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SUMARIO • SUMMARY • RESUMO

Editorial

This second issue of the year 2023 begins with two research projects developed at the Secondary Education stage. The first of these addresses issues relating gender and nationality to academic performance, but within the arts modality. To this end, a non-experimental study based on the application of a scale is developed. Respondents showed little interest in seeking recognition from parents, friends and teachers. In the case of academic achievement in the Spanish language, Haitian youth have significantly higher achievement levels. The second study focuses on the integral formation of students in rural areas of Peru. To this end, the level of influence of the educational model based on socio-formative processes and educational *benchmarking* in the conception of quality in secondary education in rural areas is analyzed. The study methodology was mixed and data collection was carried out by means of a checklist and a questionnaire. The integration of the analysis of the theories studied and the empirical information obtained from the field work, show that the practice of socio-training and educational *benchmarking* based on the characteristics of the context are directly related to educational quality in rural secondary education.

The teaching of Spanish is analyzed from the perspective of teachers and students at the University of Guyana. The aim is to determine the perception of these groups at the University of Guyana about the teaching-learning of Spanish in the post-COVID-19 era, as well as the advantages and disadvantages they perceive when using online classes. The study was exploratory-descriptive in nature. The results show that teachers preferred the blended mode and students preferred the online mode.

Other types of work focus on the learning process. Thus, the didactic material for the teaching of musical literacy in second childhood in Costa Rica is analyzed. This is a mixed type of research and the data collection was carried out by means of documentary analysis instruments and a semi-closed questionnaire applied to a sample of teachers who teach this subject. The Curso de Lectura Elemental (1984) is the most widely used teaching material by teachers who teach this population in Costa Rica. It has an important degree of comprehensiveness, since it is possible to find the main areas of musical literacy learning.

Service-learning (SL) is a relatively recent modality that is analyzed in the Colombian context, in this case in the area of health. In order to deepen the topic, elements of reflection and appropriation of health in the school are proposed based on the ApS. The study is based on research+creation, which resulted in the construction of an open-access hypermedia. The finished product was socialized with teachers and students from two educational institutions, who made a positive evaluation of the resource as a starting point for a comprehensive school health education program.

Also in the health area, the research is aimed at determining the level of satisfaction of graduates in the context of a machine learning methodology. Its purpose was to perform a network-based classification using an e-learning methodology. To this end, a survey research was carried out which showed a better score in the section on the logistics of materials and in the management and technical support of the virtual campus, while the lowest scores were related to aspects related to extra-center communication and the facilities offered by the institution for the improvement of the participant's economic and social context.

The following contribution deals with a common theme in MLSER, inclusive education. In this case, it is set in the city of Florencia, the capital of Caquetá in Colombia, and focuses on characterizing the population of students with disabilities in urban and rural public institutions. To this end, information was requested from the authorities and an extensive literature search was conducted. The results showed higher rates of disability in the student population between 11 and 14 years of age, particularly at the elementary school level, with a higher incidence among males.

One type of studies of great interest for present and future research is bibliometric studies. The one presented in this issue of the journal concerns the corpus linguistics approach to terminology and lexicology studies in the linguistics category of Web of Science. It aims to analyze, describe and show how language works, as well as to reorient its study by exploring its actual use. In this way, the main trends in this field are identified. To this end, bibliometric elements and text mining techniques are used to discover the most relevant authors, the institutions with the most publications and the most productive journals. There has been an exponential increase in the productivity of research based on corpus linguistics in the last decade in different universities and publications.

Also within linguistics is an article based on an inverted classroom experience in a group of students of English as a foreign language in the eighth grade in a center of the city of Bogota in a blended learning regime. To this end, an action research model was designed. The data collected evidenced that the students interacted in different and meaningful ways when a scenario was exposed, revealing signs and characteristics that demonstrated that they were able to maintain a conversation using different resources with their interlocutors.

This issue of the journal ends with an interesting study on generic competencies in the curriculum of the mixed and non-school bachelor's degree programs at the Universidad del Valle de México. It is supported by the general updating of the curricula at the undergraduate level in its mixed and non-school modalities, in order to design an action research model. The data collected allowed us to conclude that a new curricular model with new and innovative generic competencies has been implemented and will strengthen the graduate profile of students graduating in the second half of this decade.

Antonio Pantoja Vallejo
Editor Jefe / Editor in chief / Editor Chefe

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ACADEMIC GOALS ACCORDING TO GENDER, NATIONALITY AND PERFORMANCE IN HIGH SCHOOL STUDENTS IN ARTS MODE

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Abstract. The objective of this work was to analyze the perspectives of students regarding their academic goals in relation to gender, nationality and academic performance in high school students of the Arts Educational Center, Julio Alberto Hernández, Santiago, Dominican Republic. The selected sample was 187 students, 61.5% were women, 38.5% men, 89.8% Dominicans and 10.2% Haitians, the research has a quantitative approach and a non-experimental cross-sectional design. The t test did not show significant differences for the selection of students by sex ($p = 0.07$) or by nationality ($p = 0.304$). The Academic Goals Scale (CMA) questionnaire was used, it has 20 items with Likert-type responses, with a reliability level of 0.806. The students responded with very low averages in the MRS, in addition, the ML are significantly higher in women ($p = 0.025$), however, Haitian nationals have ML ($p = 0.023$) and MRS ($p = 0.038$) significantly higher, in the case of academic performance in Spanish, Haitians present significantly higher performance ($p = 0.001$). Finally, conclusions are offered that will be helpful for future work in this line, to verify the effect of ML, MA and MRS factors in other academic situations.

Keywords: Academic goals, Modality in Arts, Performance, Nationality

LAS METAS ACADÉMICAS EN FUNCIÓN DEL GÉNERO Y LA NACIONALIDAD Y SU RELACIÓN CON EL RENDIMIENTO EN ESTUDIANTES DE SECUNDARIA, MODALIDAD EN ARTES

Resumen. El objetivo del presente trabajo fue analizar las perspectivas de los alumnos respecto a sus metas académicas en relación con el sexo, la nacionalidad y el rendimiento académico en estudiantes de secundaria del Centro Educativo en Artes, Julio Alberto Hernández, Santiago, República Dominicana. La muestra seleccionada fue de 187 alumnos, 61.5% eran mujeres, 38.5% hombres, 89.8% dominicanos y 10.2% haitianos, la investigación tiene un enfoque cuantitativo y un diseño transversal no experimental. La prueba t no mostró diferencias significativas para la selección de los alumnos por sexo ($p = 0.07$) ni por nacionalidad ($p = 0.304$). Se utilizó el cuestionario Escala de Metas Académicas (CMA), cuenta con 20 ítems con respuesta tipo Likert, con un nivel de fiabilidad de 0.806. Los estudiantes respondieron con promedios muy bajos en la MRS, además, las ML son significativamente más elevadas en las mujeres ($p = 0.025$), sin embargo, los nacionales haitianos tienen ML ($p = 0.023$) y MRS ($p = 0.038$) significativamente más altas, en el caso del rendimiento académico en lengua española, los haitianos presentan rendimiento significativamente más alto ($p = 0.001$). Finalmente, se ofrecen conclusiones que serán de ayuda para futuros trabajos en esta línea, para verificar el efecto de los factores ML, MA y MRS en otras situaciones académicas.

Palabras clave: Metas académicas, Modalidad en Artes, Rendimiento, Nacionalidad

Introduction

The exercise of teaching from a social point of view is the basis for which teachers are trained; however, there are many factors that affect this process, among which is the motivation of students, which is also found in the various biopsychosocial spheres that make up their environment. In this regard, Diaz (2021), defines motivation as a relevant factor in defining the goals of middle level students, these allude to the intellectual objective that is proposed to achieve, the motive or desire to achieve the goal, the expectations that are forged, in addition, the author refers to the action plans aimed at achieving achievements, autonomy, gratitude, recognition of the people who are in their environment helping to develop the student in their academic and formative life.

For William and Lara (2020), intrinsic motivation is an activity related to the achievement of a personal satisfaction and is mediated by interest and satisfaction towards the task; while extrinsic motivation is related to the performance towards an action to be rewarded or avoid being punished; these motivations are important in adolescents, seeking the achievement of the proposed goals regarding their academic training and life projects, guided by patterns of appropriate behaviors that help in the whole process.

For their part, Ecos and Manrique (2018), propose academic motivation based on the goals pursued by the student, regulated by a series of patterns found in the context where they develop, both academic and social; these are guided by the desire to learn, be accepted and the realization of activities that allow them to develop as people and thereby improve their skills.

For García, et al. (1998), academic motivation contemplates learning goals, in this case students seek strategies for solutions to problems posed in their context; performance goals, related to the rewards that the student desires, these are not focused on learning and the goals of the self, for which the student faces tasks and wonders if he/she is capable of performing them. In this sense, the author suggests that in order to influence students' motivations in the right direction and to be able to guide them towards learning goals in accordance with their interests, the teacher must be able to identify motivational tendencies.

According to Diaz (2021), it is important to consider learning goals since they have an important impact on the way academic results are valued, which are of vital importance for secondary school students, who need to be recognized and accepted in certain social groups, the family and school environment.

For his part, Cetarez (2019), states that "the physical environment significantly influences student learning" (p. 2), referring to the impact of the environment to improve student motivation, this element is of utmost importance because in vulnerable contexts, which is where a large part of the young people of the Center for the Arts, Julio Alberto Hernández, are impacted by a series of patterns that keep them away from the academic and personal goals that they can set and wish to achieve in the near future.

In the case of the Julio Alberto Hernández Center for the Arts in the city of Santiago de los Caballeros, the following occurs: There are five modalities in the arts areas, students enter after fulfilling a profile and vocation evaluation in the area of interest; however, the students of the aforementioned center, however, students at the center take one of the modalities in order to remain enrolled, these modalities may be the following: Music, Applied, Visual, Dance and Theater, in this regard, Navas, et al, (2007), states that students live music, enjoy music and relate thanks to music, in the art modalities, students live and relate to their peers, not only in the area of music; as Ramona Liriano, a theater teacher, says, "although conflicts are generated by age, there is also the motivation and mutual support among them as a group with common

goals"; however, the student trained in the arts modality is different, due to the approach they have in their training, their strength and their tendency are not the sciences, but the Arts.

In this regard, the Ministry of Education of the Dominican Republic (MINERD), in the memories of the modality in arts (2015):

> "The arts modality is a curriculum that combines training and education in different artistic disciplines, sciences, skills for spoken and written communication, skills for cooperative work, and training in citizen and human values, in order to increase the graduates' chances of success." (p. 90).

Regarding academic goals, achievement goals, motivation and gender differences in middle level students, some authors found similar behavior patterns (Barca, et al., 2011; Riveiro and Suarez, 2019, Ruiz-Esteban, et al., 2018), where as learning goals improve, so does academic performance, likewise, the academic metras variable presents significant differences regarding academic performance and females presented a tendency towards academic goals over males. Although other research found no differences in academic, achievement, and social reinforcement goals of students of similar levels, such as those of (Cetarez, 2018; Williams & Lara, 2020).

Method

Design

The research design was based on a quantitative approach and a non-experimental cross-sectional design, according to Bizquerra (2009), in the quantitative approach "the interest of educational research focuses on explaining, predicting and controlling the phenomena under study" (p. 71), on the other hand, for the descriptive analysis of the data the SPSS v. software was used. 27 and the Excel 2019 spreadsheet, for the inferential part Student's t-test was applied to perform the comparison between independent means, likewise for the comparison between items the Mann-Whitney U test was used with a significance value $\alpha = 5$ %.

Participants

The study involved 187 students from the second cycle of the middle level of the Julio Alberto Hernández Arts Education Center, randomly selected from the different grades of the second cycle of the middle level. The 61.5% were women and 38.5% were men. Likewise, of the total sample, 57.2% were from the fourth grade of secondary school, 25.7% were from the fifth grade of middle school and 17.1% were from the sixth grade of middle school. Those who did not complete the test were excluded, as well as those who did not sign the informed consent form. The age range was between 15 and 19 years. The mean age for men was 16.72±1.13 years and for women was 16.40±1.21 years, the t-test showed no significant statistical difference for both sexes ($p = 0.07$).

On the other hand, the sample was divided by nationality, consisting of 89.8% of young people with Dominican nationality and 10.2% with Haitian nationality, also the average age for Dominicans is 16.49±1.17 years and for Haitians is 16.79±1.27 years, the t-test indicates that there is no difference in selecting a student of Dominican or Haitian nationality ($p = 0.304$).

Instruments

As a data collection system, a survey was carried out by applying an instrument with 20 questions called the Academic Goals Questionnaire (CMA), with some adaptations, Valle, et

al., (1997), capable of evaluating the academic goals of adolescents with a multidimensional approach. The 20 items assess three dimensions, called factors.

Factor I: Learning goals (L*):* composed of eight items (from 1 to 8), these seek to measure the students' interest in acquiring knowledge and increasing their competencies. Fator II: Milestones of Achievement (ML): composed of six items (item 9 and from 15 to 20), which measures the achievement of a good grade in exams and progress in studies. Factor III: Social Reinforcement Goals (SRM)*:* composed of five items (from 10 to 14), which measure the tendency to acquire social esteem and the approval of teachers, parents and friends, both in the school environment and in the community.

The responses to each of the items in the questionnaire are categorized on a Likert-type scale ranging from 1 (never) to 5 (always). In order to gather more information from the participants, the students were asked to complete the questions on the modality to which they belong, nationality, sex, academic performance in the modality, Spanish language and mathematics, as well as age and sex.

The reliability of the instrument was measured through Cronbach's alpha and an overall index of 0.806 was obtained for the factors contained in the instrument, the values were as follows: MA (0.777), ML (0.705) and MRS (0.736), although García, et al., (1998), found reliability indices for the instrument ranging between 0.765 and 0.894, Rodríguez-Rodríguez and Guzmán (2018), found reliability indices ranging between 0.83 and 0.92, these values are above those determined in the present research, however, Valle, et al., (2006) determined reliability indexes similar to those of the present work, ranging from 0.73 to 0.87, on the other hand Duran-Aponte and Arias-Gómez, (2015), also obtained reliability indexes between 0.71 and 0.89, as well as Navas and Ivorra (2004), determined reliability indexes between 0.82 and 0.83, in this sense, we can see that the reliability measurements of the instrument in the research are within the parameters determined by other researchers.

Procedure

The information was obtained through the application of the questionnaire by the researcher, in addition, the authorization of the center's management was obtained. The application was carried out in person at the educational center on May 12, 2022, by appointment with the students and with parental authorization for students under 18 years of age, working with the groups in the classrooms and with the help of the center's teachers so that the test could be applied simultaneously, with an average duration of 8 minutes.

Data analysis

The descriptive-correlational analysis was considered with their respective measures of central tendency and dispersion, for the inferential analysis the normality of the factors was considered through the Kolmogórov-Smirnov and Shapiro-Wilk test, the t-test for independent samples was used and ANOVA was used to determine if there were differences by sex and nationality in each of the scales. The Brown-Forsythe test was used when equality of variances could not be admitted by Levene's test. Finally, through Pearson's correlation analysis it was possible to determine the correlation of the academic performance variables with respect to the factors (MA, ML, MRS). Likewise, the Mann-Whitney U test was used for the comparison by items of the Academic Goals Questionnaire (AMC) considering a significance value of 5% (α=0.05). Analyses were performed with SPSS v.27 software.

Results

Descriptive analysis

The general descriptive statistics of the sample under study are presented (Table 1), where 61.5% of the students who participated in the study were female and 38.5% were male, likewise, the classification by nationality showed that 89.8% of the students who participated in the research were of Dominican nationality and 10.2% of Haitian nationality, subsequently it was shown that there is no difference in choosing a male or a female, a Dominican or a Haitian from the educational center. On the other hand, the age of the students was 16.52±1.18 years, where the highest representation is in 16 and 17 years with 28.9% and 27.8% respectively.

Table 1
Descriptive characteristics

Variable	n	%
Sex		
Man	72	38.5
Woman	115	61.5
Nationality		
Dominican	168	89.8
Haitian	19	10.2
Age in years completed	43	23.0
15	54	28.9
16	52	27.8
17	25	13.4
18	13	7.0
19	43	23.0
Average	16.52	
Standard deviation	1.18	
Student's modality to which the student belongs		
Applied	43	23.0
Music	50	26.7
Dance	30	16.0
Theater	32	17.1
Visual	32	17.1
Grade being pursued by the student		
Fourth grade	107	57.2
Fifth grade	48	25.7
Sixth grade	32	17.1

It was observed that the modality with the highest representation is music with 26.7%, followed by applied with 23.0%, in that sense, the lowest representation is dance with 16.0%; likewise, when distributing students by grade, el 57.2% are from fourth grade, this is due to the fact that, as the years go by, some students leave the center for various reasons, the modality begins in this grade, therefore, the number of students at the beginning is very high in all modalities, and it can be observed that at the end, in sixth grade, there are few students per grade (see Table 2) with respect to the initial number.

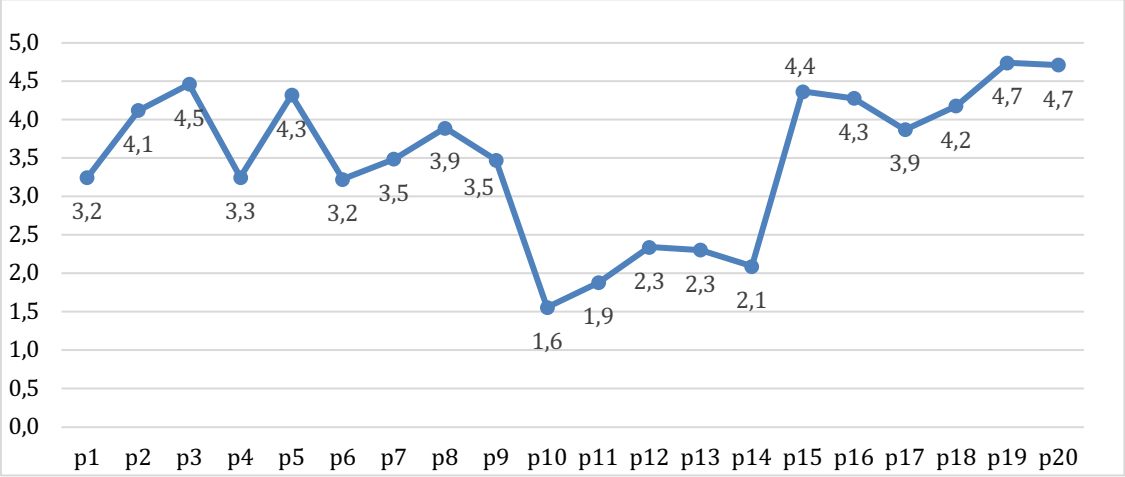
Academic performance in the areas of Spanish Language, Mathematics and Modality did not present relevant variations, which indicates that in the choice of one student or another there are no differences in any of the three areas.

Table 2
Academic performance and academic goal factors

Variable	Average	DS	Variance
Academic performance			
Spanish Language	7.7	2.0	4.0
Mathematics	7.3	2.1	4.3
Modality	7.8	1.9	3.7
Factors of academic goals			
MA	29.5	6.3	40.1
ML	29.6	4.7	22.5
MRS	10.1	4.5	20.6

Regarding the analysis of the factors, it was observed that the MA and MRS factors presented high variances with respect to the average, which may show possible dispersion in these factors generating differences, but the same was not true for the ML factor.

Figure 1
CMA Questionnaire, Average student responses by item



Regarding the 20 items of the Academic Goals Questionnaire answered by the students, Figure 1 shows the average results of each item; it was observed that the lowest averages are presented in items 10 to 14, which correspond to the factor Social Reinforcement Goals (SRG), that is, the levels of obtaining social valuation and approval from parents, friends and teachers, these are low in general, likewise items 15 to 20, which refer to the Achievement Goals (AG), showed the highest averages, these refer to obtaining good grades and advancing in their studies, in these cases the students give more relevance to this factor.

