout must be urgently addressed in all its dimensions, to identify how it is occurring in other educational institutions with the same characteristics. This implies carrying out a broader investigation that takes into account the reality of telesecundaria education in rural indigenous contexts in the state of Chiapas, which implies a research commitment to be taken into account in future research work.

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MEXICAN HIGHER EDUCATION ENTRANCE EXAMS, AN OBSTACLE TO THE ASPIRATION OF INCLUSIVE EDUCATION FOR POOR AND INDIGENOUS STUDENTS

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Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

118

— Abstract—

This article exposes and discusses a problem of big relevance nowadays in Mexican education: entrance exams, especially those that promote access to Higher Education (HE). These tests have been questioned for their remarkable limitations concerning its standardized and decontextualized evaluations of knowledge and aptitudes in thousands of students who try to access universities and other public institutions, without considering socio-cultural origin nor their socio-economic conditions. Indeed, several authors and organizations consider that such exams are an obstacle to the academic and professional development in a big sector of candidates, which frequently are in remarkable circumstances of poverty and marginalized situations (which is a very big problem in cases of students coming from different autochthonous communities). Usually, this sector does not have basic resources (nutritional, monetary, and educational among others), or even previous education (overall linguistic and mathematic aspects), to compete for a place in higher education with middle and upper-class students, creating a big disadvantage without opportunities to continue their studies. The previous goes in a decrease of the federal commitment with the inclusive education, this policy seeks that all students, without taking into account circumstances (physical, ethnics, social, etc.), can get into public education. For those reasons several proposals have been planned to modify, adequate, and remove the assessment process through the entrance exams, to allow a greater number of poor and native indigenous students to access HE, as is exposed in this essay.

Keywords

Entrance exams; High Education; Inclusive education; poor students; indigenous students.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

119

The main objective of this article is to present the main problems generated by the entrance exams concerning the federal policy of inclusive education, as well as some of the alternatives that have been proposed to solve them. For this purpose, we used an analytical method through qualitative information gathering and interpretation techniques from specialized bibliographic sources that presented results in the period 2006 - 2020. The structure of this review about the problem and the discussion on entrance exams to higher education started by defining the main difficulties arising from entrance exams, to later analyze the evidence found on the HE entrance processes of low-income and/or *indigenous peoples*[1] in different national universities; finally, we propose some options for solutions.

CHARACTERIZATION OF THE PROBLEM: THE LIMITATIONS OF ENTRANCE EXAMS AND INEQUALITY IN THE HE ADMISSION PROCESS

The concern for increasing student enrollment and opening new possibilities for young people is not new since, throughout the first two decades of the 21st century, various international organizations have warned about the low educational rates in Mexico (for example, that less than 55% of students finish upper secondary education mainly due to poor economic and social conditions), according to figures from the Organization for Economic Cooperation and Development[2] (OECD, 2015a). To these figures we must add those mentioned by Tuirán (2012), who points out that university coverage, despite having a constant growth, in 2012 barely hovered around 30% of the total number of students between 18 and 23 years of age (more or less 3 million), far below that of other Latin American countries, such as Argentina and Uruguay (where it hovers around 70%). Besides, this same association estimated that, despite economic and educational support programs, only 25% of young people from the poorest families in Mexico have the opportunity to study a professional career (approximately 750 thousand). Because of this, the National Association of Universities and Higher Education Institutions

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1 The concept of *indigenous peoples* refers to those settlements that existed before the emergence of the modern state and pre-existed the current legal-administrative structure. They include the descendants of the first settlers of America, who have "identity elements (culture, region, and beliefs) not only to distinguish themselves from the indigenous ethnic groups of the country but also to circumscribe an identity distinct from the rest" (Guzmán Vázquez, 2019, p. 2), establishing a specific construction of ethnicity. In Mexico, it includes not only the native peoples that existed before the Spanish Conquest but also the communities of different denominations (mestizos, Afro-descendants, and Creoles, among others) that have roots and belong to the localities.

2 The OECD is an international organization with more than 60 years of experience, which studies, designs, and promotes public policies to promote prosperity, equal opportunities, and well-being for all segments of society. This institution coordinates with governments, associations, and citizens to carry out comprehensive research to define alternatives, indicators, and standards in the social, economic, and environmental fields (OECD, 2020).

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for
poor and indigenous students

120

(ANUIES)[3] in 2012 had set the challenge of reaching 60% coverage by the
2021-2022 cycle (5 million 840 thousand students) with an increase of 257
thousand new spaces each year (Tuirán, 2012). Unfortunately, the goal
defined in 2012 was not achieved due to budgetary limitations and disorga-
nized administrative conditions[4].

Faced with this horizon, the OECD (2013) has stressed that Mexican
students must acquire a series of fundamental skills, either to enter the
labor market or to continue preparing for higher education. Some of the
most important, according to the same OECD (2015b) are:

- Interpersonal and social and emotional skills, such as leadership,
intelligent management of emotions, social responsibility, interper-
sonal communication, self-management skills, continuous learning,
and elimination of stereotypes, initiative, proactivity, as well as
respect and support towards women (considered *soft skills*).
- Skills that connect school content with the demands of the
workplace, such as the use of Information and Communication
Technologies (ICT), the ability to process information, language
skills, organization of work teams, project development and evaluation,
management and application of knowledge, innovation and strategic
decision-making (characterized as *tough skills*).

The said institution has also emphasized the need to expand educational
coverage to train skilled workers, professionals in all areas, and scientific
and technological researchers (OECD, 2013). To the above has been added
the requirement to institute *inclusive education*, a concept that refers to
practices that respond to the diversity of students' needs, with the objec-
tive of greater student participation in learning, cultural, and community
activities, to reduce their exclusion within and outside the educational
system, as described by the United Nations Educational, Scientific and
Cultural Organization[5] (UNESCO, 2005). This provision is also contemplated

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3 ANUIES was founded in 1950, participating in the formulation of national programs, plans, and policies,
as well as in the creation of organizations oriented to the development of Mexican HE. It is a non-
governmental, pluralistic association that brings together the main HEIs in the country to promote
their integral improvement in the fields of teaching, research, cultural extension, and academic services.
As of 2020, it was made up of 203 universities and higher education institutions, both public and
private, throughout the country (ANUIES, 2020).
4 In this regard, the OECD (2019) refers that "the effectiveness of extraordinary funding is reduced
by the fragmentation of programs, overlapping and unclear objectives, and complex implementation
procedures. Also, it is common for institutions to devote extraordinary funding to cover core costs" (p. 4).
5 UNESCO (2020) is an organization that promotes peace through international cooperation in matters
related to education, science, and culture. Its programs contribute to the achievement of the sustain-
able development goals of the 2030 Agenda, adopted at the UN General Assembly in 2015.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

121

in Mexico's General Education Law[6] (LGE), Article 36, which stipulates that the authorities must take measures, since:

> Education, in its different types, levels, modalities, and educational options will respond to the linguistic, regional, and socio-cultural diversity of the country, as well as of the dispersed rural population and migratory groups, in addition to the characteristics and needs of the different sectors of the population (Congreso de la Unión, 2019, p. 5).

Amid this panorama, the HE entrance exams that have been used to date (2020) do not usually take into account the aforementioned guidelines, much less the problems suffered by many of the students in conditions of poverty and marginalization (especially those belonging to native peoples), which significantly reduces their opportunities to continue their studies at the higher level. In this regard, Núñez (2005) pointed out, in his work on educational backwardness, that there were notable educational gaps between the two richest deciles and the rest of the population; in fact, this author noted that the educational gap between the richest decile and the 30% of the population with the lowest income exceeded nine years. In turn, Blanco (2014) corroborated the enormous inequality caused by socio-economic status in the passage from secondary to high school (with a 7.5:1 difference between the highest and lowest strata) and from their EMS path to university (with a ratio of almost 3:1 between both strata described) in Mexico City, proportions undoubtedly more unbalanced in states with larger rural populations and less economic development.