Inferential Analysis

Table 3

Kolmogorov-Smirnov and Shapiro-Wilk normality tests and normality tests for WFS factors by sex

	Sex	Kolmogorov-Smirnov		Shapiro-Wilk	
		Statistician	p-value	Statistician	p-value
MA	Man	0.24	0.20	0.88	0.23
	Woman	0.17	0.10	0.95	0.12
ML	Man	0.33	0.05	0.80	0.05
	Woman	0.14	0.10	0.87	0.11
MRS	Man	0.15	0.20	0.98	0.95
	Woman	0.20	0.05	0.85	0.06
Normality tests for WFS factors by nationality					
	Nationality				
MA	Dominican	0.14	0.20	0.96	0.40
	Haitian	0.16	0.20	0.92	0.12
ML	Dominican	0.14	0.20	0.90	0.05
	Haitian	0.19	0.09	0.89	0.06
MRS	Dominican	0.18	0.06	0.88	0.11
	Haitian	0.13	0.20	0.94	0.21
Normality tests of academic performance by nationality					
	Nationality				
Spanish	Dominican	0.15	0.20	0.96	0.32
Language	Haitian	0.21	0.20	0.91	0.37
Mathematics	Dominican	0.15	0.09	0.97	0.37
	Haitian	0.24	0.16	0.95	0.74
Modality	Dominican	0.13	0.19	0.95	0.26
	Haitian	0.25	0.16	0.87	0.21
Normality tests of academic performance by sex					
	Sex				
Spanish	Man	0.17	0.20	0.95	0.69
Language	Woman	0.17	0.20	0.94	0.33
Mathematics	Man	0.18	0.20	0.94	0.53
	Woman	0.14	0.20	0.97	0.78
Modality	Man	0.21	0.20	0.86	0.08
	Woman	0.18	0.14	0.92	0.11

The Kolmogórov-Smirnov and Shapiro-Wilk normality test showed that the WFS factors and academic performance resemble a normal distribution for both sex and nationality (Table 3)

Table 4

One-factor analysis of variance (ANOVA) by sex and nationality

	Sex		Nationality	
Items	F	p-value	F	p-value
P1	6.979	0.009	1.734	0.190
P2	0.207	0.650	1.185	0.278
P3	0.202	0.654	0.188	0.665
P4	1.855	0.175	2.061	0.153
P5	0.656	0.419	0.103	0.748
P6	0.277	0.600	1.058	0.305
P7	0.503	0.479	1.513	0.220
P8	0.001	0.972	0.000	0.995
P9	2.304	0.131	0.984	0.323
P10	0.891	0.347	3.441	0.065
P11	0.026	0.873	0.555	0.457
P12	0.151	0.698	0.071	0.789
P13	1.136	0.288	2.902	0.090
P14	0.222	0.638	19.664	0.000
P15	1.632	0.203	0.915	0.340
P16	4.793	0.030	2.855	0.093
P17	0.037	0.848	1.297	0.256
P18	1.568	0.212	0.571	0.451
P19	4.661	0.032	0.376	0.540
P20	2.846	0.093	1.742	0.188

Table 5

Man-Whitney U test by items

Items	Sex		Nationality	
	Mann Whitney U	p-value	Mann Whitney U	p-value
P1	3213.0	0.008	1301.5	0.177
P2	4116.0	0.943	1346.5	0.230
P3	3883.5	0.393	1404.5	0.304
P4	3664.0	0.176	1282.0	0.151
P5	3830.0	0.351	1583.0	0.950
P6	3970.0	0.629	1383.5	0.330
P7	3951.0	0.589	1328.5	0.218
P8	4046.5	0.783	1576.5	0.926
P9	3511.0	0.071	1420.5	0.417
P10	3819.5	0.246	1350.0	0.151
P11	4037.5	0.742	1412.0	0.340
P12	3827.0	0.361	1543.5	0.805
P13	3675.0	0.172	1259.0	0.111
P14	4076.5	0.847	860.5	0.000
P15	3736.5	0.189	1424.0	0.368
P16	3435.5	0.024	1276.0	0.098
P17	3988.5	0.653	1307.5	0.168
P18	3723.5	0.194	1410.0	0.351
P19	3743.5	0.067	1532.5	0.637
P20	3734.0	0.057	1443.5	0.249

An ANOVA was performed (Table 4), showing differences in the classification by sex for P1 items: I study because I am interested in solving problems ($p = 0.009$), P16: I study because I want to be proud of getting good grades ($p = 0.030$) and P19: I study because I want to have a good job in the future ($p = 0.032$), in these cases differences were observed between men and women. In the classification by nationality, differences were only observed in item P14: I study because I like to get better grades than my friends ($p = 0.000$).

On the other hand, the Mann Whitney U test was performed to test the hypotheses by items (Table 5), where P1: I study because it is interesting to solve problems ($p = 0.008$) and P16: Study because I want to be proud of getting good grades ($p = 0.024$), showed significant differences when the analysis was performed by sex, in the case of nationality the differences by items were presented only in P14: I study because I like to get better grades than my friends. ($p = 0.000$), the other items showed no internal differences.

Correlational analysis of academic performance and academic goals

In the academic achievement of Spanish Language, Mathematics and Modality, as well as achievement goals (ML), social reinforcement goals (MRS) and learning goals (MA), significant correlations were observed (Table 6), that is, achievement in mathematics presented a positive correlation with achievement in Spanish Language ($p =0.000$), likewise, performance in Spanish Language presented a positive correlation with MA and ML ($p =0.000$), likewise, in social reinforcement goals (MRS) a positive correlation was observed with achievement goals (ML) and learning goals (MA) ($p = 0.036$ and $p = 0.003$ respectively).

As the MA and ML factors increase, performance in Mathematics, Spanish Language and Modality also increase (positive correlation), likewise the MA factor increases as the ML factor increases (positive correlation).

Statistical analysis of WFS considering sex and nationality

Table 6
Pearson correlation, Mathematics Performance, Spanish Language, Modality and the factors ML, MA and MRS

Table 7
Academic goals and Academic performance classified by gender and nationality

		R. in Language	R. in Mathematics	R. in Modality	MA	ML
R. in Mathematics	Correlation	0.334**				
	p-value	0.000				
R. in Modality	Correlation	0.076	-0.056			
	p-value	0.301	0.449			
MA	Correlation	0.314**	0.197**	0.151*		
	p-value	0.000	0.007	0.039		
ML	Correlation	0.363**	0.159*	0.201**	0.388**	
	p-value	0.000	0.029	0.006	0.000	
MRS	Correlation	-0.038	-0.084	0.138	0.153*	0.217**
	p-value	0.604	0.252	0.060	0.036	0.003

Note. **p-value < 0.01 *p-value <0.05

Academic goals classified by gender

Academic Goals (CMA)	Man		Women		t	p-value
	Media	DS	Media	DS		
MA	29.74	6.21	29.33	6.43	0.43	0.67
ML	28.64	5.13	30.24	4.40	-2.26	0.03
MRS	10.42	3.90	9.97	4.91	0.58	0.56

Goals and academic performance classified by nationality

Academic Goals (CMA)	Dominican		Haitian		t	p-value
	Media	DS	Media	DS		
MA	29.46	6.36	29.84	6.22	0.07	0.80
ML	29.42	4.85	31.42	3.24	5.81	0.02
MRS	9.85	4.33	12.79	5.60	4.91	0.04
Spanish Language	7.57	1.81	9.21	2.84	-3.50	0.00
Mathematics	7.25	2.10	7.68	1.77	-0.87	0.39
Modality	7.82	1.89	7.58	2.14	0.51	0.61

Differences by sex and nationality were observed in the CMA scales; where statistically significant differences were observed in one of the scales, achievement goals (AT). Student's t-test showed significant mean differences, assuming equal variances. Females presented significantly higher achievement goals (AT) than males of the same age, while with respect to

the learning goals (L) and social reinforcement goals (SR) factors, no significant differences were found between males and females.

Regarding academic achievement in Spanish Language, Mathematics and in the Modality, considering the gender variable, no statistically significant differences were found ($p = 0.13, 0.59, 0.48$), respectively.

In relation to nationality, significant differences were observed in the factors achievement goals (AT) and social reinforcement goals (SRM), the results showed statistical differences in the aforementioned factors; the Brown-Forsythe test was used because different variances were assumed with respect to nationality.

Haitian youth presented significantly higher achievement goals (AT) and social reinforcement goals (SR) than Dominican youth; no significant difference was found with respect to learning goals (L) for both nationalities.

Regarding academic performance, it was shown that in the area of Spanish language there are statistically significant differences, where a significantly higher performance was observed in Haitian youths compared to Dominicans ($p = 0.001$), considering that the mother tongue is not Spanish, it was assumed that Haitian students made a greater effort to perform in this subject to perform better in this subject. In the case of the areas of mathematics and modality, there are no statistically significant differences**.**

Discussion and conclusions

This work allowed to deepen in the factors that influenced the academic goals; achievement goals (ML), learning goals (MA) and social reinforcement goals (MRS), where the characteristics and potentialities of the students were identified and the analysis was regulated by the variables sex and nationality, likewise, in the present work the academic goals and their influence on the academic performance of the young people of the Julio Alberto Hernández Educational Center for the Arts were identified.

The literature consulted showed significant differences in academic goals between males and females (Cetarez, 2019; Diaz, 2021; Williams and Lara, 2020), the study conducted in high school students of the second cycle of the Educational Center in Arts, Julio Alberto Hernández, presented the same learning goals and social reinforcement goals for male and female, but the achievement goals of females are significantly higher, these same results were obtained by Ruiz-Esteban, et al., (2018). On the other hand, Ecos and Manrique (2018), found significant differences between learning goals (MA), achievement goals (ML) and social reinforcement goals (MRS), in contrast to the results of this research that only agreed on differences in achievement goals (ML). On the other hand, it was observed that the sex variable makes a difference in the achievement goals factor, with no changes in learning goals and social reinforcement goals. In addition, there were no significant differences in academic performance considering the gender variable.

Regarding the nationality variable, the results of this research showed that the learning goals factor did not present statistically significant differences; for the achievement goals and social reinforcement goals factors, statistical evidence was found that justifies the differences between the young people who participated in the study, in this sense, the Haitian youth presented significantly higher goals than those of Dominican nationality. Regarding academic performance in Spanish language, mathematics and modality, the young people did not show any difference in mathematics and modality; however, in the subject of Spanish language,

which, although it is not the mother tongue of Haitian nationals, they showed a significantly higher performance.

Although the work of Diaz (2021), concludes that learning goals have relevance over achievement goals and social reinforcement goals, the significant incidence of the sex variable was not determined, in contrast to the present research, where achievement goals have relevance over learning goals and over social reinforcement goals. In this sense, when the analysis was carried out considering the nationality variable, achievement goals and social reinforcement goals have relevance over learning goals, in addition, in the correlational analysis it was observed that social reinforcement goals have a positive correlation with achievement goals and learning goals.

On the other hand, the work of Ecos and Manrique (2018), concluded that students have higher valuation for achievement goals, which implies that their desire to learn has more to do with not having difficulties in their exams and advancing in their studies, these results coincide with the results of this research, likewise, in the present work the same MAs were found for Dominican and Haitian nationals, with significant differences in the MLs and MRSs.

Regarding academic achievement and MA, ML and MRS, a positive correlation of ML and MA with academic achievement in Spanish language, mathematics and modality was observed.

Some recommendations made in this work are: to continue with other research on academic goals and classify them according to other variables, such as modality and grades, in order to delve deeper into problems that may arise and present possible solutions, such as: academic programs that are in line with the type of training that students receive in the arts modality, the lack of incentives for work, high levels of school failure, insertion of arts graduates in the labor market of the region and the country, as well as how they relate to the factors studied in this research.

Finally, this research should be carried out in other centers in the arts in order to confirm the results obtained, especially the conclusions by nationality.

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SOCIOFORMATIVE PROCESSES AND EDUCATIONAL BENCHMARKING AS A STRATEGY FOR QUALITY IMPROVEMENT IN RURAL SECONDARY EDUCATION

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Abstract. The comprehensive education of students in rural areas of Peru lags behind that of urban areas, influenced by both endogenous and exogenous factors that widen the gap. The objective of the study was to determine the level of influence of the educational model based on socio-training processes and educational benchmarking in the improvement of educational quality. Methodologically, the study approach was mixed, integrating the phenomenological and analytical approach, through a non-experimental-interpretative design; the study population consisted of students and teachers from the rural area of the province of Huánuco, the study sample consisted of 46 students from the district of Cayrán randomly selected by cluster, the data collection was done through a Likert-type questionnaire and interview guide, the data analysis is supported by descriptive and inferential statistical measures. For the descriptive and inferential data analysis, Minitab 20 software was used, highlighting among the results the conformity of 71.3% of the students with the practice of socio-training; 68.8% agree with the practice of educational benchmarking; while 72.4% agree with the achievement of quality learning, there is also a direct relationship between the socio-training processes and educational benchmarking with the achievement of educational quality. It is concluded that the practice of socio-training and educational benchmarking based on the characteristics of the context are directly related to educational quality in rural secondary education.

Keywords: Educational benchmarking, socio-training process, educational quality, secondary education.

PROCESOS SOCIOFORMATIVOS Y EL *BENCHMARKING* EDUCATIVO COMO ESTRATEGIA PARA EL MEJORAMIENTO DE LA CALIDAD EN LA EDUCACIÓN SECUNDARIA RURAL

Resumen. La formación integral de los estudiantes en las zonas rurales del Perú, se encuentra rezagada con respecto a la zona urbana, influenciado por factores, tanto endógenos como exógenos que ahondan la brecha. El objetivo del estudio fue determinar el nivel de influencia del modelo educativo basado en procesos socioformativos y el benchmarking educativo en la mejora de la calidad educativa. Metodológicamente, el enfoque del estudio fue mixta, donde se integran el enfoque fenomenológico y analítico, a través de un diseño no experimental-interpretativo; la población de estudio estuvo conformada por los estudiantes y docentes del área rural de la provincia de Huánuco, la muestra de estudio lo conforman 46 estudiantes del distrito de Cayrán elegido de forma aleatoria por conglomerado, la recolección de datos se realiza mediante cuestionario tipo Likert y guia de entrevista, el análisis de datos se apoya en medidas estadísticas descriptivas e inferenciales. Para el análisis descriptivo e inferencial de datos se utilizó el software Minitab 20, destacando entre los resultados la conformidad del 71,3% de los estudiantes con la práctica de la socioformación; el 68,8% manifiestan estar de acuerdo con la

praxis del benchmarking educativo; mientras el 72,4% están de acuerdo con el logro de un aprendizaje de calidad, asimismo existe una relación directa de los procesos socioformativos y el benchmarking educativo con el logro de la calidad educativa. Se concluye que la que la práctica de la socioformación y el benchmarking educativo basado en las características del contexto están directamente relacionados con la calidad educativa en la educación secundaria rural.

Palabras clave: Benchmarking educativo, proceso socioformativo, calidad educativa, educación secundaria.

Introduction

Today's education in a globalized and technological context requires the use of educational strategies and materials in accordance with the demands of the knowledge era, where education aims at the integral formation of future citizens capable of managing and handling complex situations, acting and reacting with relevance, combining resources to mobilize them in a specific context, and understanding, transferring and configuring learning to learn. This requires innovative proposals in regular basic education institutions that make possible the effective integration of theory and practice for efficient and effective educational achievements (Martínez & Echevarría, 2009). Contrary to this proposal, the Peruvian education system at the secondary education level is increasingly declining in its different components, with a mismatch between the educational development of rural and urban areas, since priority is given to education in urban areas, and little support is given to rural education.

Given the heterogeneous social, cultural and geographic context of rural areas, the educational system is in permanent emergency, urging the development of inclusive education, through contextualized teaching-learning strategies, in accordance with the current educational paradigm. It is essential to incorporate the competency-based curriculum approach, through the widespread use of ICTs, aimed at changing the vision of education through the evaluation of teacher and student performance.

The integration of educational practice to the socio-cultural context with a view to educating students with a social identity is almost nonexistent, since educational institutions in rural areas do not have formative educational models. If it existed, it would propitiate the integration of practice - teaching, learning and research - and in their work coexistence spaces, a situation that implies involvement with the community that make possible the improvement of living conditions in the territory (Martínez-Clares et al., 2018).

According to (MINEDU, 2016)according to the teacher, the teacher must design activities with a clear understanding of the learning purposes, the student's learning needs, the design and organization of meaningful situations, diverse resources and materials, pertinent pedagogical and didactic processes, differentiated strategies, and interactions that allow for a favorable climate for learning, providing students with the opportunity to deploy their abilities to act efficiently in complex situations to achieve the learning purpose.

In this sense, the study responds to the needs of secondary education in the rural area and is oriented towards an inclusive education and a quality education oriented to the development of previously established capacities and performances, leading to the development of competencies, which allow them to link with the social environment, for the strengthening of their individual development, in the family context and in the community. This prerogative is feasible from the conjunction of socio-training processes and the practice of educational *benchmarking*, which constitute catalysts for the achievement of a sustained and quality education; through the integration of culture and the experience of students with their learning

of educational content immersed in areas of study, as part of the structuring of the students' life project.

Also, the importance of the study lies in the fact that it made it possible to identify and evaluate the comparative advantages of the application of the didactic strategy based on the findings of the *benchmarking* process in rural secondary education, as compared to urban secondary education. To this end, the study has explicit and implicit reasons that justify its conduct. On the one hand, it is explained from the academic interest in promoting more meaningful learning in rural high school students, as well as seeking forms of evaluation that bring them closer to the discovery and reflection on the world and on themselves, to enjoy in knowing and know themselves in doing; on the other hand, the professional interest in researching on *socio-training* and educational *benchmarking* and concrete ways to contribute through research to the improvement of professional practice through viable strategies for the achievement of the proposed educational objectives.

From the considerations described above, the following research question arises: what is the level of influence of the educational model based on socio-training processes and educational *benchmarking* with respect to the perception of educational quality of students in the fifth grade of secondary school in rural educational institutions in the province of Huánuco, Peru?

Background and current status of the subject

Among some previous studies on socio-formative processes, educational benchmarking, which was used as a reference for this study, the following stand out:

Adames & Dino (2020) published the article "Aportes de la socioformación para una educación de calidad" in which they offer a proposal for quality education for Fe y Alegría in the Dominican Republic, taking socioformation as an articulating axis, related to the theoretical and methodological approaches of the curriculum and the quality improvement system of Fe y Alegría. The methodology is based on a documentary analysis through conceptual mapping, developing its eight axes, which favored the relationship between the three proposals. He achieved a practical synthesis of the changes that must be generated to produce an education in accordance with the knowledge society. It concludes that socio-training offers significant elements to guide the pedagogical practice of teachers, such as situating education from complex thinking, developing training processes through projects, facing problems of the context, developing competencies as integral actions in the context and consolidating an ethical project of personal and social life, which when put into practice define a route of educational change that will lead to the transformation of society.

Arreola et al. (2019) in a documentary analysis research are responsible for giving clarity to the concept of pedagogical practice from the socioformative approach, with the aim of being able to guide the reflective educational intervention by professionals and organizations, for this purpose the conceptual mapping has been used, concluding that the pedagogical practice from the socioformative approach has elements that characterize it and can be applied at any educational level in which it is worked. Where it highlights the existing relationship between the development of competencies, considered as cognitive skills, in a teaching-learning space and postulates that socio-training as an approach to improve the academic training of every student (Ceballos, 2020). Under this premise, the teaching-learning binomial, cognitive skills and competencies are integrated with key elements such as teaching, curriculum, and socio-

formative assessments based on the development of metacognition, complex thinking and problem solving.

In this context, socio-training emerges as an approach that seeks the integral development of people in different areas of their development, from complex thinking through socio-training projects, with an ethical vision, constant reflection and the support of ICTs to lay the foundations of a knowledge society (Prado, 2018). Thus, the existing sources of information on socioformation are relevant as an approach for the study of the dynamic reality in constant change and development, projecting more and more its application in different educational scenarios: in research processes, curriculum design and academic development, being vital its importance in continuing to provide innovations, in the constant search for educational quality.

On the other hand, *benchmarking* emerges as a plan aimed at improving customer service, through the analysis of the workshops programmed to improve the quality of service provided by workers to users, systematically optimizing the services offered; this plan considers as a transcendent activity the awareness of workers to provide quality care, through the design of a sequence of activities aimed at continuous improvement, through monitoring, evaluation and feedback, which led to the reduction of deficient care (Diaz, 2016).

According to Hernandez & Cano (2017) *benchmarking* is an important tool to increase the quality of service in organizations and business management, by obtaining information on the real state of the organization compared to the competition, from monitoring the behavior and actions of those organizations that are considered the best, without this meaning copying ideas from the competition, but trying to learn from them in order to create maximum efficiency in the company or organization. Also, *benchmarking* is considered as a structured and continuous process to diagnose the operations of organizations that are recognized with the best practices in the market and sales are the solution to a problem, where *benchmarking* techniques to increase the sales of the organization or company. Llantop & Rimarachín, 2016). This position allows us to have better and greater opportunities to grow, to meet expectations and to strengthen the quality of our service.

From the perspective of education, *benchmarking* is conceived as a methodological tool that makes it possible to achieve the highest level of quality in virtual education through a process of comparative evaluation, provides knowledge about the educational quality process in another university and identifies the reasons why better results are obtained there, the results obtained in the study led to the elaboration of a comprehensive improvement action plan to increase, in the short and medium term, the quality of the education offered, and highlights that *benchmarking* is a very useful and effective tool to improve the quality of virtual higher education (Marciniak, 2016).

Literature review

The theoretical construct that supports the present study integrates the concepts of socio-training, educational benchmarking and educational quality, which serve as the theoretical foundation and scientific support for the research.

Socioformation

Socio-training is an approach to human activity in general, based on activities through the collaborative work of different actors in a society. It is flexible, open, practical and focused on solving contextual problems. As such, it seeks to promote economic development, quality of life, technology, agriculture, peaceful coexistence, inclusion and respect for socio-cultural

diversity; oriented to the articulation of knowledge from different disciplines and training areas. This approach "does not focus on learning as a goal, but on the formation of people with a clear ethical life project in the framework of social, cultural and environmental interdependencies, in the synchronic and diachronic dynamics." (Tobón, 2013).

Socio-education emphasizes the full development of its members, providing them with the necessary tools to face the challenges that arise, in addition to this, from a position of ethical life, it seeks to make a difference with other educational approaches that seek permanent innovation processes inside and outside the classroom (Hernández et al., 2015). Thus, in a socio-formative process, the individual has the faculty to develop and propose creative and well-founded solutions to the contextual problems formulated, in an interdisciplinary manner.

Socio-training also makes it possible to consolidate and integrate the ethical life project, social integration, human talent management, values, scientific development and entrepreneurship, and the search for quality, among others. Becoming an approach oriented to the study of the new needs and challenges of the knowledge and information society, to innovate traditional approaches to education and talent development are limited. On the other hand, the management and recreation of knowledge orients the elaboration of a theoretical construct, having as inputs, the communication and identification of problems, the search for relevant sources, processing and organization of knowledge, contextualization and adaptation of knowledge, the creation and innovation of knowledge and the application of knowledge to problem solving (Ortega-Carbajal et al., 2015).

In the educational field, socio-training seeks innovation through teaching practice, as well as its relevance to enhance students' skills. It also has tools and techniques that take up versatile learning styles such as the ethical life project, formative projects, problem-based learning, among others. Through evaluation and follow-up instruments appropriate to each need, the socio-training process can be modified according to the goals or objectives established, highlighting the theme of competency development as a teaching task, showing its relevance as an approach that seeks to go beyond the classroom.

In short, socio-training is a tool that is not limited to the operational but responds to "training aspects in competencies necessary for solving real problems, coupled with the development of talent, which occurs through the implementation of projects and continuous improvement from collaboration" (Tobón et al., 2015, p. 200). Thus, a socio-formative process follows a path "intense, challenging and full of visions, which aims to recognize its essence, its place in society and that its members through the ethical project of life, collaborative work, constant improvement, entrepreneurship, management and co-creation of knowledge and ICT for the knowledge society" (Contreras-Torres & Rodríguez-Peralta, 2020).

Educational benchmarking

Benchmarking is the search for industry best practices that lead to excellent performance (Camp, 1993). It is also conceived as "a systematic and continuous process that evaluates products, services and work processes of organizations that are recognized as representing best practices with the purpose of making quantitative and qualitative improvements to an organization" (Splendolini, 2005). From this perspective, the *benchmarking* process can be understood as a process of organizational learning from the observation, analysis and implementation of practices that work successfully in other organizations.

To fulfill its purpose, the *benchmarking* methodology is developed in two stages. The first refers to the use of the concept as a tool that improves the company's competitiveness, differentiating it from imitators; through a process of continuous improvement that allows the comparison of the company's objectives and achievements with the best practices of companies

considered excellent in the industry or sector. That is, "*benchmarking* as the search for industry practices that lead to excellent performance." (Camp, 1993, pág. 23). The second stage considers *benchmarking* as a methodology to study how a company has established itself as a leader in the market or sector, not only through the assimilation of best practices, but also by measuring the ability to understand how to do things more efficiently and effectively (Camp, 1993).

Benchmarking is also conceived as an evaluation technique evoked to the integral study of products, services, processes and procedures that are performed between organizations, where one of them analyzes what another organization performs, in order to match or improve it, to achieve higher quality in their products and services they provide, through the praxis of cooperation, collaboration and permanent exchange of information; correcting mistakes along the way and identifying opportunities to solve the problems detected that lead to make decisions taking as a reference the quality indicators of the leading organizations; from this perspective, the quality of the services is considered as fundamental (Coldling, 2000).

The *benchmarking* process takes place in the relationship and direct interaction with competitors or non-competitors within a line of study and, at the end of the study, the results of each of the institutions involved in the process are shared, creating their own improvement systems (De Cárdenas, 2006). Thanks to *benchmarking*, the term competitiveness appears, and the development of virtual learning environments becomes the fundamental input for the development of studies aimed at the search for quality in the educational field.

Educational quality

According to the OECD (2011), quality education is that which ensures that all young people acquire the knowledge, skills, abilities and attitudes necessary for a relevant adult life. Also the UN (1990) in its "World Declaration on Education for All", establishes that quality basic education should focus on learning, according to three dimensions: effectiveness, which postulates quality education taking into account whether students really learn what they should learn, according to what is established in the curricular plans and programs; what is learned in the system and its relevance in individual and social terms; and the processes and means that the system provides to students for the development of their educational experience.

A quality educational experience relies on a rights-based approach to all elements involved in an educational endeavor (Vaillant, 2018). Thus, educational quality implies a search for constant improvement in all its elements, in inputs (resources available in schools), teaching processes (time allocated to school teaching, amount of homework and curricular stipulations) and in outputs (student achievement). Another important aspect is the link between education, reality and the personal and social life of the learner, since this determines that the acquisition of knowledge, abilities, skills and attitudes are ideal to equip them for everyday life. This also means that the responsibility for the quality of education lies not only with the directors of an educational institution, but with all its participants. In this way, the educational quality approach will not be oriented only to achieve a good product based on favorable input conditions (adequate infrastructure, ICT, among others), but to make all students progress based on their personal circumstances (UNESCO, 2016e). Thus, a quality education is locally important and culturally appropriate; it is meaningful in the present and prepares people for the future; it creates knowledge, vital skills, perspectives, attitudes and values; through instruments for transformation, based on a process of continuous improvement, with interaction of the subjects of education in a teaching-learning process carried out efficiently, which has an impact on the integral formation of the student body.

Method

Research approach

The present study is based on the mixed approach, which is based on the combination of quantitative and qualitative methodology, called multi-methods, mixed methods or methodological triangulation (Moscoso, 2017). In this approach, as mentioned by Hernández et al (2014), it is specified in the process of collecting and analyzing quantitative and qualitative data, to respond to the problem statement; for this purpose, five interrelated phases are used, such as: a) Process of observation and evaluation of the phenomenon; b) Raising assumptions or ideas as a result of the observation and evaluation carried out; c) Verification of the level of veracity and foundation of the assumptions or ideas; d) Review of the assumptions or ideas on the basis of the evidence or analysis. e) Proposing new observations and evaluations to clarify, modify, substantiate or support assumptions, or to generate new ideas.

Design

The present study contemplated the non-experimental cross-sectional design, which allows obtaining a better evidence and understanding of the phenomenon under study, which facilitates the strengthening of theoretical and practical knowledge; also, it enables researchers to have the appropriate knowledge for the integration of paradigms, so as to ensure the effectiveness of the strategy (Pereira, 2011). Through a set of systematic, empirical and critical research processes, based on the collection and analysis of quantitative and qualitative data, as well as their integration and joint discussion, in order to draw inferences from all the information gathered for a comprehensive understanding of the phenomenon under study.

It also takes into account the sequential exploratory mixed design (DEXPLOS), which involves an initial phase of qualitative data collection and analysis followed by another phase where quantitative data are collected and analyzed through the following modalities: derivative and comparative. The *Derivative* modality consists of the collection and analysis of quantitative data based on qualitative results, connecting the qualitative analysis of the data and the collection of quantitative data; the final interpretation is the product of the comparison and integration of qualitative and quantitative results; while in the *Comparative* modality, in the first phase qualitative data are collected and analyzed to explore a phenomenon, generating a data base; subsequently, in the second phase quantitative data are collected and analyzed and another data base is obtained, to then interpret them as a whole (Hernandez et al., 2014).

Participants

The population of the present study consisted of 420 students in the fifth grade of secondary school from 12 rural districts of the province of Huánuco, between 15 and 18 years of age, of both sexes.

The type of sample used is probabilistic by clusters, being chosen as the study sample the district of Cayrán which houses 46 students of the fifth grade of high school, complementarily also participate in the study teachers and directors of the four institutions installed in the district chosen by convenience, which allowed selecting a sample of the population by the fact of being accessible (Hernández eta al, 2014). Inclusion criteria took into account attendance to the face-to-face classes and exclusion criteria were those who did not participate in the face-to-face classes, as well as those who returned the questionnaires or did not respond to the interview.

Instruments

The research instruments used in the research were: a checklist, a questionnaire and an interview guide. By means of the checklist was evaluated (contents, capacities, skills, abilities, behaviors, etc.), the application of this instrument was basically for the verification of activities

of the teaching and learning process to verify the level of practice of socio-training and educational *benchmarking* during the learning activities. The applied questionnaire contains 25 items for each of the three study categories, divided into 5 dimensions, and was applied to the students in the sample. The purpose of the in-depth interview guide was to collect the narrative opinions in person, and it was applied to 8 secondary school teachers, 2 fifth grade students and 2 directors, whose responses made it possible to know the perception of the subjects of the study on the subject.

The process of construction and validation of the research instruments is based on the review of literature on the subject, the exploration of concepts of the study categories or variables, the formulation of the items, the selection of experts or judges, the evaluation of consistency and the readjustment of the items. The validation process took into account: *construct*validity, *internal*validity, referring to the triangulation in the elaboration of explanations and conclusions; and *external* validity, oriented to the generalization of the findings so that they can serve as a reference for future studies on the subject.

Research development process

The execution of the research is carried out in three phases or stages. In the first phase, prior to the literature review and knowledge of the object of study, the quantitative study consisted of the application of a questionnaire to students, and then proceeded with the analysis of the results obtained. In the second phase, a qualitative study was carried out through the collection of information by means of systematic observation and interviews with teachers and students at different times in order to corroborate the socio-educational praxis and educational benchmarking. Then, the third phase consisted of reflecting on the findings, comparing results and relating them using descriptive and inferential statistics, in this phase conclusions were drawn about the influence of socio-training activities and *benchmarking* on the improvement of educational quality on the part of the student and the teacher.

Data analysis procedure

Quantitative data are presented in graphs and tables, also through descriptive statistical measures that serve as input for the analysis and interpretation of the results obtained from the questionnaire and the categories addressed in the study; on the other hand, correlation analyses were performed between the categories under study. The level of influence that education based on socio-training and educational *benchmarking* has on the consolidation of quality education was also analyzed by means of bilinear regression and its corresponding hypothesis test.

As for the analysis of the qualitative data, information collected through direct observation and interview, the following procedure was followed: Direct observation allowed for an objective understanding of the subject under study; the information recorded was used to reinforce the argumentation of the results referred to the three study variables. Interview: the results of the interview with students and teachers on the subject under study are summarized taking into account some transcendental aspects that contribute significantly to the objective of the study.

Results

The results obtained from the questionnaire referring to the *socio-training*process, educational *benchmarking* and educational quality during the study are presented below.

From the responses to the diagnostic questionnaire administered to teachers who teach in rural areas, it can be deduced that, among some aspects that favor the teaching-learning process in rural educational institutions, the following stand out: the desire for self-improvement of most students due to the empathy they have with teachers, the possession of many resources of the social, cultural and physical reality that enable contextualized teaching, most keep certain cultural values of their ancestors and are easily integrated to the use of digital resources as an adjuvant element of their learning.

The data obtained through direct observation of the students showed that, in terms of knowledge achievement, they have deficiencies; they do not adequately manage the data and information in the process of building their knowledge; likewise, in the attitudinal aspect they have some weaknesses, which adversely influence the acquisition of learning and the student's integral development.

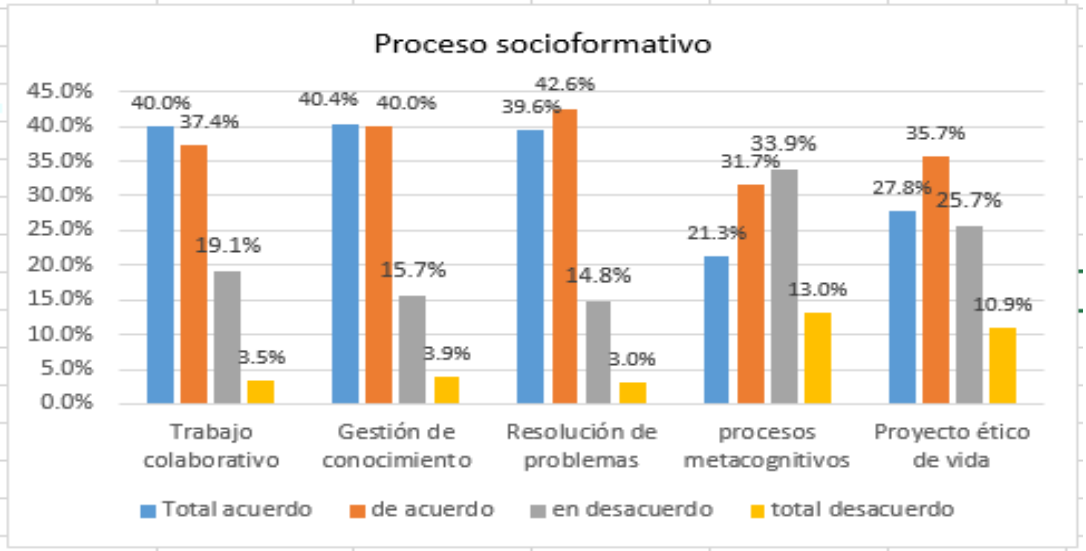
The data collected through the checklist of teachers who teach in the rural area, it was found that most of them have an adequate mastery of the curricular contents they teach, but they do it in a decontextualized way; in what concerns the pedagogical aspect, showing serious methodological and didactic shortcomings that do not enable the motivation towards the learning of students; on the other hand, the ethical posture that they show during their teaching activity does not demonstrate strength in their performance, expressed in behaviors that dilute their condition of being educational and community leaders, influencing in a negative way the development of values in young people.

Descriptive analysis

The overall result of the items corresponding to the five dimensions of the *socio-formative process* category, the majority responses of the students, adding those who totally agree and agree represent 71.3% of the respondents; while those who do not agree with the socio-formative position represent only 28.7% of the students, Figure 1.

Figure 1

Level of acceptance of the socio-training process by rural high school students

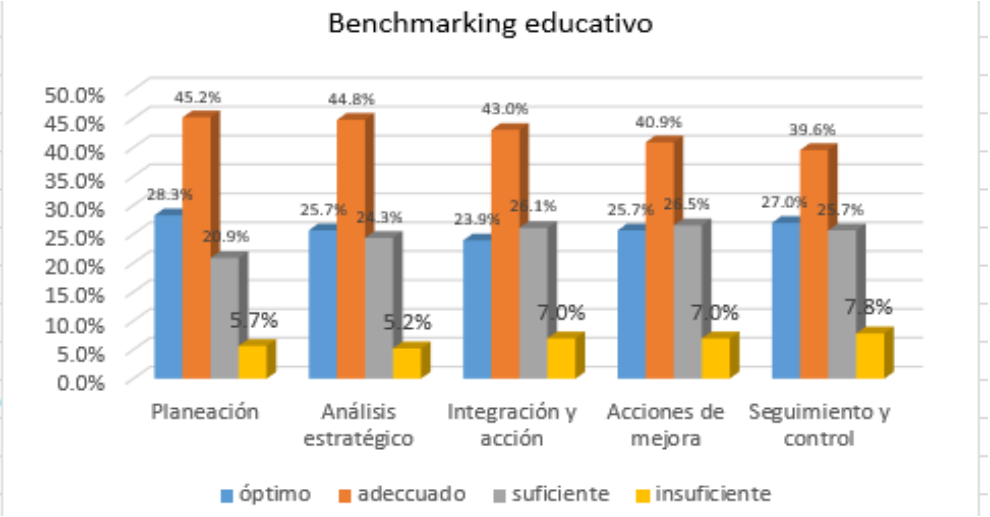


According to the responses obtained from the items corresponding to the five dimensions of the educational *benchmarking* category, the majority of students accumulate their response in the optimal and adequate alternative, which on average total 68.8% of the total

number of respondents, compared to those who qualified as sufficient or insufficient, which only represent 31.2% of the students (Figure 2).

Figure 2

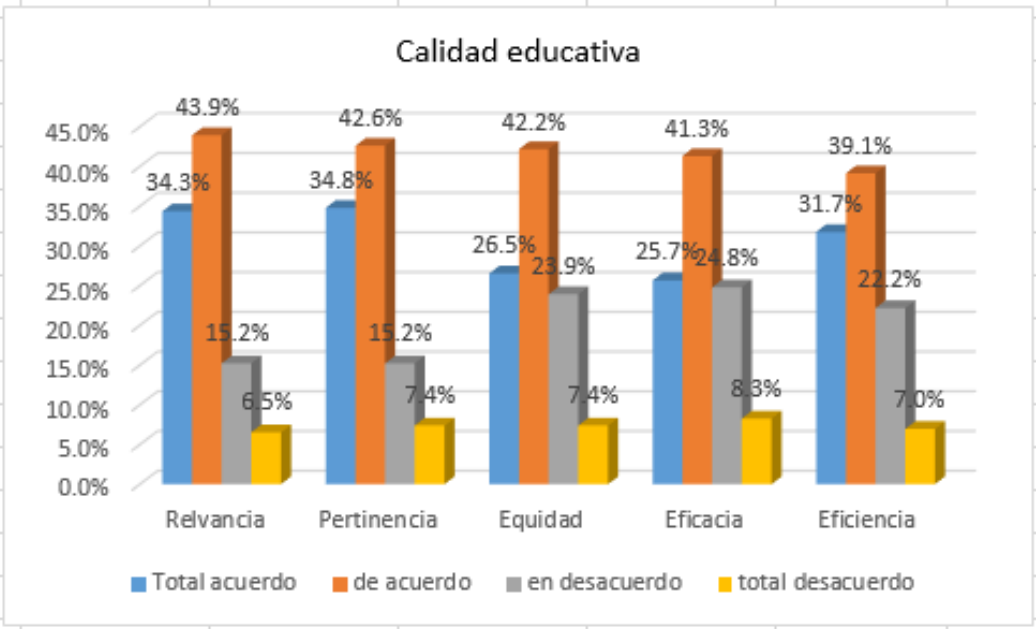
Level of acceptance of educational benchmarking by rural high school students



From the responses to the items of the questionnaire referring to the five dimensions of the educational quality category, the majority response, from the perspective of the students, the sum of those who totally agree and agree, represents 72.4% of the students and those who state that they do not agree with the quality of education during their training constitutes 27.6% of the students (Figure 3).

Figure 3

Summary of information on the dimensions of the quality of education



As described and visualized in Figures 1, 2 and 3, of the three categories analyzed, the majority of the participants in the study have a favorable opinion about the dimensions and indicators of the socio-training process and educational benchmarking for the improvement of educational quality in secondary education in rural areas.