We should emphasize that the inequality referred to above is the product of at least three decades of disguised neglect of the national education system. This has been documented by Núñez, who indicated that "the institutional apparatus that has been designed to combat educational backwardness has not been sufficiently endowed and supported in its functions, because it has been viewed as an administrator of the problem, and not as a factor for its solution" (2005, p. 66). Likewise, De Ibarrola (2012) pointed out four specific problems that have not been solved and, in many cases, have increased: coverage; quality; "inadequate management"; and insufficient resources.

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6   The LGE, published with its latest update on September 30, 2019, regulates the education provided by the State (in terms of its federal, state, and municipal authorities), as well as its decentralized agencies and individuals with authorization or with recognition of official validity of studies (RVOE) (art. 1). It guarantees the development of programs and public policies that make effective the right to education at all school levels (art. 2). It also emphasizes inclusive education, intending to eliminate all forms of discrimination or exclusion, as well as other structural conditions that are barriers to learning and participation (art. 7).

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

122

This author offers various alternatives to address them and, without directly pointing the finger of blame, she describes that "educational results will possibly always be insufficient or unsatisfactory, but there are undoubtedly many responsibilities for which we have not achieved the corresponding commitments" (p.14). In this sense, the contribution of Camacho (2020) is also noteworthy, who pointed out that, starting in the 1990s, the drive for coverage and the development of the educational system stopped and much greater importance was given to *educational quality*, which led to disagreements among the different educational actors, impacting not only in the school field but also in the cultural and socio-economic fields.

The aforementioned conflicts have caused that most students from the most disadvantaged sectors (poorer strata, indigenous communities, and people with disabilities, among others) do not have the technological tools (computers, cell phones, etc.) or the educational supports (such as specialized teachers, libraries, laboratories, etc.) to acquire basic knowledge and skills (Alcántara and Navarrete, 2014), aspects that are usually evaluated by HE entrance exams, as well as by other more specialized ones.

However, as Guzmán and Serrano (2010) rightly warn, to solve the problem of inequality of opportunities, it has not been enough to open more places in universities to increase their enrollment, since what is sought is not only greater coverage, but equity that takes into consideration the differences among students and their human diversity, to introduce policies that promote social justice.

In this regard, although new institutions have been created since the 1990s aimed at students with specific needs (technological, tourism, etc.) and contextual conditions (intercultural, rural, etc.), these have been insufficient in the face of the growing demand for HE, which is not covered by even a third of the total (OECD, 2019).

Delving into the issue of equity, Silva (2012) stated that there is no equal access to HE for poor young people, who are constrained by their socio-economic and cultural background. This author also questioned the "meritocratic" criteria in this selection process, since they do not have an evaluation system that adjusts to the diversity of the Mexican population, so it is essential to have equity policies that "implement compensatory and affirmative actions" in favor of the most vulnerable sectors.

PRESENTATION AND DISCUSSION OF FINDINGS

The 20th century brought with it the impulse and consolidation of HEIs, which already existed in previous times (since the 16th century and expanding their scope in the 19th century); however, it was after the Mexican Revolution, starting in 1917, when such institutions began to spread permanently

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for
poor and indigenous students

123

throughout the country (Herrera, 2013). It is relevant to add that, although in these post-revolutionary public universities there were already exams to select incoming students, such tests were focused on validating, more administratively than epistemologically, certain basic knowledge or specific skills focused on bachelor's degrees (Díaz Barriga, 1993). Thus, as Bartolucci (1994) explained, from the 1940s to the 1970s, since the demand to enter the HEIs was not yet high, these evaluations practically did not restrict admission to students who wished to join them; but this changed in the 1970s when population growth and the limitation of spaces led to the fact that admission began to be controlled through political rather than academic decisions.

Subsequently, in the 1980s, as Navarro and Contreras (2013) describe, the neoliberal political-economic model[7] was imposed in Mexico, which dictated, through a series of inter-institutional documents (where the report of the International Council for the Development of Education in 1990; ANUIES' assessments through the National Commission for the Evaluation of Higher Education or CONAEVA; and the OECD report of 1997 stand out), that the lack of academic level in universities was because they had expanded their enrollment very fast, with a wide differentiation of HEIs and their study plans and programs, in parallel to the management of financial restriction that did not allow greater investments in them (Navarro and Contreras, 2013).

Under these terms, the new government policies led to universities and autonomous HE institutions throughout the country -which normally planned their activities to their local contexts- having to adjust to the administrative conditions of federal and state authorities, in the face of the permanent need for additional financial resources. This caused HEIs to move from "indicative" planning (focused on strategic development factors) to "inductive" planning (guided by simply obtaining funds to cover expenses), leaving aside their own priorities to put those of the SEP first, as also expressed by Navarro and Contreras (2013).

As a result of the aforementioned circumstances, serious conflicts began to arise from the so-called "HE quality problem", which led to the concentration of economic and logistical resources in the HEIs of the largest cities, generating serious inequalities in educational services among the different regions of the country (where the central and northern states were relatively favored due to their proximity to the USA, while the southern

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7   Neoliberalism is the theory that establishes a reduction of state intervention in the economy, privati-
     zation of public enterprises, decentralization of authority, deregulation and reduction of bureaucracy,
     marginalization of trade unions, minimization of subsidies for the protection of the population (espe-
     cially in health and education), as well as the reduction of various social assistance programs for the
     poor (Latapí, 2008).

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

124

and eastern states were not prioritized because they were mostly rural), as Camberos, Huesca and Castro (2013) and López and Peláez (2015) expressed in their works. Also, there was a marked inequality in the selection of applicants between social groups (with a notable advantage for the upper classes and few incentives for the most marginalized sectors) (Padua, 1994; De los Santos, 1997; Millán & Pérez, 2008; Cortés, 2013). In turn, disparities appeared in the distribution of students among professional fields (with a sustained growth of applicants for administrative and computer sciences), with a significantly low number of graduates and a reduced absorption capacity of graduates in the labor markets, as mentioned in the OECD reports (1997, 2013) and the reports by López Moguel (2009) and Navarro and Favila (2013).

All of the above led federal administrations, starting in the 1990s, to turn educational evaluations into the perfect pretext for cutting university budgets, limiting entry to HE, and justifying inequalities in access to this level, as described by De los Santos (1997). This is how the exams elaborated by the National Evaluation Center (CENEVAL) appeared.

Taking as a reference what was expressed in previous lines, nowadays (2020) the entrance evaluations to different HEI have become a reason for concern, anguish, and innumerable complications for parents and students themselves. Many media -echoing the neoliberal discourse of educational quality and the scale of academic merits to move up in society-, have insisted on the importance of standardized, internationally accredited and strongly technical evaluation; to this has been added the pressure of different civil society organizations (such as "*Mexicanos Primero*" and businessman Claudio X. González' "*Bécalos*"), which have insisted that exams are the main solution to move forward the country's educational system (Sánchez, 2019).

As a result of these circumstances, in recent decades a repertoire of evaluation concepts and proposals has been developed under different theoretical and methodological perspectives (Rueda & García, 2013), but they continue to be mostly quantitative, unequal, and focused on general or utilitarian theoretical contents. Some examples of this problem are presented below:

The first paradigmatic case is that of the National Autonomous University of Mexico (UNAM), the largest in the country in terms of enrollment and the one with the greatest resources. Its selection contest is open twice a year (in February and June), where students from any high school (public or private) with a minimum average of seven can participate, being able to choose the desired bachelor and campus. In this competition, a 120-item

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

125

exam is applied to the different areas of knowledge recognized by the SEP[8] (very similar to the CENEVAL, but without belonging to that organization), assigning a place to applicants who obtain a minimum score established for each career, regardless of their place of residence (UNAM, 2020).

Now, when analyzing the 2006-2007 admission process to UNAM, Guzmán and Serrano (2011, p.40) characterized the population of applicants, finding very interesting data, such as that only 29% of their fathers and 17% of their mothers had university studies (p. 40); likewise, most of the students were children of families of employees, trade or domestic workers, and merchants (more than 60 %), belonging to the lower-middle classes, with precarious incomes (especially in the case of female students, who tend to have less support in terms of resources in relation to males); only a little more than a quarter (26.5 %) came from families earning more than six minimum wages per day.

The aforementioned differences weighed significantly in the admission process, as broken down by Guzmán and Serrano (2011) giving a marked advantage to students from families with incomes above ten minimum wages, whose pass rate was 100% higher than that of students from families earning less than two minimum wages. These researchers also highlighted that the relationship between family income and acceptance at UNAM was linear, since as family income increases, so does the frequency of admitted students (2011, pp. 45-46). In turn, they found an approval ratio of 2 to 1 in favor of men concerning women, a situation that was explained by pointing out the possibility that there was an unfavorable influence of the socio-economic conditions of most female applicants, contrasting with the studies of Mingo (2006) and Millán (2006), which emphasize a better overall academic performance from women. It was also indicated that the exams show an evident bias, giving greater weight to mathematical skills, formal thinking, and standardized communication, without taking into account the learning styles developed by many female students in general (usually non-technical) schools, which gives advantages to male students, as highlighted by Mingo (2006).

Another revealing fact is that more than 50% of the students who pass these tests studied their basic education and high school in private schools, making it clear that they have a better education as they enjoy notorious advantages: higher family income, parents (and especially mothers) with more schooling, schools with better infrastructure, more effective teaching-

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8   The Ministry of Public Education (SEP, 2020) is the federal agency responsible for the planning, management, implementation, monitoring, and evaluation of educational services offered by the Mexican State, as well as the reviewer and accreditor of private school institutions.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

126

learning models, smaller groups, better-trained teachers and, as a consequence, better academic trajectory and higher averages (Mingo, 2006, p. 44).

Based on these findings, it has become evident that the admission process to UNAM -the university with the largest academic offerings in the country- shows aspects that can be attributed to socio-economic and cultural inequalities, which can affect the admission opportunities of very specific segments (low-income students, women and public school students).

Adding to this position, Dr. Pérez Castro (2016), belonging to the Research in Education area of UNAM itself, has pointed out that there are marked inequalities in the living conditions of students that educational institutions reproduce and prolong in a vicious circle of exclusion, such as poverty, gender discrimination, place of residence, age, ethnicity, violence, migration, and disability. The elitism of most HEIS is largely because they are usually autonomous, so that each student, to enter, must submit to procedures that are more administrative than educational (such as the general knowledge exam or aptitude and talent tests), which tend to focus on measuring and accrediting "a set of individual qualifications and competencies" (p. 2). This has led to the fact that only seven out of every one hundred young people from the poorest decile of Mexican society can access HE, in contrast to the 47 out of 100 young people from the highest decile who can enter this level.

Another example, described by Zueck (2011), occurred in the 2010-2011 process at the Autonomous University of Chihuahua (UACH), where they apply the CENEVAL entrance exam, better known as EXANI II (which has been institutionalized since 1997 as the test most commonly applied by public universities, regional technological institutes, technological and polytechnic universities, and even some private HEIS). With this test, as well as the Terman intelligence test, three groups were assessed: disciplinary areas (2090 students), Health Area specialties (429 students), and the Physical Education degree (234 applicants). To classify and interpret the results of the exams, predictive variables (disciplines, professional area, and degrees), outcome variables (Terman cognitive skills and EXANI II factors), high school averages, and demographic conditions (gender and context) were used. Among the findings, it was detected that administrative, health, and engineering areas had the highest performance; on the other hand, physical education students (who present the most disadvantageous contextual circumstances) showed statistically lower ranks in both tests, exhibiting a notably low level of cognitive skills and general knowledge. The author of this research attributed this to the fact that such instruments do not take into account their psychological, social, and economic characteristics, which are fundamental in competency-based and learning-centered educational models, but which are not measured with these standardized tests.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

127

Broadening the discussion of cases, it is also relevant to analyze the case of the Benemérito Instituto Normal del Estado de Puebla (BINEP), where the EXANI II was applied in the admission process of the 2012-2013 cycle. This 110-item instrument measured students' skills in five areas (logical-mathematical reasoning, mathematics, verbal reasoning, Spanish, and information and communication technologies), with the addition of a complementary English test. In this regard, authors Bringas and Pérez (2014) referred that students required an average score above 1000, out of a maximum of 1300, to pass the exam; they found that 80.3 % of students scored above the previously defined standard, for only 19.7 % who did not pass. However, the students' results showed low scores in the six areas assessed (just 80 points above the mean line on average), which made it possible to verify that none of the selected applicants possessed the minimum competencies established by CENEVAL, so they needed "compensatory academic actions". This made clear a very interesting message: obtaining the highest scores in the EXANI II does not mean that students have the knowledge and skills required for HE; nor does it mean that students with the lowest scores are incompetent since the process is not equitable for all and a large number of them are in positions of socio-economic and educational disadvantage.

Regarding the situation of students of indigenous origin trying to access and develop academically in HE, Bermúdez (2017) made a recapitulation of the studies done between 2002 and 2015 on that topic. His findings showed that from the 2000s onwards, policies for the inclusion of students from native peoples began to be incorporated, with the implementation of the Program to Support Indigenous Students in Higher Education Institutions (PAEEIES) of the Ford Foundation and ANUIES in 2001, as well as with the creation of intercultural universities (UI) in 2003. However, the students who participated in these initiatives made it clear that there were notorious controversies between the national educational system (strongly oriented towards the achievement of technical and economic progress) and the intercultural educational models (related to the contextual conditions of the native peoples), such as marked institutional racism, since the former discriminates against indigenous students by rejecting their languages, cultural characteristics, traditions, ways of learning and socio-political stances, in addition to marginalizing them in the labor market. This contradiction has materialized in the admission exams, where indigenous students find themselves in a clear inequality of opportunities, having to take them in another language (Spanish), with questions formulated in an urban and high tech environment (which is usually not theirs) and without taking into account their socio-cultural perspectives (which may be quite different from the conceptualizations of Westernized societies), just to point out some of these inequities.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

128

At this point, emphasis can be placed on the most forceful criticisms of evaluation instruments such as EXANI II, listed by Navarro and Contreras (2013): 1.- They are homogeneous exams, so they are based on general contents that do not take into consideration the different contexts in which students find themselves. 2. They are standardized tests, so they do not value the socio-cultural particularities of students or their types of intelligence. 3. They are multiple-choice, so they do not incorporate learning styles or other characteristics of students. 4. - They consolidate CENEVAL's monopoly in the design and application of these exams, preventing other educational and professional organizations from participating in these processes. 5.- Their role hinders the access of most students to HEI, greatly limiting their coverage. 6.- They prevent compliance with the guidelines of inclusive education proposed by SEP and ANUIES. 7.- They show a more than questionable academic validity, as they contain biases and discriminatory features against women, young people in poverty, and students coming from native communities.

ALTERNATIVE SOLUTIONS

Intending to reduce the negative impact of decontextualized and impersonal entrance exams, Rueda and García (2013) have proposed the possibility of carrying out a diagnostic-formative evaluation, which allows the evaluation of individual performance through the documentation and presentation of experiences, combined with the delivery of finished products. Thus, the evaluation of portfolios of work, which would be reviewed by professionals in the respective area, would allow a greater openness to the inclusion of different learning styles and would mitigate several aspects that cause inequality in the opportunity for applicants to access HE. Unfortunately, this proposal is hampered by the enormous operational requirements that would be needed in terms of materials, trained reviewers, and time, although it could be used for specific cases of students in especially complicated conditions due to poverty and marginalization.

Regarding the evaluation of students from native communities, Bermúdez (2017) pointed out that, being a heterogeneous group, it is necessary to incorporate educational policies that focus on their identity processes, meanings, and intercultural practices, which lead to reformulations of ethnicity. Consequently, admission exams would have to be adapted considering their different cultural particularities, to achieve a fair assessment process. To achieve this, it would require the participation of a group of specialists in Anthropology, Sociology, Linguistics, and other social sciences, which is complicated to coordinate and carry out, so it would be essential to create a national plan for the inclusion of these students in HE,

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

129

which would be jointly financed by international institutions, civil associations and authorities at all academic levels.