Summary of student and teacher interviews

Most of the students interviewed reside in the same community where the educational institution is located, and others come from nearby communities. Most of the students work in activities to finance their studies and family maintenance; on weekends they participate in communal tasks for the improvement of the community; most do not perform salaried work in the community but do so in other places during vacation time to cover the basic needs of the family. Regarding the time dedicated to the practice of collaborative work, problem solving, knowledge management and others, they consider fundamental for their training; they consider social networks as fundamental to interact and communicate with their peers and with the teacher, they also use this medium for educational purposes to share knowledge and school assignments; but more frequently they use cell phones, being the one that most use the instant messaging service through WhatsApp, but only between 15% and 25% use it for educational or learning purposes, within the approximately 12 hours they are connected daily

Regarding teachers, an average of 10% of the total number of teachers working in rural areas live in the community where the educational institution is located; most of them only go to the community to attend classes, since most of them live in the district or provincial capital, with an average monthly income of 2,450 nuevos soles; 6 out of 10 are engaged in other activities to cover family expenses. From the academic and methodological point of view, most of the teachers do not know the theory referred to socioformation and benchmarking, but they carry out these procedures in a practical way, contributing significantly to the academic and value formation of the students; through the practice of an education under the competency approach, through the use of ethnic resources of the context, complemented with the use of digital resources and media; since it is fundamental to manage the information, supporting their academic and human formation.

Correlational and inferential analysis

Prior to the inferential analysis, the data collected through the questionnaire applied to the categories: *socioformative* processes, educational *benchmarking* and educational quality of 25 items each, applied to the study sample, are subjected to normality test through the *Kolmogorov-Smirnov*test**,** obtaining p-value = 0.051 (>0.05), therefore, the data are on the borderline between normality and non-normality; consequently, the normality of the data, Pearson's bilinear regression analysis and the ANOVA test are chosen to measure the level of association or correlation between the dimensions of the categories under study.

Table 1 shows that there is a direct relationship between *socio-training* and *benchmarking* with educational quality; comparisons with other institutions and *benchmarking* are more influential for this purpose than *socio-training* processes, but both contribute to the achievement of educational quality in secondary school students in rural areas.

Table 1
Bilinear regression equation for educational quality

Regression equation
Educational quality = 0.051 + 0.331 Socio-training + 0.666 Benchmarking

Note. Source: answers obtained from the questionnaire applied to the three study categories.

From the regression equation it can be deduced that:

- In case of the implementation of socio-training procedures in rural secondary education, the educational quality or academic success of students would increase by 33.1%.
- With the practice of educational benchmarking to carry out the educational process, the quality of secondary education in rural areas would increase by 66.6%.

Hypothesis testing

The educational model based on the practice of *socio-training* and educational *benchmarking* based on the characteristics of the context are directly related to the development of competencies and educational quality at the secondary school level in rural areas of the province of Huánuco, Peru

Level of significance: 0,05

Test statistic: F for Fisher

Table 2
Statistical measures from the study categories.

Analysis of Variance					
Source	GL	SC Adjust.	MC Adjust.	F-value	P-value
Regression	2	1.7135	0.85676	27.09	0.000
Socioformation	1	0.2684	0.26844	8.49	0.006
Benchmarking	1	0.7575	0.75755	23.96	0.000
Error	43	1.3598	0.03162		
Lack of adjustment	41	1.1982	0.02922	0.36	0.925
Pure error	2	0.1616	0.08080		

Note. Source: answers obtained from the questionnaire applied to the three study categories.

In Table 2, the p-value obtained is less than the 0.05 significance level (0.000... < 0.05), ratifies the research hypothesis (alternative); consequently, with a confidence level of 95%, "The practice of *socio-training* and educational *benchmarking* based on the characteristics of the context are directly related to learning, the development of competencies and the improvement of the educational quality of secondary education students in rural areas of the province of Huánuco, Peru".

Discussion and conclusions

The results obtained in the category of socio-training processes in the questionnaire administered, highlight the value given by both students and teachers in rural areas to its implementation, most of them agree with a teaching model immersed in socio-training through

an interactive and contextualized teaching-learning process oriented to the integral formation of the student. Since, socio-training is a broad approach because it seeks a comprehensive development of people in different areas from complex thinking, through socio-training projects, with an ethical vision, constant reflection and the support of information technologies to lay the foundations of a knowledge society (Prado, 2018)

According to Marciniak (2016) *benchmarking* is a methodological tool that makes it possible to achieve the highest level of quality in virtual education, through a process of comparative evaluation, it allows to have knowledge about the process of educational quality. As a complement to this statement, the research showed that in order to carry out a benchmarking process in education, from the perspective of students and teachers, it is essential to identify the practices of other educational institutions with better achievements; or simply to learn something new from successful institutions, taking the necessary corrective measures to minimize the existing differences.

Quality is an inherent characteristic of the provision of educational services, valued with respect to any other of the same kind. Educational quality is based on processes and procedures aimed at satisfying the needs of students and society in general; quality is achieved if the resources are sufficient to carry out the educational process; also if they are managed in a pertinent manner oriented to provide an effective, efficient and effective education; satisfying the needs of students and the community in general.

Socio-training processes and educational benchmarking are two catalyzing elements for the development of competencies in students, so the general objective of "determining the level of influence of the educational model based on *socio-training* processes and educational *benchmarking* with respect to the conception of educational quality in rural secondary education students in the province of Huánuco, Peru", in the study these two methodological categories made possible the optimization of the educational process, promoting the achievement of qualitative changes of great impact on learning and the development of competencies in secondary education students in rural areas.

The convergence of the *socio-training* process, educational *benchmarking* and educational quality, in the model analyzed, allow for social interaction and the collaborative participation of students in the construction of knowledge, where the teacher plays the role of facilitator; through the combination of pedagogical, technological and organizational elements, to optimize the teaching-learning process, where the actions of the teacher and the student converge in the constant search for the improvement of quality in rural education.

The information gathered through the interview allowed us to know relevant aspects of the activities and the opinions of the students at the secondary school level in the rural area. The data revealed do not bear much relation to other studies, referred to in the theoretical framework, concerning the *socio-training* processes, which were carried out only within the educational institution, since outside class hours they do not have time, due to the multiple extracurricular tasks they perform. However, with a positive and proactive attitude, favorable environments can be generated for the praxis of socio-training and educational benchmarking through contextualized methodological strategies that lead to academic success and educational quality in rural education.

In short, *socio-training* processes and educational *benchmarking* are susceptible to be implemented at all educational levels; based on the hypothesis that their implementation through collaborative and contextualized activities leads to motivation and autonomous learning of students, and is directly related to the achievement of learning that involves the development of competencies and the improvement of educational quality; it also favors interaction among students and between them and the teacher in a teaching-learning

environment mediated by context and technology resources. The quality of education in rural areas can be significantly improved through the implementation of *socio-training* processes by means of educational benchmarking, contributing to the quality of rural secondary education.

Considering the existence of many studies related to socio-training and *benchmarking* in the educational field, with the results obtained in the study, it can be affirmed that the implementation of programs based on the socio-training approach through the *benchmarking* methodology in an experimental way, oriented to the development of students' competencies and the improvement of educational quality in different contexts, but for its consolidation it requires much effort on the part of the teacher in correspondence to the student's requirements.

Some of the limitations of the study include application of *benchmarking* only in some aspects necessary for the confirmation of the categories involved in the problem from the researcher's worldview. The geomorphology of the rural areas of the province and the distance between educational institutions prevented us from covering most of the educational centers in the rural area, in the sample we could not cover all the educational centers of the province; but, the rural district chosen as a sample represents the characteristics of the other districts in more than 90%, therefore it is representative and evidences the gap that exists between rural and urban education. The study was carried out in a non-experimental manner, supported by a descriptive correlational design, through the analysis of the relationship between the categories considered in the study, limiting the robustness that would have been acquired in the case of an experimental study. The scarce collaboration of the students, teachers and directors of the rural institutions, caused by the COVID-19 pandemic, which made it considerably difficult to carry out the field work, forcing the modification or adaptation of some strategies and techniques, forced by the adverse circumstances, and the risk of not being able to conclude the work in the time foreseen.

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PERCEPTION OF LECTURERS AND STUDENTS OF THE UNIVERSITY OF GUYANA ABOUT TEACHING AND LEARNING SPANISH POST COVID-19

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Abstract. This research made it possible to determine the perception of lecturers and students of the University of Guyana about the teaching-learning of Spanish in the post-COVID-19 era, as well as the advantages and disadvantages they perceive using online classes. This non-experimental study had an exploratory-descriptive scope. The sample consisted of 7 lecturers and 145 students from the SPA1003 (Beginners Spanish) course at the University of Guyana. Participants answered surveys with open-ended and closed-ended questions. The data obtained were analyzed using the statistical tools of Microsoft Excel. After processing the results, it was determined that lecturers preferred blended education and students preferred the online modality. The main disadvantages with the use of online education were technical difficulties, too little interaction, limited practice of oral expression, insufficient mastery of technological tools by the lecturers, and increase in academic dishonesty of students. Advantages of online classes included the using of multimedia resources, immediate and direct communication through virtual platforms, and the possibility of learning at one's own pace. For future research, it is recommended to interview lecturers, to do an experimental study with students taking SPA1003 course in the same academic year in different modalities, to choose a probabilistic sample, to further investigate the issue of academic dishonesty among students, and to evaluate the possibility of introducing a competency-based curricular model for SPA1003 course.

Keywords: online education, higher education, teaching-learning post COVID-19, Spanish.

PERCEPCIÓN DE PROFESORES Y ESTUDIANTES DE LA UNIVERSIDAD DE GUYANA ACERCA DE LA ENSEÑANZA-APRENDIZAJE DEL ESPAÑOL POS-COVID-19

Resumen. Esta investigación permitió determinar la percepción de docentes y estudiantes de la Universidad de Guyana sobre la enseñanza-aprendizaje del español en la época pos-COVID-19, así como las ventajas y desventajas que perciben al utilizar las clases en línea. Este estudio de tipo no experimental tuvo un alcance exploratorio-descriptivo. La muestra estuvo compuesta por 7 profesores y 145 estudiantes del curso SPA1003 (*Beginners Spanish*) de la Universidad de Guyana. Los participantes respondieron encuestas con preguntas abiertas y cerradas. Los datos obtenidos fueron analizados utilizando las herramientas estadísticas de *Microsoft Excel*. Luego del procesamiento de los resultados, se determinó que los docentes preferían la modalidad semipresencial y los estudiantes la modalidad en línea. Las principales desventajas del uso de la educación en línea fueron las dificultades técnicas, la poca interacción, la práctica limitada de la expresión oral, el dominio insuficiente de las herramientas tecnológicas por parte de los profesores y el aumento de la deshonestidad académica de los

estudiantes. Las ventajas de las clases en línea incluyeron el uso de recursos multimedia, la comunicación inmediata y directa a través de plataformas virtuales y la posibilidad de aprender a su propio ritmo. Para futuras investigaciones se recomienda entrevistar a docentes, hacer un estudio experimental con estudiantes del curso SPA1003 en el mismo año académico en diferentes modalidades, elegir una muestra probabilística, profundizar en el tema de la deshonestidad académica de los estudiantes y evaluar la posibilidad de introducir un modelo curricular basado en competencias para el curso SPA1003.

Palabras clave: educación en línea, educación superior, enseñanza-aprendizaje pos-COVID-19, español.

Introduction

Today there is talk of the new normal, but not of returning to the routine prior to the last months of 2019. However optimistic one may be, life will not be the same after the end of the COVID-19 pandemic, or at least not in the immediate years. Education, as an essential component of society, will have to survive under these new circumstances that are now considered normal.

When the COVID-19 pandemic began to hit almost every country in the world on a massive scale, the immediate closure of movie theaters, restaurants, supermarkets, transportation lines, factories... and of course, schools and universities was determined. The slogan of the moment was "Stay at home". However, when the first weeks of fear, euphoria and bewilderment had passed, educational directors, teachers, parents and students began to ask themselves, "What now? One could not leave the house, but neither could one see a clear path to continue the class, course, semester or school year that had been interrupted due to the pandemic.

At the beginning of 2020, the implementation of online classes began to be considered, although in reality this "every man for himself" was nothing more than remote emergency education, an educational modality that had been used in many countries for several years to prevent the interruption of the teaching-educational process in the event of natural disasters, wars and other extraordinary circumstances.

However, for a significant sector of the world's population, the COVID-19 pandemic is a thing of the past. It would make no sense to continue to use emergency remote education when the "emergency" no longer exists. So, should we go back to face-to-face classes, keep online classes with more preparation and experience, or implement a combination of both modalities?

What needs to be known to better understand this research?

Online education is defined as "the process by which virtual educational environments are built to provide information, which is analyzed, processed and appropriated by active learners, without the need to attend a physical space" (Herrera and Herrera, 2013, p. 67). A narrower definition indicates that online education is:

> This is where teachers and students participate and interact in a digital environment through technological resources making use of the facilities provided by the Internet and computer networks in a synchronous manner, i.e., they must coincide with their schedules for the session. (Ibáñez, 2020).

However, online education is not only limited to the use of synchronous tools, but also asynchronous ones. In other words, the teacher and the students do not have to be connected at the same time, which is one of the main attractions of the online modality.

Closely related to the above concepts is that of remote emergency education, which became fashionable in the early 2020s in the wake of the COVID-19 pandemic. In short periods of time, and in most cases without the necessary human preparation or technological resources, it was necessary to "transfer the courses that had been taught face-to-face to a remote, virtual, distance or online classroom" (Ibáñez, 2020). Thus, emergency remote education can be defined as "a temporary shift from instructional delivery to an alternative delivery mode due to crisis circumstances" (Hodges et al., 2020, p. 17).

The Real Academia Española defines "-semi" as a compositional element meaning "half" or "almost". Therefore, the term semipresential would mean "almost face-to-face". Blended learning, also called *blended learning*, is strictly speaking facilitated learning through the effective combination of different delivery modes, teaching models and learning styles, and based on transparent communication between all areas involved in a course (Heinze and Procter, 2004). When studies are carried out on a blended learning basis, "education takes place at home except for certain periodic sessions in which the student must attend classes" (*Educación semipresencial*, 2022). As stated by Sivula (2018): "in blended learning, digital tools do not compete with traditional teaching and education methods, but complement them, improving the efficiency and flexibility of the education process". The same article states that "blended learning is one of the most effective training and education methods [...] we can safely say that blended learning is here to stay" (Sivula, 2018).

With the ever-increasing amount of material to be learned by the student, the traditional classroom became a marathon where the teacher was the center of the teaching-learning process. The role of the students would be limited to taking notes. There would be hardly any time left to clarify doubts, review homework or do activities, as there would be much more material to cover before the next exam. Educators around the world are trying to practice a more learner-driven approach. This other model, known as flipped learning, consists of "a student-centered model that deliberately consists of moving some or most of the direct instruction outside the classroom to take advantage of class time by maximizing one-on-one interactions between teacher and student" (Instituto Tecnológico y de Estudios Superiores de Monterrey, 2014).

Flipped learning is one of the modalities of blended learning. The *Flipped Learning Network* (2014) defines flipped learning as:

> A pedagogical approach in which direct instruction is shifted from the group learning dimension to the individual learning dimension, transforming the remaining group space into a dynamic and interactive learning environment in which the facilitator guides students in the application of concepts and their creative engagement with the course content.

For its part, UNIR REVISTA states the following:

> This is a groundbreaking system because it proposes that students study and prepare the lessons outside the classroom, accessing the contents of the subjects at home so that, later, it is in the classroom where they do their homework, interact and carry out more participatory activities (analyzing ideas, debates, group work, etc.). All of this is strongly supported by new technologies and with a teacher acting as a guide. (JOIN MAGAZINE, 2020)

Will education be the same during and after the COVID-19 pandemic?

These days, even customs such as blowing out a birthday candle and shaking hands are considered dangerous because of the high degree of contagion involved. The school did not escape this peculiar dynamic of life brought about by COVID-19. With the transition from face-

to-face to online classes, technological tools quickly went from being support resources to become the essential means upon which the teaching-learning process would be sustained during the pandemic. Platforms such as Zoom, Google Classroom, Moodle or Edmodo have constituted the space for exchange between teachers and students from the end of 2019 to the present (March 2022). Even digital media that were not originally conceived for that purpose, such as WhatsApp, Facebook or YouTube, have been integrated into online classes at a dizzying pace.

López (2020) states that "the analog and the digital have been merged, at least, in a single world; we cannot renounce the value of virtuality in the teaching field" (p. 132). However, the same article warns that "it is not enough to simply incorporate technological tools into teaching in order to consume knowledge; it is necessary to redesign teaching with the help of the virtual world, to enrich content and reconstruct learning experiences" (López, 2020, p. 133). For all these reasons, it is necessary to carefully examine the disadvantages and advantages of online classes before assessing the definitive migration to a modality that was adopted out of obligation, not choice.

As for the disadvantages of the online modality, one of the most obvious is the stress it generates in the teaching staff. Teaching was one of the most affected by the COVID-19 pandemic. According to Cortés (2021), "the adaptation process resulted in an exhausting task that derived in work stress, which seriously affects the physical and mental health of teachers, considerably affecting their quality of life" (p. 3). Overnight, teachers and students had to assume a new routine that, whether they liked it or not, constituted the new normal. An interview with professors from the Universidad Autónoma de México (UNAM) shows the following:

> Teachers have left the traditional classroom, to which they have been accustomed for decades, to become forced users of the technological tools that exist to interact remotely between themselves and their students, while having to deal with the personal pressures of confinement and its economic, health and emotional implications. (Sánchez et al., 2020, p. 3)

In addition to the stress caused by the new conditions, the technological gap of education in almost every country in the world. Many students were affected by factors such as "the availability of equipment and connection at home or the time and place to go to an establishment where they can access these elements" (Cortés, 2021, p. 5).

Connectivity problems and the lack of adequate technological tools pose "a serious difficulty for a good number of students who may be deprived of their fundamental right to education" (López, 2020, 134). One of the major lessons learned from education in times of the COVID-19 pandemic "is the imperative need to close the digital divide in the population, an issue that is not new, but which the pandemic highlighted as a major determinant of access, or not, to the possibility of continuing to learn at a distance" (Furman, 2020, p. 40).

The pandemic also demonstrated that teachers were not prepared to incorporate digital technologies into their classrooms. One of the priorities in the post-COVID-19 stage will be "to strengthen teacher training policies and the generation of teaching content with a focus on the design of sequences and activities that take advantage of the potential of blended learning" (Furman, 2020, p. 41).

The practice also revealed that the online modality requires teaching students to learn autonomously, without expecting teachers to "chew everything over", as could be attempted, and even achieved, in the face-to-face modality. When online classes began, many teachers assumed that their students would continue to be as diligent as they were intended to be in the

classroom, but this did not happen. The very essence of the online modality "requires greater doses of autonomy on the part of the students, reflected in abilities such as the organization of their time, planning work routines, perseverance and the capacity for self-evaluation" (Furman, 2020, p. 41).

As for the advantages of the online modality, the most visible one is the possibility of making the teaching-learning processes more flexible, "not only in terms of time and space, but also to facilitate reinforcement for students who are lagging behind, with the consequent boost for greater group cohesion" (López, 2020, 134). As Furman (2020) mentions, "distance work enables new possibilities that complement and enrich face-to-face work" (p. 39). Some of these possibilities include better organization of learning time, access to resources in audiovisual format, novel means of assessment, and opportunities for collaboration between teachers in different locations (Furman, 2020).

Another point in favor (and against) of online classes is the achievement of better academic results by students. According to Pardo (2020), "the students who were used to passing by the skin of their teeth succeeded with a B or A" (p. 4). In turn, a study by Romero (2021) reveals that Spanish students at the University of Guyana have achieved better academic results since the emergency remote education model was implemented. Romero leaves open the question of whether students "obtain better grades in exams taken remotely because they have the required knowledge and skills or because this modality is more permissive in terms of evaluation" (Romero, 2021, p. 391). For Pardo (2020), the better academic results could be the result of greater leniency on the part of teachers due to the greater amount of homework they have to face in the online modality or because some students seek help from friends or classmates to take the exams. This same professor also considers that the better academic results may be due to the fact that students "look for new learning strategies and have their own techniques to get the best out of distance learning" (Pardo, 2020, p. 4).

What to expect from this research?