CONCLUSIONS

This analysis exposed how the existing inequalities in Mexican HEIs entrance exams are related to inequalities in different aspects of life (access to public services, food, safety, health, educational quality, and labor obligations) of many students from lower strata and/or coming from native peoples, which have been documented in studies such as those of Moreno and Flamand (2015), Cortés (2013) and Millán and Pérez (2008). Likewise, such students, by not being able to access HE, lose the possibility of having social mobility (an increasingly rare phenomenon in Mexico), remaining in poverty, as discussed in the report by Olaberría and Dugain (2015).

It cannot be overlooked that inequities in HE entry can be linked to the geographic location of students (with greater options for those living in the center and north of the country) and the size of the populations in which they live (where rural areas are very prone to educational backwardness), as the research by Navarro and Favila (2013) and Alcántara and Navarrete (2014) expose.

On the other hand, it is relevant to point out that, during the search, analysis, and comparison of information sources, it could be noted that there are few studies focused on reviewing and criticizing the admission processes and evaluation instruments used for the selection of students in Mexican HE, especially with the socio-economic conditions and ethnicity of students. Most studies focus on how the admission test is related to the quantification of academic performance and its relationship with their school of origin, as in the work of Torres, Torres, and Ponce (2018) in several HEIs in Aguascalientes; or its value as a predictor of school dropout, as investigated by Solís and his work team (2017) at the Autonomous University of Campeche. This is largely due to the failure of inclusion policies and the strong "meritocracy" that still predominates in national universities, where these evaluations are still considered completely valid, functional, modern, accredited, and unquestionable.

Faced with this difficult situation, educational authorities and university academies of HEIs must become aware that these instruments are not the most equitable or adequate for the selection of students in an environment such as the Mexican one, so each university and institute must design their own contextualized instruments adapted to the socioeconomic and cultural conditions of their students. This is not an easy task, considering that the CENEVAL has monopolized the area of entrance evaluations with the

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for poor and indigenous students

130

approval of the universities, since the acceptance of its assessment criteria (approved by international organizations) results in greater funding for the HEIs, in addition to greatly facilitating their administrative tasks. This is where HE managers must make a strategic decision: is it worth sacrificing the future of millions of young people with limited resources and disadvantaged by their socio-cultural status to obtain resources and facilitate the management of the admission process? It is urgent that the answer to this question goes beyond bureaucratic expediency and leads to a fundamental change in the admission processes of all HEIs in the coming years.

Mexican Higher Education entrance exams, an obstacle to the aspiration of inclusive education for
poor and indigenous students

131

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132

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133

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134

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PREVALENCE AND MOLECULAR CHARACTERIZATION OF *ESCHERICHIA COLI* AND *SALMONELLA SPP.* IN GUINEA FOWLS (*NUMIDA MELEAGRIS*) IN TWO RANCHES OF CHIAPAS, MEXICO

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Prevalence and molecular characterization of *Escherichia coli* and *Salmonella spp*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

136

— *Abstract*—

The objective of the study was to evaluate the prevalence and molecularly characterize the isolates of *Escherichia coli* and *Salmonella spp.* in Guinea fowl (*Numida meleagris*) in two ranches in the municipalities of Villaflores and La Trinitaria, Chiapas, Mexico. A total of 23 guineas were randomly sampled, from which cloacal samples were taken for bacterial identification using selective media, while the *rfb*O157 gene (producer of *Shiga* toxin) was analyzed for molecular characterization. Data analysis was carried out using point prevalence. The results showed that there was no presence of *Salmonella spp.* nor of *Escherichia coli* in the guineas of the La Trinitaria ranch. Regarding the guineas sampled in the Villaflores ranch, no presence of *Salmonella spp.* was found, however, a 95% prevalence of *Escherichia coli* was found. The molecular characterization of 10% of the *Escherichia coli* samples allowed the identification of the serotype O157: H7 (producer of *Shiga* toxin). There was no prevalence of *Salmonella spp.* in guineas; however, the study shows that guinea fowl are carriers of *Escherichia coli* O157: H7, so it is necessary to continue with studies of the impact of the serotype on animal health, as well as on public health.

Keywords

Enterohemorrhagic strain; Public health; Animal health.

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella SPP*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

137

Poultry represents one of the main sources of animal protein and for this reason, it is common to find different domestic birds under backyard conditions, where chickens (*Gallus gallus domesticus*) and turkeys (*Meleagris gallopavo*) are mainly observed, as well as ducks (*Anas platyrhynchos domesticus*), geese (*Anser anser*) and guinea fowl (*Numida meleagris*) (Zaldívar-Pedroso, 2007).

In Mexico, guineas as an exotic species occupy an area of approximately 5,648 ha. (SEMARNAT, 2000), being reported mainly in wildlife conservation management units (UMAS) in Coahuila, Hidalgo, and Nuevo León (Goméz-de Silva, et al., 2005).

Currently, the guinea fowl has become popular among people for breeding, either as an ornamental bird or as meat and/or egg producer, due to its hardiness and low management. This bird has its origins in Central and East Africa, and although it was already known by the Greeks and Romans, it has only recently been used for meat production (Zaldívar-Pedroso, 2007). Among the advantages of guinea fowl production is its hardiness and good adaptation to adverse conditions, qualities that make it an effective and novel poultry species for backyard producers (Gómez-de Silva, et al., 2005; Salgado, et al., 2011), although information about this species in terms of production is scarce, it is known that it is kept in some communities in the country (Camas-Robles, et al., 2017).

However, some diseases originated by bacteria directly affect birds, causing a considerable drop in production. The *Enterobacteriaceae* family is the largest and most heterogeneous family of Gram-negative bacilli with importance in human and animal health (Araujo-Guerra, et al., 2019). Among the most common bacterial diseases are *Salmonella spp.* and *Escherichia coli*, which affect the intestinal tract of the poultry, causing its death; additionally, some bacterial serotypes can reach the consumer through meat or eggs, generating a negative impact on food safety and security (Leotta, et al., 2005; Rincón-Acero, et al., 2011; Araujo-Guerra, et al., 2019).

Regarding *Escherichia coli*, many serotypes have been associated with hemolytic uremic syndrome in humans (Ochoa, et al., 2004), with serotype O157:H7 being its main cause. On the other hand, *Salmonella spp.* infections are related to diseases transmitted by contaminated food (Rincón-Acero, et al., 2011) such as meat, which are dangerous when kept under circumstances that favor their multiplication, a situation that represents a serious public health problem (Bello-Pérez, et al., 1990; Mussaret, et al., 2006).

Although guinea fowl farming represents an efficient alternative for small-scale food production, it is important to carry out studies to identify the microorganisms that endanger the health of both the animal and the consumer. Therefore, the objective of this study was to evaluate the prevalence and molecular characterization of *Escherichia coli* and *Salmonella spp.*

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella spp*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

138

isolates in guinea fowl (*Numida meleagris*) on two farms in the municipalities of Villaflores and La Trinitaria, Chiapas, Mexico.

MATERIALS AND METHODS

The present study was carried out in the ranches of "Las Amazonas" in the municipality of Villaflores, Chiapas, located at the geographical coordinates 16° 13' 57''N, 93° 15' 57''W and "Monte Calvario" in the municipality of La Trinitaria, Chiapas, located at the geographical coordinates 16° 7' 13''N, 92° 2' 27''W. The identification of bacteria, as well as their molecular characterization, was carried out in the Molecular Biology Laboratory of the Faculty of Veterinary Medicine and Husbandry Campus (FMVZ) of the Universidad Autónoma de Chiapas (UNACH).

A random sampling without replacement was used, selecting 30% of the total population of birds in both ranches. Samples were taken by cloacal swabbing of the guineas with the support of Stuart medium, then placed under refrigeration at a temperature of 4°C until processing. The samples were inoculated in Petri dishes with *Salmonella Shigella* agar media (MCD Lab®) and *Methylene Blue Eosinia* (MCD Lab®) for the identification of *Salmonella spp*. and *Escherichia coli*, respectively. Subsequently, they were incubated at 37°C for 24 h; after this period, the bacteria were identified, being positive for *Escherichia coli* when the colonies had a phosphorescent green coloration and for *Salmonella spp*. when the colonies had dark coloration centers. Subsequently, a bacterial reseeding was performed, incubating the samples at a temperature of 37°C for 24 h, to isolate the positive colonies, then they were treated with a *Brain Heart Infusion* broth (MCD Lab®), to avoid the death of the colonies inside the agar medium, then they were homogenized with a Vortex type shaker and incubated at 37°C for 24 h after the time elapsed, a cloudy coloration was observed in the samples, indicating that the colonies grew in the broth; Subsequently, the samples were inoculated on *Muller Hinton* agar (MCD Lab®) and incubated at 37°C for 24 hours. Subsequently, the samples were preserved with glycerol and brought to a temperature of -26°C.

Then, the DNA extraction process was performed following the methodology used by Leotta, et al. (2005), where a small bacterial colony was placed in sterile distilled water. The samples were homogenized and transferred to a dry bath incubator (Thermo Shaker® TSI-100, USA) at a temperature of 100°C for 15 min with 600 rpm; subsequently, the samples were centrifuged with a centrifuge (VelaQuin® VE-4000, Mexico) at 1500 rpm for 5 min. Later, the supernatant was extracted and the amount of DNA was analyzed in a nanodrop spectrophotometer (Thermo Scientific®, ND-ONE-W, USA).

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella SPP*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

139

For the identification of the *Escherichia coli rfb*O157 gene, the polymerase chain reaction (PCR endpoint) technique was used, placing in microcentrifuge tubes, 6.5 μL of sterile water, 2.5 μL of forwarding primer, 2.5 μL of reverse primer (using the nucleotide sequences described by Leotta, et al, 2005 shown in Table 1), 12.5 μL of premixed solution with Taq DNA polymerase, dNTP, MgCl2 and reaction buffers (GoTaq® Master Mix) and 1 μL of DNA per sample; samples were placed in a thermal cycler (Bio Rad® C-1000, USA) under the following cycles: 94°C for 5 min, 30 cycles at 94°C for 30 s, 52°C for 30 s, 72°C for 1 min, with a total volume of 25 μL at 105°C.

Table 1

Characteristics of the rfbO157 gene used in the study (Leotta, et al., 2005)

Gen	Sequence (5'-3')	Size (Pb)
O157a	CGGACATCC ATGTGATATGG	259
O157b	TTGCCTATGTACAGCTAATCC	25.62%

*Pb: Base pairs

Source: Own elaboration

The bands were detected using a 2% agarose gel stained with ethidium bromide, placing 1 μL of bromophenol blue and 4 μL of DNA in each well, in addition to placing the positive and negative reference of the gene in the first and second wells, respectively; the electrophoresis chamber was programmed at 60 V for 45 min. Visualization of the electrophoresis results (Image 1) was performed with UV light in a transilluminator (Bio Rad® Chemi-Doc XRS+, USA).
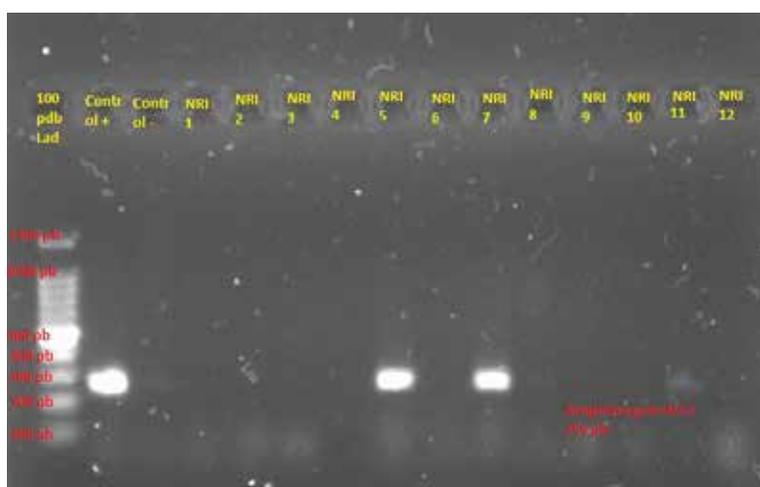
*pb/pdb: base pairs; NRI: *Numida*-related isolate.

Source: Own elaboration

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella spp.* In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

140

Data were analyzed using point prevalence formula (Rodriguez-Hernandez, 2015), as shown below:

$$\text{Point prevalence} = Ct \,/\, Nt$$

Where:

Ct: Number of existing cases (prevalent) at a given time or age.

Nt: Total number of individuals in the population at that given time or age.

RESULTS AND DISCUSSION

No prevalence of *Salmonella spp.* was found in any of the farms studied, results similar to those of García, et al. (2009), who carried out a study in Spain with laying hens, finding a prevalence of 1.3% of *Salmonella spp.* in feces collected by cloacal swabbing; this shows that the prevalence of *Salmonella* is low in this type of sampling method; however, these results differ from those obtained by Castañeda-Salazar, et al. (2018), who found a prevalence of 29.2% in chickens for human consumption in Colombia.

In the case of *Escherichia coli*, no prevalence was found in the "Monte Calvario" ranch in La Trinitaria, while in the "Las Amazonas" ranch in Villaflores, 95% of the samples were positive (Image 2), this is attributed to the type of management employed with the guineas and the variation of temperatures between municipalities. Findings of Hernández-Fillor, et al. (2017), who conducted a study in Cuba with laying hens and found a prevalence of 45.9%, differs from this study; on the other hand, Gibert-Perelló, in 2010, found a prevalence of 72.7% in samples of different organs from laying hens in Spain. However, for the identification of serotype O157:H7 (*Shiga* toxin producer), 10% prevalence was found (Image 3), this differs from the findings of Zotta, et al. (2016), who did not report the presence of the gene in chicken viscera in Argentina. A study by Rípodas-Navarro, et al. (2017), found 12.12% presence of the gene in meats and their derivatives from domestic slaughter species in Madrid, Spain.

Studies have demonstrated the ability of *Escherichia coli* O157:H7 to colonize the intestinal mucosa of chickens and spread to the environment (Best, et al., 2005; La Ragione, et al., 2005), which may explain that chickens and guineas can act as carriers of *Escherichia coli* O157:H7, being a possible threat to public health.

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella SPP*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

141
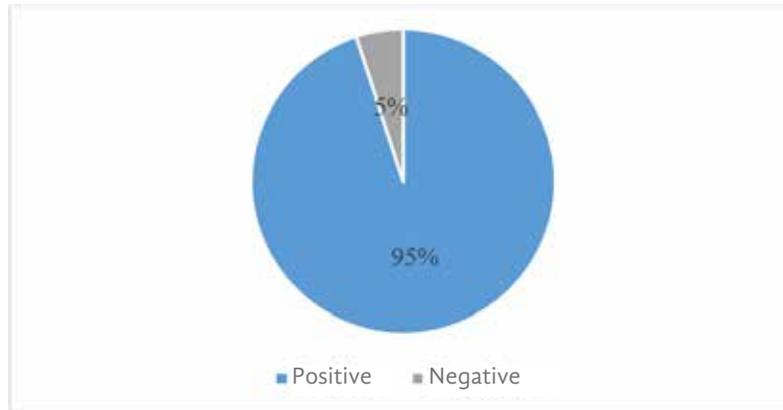
Image 2. Prevalence of *Escherichia coli* in guinea fowl at "Las Amazonas" ranch, Villaflores, Chiapas. Source: Own elaboration
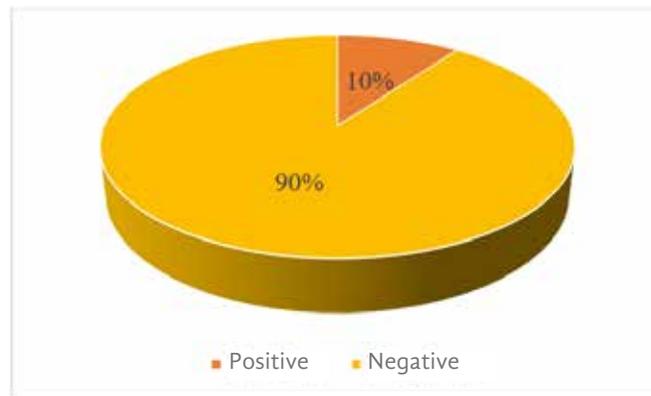
Image 3. Prevalence of *Escherichia coli* serotype O157:H7 (*Shiga* toxin producer) in guinea fowl from "Las Amazonas" ranch, Villaflores, Chiapas. Source: Own elaboration