The objective of this research was to determine the perception of teachers and students at the University of Guyana about the teaching-learning of Spanish post-COVID-19. At the same time, this study also sought to learn about the advantages of online and face-to-face classes for teachers and students of the University of Guyana who have taught or received the SPA1003 (*Beginners Spanish*) course at this institution, respectively. After processing the results, it was concluded that teachers preferred blended learning for the post-COVID-19 era, while students opted for online classes.

Method

Design

This research consisted of a non-experimental study of exploratory-descriptive scope. No hypotheses were posed as only the opinion of professors and students on the teaching of post-COVID-19 Spanish at the University of Guyana for two consecutive academic years was sought. Participants answered surveys with open-ended and closed-ended questions.

Participants

The population comprised teachers and students of the SPA1003 (*Beginners Spanish*) course at the University of Guyana for 2 consecutive school years: 2020-2021 y 2021-2022. The teaching population consisted of the 7 teachers who taught this course in both periods. Of these teachers, 4 are Guyanese between 27 and 36 years of age. All 4 are Spanish graduates who have been teaching Spanish in local secondary schools for 8 to 15 years and have also been working part-time at the University of Guyana for 3 years (one teacher) and one year (3 teachers). The other 3 teachers work full time at the University of Guyana, hold master's degrees and are native Spanish speakers. One is Panamanian, 57 years old and has been teaching Spanish for 24 years; in addition to the SPA1003 (*Beginners Spanish*) course, she teaches Spanish and Spanish-American literature, comprehensive practice, and translation. The other 2 professors are natives of Cuba. One is 57 years old and has taught Spanish for 6 years; he also teaches dialectology, history of Spanish, and morphology and syntax. The other Cuban professor is 44 years old and has taught Spanish for 16 years; he also teaches Spanish and Latin American literature. None of these 7 teachers had taught online classes prior to the advent of the COVID-19 pandemic.

The population of students chosen was the one accessible at the time the instruments were applied. In the 2020-2021 academic year it was 125 students. Of these, 79 (66.4%) came from SEBI (School of Entrepreneurship and Business Innovation), 37 (31.1%) from the Faculty of Social Sciences and 3 (2.5%) from the Faculty of Natural Sciences. In the following year, the student population was 102 students. Of these, 68 (66.7%) belonged to SEBI and 34 (33.3%) to the Faculty of Social Sciences.

Non-probability sampling was used in the research, "whose purpose is not generalization in terms of probability" (Hernández et al., 2014, p. 386) and, therefore, does not aim to achieve a representative sample. The sample of teachers matched the population because all 7 teachers were accessible at all times. Of these faculty members, 3 are employed at the University of Guyana on a full-time basis and 4 are employed on a part-time basis. Her Spanish teaching experience ranges from 6 to 24 years. The student sample consisted of 72 students (60.5%) from the 2020-2021 school year and 73 (71.6%) from the 2021-2022 school year. Here, voluntary participant sampling was employed, in which "people propose themselves as participants in the study or respond to an invitation" (Hernández et al., 2014, p. 387). This sampling method was used because, as the instruments were applied online, it was impossible to control the number of students who would respond.

Instruments

The instruments used in this study were a teacher survey and two student surveys. The three forms were created and published in the survey management program *Google Forms*.

The teacher survey, consisting of 14 questions (6 open-ended and 8 closed-ended), was available for 3 weeks: from November 29 to December 19, 2021. The 2 objectives of this survey were as follows:

1. Determine the modality preferred by teachers in the post-COVID-19 era.
2. Know the advantages and disadvantages of online and face-to-face classes for teachers;

In the case of students, the first survey was applied in the 2020-2021 school year and the second in the 2021-2022 school year. Both forms consisted of 3 open-ended and 5 closed-ended questions. The first survey was open for 3 weeks: from November 23 to December 20, 2020, with a response rate of 60.5%. The second student survey was also open for 3 weeks: from November 22 to December 19, 2021, with a response rate of 71.6%. The 2 objectives of both surveys were as follows:

1. Determine the modality preferred by students in the post-COVID-19 era.
2. Know the advantages and disadvantages of online and face-to-face classes for students;

As noted above, the questions used in the instruments were both open-ended and closed-ended. The open-ended questions were of the essay type, while the closed-ended questions were both dichotomous (offering a single choice of two answers) and polytomous (participants had to select different answers). The Likert scale was used in one of the closed-ended questions in the student surveys.

Data analysis

The information collected was analyzed quantitatively and qualitatively. Tables and graphs were used for the analysis of the quantitative data resulting from the processing of the closed-ended questions. For the analysis of the qualitative data, key words were assigned based on the frequency of certain terms used in the answers to the open-ended questions. Some of these key words were "assistance", "participation", "connectivity", "electricity supply", "lack of resources", "interaction", among others. The data obtained were processed, organized and tabulated using the statistical tools of the *Microsoft Excel* program. Percentage calculation was used to process the information and arrive at conclusions about the perception of professors and students at the University of Guyana about the teaching-learning of Spanish in the post-COVID era.

Results

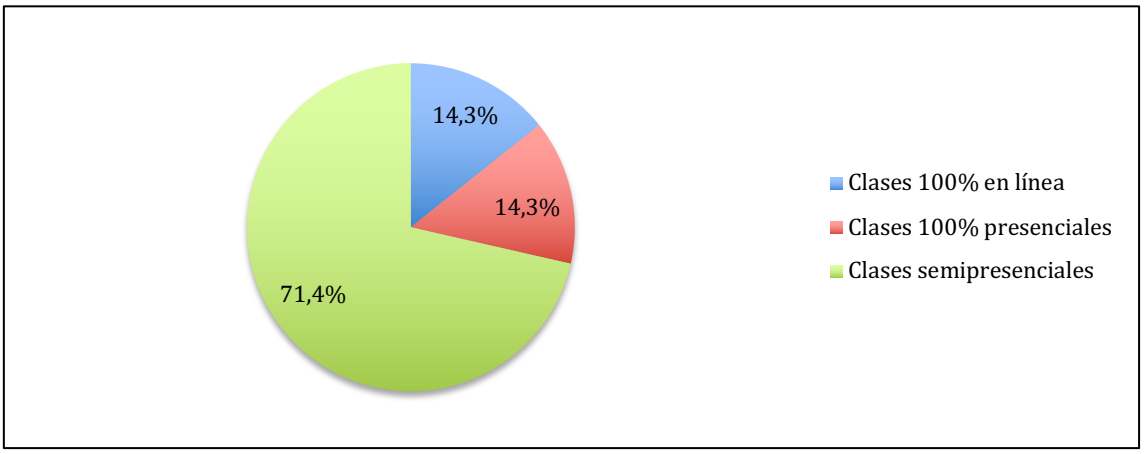
Of the 7 teachers who taught the SPA1003 (*Beginners Spanish*) course during the 2020-2021 and 2021-2022 academic years, 2 part-time teachers (28.6% of the sample) expressed that the online classes did not present a challenge, while the other 5 (71.4%) expressed that they did. The disadvantages of online classes listed by teachers were poor student attendance and participation, technical difficulties (especially poor internet service and power outages), and lack of expertise in handling the computer tools required to teach online. According to the opinion of 5 teachers (71.4%), face-to-face classes favored interaction and oral practice by students, allowed for better academic results and eliminated the suspension of classes due to connectivity problems or power outages. It is noteworthy that one permanent and one part-time professor (28.6%) consider that online teaching could be more effective than face-to-face teaching with more experience and availability of resources.

When asked about the advantages of online teaching, the teachers surveyed acknowledged that they would retain several aspects of it if classes returned to the classroom. Some would be communication with learners via WhatsApp, systematic online assessments, pre-recorded lectures in video format, dialogues in audio format, PowerPoint presentations, subgroup work and integration of multimedia resources.

When asked about the preferred modality for teaching Spanish after the pandemic, 3 part-time professors and one staff professor (57.1%) preferred to keep the lectures online, but to teach the reviews (practical classes) and administer the exams in person. These results indicate that 5 professors (the 4 part-time and one full time, for 71.4%) would take advantage of both teaching modalities. These results translate into teachers' preference for blended learning to teach Spanish post-COVID-19 (Figure 1).

Figure 1

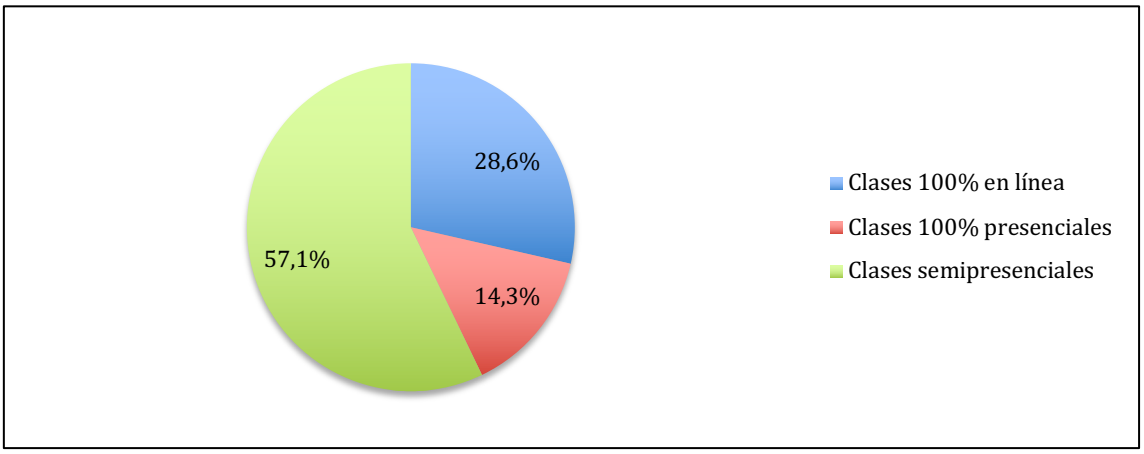
Preferred mode of teaching the SPA1003 course in the post-COVID-19 period: online, face-to-face or blended learning



When teachers were asked about the modality that, according to them, students would prefer to learn Spanish in the post-pandemic period, 4 (2 part-time and 2 permanents, for 57.1%) considered the blended learning modality, while 2 part-time (28.6%) and 1 permanent (14.3%) chose the online and face-to-face modalities, respectively (Figure 2).

Figure 2

Methods that, according to teachers, students would prefer to take the SPA1003 course in the post-COVID era: online, face-to-face or blended learning

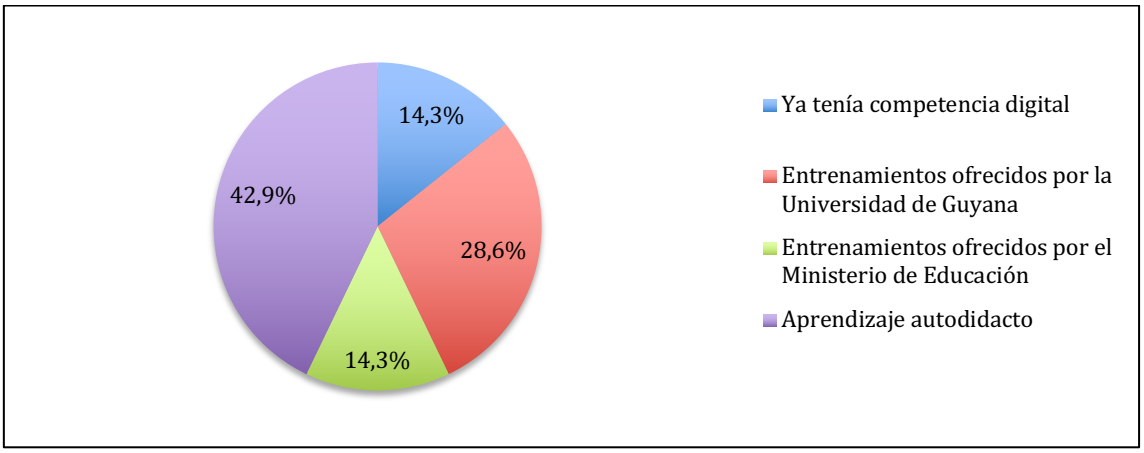


Teachers were also questioned about academic honesty in the exams. 100% were of the opinion that fraud does occur in written tests. Six teachers (85.7%) believe that fraud is also committed in oral exams, while one (14.3%) believes that it is not. Some of the general suggestions for maintaining academic honesty in Spanish exams consisted of designing intelligent tests based on the higher categories of Bloom's Taxonomy, using platforms that prevent fraud, and, ultimately, conducting face-to-face exams. For oral tests, it was suggested to establish a spontaneous conversation instead of asking questions known in advance, to require that the student's camera be activated for the duration of the exam, to pay attention to the student's body language to detect possible fraud attempts, and to require the presentation of the identification card to verify the student's identity.

Regarding teachers' readiness to teach online, 2 part-time (28.6%) expressed that they were ready at the time of transition, but 5 (71.4%) posited that they started teaching online without being fully prepared. On how digital competence was acquired, 3 teachers (two part-time and one staff, for 42.9%) acquired it self-taught, 3 (one part-time and two staff, for 42.9%) were trained at the University of Guyana or the Ministry of Education, and one part-time (14.3%) claimed to possess digital competence at the time of starting online classes (Figure 3).

Figure 3

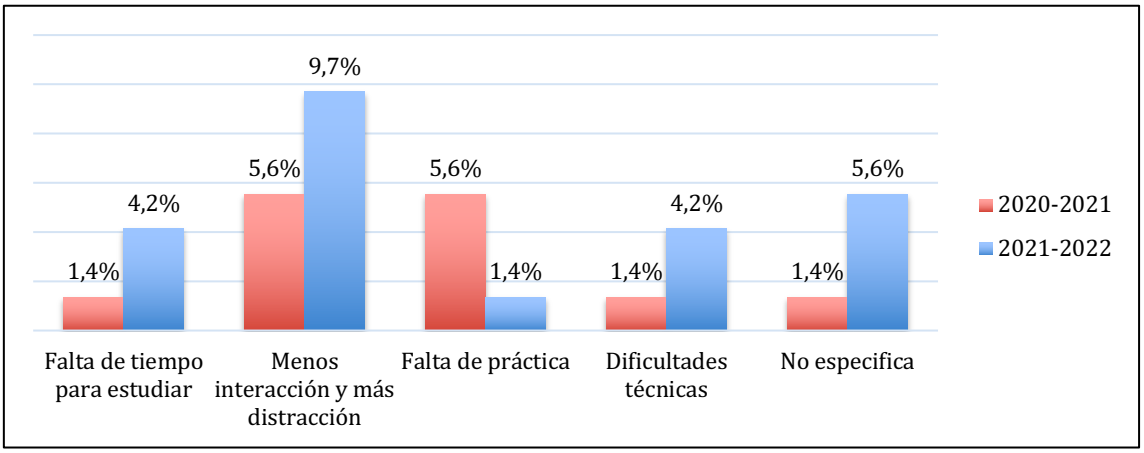
How teachers acquired the digital competence needed to teach online classes



Tabulating the student surveys, it was apparent that the online classes did not present a challenge for 61 students (84.7%) from the 2020-2021 academic year and 55 (75.3%) from 2021-2022, while 11 (15.3%) from the 2020-2021 academic year and 18 (24.7%) from 2021-2022 claimed to have presented some type of difficulty, especially less interaction, increased distraction, and shortage of practice (Figure 4).

Figure 4

Students' challenges in learning Spanish online



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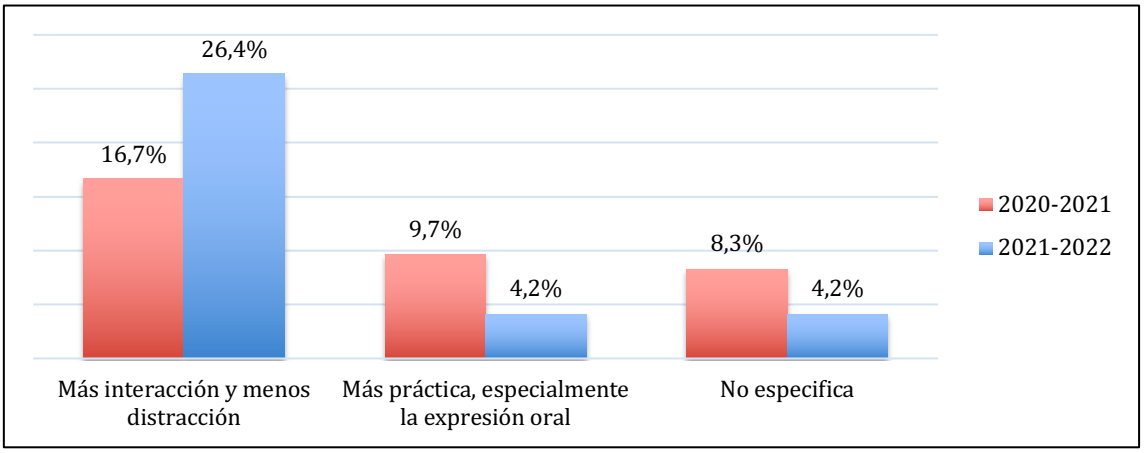
Face-to-face learning was considered less effective than the online modality by 47 students (65.3%) from academic year 2020-2021 and 48 (65.8%) from 2021-2022, while 25 (34.7%) from 2020-2021 and 25 (34.2%) from 2021-2022 felt otherwise. Students who preferred face-to-face learning cited several reasons, especially more interaction and less distraction (Figure 5).

Figure 5

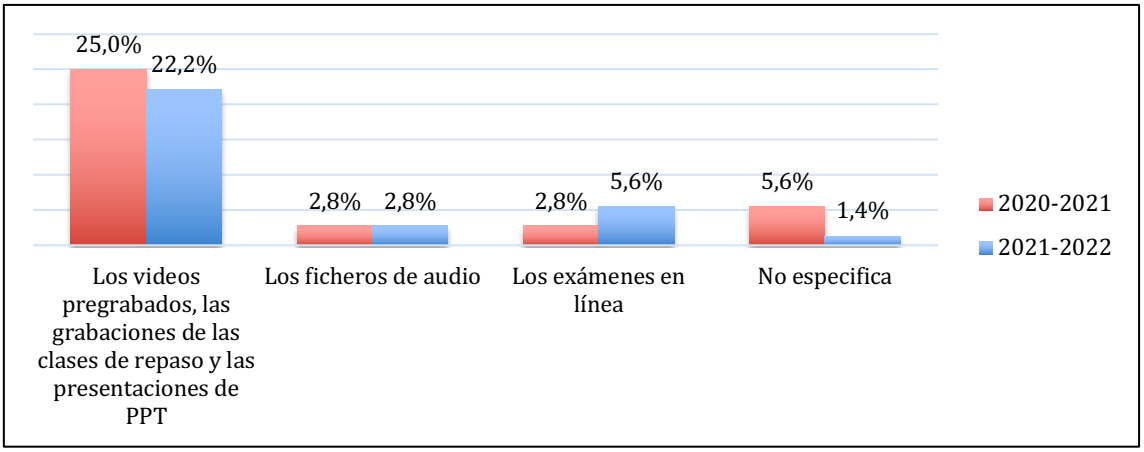
Students' opinions on the advantages of face-to-face learning



Regarding aspects to retain if Spanish classes return to the classroom, 26 students (36.1%) in the 2020-2021 academic year and 23 (31.5%) in the 2021-2022 academic year would retain some elements of the current online deliverables, such as pre-recorded videos, review class recordings, PowerPoint presentations (PPTs), audio files, and online exams (Figure 6).

Figure 6

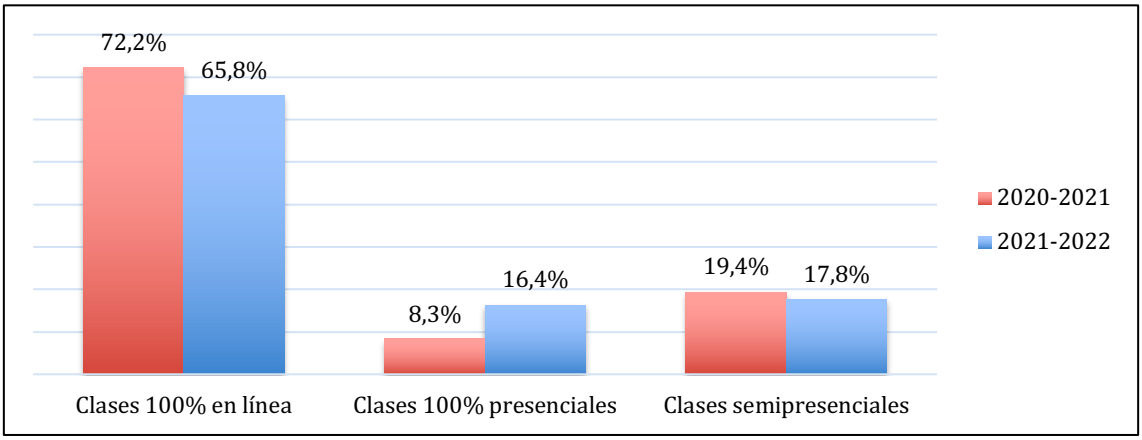
Elements of the online classes that students would retain in the face-to-face classroom.



When students in 2020-2021 were asked about the modality they would prefer for learning Spanish in the post-pandemic era, 52 (72.2%) opted for online classes, 14 (19.4%) preferred blended classes and 6 (8.3%) chose face-to-face classes. Those figures for 2021-2022 were 48 (65.8%), 13 (17.8%) and 12 (16.4%) respectively (Figure 7).

Figure 7

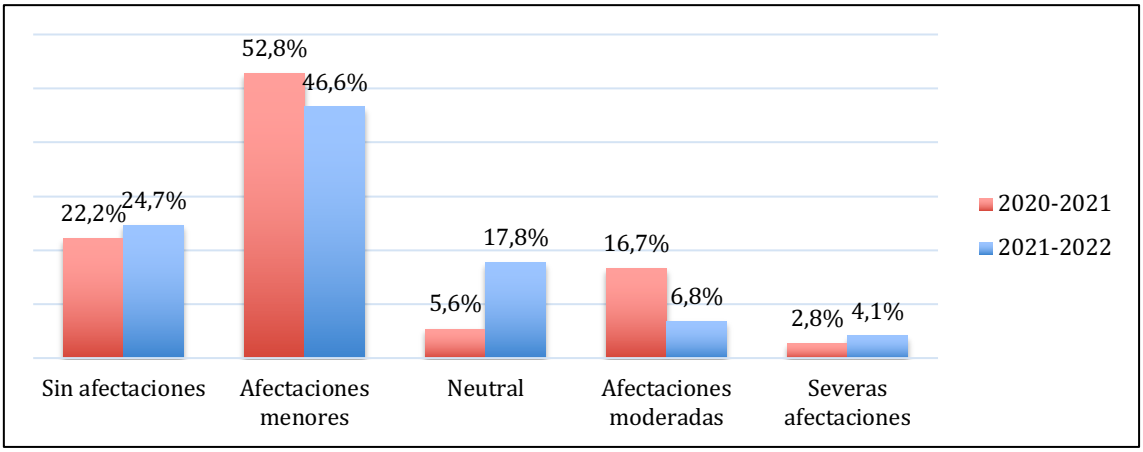
Students' preferred method for learning Spanish post-COVID-19: online, face-to-face or blended learning.



Of the 2020-2021 students, 69 (95.8%) expressed that the online classes allowed them to study at their own pace, while 59 (81.9%) stated that these favored better punctuality. These values were 66 (90.4%) and 62 (84.9%) respectively for 2021-2022. Technical problems affected students in different proportions. The most frequently mentioned difficulties in 2020-2021 were power outages (27 students, 37.5%), internet outages (29 students, 40.3%) and device breakage (17 students, 23.6%). In 2021-2022 these figures were 26 (35.6%), 31 (42.5%) and 12 (16.4%) respectively (Figure 8).

Figure 8

Extent to which technical problems affected students' online Spanish language learning.

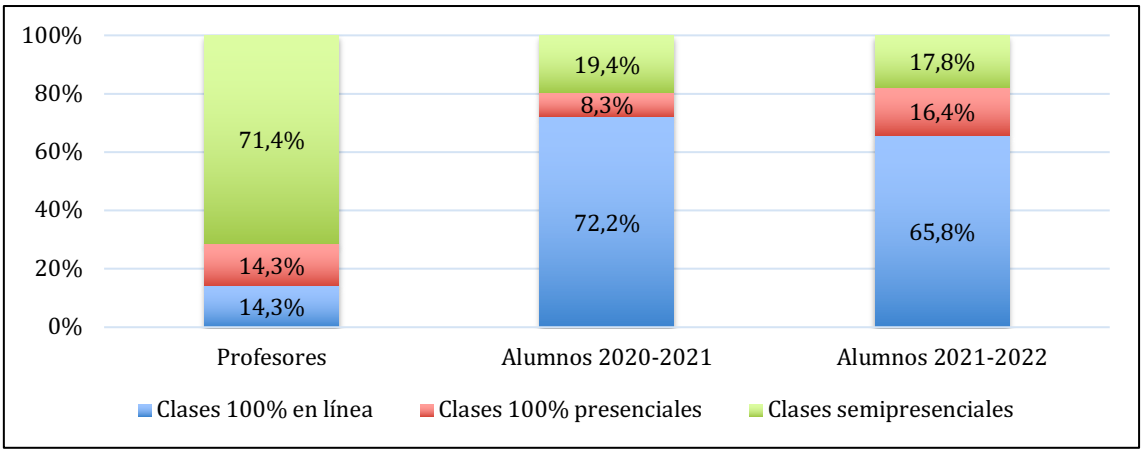


Discussion

The results of the study showed substantial differences between the perception of teachers and students at the University of Guyana about the teaching-learning of Spanish post-COVID-19. Teachers preferred blended classes, while students preferred online classes (Figure 9). It is noteworthy that part-time (younger) teachers were more open to online or blended classes than full professors. It is likely that the age of teachers influences their perception of new technologies: the older they get, the greater the resistance to change. The opinion of teachers coincides with that expressed in several research that ponder the advantages of blended learning for the post-COVID-19 era (Heinze and Procter, 2004; Sivula, 2018; López, 2020), especially flipped learning (Flipped Learning Network, 2014; Instituto Tecnológico y de Estudios Superiores de Monterrey, 2014; UNIR REVISTA, 2020).

Figure 9

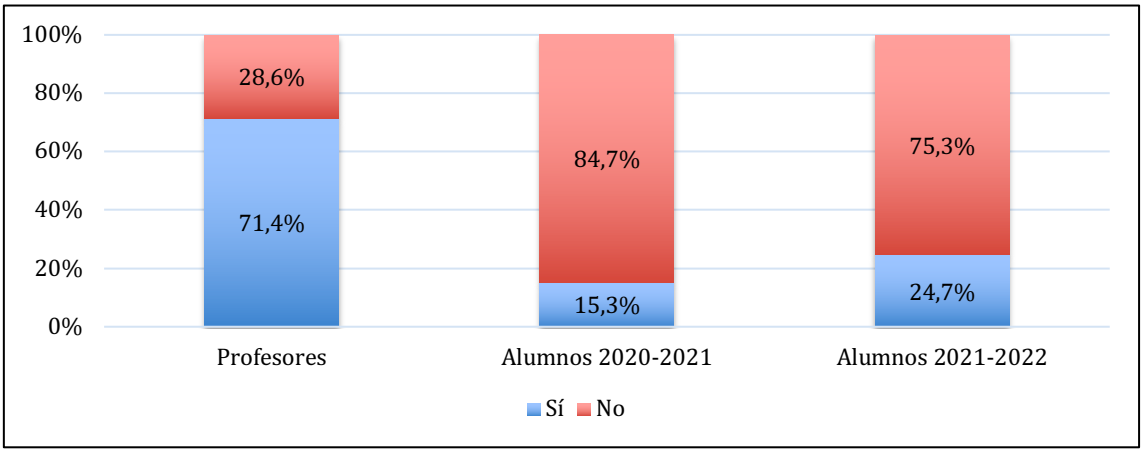
Preferred mode of delivery for the SPA1003 course in the post-COVID-19 era: online, face-to-face or blended learning.



From the comparison of the results obtained from processing the responses of teachers and students, it was appreciated that online classes represented a greater challenge for the former than for the latter (Figure 10).

Figure 10

The challenge of online classes for teachers and students



On the disadvantages of online classes, teachers and students agreed that technical difficulties, especially blackouts and Internet service interruptions, interfered with the teaching-learning process, which coincides with the findings of Cortes (2021), Furman (2020) and Lopez (2020). Teachers also argued that student attendance and participation was lower in the online classes. For their part, students reported less interaction, greater distraction at home and lack of practice as the biggest drawbacks, in agreement with studies on stress in online environments by Cortés (2021) and Sánchez et al. (2020).

The teachers pointed out that the biggest problem with online classes is the academic dishonesty of the students, to the point that 100% of the teachers expressed that all their students commit fraud in the online written exams. Opinions on the elimination of fraud are divided: some professors believe that it can be eliminated, others that it cannot, while a third group believes that it can only be reduced. On this subject, studies by Pardo (2020) and Romero (2021) affirm that academic results are better for students in the online modality. Pardo ventures the opinion that they may be the result of greater leniency on the part of teachers or that some students seek help from others to take their exams. For his part, Romero wonders whether students get better grades because they really have the knowledge or because the online modality is more permissive in terms of evaluation.

The teachers' lack of mastery of technological tools is another weakness of the online modality. Furman's studies (2020) insist precisely on the need to train teachers in the use of these technologies. Despite the initial difficulties, a generative resilience was found in the Spanish teachers at the University of Guyana that allowed them to adapt to new environments, especially in a self-taught manner.

Teachers and students agreed that the face-to-face classes fostered a climate of greater interaction, allowed for better communication, facilitated the practice of oral expression and minimized the distraction caused by interruptions and noises typical of the home environment.

The advantages of online classes most frequently mentioned by teachers and students were the use of multimedia resources, such as pre-recorded videos, recorded lectures, audio files and PowerPoint presentations. Teachers also recognized the usefulness of digital platforms such as WhatsApp, Zoom and Moodle to interact with their students. Furman (2020) and López (2020) agree that the main advantage of the online modality is the greater flexibility of the

teaching-learning processes. For their part, more than 80% of students in both academic years indicated that online classes favored self-paced learning, as well as increased attendance and punctuality, which is consistent with studies by Furman (2020) and Lopez (2020). However, the latter contradicts the assertion of the teachers surveyed that student attendance was lower in online classes than in face-to-face classes.

Conclusions

Continuity proposals

The application of teacher interviews may yield more information to clarify certain points. It will also be useful to conduct a didactic experiment with three groups of students to assess the effectiveness of their learning. One group would receive the course face-to-face, another one online and a third one blended.

The choice of voluntary sampling was due to the impossibility of contacting the students in person. In future research, it is recommended that a probability sample be obtained by randomly selecting a representative number of students in order to be able to extend the results to the entire population.

The issue of academic honesty in the students of the SPA1003 (*Beginners Spanish*) course at the University of Guyana is another issue that is recommended to be investigated in depth. The fact that all teachers consider that 100% of their students commit fraud on written exams and most think that these students do the same during oral exams is a wake-up call that cannot continue to be ignored.

Didactic implications

According to the present study, students would prefer to receive Spanish classes online in the post-COVID-19 era, while teachers would prefer to partially return to the classroom. There is no clear agreement, and this is neither healthy nor desirable. Rather than weighing the relevance of adopting face-to-face, online or blended learning when the pandemic is over, rather than returning to the classroom because students would commit less fraud or because teachers are more fluent with the blackboard and chalk than with Zoom or Moodle, a deeper reflection is needed.

For several centuries, various modes of content delivery have been tried and tested, and perhaps this is precisely what needs to change. It is time to think about abandoning the model in which the student is conceived as a passive recipient of content -grammar and vocabulary in the case of the SPA1003 course-, to adopt a curricular proposal where the student is the center of the teaching-learning process, while the teacher adopts the role of facilitator. Teachers should not be afraid because their students have not mastered the content, because it is not content that should be being taught. Teachers would be better off ensuring that their students acquire the competency-based learning necessary to fully and functionally insert themselves into the global village of the 21st century.

By adopting a competency-based curriculum, the current concerns about students' academic dishonesty would not exist because traditional forms of assessment such as oral or written exams that require the reproduction of content would not be applied, but rather collective assessments or self-assessments would be used. Currently, by working with a content-based model, "the collective nature of assessment is dramatically cut to individualize training and prevent the attribution of false learning" (Corral, 2021, p. 10).

In many parts of the world, competency-based curricula are already being used and innovative forms of assessment are being tested. However, implementing new models implies, first and foremost, a change of mentality. This "can only be achieved with participation, personal commitment and reflection; it requires cooperation and interdisciplinary work; it is not immediate or magical, it promises effort and transformation" (Corral, 2021, p. 12). It is time that in the SPA1003 course, and in general in all Spanish courses at the University of Guyana, steps are taken to begin to move away from the content-based model and adopt the competency-based curriculum approach. This is the perfect time: the buildings have been renovated, the classrooms are freshly painted, the new plants are blooming. "We wish to return to normality, but to a normality, if possible, improved" (Lopez, 2020, p. 137).

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DIDACTIC MATERIAL FOR TEACHING OF MUSICAL LITERACY IN SECOND CHILDHOOD IN COSTA RICA

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Abstract: This article analyzes the didactic material used for the teaching of musical literacy in middle childhood in Costa Rica, and the parameters that define its implementation. This topic is part of the results of the doctoral research entitled "Del Wesby-Díaz and active musical pedagogy: Construction of a curricular proposal for learning music theory in the Introductory Program of the National Institute of Music of Costa Rica", that seeks to know the construction of the pedagogical mediation processes from the Elementary Reading Course of Wesby, Wesby and Díaz (1984). It corresponds to a mixed-type investigation and the collection of information was carried out through document analysis instruments and a semi-closed questionnaire applied to a non-representative sample of teachers who teach this subject. Thanks to the work carried out, it was possible to know that precisely the Elementary Reading Course (1984) is presented as the most used didactic material by the teaching staff who give lessons in this population in Costa Rica. This situation is considered to be due to the fact that this material has a significant degree of comprehensiveness, since in it it is possible to find the main areas of musical literacy learning: intoned reading, rhythmic reading and coordinated reading; which puts it at an advantage in relation to other existing materials in the field of musical training in the country.

Keywords: Music, pedagogy, reading, writing

MATERIAL DIDÁCTICO PARA LA ENSEÑANZA DE LA LECTOESCRITURA MUSICAL EN LA SEGUNDA INFANCIA EN COSTA RICA

Resumen: El presente artículo realiza un análisis del material didáctico utilizado para la enseñanza de la lectoescritura musical en segunda infancia en Costa Rica, y los parámetros que definen su implementación. Este tema forma parte de los resultados de la investigación doctoral titulada “Del Wesby-Díaz y la pedagogía musical activa: Construcción de una propuesta curricular para el aprendizaje de la teoría musical en el Programa Introductorio del Instituto Nacional de la Música de Costa Rica”, que busca conocer la construcción de los procesos de mediación pedagógica a partir del

Curso de Lectura Elemental de Wesby, Wesby y Díaz (1984). Corresponde a una investigación de tipo mixto y la recolección de información se llevó a cabo mediante instrumentos de análisis documental y cuestionario semicerrado aplicado a una muestra de docentes que imparten esta materia. Gracias al trabajo realizado fue posible conocer que justamente el Curso de Lectura Elemental (1984) se presenta como el material didáctico de mayor utilización por parte del personal docente que imparte lecciones en esta población en Costa Rica. Esta situación se considera, se debe al hecho de que este material posee un grado importante de integralidad, pues en el mismo es posible encontrar las principales áreas del aprendizaje de la lectoescritura musical: lectura entonada, lectura rítmica y lectura coordinada; lo cual le pone en ventaja con relación a otros materiales existentes en el ámbito de la formación musical en el país.

Palabras Clave: Música, pedagogía, lectura, escritura

Introduction

The teaching of music theory has been a topic of discussion for decades. Important exponents in the field of music such as Carl Orff, Jacques Dalcroze, Suzuki, Martenot, Willems, among others, have made reference to the importance of defining the methodology and materials used in the teaching of this area, especially in childhood.

One of the most important aspects to take into consideration is that a distinction must be made between what would be recognized as a literacy teaching method and a didactic material that will accompany the pedagogical mediation process. In the dynamics of music pedagogy, it often happens that both concepts are related as if they were synonymous, which could directly affect the educational processes.

In Costa Rica, a series of didactic materials are mentioned daily in music training institutions, such as *Curso de Lectura Elemental* (1984) and *¿Dónde está la Ma Teodora?* (2000) which correspond to proposals originated in the country; while others, such as Van der Horst's *Ritmo* (1963) and *Solfeo de los Solfeos* (n.d.), turn out to be foreign materials that were established as part of the formative processes.

From this arises the need to know which are the main didactic materials that are being implemented in the teaching of musical literacy in second childhood in Costa Rica and what are the reasons for this to happen.

This article seeks to delve deeper into this topic, considering that there are specific criteria that allow teachers to make decisions regarding the supports they use in pedagogical mediation based on pedagogical, methodological and even historical aspects.

Theoretical framework

Active music pedagogy

Active music pedagogy corresponds to a movement that was born in the 20th century and is inherited from the movement known as the *New School,* which was promoted by Froebel, Montessori, Pestalozzi, among others.

One of the aspects to highlight is the fact that active music pedagogy, from its beginnings, took into consideration musical learning as a fundamental part of the integral development of the person (Villena, Vicente and Vicente, 1998).

From the *Escuela Nueva*, the role of music was considered as an indispensable element, through which the person can develop life skills, such as (Villanea, Vicente and Vicente, 1998):

- Critical capacity.
- Assertive expression of emotions.
- Aesthetic sense.
- Auditory recognition.
- Alternative expression skills to verbally.

Authors such as Trallero and Oller (2008), have considered that active music pedagogy has a series of principles within which it is highlighted that, unlike the way of looking at music education in the past, active music seeks to give a particular emphasis to the human being, by looking at it as a promoter of personal development and not as a source of aesthetics (Trallero and Oller, 2008).

This same author also makes a series of points in relation to active music pedagogy, which includes aspects such as:

- Its origins are based on psychological currents of the time, such as transpersonal-humanist psychology, cognitive psychology, among others.
- From this pedagogy, later on, new currents will emerge, as is the case of music therapy.

According to Talavera (2002), cited by Gertrudix and Gertrudix (2011), the main contributions of active pedagogy to all the music education currents that emerged during that time are reflected in elements such as the fact that they considered music education as a space that promotes the development of affectivity.

In addition, singing is considered a means and not an end in itself, since it facilitates the development of language, as well as expressive and comprehension skills. Finally, the group dynamics of music education allowed the development of interaction skills, as well as self-criticism skills, respect for other people's opinions, among other elements (Gertrudix and Gertrudix, 2011).

Active music pedagogy is made up of the contributions of several music teaching methodologies, among which we find:

- The Kódaly method
- Dalcroze rhythmic
- The Orff-Schulwerk method
- The Willems method
- The Martenot Method

Each of these methodological proposals has a philosophical background and, consequently, a didactic application, which will determine to a certain extent the way in which teachers will approach knowledge in the classroom, particularly in the teaching of musical literacy.

In addition, it should be noted that, curiously, each of these methodologies gives particular emphasis to the teaching-learning process in early and early childhood; therefore, their application

in these age groups should be accompanied by appropriate didactic material that facilitates pedagogical mediation.

As will be seen in the following section, there are a series of differences between what is understood by a method and what is didactic material that serves as support for the training processes in the area of musical literacy.

Method and didactic material for teaching music reading and writing

There is a significant risk of confusing the concept of methodology with that of didactics, as if the two were synonymous. The reality is that both definitions complement each other, where the methodology is the route through which the didactics will travel.

According to authors such as Gustems (2007), methodology is a word that comes from the Greek words *Meta* 'objective' and *Odhos* 'path', so we will understand methodology as being defined as the path traced to achieve an objective (Gustems, 2007).

Didactics, on the other hand, is understood as the organization of teaching-learning processes (Picado, 2001).

Although there are many concepts of didactics, authors such as Medina (2009) define it as an applied science, in which there is a duplicity of acts; on the one hand, learning and, on the other, teaching (Medina, 2009).

Likewise, for these authors, didactics is an applied science, since it does not develop if the activity is not present, which must give rise to the formative process. They also indicate that didactics must be able to adapt to the most diverse contexts and conditions (Medina, 2009).