CONCLUSION

The breeding of guinea fowl represents an alternative for backyard producers due to their easy adaptation to the environment, as well as the low initial investment, in addition to presenting a source of animal protein.

Although no prevalence of *Salmonella spp*. was found in guinea fowl, the study demonstrates that guinea fowl are carriers of *Escherichia coli* O157:H7, so it is necessary to continue with studies on the impact of the serotype on animal health, as well as on public health.

Prevalence and molecular characterization of *Escherichia coli* and *Salmonella SPP*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

142

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Prevalence and molecular characterization of *Escherichia coli* and *Salmonella SPP*. In guinea fowls (*Numida meleagris*) in two ranches of Chiapas, Mexico

143

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PHOTOJOURNALISM AS A SOCIAL FIELD. PROPOSAL TO STUDY JOURNALISTIC PHOTOGRAPHY

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Photojournalism as a social field. Proposal to study journalistic photography

146

— Abstract—

Journalistic photography is a message that is constructed, like any communicative act, to provoke something and, through its articulation with other elements, it can structure a complex discourse that far exceeds the simple enunciation of a particular fact.

In addition to the photography itself, its study must consider the production pole, whose interests and objectives determine its themes, treatment, and disposition to the public. Understanding photojournalism as a social field allows us to study the relationship -in two senses- between the objective structures and the structures incorporated in the agents of the field and their incidence in the configuration of the message.

Keywords:

Photojournalism; journalistic photography; journalism.

Photojournalism as a social field. Proposal to study journalistic photography

147

One of the most important elements of today's journalism, printed or digital, is photography. Today, despite the development of digital technologies and the supposed general crisis of journalism, it is mainly used as a reliable proof of facts or situations and is associated, due to its degree of precision and detail, with concepts such as *truth* and *objectivity*.

However, journalistic photography is a message that is constructed, like any communicative act, to provoke something that, through its articulation with other elements, can structure a complex discourse that far exceeds the simple enunciation of a particular fact.

Since its origin, as a consequence of the Industrial Revolution, photography was attributed the task of documenting, and witnessing -without interfering- the most important events of family life, first, and once the technical adjustments[1] were achieved, of public life. Hence, the relationship between photography and journalism derives from the positivist tradition and is based on the idea that events or situations of public interest can be "encapsulated in time" to be shown through the press.

In photography, the subject becomes the object and the unrepeatable can be reproduced infinitely: "to take a photograph is to participate in the mortality, vulnerability, mutability of another person or thing. Precisely because they section a moment and freeze it, all photographs bear witness to the merciless dissolution of time" (Sontag, 2006, p.32). The past is nothing more than an exclusive reconstruction of memory.

JOURNALISTIC PHOTOGRAPHY, AN INTELLECTUAL CREATION

In the first quarter of the 20th century, photography appeared regularly in newspapers, gradually replacing the engravings and illustrations used until then[2]. Due to its characteristics, this new "window" to the world, revolutionized the way of doing journalism. According to Susan Sontag (2003, p.33):

Photographs had the virtue of uniting two contradictory attributes. Their claim to objectivity was inherent. And yet they always had, necessarily, a point of view. They were the record of the real - uncontroversial, as no verbal account could ever be despite its impartiality - since a machine was recording it. And they testified to the real since a person had been there to make them.

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1   "To take the first portraits (around 1840) it was necessary to subject the individual to several poses under a glass case in full sunlight; [...] a device called headrest was then invented, a sort of prosthesis invisible to the lens that supported and maintained the body in its passage to immobility..." (Barthes, 1990, p.34).

2   Because of the time-consuming process, the photographs began to be published regularly in weekly newspapers such as *Le Monde Illustré* in France, the Illustrierte Zeitung in Germany, and the *Illustrated London News* in Great Britain.

Photojournalism as a social field. Proposal to study journalistic photography

148

Both attributes pointed out by Sontag continue to operate in journalistic photography. In the beginning, this *objectivity* occupied almost all the expectations of the photographer, the medium, and the public itself; it was this "probative force of the images" that came to confer on them a status of *truth*. Hence the interest of governments in distributing their photographs.

Today we know that when we talk about photojournalism we need less totalizing concepts (*objectivity/truth*) because although photographs are indeed a record of something that happened, it is necessary to clarify that:

> All photography is fiction that is presented as true. Against what we have been taught, against what we usually think, photography always lies, it lies by instinct, it lies because its nature does not allow it to do otherwise. But the important thing is not this inevitable lie. What is important is how the photographer uses it, what intention it serves. What is important, in short, is the control exercised by the photographer to impose an ethical direction to his lie. The good photographer is the one who *lies the truth well* (Fontcuberta, 2016, p.17).

That is, the photojournalist makes a series of decisions to take the photo, decisions that require, at the very least, training, skill, and intentionality. In the end, the photograph is the combination of the photographer's vision, the use of a series of technical and compositional elements, and the expectations of the medium that makes them public. Journalistic photography is anything but objective.

In 1924, Ernst Friedich published *Krieg dem Kriege!* (War against war!), a photographic album about the horrors of World War I, sequences of close-ups and panoramic shots that openly contravened the pro-war discourse of the time.

Despite its wide acceptance in intellectual circles, especially on the left, the German government censored both the book and the exhibition of the photographs. The mutilated soldiers, the rotting bodies, the faces with almost indescribable wounds, were accompanied by feet in four languages; together they designed a kind of cry to raise public awareness and refute war propaganda.

In the United States, Friedrich's works, like those of Lewis W. Hine and Jacob Riis[3] "used the camera as a tool to move public opinion" (Colorado, 2016, p.5). While it is true that these works are not considered properly photojournalistic, they demonstrated the capacity of the photographic image to deal with specific social phenomena.

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3   Hine made photographs of the conditions under which children worked and Riis made photographs of the immigrants' conditions. The former is credited with a major influence on the Keating-Owen Act which regulated child labor and the latter on Roosevelt's social policy.

Photojournalism as a social field. Proposal to study journalistic photography

149

Thus, to speak of photography is to speak of intentionality. Even in the private sphere, there is an intention that guides the *making of*[4] photographs: to share a moment, to remember an event or situation, to show oneself in a certain way to others, etc.; each situation demands adjustments and decisions by the Photographer according to his or her objectives, even in a selfie.

In the public sphere, journalistic photography materializes a synecdochic gaze constructed from a (political) position. Objectivity is a look that is neither naïve nor innocuous, of defined but camouflaged intentions, which in its materiality overflows the classic pretension of informative journalism.

According to Enrique Villaseñor, there are four types of photography in photojournalism: informative, testimonial, photo essay, and photo-illustration. Informative photography dispenses -at least so it is believed- with the photographer's subjectivity and seeks above all the truth; on the other hand, testimonial photography[5] focuses on structural phenomena and, in this case, "is based on the photographer's opinion (...) a graphic journalism of opinion that goes beyond immediate information" (2011, p.33).