For didactics to make sense in itself, there must be two basic ingredients: the task and the activity. The task will be given by the teacher and is defined as the duties that the learner must perform during the learning process (Núñez, 2002). For the task to have pedagogical relevance, it must meet a series of requirements:

- Be attractive.
- Generate new challenges.
- Be commensurate with the knowledge levels of the learner.
- To count on the adequacy to the learning needs of the student.

Reciprocally, there is the activity, understood as the work to be developed by the learner (Núñez, 2002). It is said that without a learner there is no activity, and if the learner does not show interest, no activity will take place.

Therefore, didactics should not only be based on the pedagogical knowledge of the person who teaches or be guided by the didactic material (literature) used, but should also be appropriately designed by the teacher, which guarantees pedagogical mediation.

Based on the above, it can then be considered that the methodology provides the objectives to be achieved, which will be achieved through the didactic strategies established and, for this purpose, material specifically designed for this type of activities will be used.

These aspects are of utmost relevance when dealing with the didactics of teaching music reading and writing, since this should not be approached if the teacher is not clear about the methodologies, he/she will use beforehand.

Likewise, there is an important distinction between what concerns methodology, for which according to Mora (2019), there must be clarity on the part of whoever teaches about methodology in general, understanding by this, models as is the case of behaviorism, constructivism, technological methodology, socio-constructivism, just to mention a few (Mora, 2019).

In addition to this aspect, the teacher must have a clear understanding of the specific methodology, understanding by this all those methodologies that have been created exclusively for the training of students in a particular area. In the case of learning to read and write, there are specific methodologies, for example: Orff, Kódaly, Dalcroze, Willems, Martenot, Suzuki, among others.

Once these elements are defined, the teacher will have the opportunity to establish the didactic strategies, that is, the mediation routes for teaching the different concepts, through which knowledge will pass from its purest state to be transformed into information accessible to the students.

It is in this process, as indicated by Giraldez et al. (2010), that the presentation of the bibliography or didactic material is necessary, which will be a key element for the knowledge to reach the learners in the most appropriate way possible (Giraldez et al., 2010).

All this makes it clear that each of the intervening elements depends almost exclusively on the person who teaches and not on the didactic material to be used, which at the musical level has turned out to be misnamed *method*.

It is therefore that, from this moment on, such didactic material will only be called in this way, as well as it will be considered exclusively as written productions that have been designed with the purpose of supporting pedagogical mediation; since, by themselves, they do not have the capacity to properly transmit the knowledge that a person requires to adequately learn musical literacy.

Methodology

Research paradigm

The present research is positioned in the paradigm of action research, since it is considered that it contains the necessary elements for the development of an adequate study in the educational field.

In particular, the paradigm of action research allows to solve the difficulties that often arise from the interrelation between theoretical and practical elements (Elliot, 2000.p.67). Thanks to this research paradigm, practical experiences do not distort existing theoretical knowledge, just as the latter is subject to modifications based on field work.

Another contribution of the action-research paradigm to the present study is that it allows the possibility of critical analysis of the data collected throughout the research process to be maintained at all times, being a reflective constant that could even be carried out in cycles (McKerman, 1999).

Type of study

The research to be carried out is descriptive, since, according to authors such as Pérez (2009), this type of research is characterized by the attempt to reveal the main aspects that make up a phenomenon.

Data collection techniques

In order to carry out an appropriate analysis of each of the methods, an online questionnaire was conducted, which was aimed at people who teach music reading and writing lessons to children. Linked to this data collection instrument, a table was created to analyze the different didactic materials.

The following is the table of categories of the questionnaire applied to music literacy teachers:

Table 1

Categorization table questionnaire for teachers who teach music reading and writing in Costa Rica

Category	Questions
Personal data	Age Sex Academic degree Time working in teaching Time of work teaching music theory courses Time spent teaching courses to people from 7 to 12 years old
Didactic materials used in music literacy classes	Indicate the name of the didactic materials used to teach musical literacy
Use of resources for the teaching of music theory	Teaching resources used in the classroom to teach music theory classes Didactic strategies applied according to each of the aspects of music theory: reading, writing, appreciation, history, recorder

The questionnaire was shared via web to the institutions that provide musical education to children, such as municipal music schools, headquarters of the National System of Musical Education of Costa Rica.

As for the documentary analysis of the different pedagogical materials for the teaching of musical literacy, the contributions of other research on similar topics were taken as a basis. Such is the case of the study conducted by Borne (2019), who indicates that in his process of collecting information about what he himself called *solfeology*, it became necessary to create data collection instruments that were purely qualitative, with which he managed to deepen, in a more objective way, a phenomenon that has components of different kinds (social, pedagogical, academic) (Borne, 2019).

It is therefore that for the documentary analysis, part of the elements already proposed by Borne (2019) in his research were incorporated:

- Focus: The material possesses a historical character, in this particular case it is based on the possible target population (Borne, 2019).
- Atomic or integrated: The material seeks to develop one or more skills in the learner (Borne, 2019).

Based on the above, the following categories were proposed for analysis:

- If it indicates the population to which it is oriented.
- Includes intoned reading section.
- Includes spoken reading section.
- Includes rhythmic reading section.
- Includes a section on coordinated reading.
- Includes reading in more than one key.
- Includes extra material.

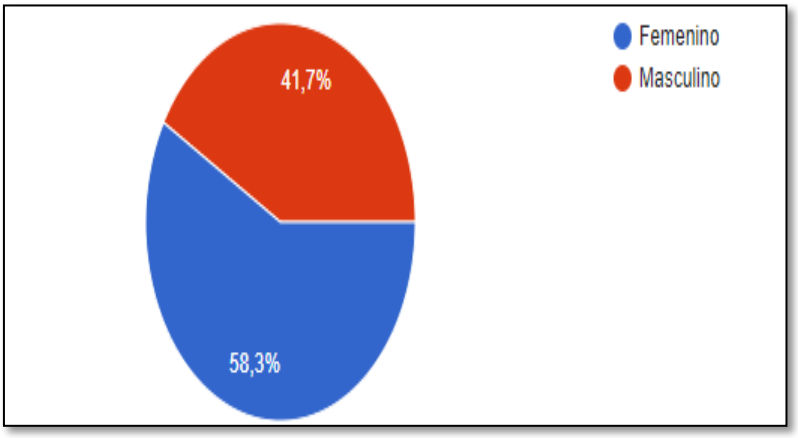
Results

Questionnaire on didactic material

The questionnaire was sent to a total of 50 teachers who teach music reading and writing courses to children, of whom only 12 provided the requested information, which allowed us to obtain the following results, which, although not statistically representative, allow us to obtain an overview of the use of didactic material in this specific subject.

Figure 1

Distribution by sex of the participants in the questionnaire on didactic material for music reading and writing (2021)



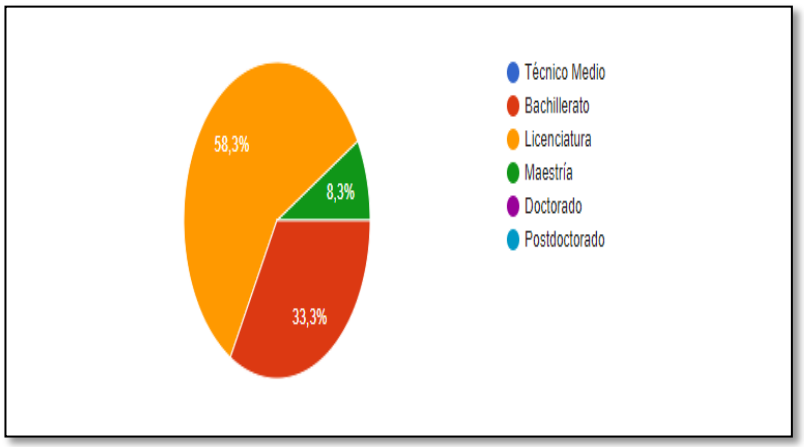
Of those who completed the questionnaire, 58.3% were female and 41.7% were male, which allows us to obtain a fairly homogeneous sample, as can be seen in Figure 1.

In terms of age, most of the participants are between 36 and 37 years old. An important fact to mention is that, although the questionnaire was sent to them, teachers under 30 years of age did not complete the instrument.

Regarding the academic degree of the participants, it was found that most of them have a bachelor's degree (58.3%), followed by those with a university baccalaureate (33.3%), and no teachers with technical, doctoral or postdoctoral degrees participated in the study. This information can be seen in Figure 2.

Figure 2

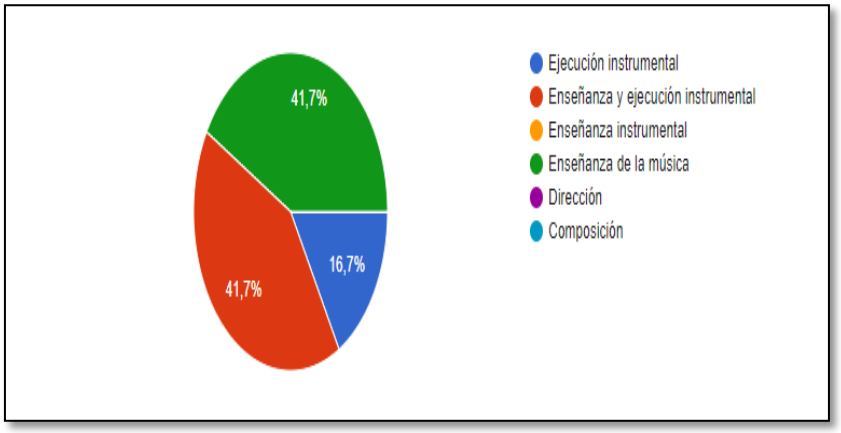
Distribution by professional training of the participants in the questionnaire on didactic material for musical reading and writing (2021)



On the other hand, the participants were asked about their professional training, and it was found that 83.4% of the sample had training at the teaching level, either in music education or instrumental teaching. Likewise, 16.7% of those who responded to the instrument have a degree in the area of composition.

Figure 3

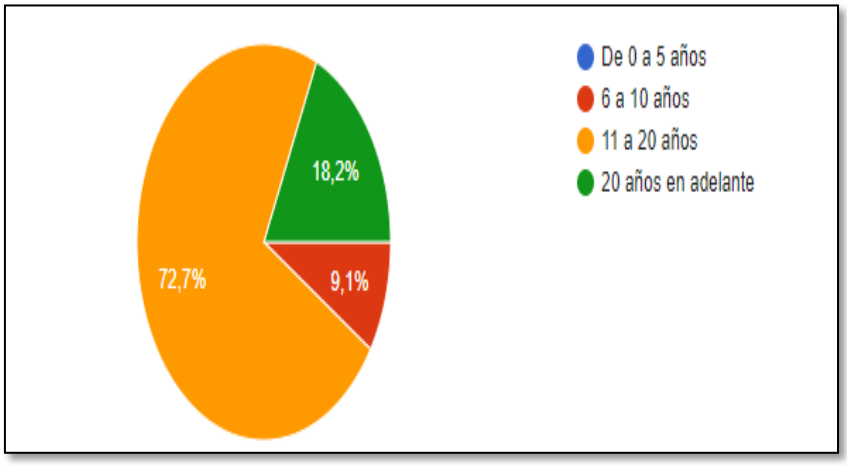
Distribution by professional specialty of the participants in the questionnaire on didactic material for music reading and writing (2021)



The participants were also asked how long they have been working in teaching in general, to which 72% indicated that they have between 11 and 20 years, followed by those who have more than 20 years and 9.1% have between 6 and 10 years working in this area, which is an important data, where the contributions provided reflect a number of years of experience in educational work, since none of the participants were in their early stages as teachers.

Figure 4

Distribution by working time of the participants of the questionnaire on didactic material for music reading and writing (2021)



Among the materials used, the one mentioned most frequently is the *Elementary Reading Course* by Wesby, Wesby and Diaz (1984), which is used by 63.3% of the sample. However, another group of didactic materials that were mentioned are the following:

- Van der Horst.
- Didactic materials of our own elaboration.
- Solfege of solfeos.
- Brochures created for the National Music Education System.
- Laz. graduate.
- Yamaha Method.
- A new approach to sight singing.

Each of these other materials was mentioned one to two times, and as indicated above, the only one that appears as a constant in the responses is the Elementary Reading Course by Wesby, Wesby and Diaz (1984).

People were also asked about what other teaching resources they use. 100% mentioned using videos or audios, most of them self-created or taken from recommended sites. They also indicate that they create extra materials to support the learning process in their classes. To a lesser extent, the use of apps and the keyboard are mentioned.

Based on the information provided by the participants at this stage of the research, we proceeded to create a table of analysis of the didactic materials for the teaching of musical literacy.

The information provided by the participants included materials that could not be located, such as the materials used by the National Music Education System. Also mentioned were materials for the teaching of musical literacy, whose purpose is for instrumental teaching, so they were not included in the above-mentioned table, as is the case of Yamaha's Advantage methods, since their raison d'être is oriented to the acquisition of performance skills and abilities and not to musical literacy itself.

Atomism versus integration

The number of elements to be taken into consideration in this work is extremely broad, and some of the proposals are more applicable to the child population than others.

Based on the two aspects on the basis of which the documentary analysis table was constructed, it is possible to highlight important differences between the materials. One aspect in particular is regarding atomism versus integration (Borne, 2019), since part of the didactic materials that are used in Costa Rica tend to have a tendency towards atomization, that is, they focus on specific aspects or areas of musical literacy learning.

However, among the materials mentioned by the participants as well as those reviewed, it was possible to locate two materials aimed at integration, the *Curso de Lectura Elemental* (1984) and the material entitled *Dónde está la Ma Teodora* (2000).

In the case of the didactic material entitled *Dónde está la Ma Teodora* (2000), besides being comprehensive, it also clearly indicates an approach, which is given from the information it tries to teach and the pedagogical mediation route it traces to achieve it, "whose main objective is to introduce in the teaching certain aspects that are directly related to musical rhythms belonging to our culture" (Universidad Nacional, 2021.p.1). Thus, specifically, the material is oriented to the teaching of musical literacy based on Afro-Caribbean rhythmic principles.

Since this didactic material has a function oriented to the learning of Afro-Latin rhythms (Universidad Nacional, 2021), it is possible to consider that it would not apply to the teaching of musical literacy in children from 7 to 12 years old, if we take into consideration the degree of complexity that these rhythms have, at least not in the case of those who are just starting in the process of musical education. The fact that it is not mentioned by the teachers who work with this population group is considered totally coincidental, as can be seen in Figure 5 below.

Figure 5

Exercise 152 of the Method "Where is Ma Teodora?

Note. The degree of difficulty of the exercises proposed in this didactic material does not coincide with students of initial levels of musical reading and writing, since they have a large number of syncopations, accents, among others. Adapted from *¿Dónde está la Ma Teodora? (*Cardona and Diaz, 2000).

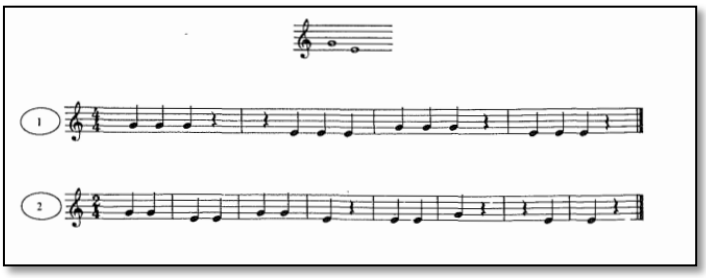
For its part, the *Elementary Reading Course* (1984) clearly indicates that its main purpose is to promote a rapid progression in the learning of musical reading and writing, based on the inclusion of elements such as: imitation, improvisation, recognition, interval intonation, auditory learning of different tonalities (Wesby, Wesby and Díaz).

As it coincides with what was found with the participant sample, it is possible to observe the reason why the *Curso de Lectura Elemental* by Wesby, Wesby and Díaz (1984) is presented as the didactic material most used in the teaching of musical reading and writing by the participants, and this is apparently due to the comprehensiveness it possesses.

This integration can be found in the different sections that make up the material, for example: a part dedicated exclusively to rhythmic reading, a part two oriented to the learning of intoned reading through the pentatonic scale, indicating that the authors included rounds and duets (Wesby, Wesby and Diaz, 1984).

Figure 6

Sample from Section II entitled "Low pitched reading"

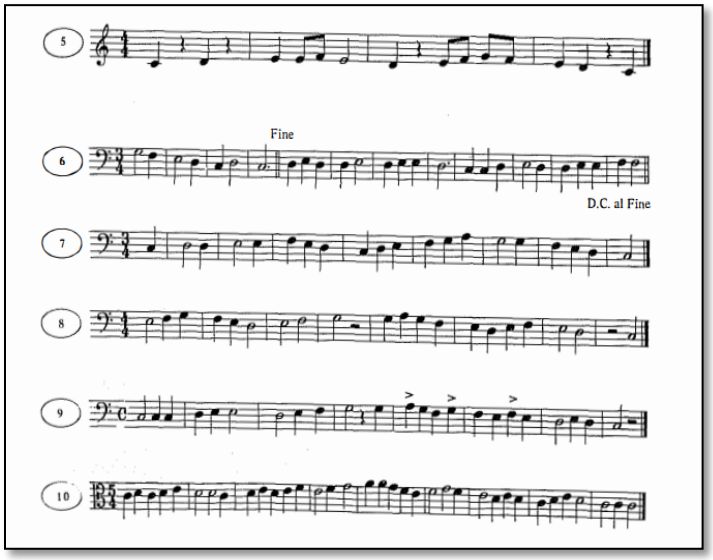


Note. In the image following elements of the Kódaly Method, this didactic material starts with the notes G and E, which belong to the pentatonic scale. Adapted from *Curso de Lectura Elemental* (Wesby, Wesby and Diaz, 1984).

Subsequently, it is possible to locate a section three. It promotes diatonic reading, which tries to encourage the learner to develop a sense of tonality, and by this time the learner should not only read but also be able to intonate all the musical notes in different keys, as can be seen in Figure 7.

Figure 7

Diatonic Reading Section III



Note. As it is possible to observe, F and C 3rd line clefs are included in addition to the G clef. Adapted from *Curso de Lectura Elemental* (Wesby, Wesby and Diaz, 1987).

The didactic material concludes with a fourth part, which seeks to address the learning of coordinated rhythms by presenting material that, as indicated above, is shown with a high degree of comprehensiveness.

In spite of having this valuable characteristic, the authors of this didactic material insist, in the prologue, on the importance of the teacher making decisions on the order in which he/she approaches the exercises and sections, as well as on the incorporation of extra materials, which allow him/her to have a greater and better understanding of the material (Wesby, Wesby and Díaz).

Through the information gathered, it is possible to denote that the teaching staff that teaches this area of knowledge is aware of this particularity, which is associated to the fact that almost the totality of the sample has pedagogical training; therefore, they know about didactic transposition, and the importance of the teaching work in finding the functionality of the same towards the work of pedagogical mediation, as indicated by Gómez (2005), citing Verret (1975), the object of study must be transformed to be converted into a pedagogical object that can be taught (Gómez, 2005).

Among the elements of didactic transposition are both the creation and the adaptation of didactic material according to the pedagogical work developed in the classroom, for which the teacher must take into consideration all the activities so that both the material and the knowledge are a true pedagogical object (Gómez, 2005).

All of the teachers participating in the present study indicated that they use more than one didactic material to teach music reading and writing classes, so it is possible to consider that the vision of didactic transposition is present when establishing the routes of pedagogical mediation; however, as mentioned above, the material that appears constantly is the Elementary Reading Course by Wesby, Wesby and Díaz (1984).

Historical and social aspects in the selection of didactic material

Giráldez et al. (2010), citing Green (2008), consider that it is impossible to analyze didactic materials related to the teaching of musical literacy without taking into consideration that, in most cases, they were created to meet the needs of a specific place and historical moment (Giraldez, 2010).

Similarly Borne (2019), refers to the fact that didactic materials can be analyzed based on whether the same was created from particular historical facts, i.e., the selection of the materials to be used must take into consideration the historical context or functionality for which the same was created (Borne, 2019). Based on this aspect, it is necessary to point out that the *Curso de Lectura Elemental* by Wesby, Wesby and Díaz (1984) is the only didactic material mentioned by teachers that was developed in Costa Rica, so its historical contextualization is of utmost relevance (Wesby, Wesby and Díaz, 1984).