On the other hand, the photo-essay is an iconographic narrative on some topic and, as its name indicates, is eminently subjective, while the photo illustration has no commitment to reality and is more related to commercial interests[6].

Therefore, all journalistic photography is fundamentally committed to *reality* and is conceived to reach the general public. That is its condition to exist in the field of journalism and at the same time it is the greatest of its limitations; the *noema of photography* according to Barthes (1990, p.91): "It has been [¬...] it has been there, and yet it has been immediately separated; it has been absolute, irrecusably present, and yet already deferred".

Recognizing, then, that beyond our pretensions, photography ¬-as such- is not reality itself or its analog and, consequently, neither is journalistic photography, also implies rethinking the role of the photographer. That is to say, journalistic photography is no longer the mechanical work of reproducing reality, but an intellectual creation -of a subject- that has as its

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4   *Making* rather than *taking* photographs. *Making* implicitly recognizes the photographer's action; *taking*, on the other hand, reserves a marginal place for it. In the former, it is recognized that photography is construction; in the latter, only reproduction.

5   Traditionally called "documentary."

6   Villaseñor includes this type of photography by resorting to Pepe Baeza's classification in *Por una función crítica de la fotografía de prensa* (2007). However, photo-illustration does not fit in this essay since it does not necessarily deal with events of public interest, nor is it closely related to the news or information field. A distinction should be made between press photography, i.e., that which appears regularly in the press, and journalistic photography, which, as mentioned, is necessarily linked to events of public interest.

Photojournalism as a social field. Proposal to study journalistic photography

150

raw material facts of public interest, which is constituted as a media and message[7] to be distributed through different media and modalities.

According to Gamarnik (2010, p.17) "photography shows great ductility and the possibility of being used in multiple instances" and its meaning -changing and historical- depends on social uses; therefore, by overcoming the myth of objectivity that has been used almost indiscriminately since its invention, the study of photography, including journalistic photography, must focus on production; that is, on the creative pole, whose interests and objectives determine the configuration of the message.

In his dystopia *1984*, George Orwell (1948) posits the interest of the government, the Ministry of Truth, in controlling the past through its documents and records to justify its actions in the present. If journalistic photography contributes to record events or situations of public interest that time turns into documents, then how does it intervene in the construction of history?

Nazi Germany, for example, had in the photographs of Hugo Jaeger, Hitler's personal photographer, the perfect device to record the entire propaganda system of the Third Reich. It was not only the swastika, or the predominant use of red, white, and black, but also the impeccable formations of the soldiers, the precise placement of the flags, and in general, the arrangement of the distinctive elements of any official Nazi rally. According to Ben Cosgrove (2014), all these elements -recorded by Jaeger- contributed to the construction of the myth of Hitler, Goebbels, Himmler, and Goering, and above all, to perceive Nazism, at least for some years, as unstoppable.

In Argentina, during the first Peronist government, the Undersecretariat of Information of the Presidency of the Nation was created, which was in charge of producing and distributing government propaganda and, in turn, a photographic division dedicated almost exclusively to building the image of Perón and -subsequently- of Eva Perón. In that area "the most repeated and widespread photograph of Peronist iconography" -Perón on horseback-, and that of Evita "chosen by Peronist youth during the 1970s as their own symbol" (Gamarnik, 2010, p.5) would be created.

In contrast, in 1981 a group of photographers held the first exhibition of Argentine Graphic Journalism "intending to exhibit the photos they had taken during those years [during Perón's governments] and that had not been published or had been directly censored by the mainstream media" (p.13).

In Mexico, the student movement of 1968 and its terrible outcome -more than 50 years ago- meant a schism in the depths of the Mexican political system, including, of course, the journalistic sphere. The messages from

7   In the same document, Villaseñor explains that journalistic photography is both media and message because it functions as a vehicle to transmit other messages through different means (2011, p.30).

Photojournalism as a social field. Proposal to study journalistic photography

151

the government were accompanied by censorship of dissenting voices; an information control system was set up that equally restricted the journalistic exercise of the media, reporters, and photojournalists[8].

Fortunately, many photographic archives were preserved and over time have seen the light of day. This is the case of the portfolios of Armando Lenin and Manuel Gutiérrez "*El Marichito*" -photographer of the Ministry of the Interior-, which *Cuartoscuro* magazine presented in 2008; two views of the same movement, one built from the journalistic field and the other from the power.

APPROACHES TO JOURNALISTIC PHOTOGRAPHY

Even today, journalistic photography does not occupy a prominent place in journalism studies. In Mexico, for example, research works focus mainly on written texts, conferring an accessory position to this type of photography. Many local and national media indeed privilege the use of photography, as an illustration, that is, completely detached from the journalistic piece; however, the mere increase in recent years in the number of photographic images published in newspapers, both print and digital, justifies the need to address it through rigorous studies that conceive it as a protagonist in the field.

However, there are several ways to study photography. Following Laswell's scheme, Javier Marzal explains that each instance entails a way of approaching the object of study. There are biographical and historical works; there are also tech works and those based on iconological or semiotic orientations; of course, each of them has implications and limitations. However, this is a developing field.

Javier Marzal (2011, p.12) himself explains that studies on the photographic image have usually "developed within the framework of the world of collecting and photographic criticism in specialized and popularization magazines." That is to say, despite its massification in the second half of the 20th century, photography has been studied, above all, from intellectual and artistic circles.

Walter Benjamin (1973), for example, one of the thinkers of the Frankfurt School, studied photography as a subversion of the concept of art. Due to its capacity for reproduction, photography disrupts the limits of authenticity and originality of art to the point of turning it into a commodity.

For her part, the photographer and sociologist Gisèle Freund (1974), through the historical opposition painting/photography, introduces the idea

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8   Confiscating rolls of film at rallies was a recurrent task of the Interior, military, and paramilitary agents of the time.

Photojournalism as a social field. Proposal to study journalistic photography

152

that changes in the social structure influence both the themes and modalities of artistic expression. That is to say, from her perspective, there is an undeniable incidence of the structure on what is considered art.

Now, Joan Fontcuberta (2016), Jacob Bañuelos (2014), Pepe Baeza (2001), among others, have developed works on the limits, implications, and transformations of photography in its use as a journalistic tool; this, of course, according to the structures of the journalistic field, without denying the inherent attributes of photography itself.

As Roland Barthes (1986, p.15) maintains, beyond its conception as an analogous document of facts and situations, "press photography is an object worked, chosen, composed, elaborated, treated according to professional, aesthetic and ideological norms that constitute as many factors of connotation."

For example, in Chiapas, in the 1994 conflict between the Ejército Zapatista de Liberación Nacional (EZLN) and the federal government, which was initially armed and derived in an informational strategy[9], press photography was determinant. According to Flor Gómez (2015, p.245), the guerrillas configured a space of representation that included *disguise*, symbolic locations, and an epic style that was distributed through press photography.

> The photographs published in the press about the events in Chiapas offer ideological information, serving the propaganda of the guerrilla Ejército Zapatista de Liberación Nacional. We are led to this affirmation by the detection of certain elements in the images that, related, fix ideas, concepts, symbols, in short, propaganda.

For Gómez Cortecero the graphic material published in Spain about the armed conflict in Chiapas, on the one hand, proves that "press photography is, indeed, a medium capable of establishing strategies of persuasion and creating opinion", and on the other that, at least, in this case, it served to provide ideological information following the propagandistic interests of the EZLN (2015, p.242). This research work, then, found underlying intentionality that conditioned the way of doing photojournalism about the guerrilla. A *sui generis* situation that evidences the need to understand journalistic photography as a message within a structure that, materializes through the exercise of the photographer.

If this requirement is met, then, it can be observed that photojournalism is part of a larger informational structure, with commercial interests, but,

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9 Manuel Castells (2009) considers the EZLN as the world's first informational guerrilla.

Photojournalism as a social field. Proposal to study journalistic photography

153

above all, political; that uses the nature of photography, how it is perceived in everyday life, to build a discourse of great semantic weight.

This position opens the door to study not only the photography of governments or different political entities but also journalistic photography itself as an instrument of political propaganda. Journalistic photography is no longer reality, nor the reproduction of the referent, but a message that is deliberately constructed.

From Cultural Studies, Osiris Aquino (2018) argues that there is a gender bias in the work of male photojournalists, as a result of the normalized heteropatriarchal structure that shapes their way of seeing. From this point of view, the gaze is constructed through culture and inevitably reproduces its stereotypical forms.

In such a way that, without being aware of it, through their work, photojournalists not only make certain social groups (women and LGBTTTIQ members[10]) invisible, but also construct their messages from a negative charge in line with the discourse dictated by male hegemony.

That is to say, for this work the structural mandates are internalized through culture and then reproduced through journalistic photography, as an extension of the gaze of the subjects. The political component then becomes more complex through a new element: culture.

It is worth asking, then, how can journalistic photography be studied without falling into reductionist visions, that is, recognizing it as a structured message in which both the photographer's intentionality and the structural elements of the journalistic sphere are materialized?

POLITICS AND CULTURE, A SPACE FOR THE PRODUCTION OF JOURNALISTIC PHOTOGRAPHY

Journalistic photography is of interest as a document that crystallizes, explicitly or implicitly, on the one hand, the objectives and interests of the information market, and in turn, the subjectivities of the photographer. In such a way that, to understand it, the one is inseparable from the other.

Cultural Studies, in its Latin American aspect, which emerged in the middle of the last century, focuses mainly on "the spaces of resistance between popular and mass culture" (Szurmuk and Mkee, 2009, p.9). This interdisciplinary field "inherits from the German-Jewish intellectual diaspora exiled from Nazism, the concern for the power of the culture industry and

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10   Lesbian, gay, bisexual, transgender, transvestite, transsexual, intersex, queer.

Photojournalism as a social field. Proposal to study journalistic photography

154

the interest in analyzing new modes of cultural production, often with a changed sign" (Szurmuk and Mkee, 2009, p.12).

That is, Cultural Studies, among other things, reformulate the concerns of the Frankfurt School, which posited a mass society without individual freedom, to give way, mainly as a result of poststructuralism, to a society with the capacity to produce meaning (Szurmuk and Mkee, 2009, p.13).

In this context, the theories of mediations[11], especially the one developed by Jesús Martín Barbero in *De los medios a las media a las mediaciones: comunicación, cultura y hegemonía* (1991) have resulted in a whole school of reflection on mass media and globalization in Latin America.

In this work, Martín Barbero argues that communication is more a matter of culture than of media, that the idea of transmitters-dominant and receivers-dominated was insufficient to explain what was happening in a scenario of "memories and imaginaries that mix the indigenous with the rural, the rural with the urban, folklore with the popular and the popular with mass media" (Barbero, 1991, p.10).

Martín Barbero proposes a kind of conversion; to formulate the questions not from the commonplaces of the academic tradition, but its opposite; this means "to re-see the whole process of communication from its other side, that of reception, that of the resistances that have their place there, that of appropriation from the uses" (1991, p.10).

However, as a consequence of the theoretical displacement that placed culture at the center of interest, studies on Latin American communication, especially those derived from the theories of mediations, have shown a "marked process of de-politicization":

> The segmented, decontextualized, and micro-scale study of the reception process; the indifference towards the links of the media with ideology, dependence, and power; as well as the adoption of research agendas designed from the business market, are some of the manifestations of this loss of the critical and utopian sense of research (Gámez, 2007, p.207).

That is to say, although it is true that the works on mediations evidenced the insufficiency of analytical categories to account for the process of mass communication, they focused mainly on the relationship of the subject-cultural practice, leaving aside the political categories of power or, to put it another way, the categories that refer to the great structures (Gámez, 2007, p.208).

Journalistic photography, as mentioned above, deals with matters of public interest, newsworthy or not. Its area of action is broad and complex

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11   In 1977, Manuel Martín Serrano published *La mediación social.*

Photojournalism as a social field. Proposal to study journalistic photography

155

because it is related to social dynamics; consequently, it fits perfectly into the logic of mass media whose primary interest is the dissemination of contents on a large scale.

Although there are examples of journalistic photography with the status of art[12], it does not pretend, in the first instance, to be enclosed in a kind of intellectual solipsism; on the contrary, its main objective is its massive distribution, to reach the general public. If an analogy were to be made with painting -one more- journalistic photography would be a mural as opposed to easel painting.

According to García Canclini (2000, p.72) the recomposition of the public sphere within countries and the questioning of the classical forms of representation have problematized the different conceptions of the public sphere:

> the public is developed in newspapers and broadcasting as well as in entertainment, not only in the media under state control or conceived as a public service, but also in talk shows, video games, contests in which personal successes and skills are rewarded as if they were public performances (García, 2000, p.75).

In this sense, to the extent that it is distributed, journalistic photography participates in that deliberative scene that overflows the classic mechanisms of representativeness, in that symbolic space complexed by the communication and information industries, where public affairs are discussed, where politics is made.

Therefore, it is essential to pay attention to the immanent political component in every communicative act that takes place in the media, without ignoring the cultural context of which it is a part; both, politics and culture, are the frameworks of interpretation of media contents; both are also the space of production of journalistic photography.

It is imperative then, in addition to analyzing journalistic photography itself as a complex and structured message, to account for the motivations and intentions of the producer pole; that is, the photographer: a subject who creates but at the same time reproduces, who is indebted to society but depends on an industry, who sees but above all, looks.

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12 Mexican Enrique Metinides, a sensationalist photographer, has exhibited his work in museums such as the Recontre d'Arles Photographie in France, the Aperture Gallery in New York, and the Fair Royal College in England.

Photojournalism as a social field. Proposal to study journalistic photography

156

FROM JOURNALISTIC PHOTOGRAPHY TO PHOTOJOURNALISM AND VICE-VERSA

Understanding journalistic photography as a text in context, which is also deliberately structured, demands reflecting on the role played by the photo-journalist as a political entity; that is, as part of the web of relations not only of the journalistic industry, but also of the economic and social sphere; and, to top it off, as a subject -which is not determined by the structure- with the capacity of the agency.

This implies understanding that journalistic photography is built within a *social field*[13], in the meaning of Pierre Bourdieu (1997), in a web of relationships and structures that determine what is understood as legitimate and what is not, and that inevitably affect its daily practice. This field is photojournalism.

Thinking of photojournalism as a field urges us to study the relationship -in two senses- between objective structures and incorporated structure[14], that is, between other social fields and *habitus*; the former as exogenous structures and the latter as internalized practices.

In other words, with photojournalism we speak of agents and institutions and their practices and relationships in a specific context; that is, photographers, editors, and journalistic companies (of printed or digital products), mainly, and their incidence in the configuration of journalistic photography.

The demand here is to understand that journalistic photography cannot be studied without paying attention to the production pole (including the photographer himself), whose logics determine its themes, its treatment, and its disposition to the public; that is to say, the margins in which it develops.

Studying journalistic photography on its own, or as a reproduction of reality, reveals a serious problem in the relationship between the researcher and the object of study because it excludes, in a simplistic equation, the political component, which is essentially what motivates photojournalism.

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13 In *Practical Reason. On the theory of action* (1997, p.49), concerning social space, the author explains that a field is "a field of forces, whose necessity is imposed on the agents who have entered it, and as a field of struggles within which the agents confront each other, with means and ends differentiated according to their position in the structure of the field of forces, thus contributing to preserve or transform its structure".

14 In the 1960s, Pierre Bourdieu conducted a study on the social function of photography in France. The work focused on the meaning of photographic practice, specifically of the popular classes. The paper shows that photography, more than a spontaneous activity, starts from the reality in which it exists and materializes, in addition to the intentions of the subject, the systems of thought of an entire group.

Photojournalism as a social field. Proposal to study journalistic photography

157

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158

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