This material, according to its authors, was created in 1977 for the Youth Symphony Orchestra Program of the National Symphony Orchestra of Costa Rica (Wesby, Wesby and Díaz, 1984), so its elaboration did not follow the steps of a specific music teaching methodology, but was built as a didactic material to accompany the pedagogical mediation that developed in the dynamics of the incipient process of musical education for children and youth at that time. This is a clarification made by the authors themselves in the prologue of the material, and it is even indicated that there are two versions; the first was elaborated in 1977 for the Youth Program of the National Symphony Orchestra and, later, the same material was revised and reordered in 1984 to be used at the National University of Costa Rica (Wesby, Wesby and Díaz, 1984).

Borne (2019) considers that the historical value of the training material is extremely important, even because in its construction are imprinted characteristics of the institution, region

or place in which it was created (Borne, 2019.p.27). This is an aspect that should be taken into consideration with the *Curso de Lectura Elemental*, since it is presented as a didactic material designed to meet the support needs in the pedagogical mediation of a specific group and historical moment.

Based on the above, it is possible to consider then that the *Curso de Lectura Elemental* is the only didactic material made in Costa Rica that is mentioned by the people participating in the study, whose historical characteristics are found in aspects such as:

- Origin between the end of the 70's and the beginning of the 80's, when the first formal processes of musical-instrumental education for adolescents began in Costa Rica.
- No updates or new adaptations have been made since 1984.
- Its use was designed for youth programs in both the National Symphony Orchestra and the National University of Costa Rica, being these two different populations, since the age of entry to the Institute is lower than that of the training processes offered by the UNA at that historical moment.

Borne (2019), as well as Giraldez et al. (2010), consider that these historical parameters should be analyzed, so it is possible to consider then that, although this material is being used for teaching musical literacy in second childhood, it was possibly intended for ages higher than those mentioned here. This is based on the fact that, in the institutions where its use was implemented for the first time, they were mainly dedicated to the musical training of adolescents.

Another aspect to take into consideration is the age of the material, which has not been updated for almost forty years, which poses a challenge when considering its application both for the population for which it was intended and for younger ages.

Conclusions

The differentiation between methodology, didactics and didactic material is a topic that should be present in the training processes of teachers at the level of teaching music reading and writing, which is considered indispensable for the classroom dynamics to be more appropriate.

As it is possible to find throughout this article, the selection of didactic material in the area of musical literacy, oriented to the pedagogical mediation in second childhood, must be determined by the person who teaches the subject, taking into consideration aspects such as:

- Focus of the material on the age group.
- Focus of the didactic material, in terms of whether it is atomizing (dedicated to a single area) or comprehensive.
- The historical origin and function for which the material was created.
- The coherence between the teaching methodology used by the teacher versus the teaching material selected.

From all the information gathered and its respective analysis, it is possible to consider that, although the sample is not representative, statistically speaking, there are aspects, of those previously mentioned, that place the *Curso de Lectura Elemental* by Wesby, Wesby and Diaz

(1984) as one of the options of didactic material that is most commonly used at present during childhood for the teaching of musical literacy.

It is considered that the main reason why this didactic material is preferred by the teaching staff is the fact that it includes the different areas that need to be developed in order to achieve an appropriate learning of musical reading and writing: rhythmic reading, intoned reading and coordinated reading.

This allows the teacher to offer students a wide variety of activities in a single didactic material, even in progressive order, as in the case of the low-level reading versus the following section of intoned reading (Wesby, Wesby and Diaz, 1984).

Although this didactic material has specific characteristics that make it extremely practical for working with children at the initiation level of reading and writing, it is true that its historical characteristics, as well as some clarifications provided by its authors, allow us to consider that its use should be subject to the following conditions:

- The assessment of the psycho-affective and cognitive development characteristics of the group of students with whom we work.
- From the previous aspect, the use of the document in a textual manner or making omissions should be considered, as well as variants in its application within the dynamics of pedagogical mediation.
- The methodological coherence of the teacher with the principles of this area included in the didactic material.
- That the teacher takes into consideration the socio-historical aspects of the didactic material to be used.

In this particular case, although the *Curso de Lectura Elemental* (1984) is presented as the most widely used option, since it is the only didactic material proposed in Costa Rica, there are certain historical characteristics that the teacher should analyze before applying it.

Since the material was created for two specific institutions and historical moments, it is considered that the person must take into consideration the need to adapt it to the age group with which he/she will work, valuing, as the authors themselves indicate (Wesby, Wesby and Díaz, 1984), the establishment of omissions and variants in the approach, as well as the creation of a series of complementary exercises that allow the learners to approach the proposed knowledge in a better way.

In addition to the above, it should be remembered that the didactic material is a function of the teacher-learner, therefore, it is necessary for the teacher-learner to take into account his/her pedagogical and methodological teaching trends prior to the selection and use of the material.

Based on the above, it is possible to conclude by indicating that in general the didactic materials for the teaching of musical literacy in the second childhood will have significance from the work done by the teacher, both in the selection, organization and application of the same.

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APPROPRIATION OF HEALTH IN SCHOOL THROUGH SERVICE - LEARNING

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Abstract. In Colombia, health education (HE) has been the responsibility of health personnel, which has given it an instrumental and hygienist approach, in which education is secondary. For this reason, HE is a pending commitment in the educational system, which is why this research asked how to propose elements of reflection and appropriation of health in the school based on Service-Learning (SL). SL is a pedagogical approach that develops academic objectives, but at the service of solidarity interests, i.e., the emphasis is not on indoctrination about health, but on the mediations and social networks that are forged during the search for it. This study was conducted through a research+creation methodology, which resulted in the construction of an open-access hypermedia. The content of the hypermedia was based on relational communication for health, popular education for health and health as a counter-hegemonic concept, that is, as the capacity to fight against the limitations of the lives of individuals and the communities to which they belong. The product was developed with the content editors Netex Learning Maker and Genially and the organization of the contents within the hypermedia responded to the WebQuest logic. The finished product was socialized with teachers and students from two educational institutions, who made a positive evaluation of the resource as a starting point for a comprehensive school health education program.

Keywords: health education (HE) service-learning (ApS), relational communication for health, WebQuest.

APROPIACIÓN DE LA SALUD EN LA ESCUELA A TRAVÉS DEL APRENDIZAJE-SERVICIO

Resumen. En Colombia, la educación para la salud (EpS) ha estado a cargo del personal sanitario, lo que le ha dado un enfoque instrumental e higienicista, en el que la educación tiene un papel secundario. Por lo anterior, la EpS es un compromiso pendiente en el sistema educativo, motivo por el cual esta investigación se preguntó cómo plantear elementos de reflexión y apropiación de la salud en la escuela a partir del Aprendizaje-Servicio (AS). El AS es un enfoque pedagógico que desarrolla objetivos académicos, pero al servicio de intereses solidarios, es decir; que el énfasis no es el adoctrinamiento sobre la salud, sino, las mediaciones y las redes sociales que se forjan durante su búsqueda. Este estudio se realizó a través de una metodología de investigación+creación, que resultó en la construcción de un hipermedia de acceso libre. El contenido del hipermedia se fundamentó en la comunicación relacional para la salud, la educación popular para la salud y la salud como concepto contrahegemónico, es decir; la capacidad de luchar frente a los limitantes de la vida de los individuos y de las comunidades a las que pertenecen. El producto se desarrolló con los editores de contenido Netex Learning Maker y Genially. La organización de los contenidos dentro del hipermedia respondió a la lógica WebQuest. El producto

finalizado se socializó con docentes y estudiantes de dos instituciones educativas, quienes hicieron una evaluación positiva del recurso como punto de partida para un programa integral de Educación para la Salud escolar.

Palabras clave: Educación para la salud, Aprendizaje – Servicio, Comunicación relacional para la salud, WebQuest.

Introduction

In Colombia, at the end of the 20th century, Law 100 of 1993 included health promotion and education (hereinafter EpS) among the services to be covered by the General Social Security System (MSPS, 2008). At the beginning of the 21st century, Resolution 0425 of 2008 defined the Collective Intervention Public Health Plans. These plans set forth promotion and education actions that should be designed and implemented by the State Health Care Providers Institutions (IPS).

This has meant that health promotion and education actions have been entrusted to health personnel, which is why they have focused on education based on the dissemination of knowledge with a medicalized approach, i.e., centered on disease and oriented towards prevention rather than on pedagogical actions and information, education and communication strategies for health (Mantilla, 2011).

In contrast to the MSPS, the Ministry of National Education (hereinafter MEN), in charge of guiding the country's educational activities, has not established regulations on EHP in the school setting, which allows inferring that health is a pending commitment on the part of Colombia's educational institutions, which base a large part of their activities on the guidelines issued by this regulatory body.

In order to fulfill part of this commitment, the present research aimed to generate elements of reflection and appropriation of health in the school from a hypermedia resource based on the AS, a pedagogical trend based on the achievement of academic objectives, but at the service of solidarity objectives.

Theoretical framework

To provide a foundation for hypermedia, the theoretical relationships established between health from the Communication-Education field (Huergo, 2009), EpS with a Popular approach (Zea 2007 and 2019), Communication for Health with a relational perspective (Díaz, 2011; Silva Fontana Rosa 2015), and the relationship between education, communication and health (Hernández, 2014; Bañuelos, González and Ramírez, 2016; Choque, 2005; Estévez and Delgado, 2018) were reviewed. These linked areas are representative because, as will be shown below, the emphasis of each is on health that is built, learned and taught in context, without a diffusionist spirit.

During this tracing, theoretical-practical inconsistencies were evidenced in each case: EpS is formulated from popular education, but its activities are based on a concept of health that does not take into account the context or the needs of the people (Chamorro 2010, Serrano 2012, Peñaranda, López and Molina 2017,). For its part, Communication for Health (CoH) has theoretically focused on a participatory paradigm in which communities are central actors, but in practice CoH is informative, diffusionist and hegemonic (Gómez, 2018) and is at the service of universally desirable situations, which assume for all the same circumstances and capabilities (Silva F, R. 2015). With this background, we proceeded to define the concepts under which the hypermedia product would be framed.

The longest standing definition of health is the one proposed by the World Health Organization (hereinafter WHO), which considers it as: "A state of complete physical, social and mental well-being and not merely the absence of disease or infirmity" (WHO Constitution, 1946). Health, therefore, is seen as a resource for daily life, not as its goal; it is a positive concept that emphasizes social and personal resources as well as physical capabilities. (WHO, 2012, p. 13)

According to the Universal Declaration of Human Rights (1948), health is a right, since every individual should be able to have access to a standard of living adequate for his or her health. The same is stated in the Ottawa Charter, which also states that this right depends on conditions such as: peace, possession of economic resources, access to food and shelter, development in a stable ecosystem, sustainable use of resources, promotion of favorable social and economic conditions, physical environment, individual lifestyles and health, and access to health services (WHO, 1986).

In the words of Huergo (2009), this imaginary about health can be considered the result of a hegemonic health system, which does not nuance the circumstances of communities and which distances itself from the adverse living conditions that people ~~face~~. He explains that, in hegemonic systems, health equals scientificity, objectivity, technicality, truth, meanings and ignores the historical-social conditions of a community (p. 5). Therefore, he proposes that health interventions should be articulated with the cultural conditions of the communities, in order to develop counter-hegemonic policies, that is, models in which a social hegemony is conquered from another construction of meanings.

Therefore, this research+creation focused on producing a hypermedia in which to reflect on the community's conceptions of health, as prior knowledge for any other communication and health education activity.

With this basic conception of health, the next step was to establish a coherent EpS plan. WHO understands HPE as the set of "consciously constructed learning opportunities involving some form of communication designed to improve health literacy, including the enhancement of knowledge and the development of life skills, leading to individual and community health" (WHO, 2012, pp. 59 - 60).

In Colombia, the Conceptual and methodological framework for the development of health education of the Integrated Health Care Routes - RIAS - defines HEE as

> The pedagogical process (dialogic and intentional) of knowledge building and learning that, through the dialogue of knowledge, aims to build or strengthen the potential of individuals, families, communities and organizations to promote health care, manage health risk and positively transform the environments in which they live. (MINSALUD, 2018, p. 15)

The pedagogical perspective of EfS in the RIAS is based, among others, on Popular Education (PE), which provides EfS with the possibility of realizing its purposes. According to Freire (2004), PE is aimed at the reflection and realization of new social realities, and involves mobilization for transformation through dialogue, participation, training of critical subjects, and community organization.

With this manifest relationship, the EpS that served as the basis for the development of the hypermedia resource dealt with learning opportunities that involve communication to identify and strengthen the perception that people and the communities to which they belong have about health; these learning opportunities are conceived as those that promote reflection on reality for the sake of its transformation, through dialogue, community participation and the formation of critical subjects.

Now, thus understood, PHE requires adequate Health Communication strategies (HcH). According to Díaz (2011) there are two widely used perspectives of SCP: informational and relational.

The informational perspective emphasizes the diffusion of innovations and modernization, which highlight the transmission, acquisition and changes in knowledge, attitudes and beliefs about health. In the relational perspective, on the other hand, the conditions of production, circulation and recognition configure a certain socio-cultural reality, whose understanding is based on two key elements: the mediations through which social relations are constructed, and culture as the ground that fertilizes (and conditions) these relations (Díaz, 2011). In this sense, the health communication strategies used in hypermedia leaned towards the relational perspective, focused not on informing nor on the media for this purpose, but on the mediations through which the social network is constituted.

In order to align and apply the above conceptions of Health Education and Communication, the pedagogical proposal (i.e., the way of teaching and learning the contents of health education and communication proposed in the hypermedia) was Service Learning (hereinafter referred to as SL), which consists of learning through service to the community. According to the Latin American Center for Solidarity Learning and Service CLAYSS, the ApS is:

> (...) the solidarity service aimed at attending in a limited and effective way to real and felt needs with a community and not only for it; actively led by the students from the evaluation approach and intentionally articulated with the learning contents (Tapia, 2009).

Thus, in the PHE practices developed from the SA, the service contributes to "the qualitative improvement of community health" and learning is consolidated through knowledge "related to health or derived from carrying out a group project and doing so with a dimension of service to the community". (Associació Centre Promotor d'Aprenentatge Serve, n.d., p. 5).

In summary, the review of theoretical and practical antecedents provided the basis for a digital media product, -a hypermedia- whose AS pedagogical approach, which emphasized SBE from popular education, and which applied relational communicative strategies.

Method

The modality under which the product of this study was developed was research+creation, understood as "creative and systematic work carried out with the objective of increasing the volume of knowledge (including knowledge of humanity, culture and society) and conceiving new applications from the available knowledge" (FECYT, 2015, p. 47).

The product of this research was a hypermedia resource, that is, "the sum of hypertext plus multimedia" (Scolari, 2008, p. 113). Here, hypertext is understood as a digitized, reconfigurable and fluid text, made up of nodes (information elements, paragraphs, pages, images, musical sequences) and links between these nodes, references, notes, pointers, "buttons" that indicate by arrows the passage from one node to another..." (Levy, 2007, p. 42); while multimedia is evidenced by "the combination of sound, image and information" (Scolari, 2008, p. 113) and refers to the use of "several supports or several communication vehicles" (Levy, 2007, p. 49). Finally, this product made use of a process of hypermediation, that is, "processes of symbolic exchange, production and consumption that take place in an

environment characterized by a large number of subjects, media and languages technologically interconnected in a reticular way with each other". (Scolari, 2008, pp. 113-114).

In terms of technical features, the hypermedia was developed with the HTML 5 editor *Netex learning maker*. Among the resources included are images and videos for free use and purchased under subscription, videos developed for hypermedia, audio effects, screen recordings and presentations, video-presentations, interactive activities and animations.

Regarding the content of the resource, the hypermedia sections were organized according to the stages of a SA project, adapted from the Latin American Center for Solidarity Learning and Service presented in Table 1.

Table 1

Stages of the Service-Learning project worked on in the hypermedia resource

Stage	Explanation
Home	At this stage, the hypermedia user encounters the proposed problem question: *What is health for my community?* and a contextualization of the issue. It also has methodological suggestions and a downloadable document that serves as a rationale, which clarifies the solidarity and academic objectives to be addressed, the project activities, the learning contents and the tentative schedule.
Planning	At this stage, the hypermedia user finds the project route and a guide document to determine the sources of resources. Within the project path, the suggested product (a podcast) is stated, and how, why, what for and with what it would be made.
Development	At this stage, the user finds 10 proposed exercises. Each exercise contains interactive activities and instructions to leave evidence of what has been done and to build the final product. Once completed, these exercises provide the user with the tools to solve the question suggested for this project.
Evaluation and closure	At this stage the user finds material to make a final evaluation and systematization, estimate the impact of the project, celebrate the work done and propose actions for continuity and multiplication of emerging AS projects.

Note. Adapted from "Believing is Seeing. Manual for supportive teachers and students". Centro Latinoamericano de Aprendizaje y Servicio Solidario-Natura, 2009.

The instructional design of the hypermedia was based on the *WebQuest* (hereinafter WQ) logic, a didactic approach that proposes to solve questions, tasks, projects or challenges through resources hosted on the Internet. The WQs indicate to students a process to find solutions to the questions posed, based on the analysis, synthesis, comprehension, transformation, evaluation, among others, of the resources consulted on the Internet (Adell, 2004, p. 2).

After the hypermedia was finished, two focus group discussions were held with teachers and directors of two educational institutions in Bogota. The purpose of the focus groups was to determine, through a set of open-ended questions, the ways in which teachers established reflective actions in relation to the product developed. Table 2 shows the categories presented in the Guide for the design, use and evaluation of health education materials of the Pan American Health Organization (PAHO, 1984) and the Guide for the validation of educational

materials by Ziemendorff and Krause (2003), which served as an orientation for the questions posed during the discussions.

Table 2
Categories of valuation of the hypermedia resource by the focus groups

Category	Description
Attractive	It refers to whether the material is appreciated, arouses interest and attracts attention; it also evaluates the relevance of the information channels used.
Understanding	It aims to assess whether the materials used are appropriate in language and comprehension, with the intention that they are understood by the user.
Identification	Evaluates whether the user identifies with the material, through its characters, scenery, costumes, sounds, etc. If the group does not identify, the objectives of the material will hardly be fulfilled.
Acceptance	Verify whether the ideas and proposals put forward make sense to the user or are feasible.
Induction to action	It assesses whether the content of the material contributes to a change in a reality, in a behavior or in the conception of a meaning.

Note. Adapted from *Guía para el diseño, utilización y evaluación de materiales educativos de salud*. Pan American Health Organization, 1984; and *Guía de Validación de Materiales Educativos*: *Focusing on Health Education materials.* Ziemendorff and Krause, 2003.

Results

Hypermedia provides the user with tools to solve the question "What is health? Although EfS in this product could have focused on addressing needs such as sexual and reproductive health, healthy eating habits or the prevention of psychoactive substance use, we wanted to address the fact reported by several authors, who state that EpS activities are based on a concept of health that does not take into account the contexts or health needs and in which education has an instrumental role (Peñaranda, López and Molina 2017, Hernández, 2014), or in which the prevailing conception of health, that of the WHO, is globalizing (Chamorro 2010), totalizing (Serrano, 2012) and hegemonic (Huergo, 2009).

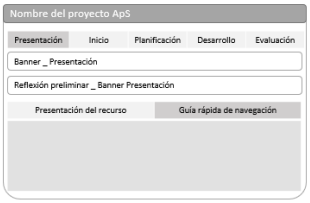
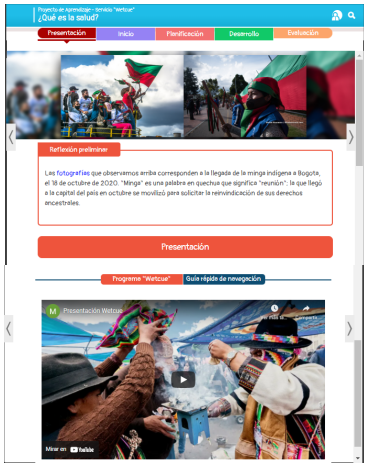
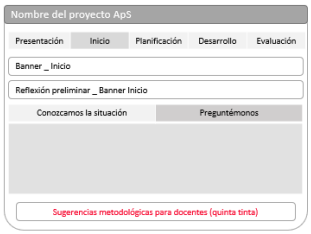
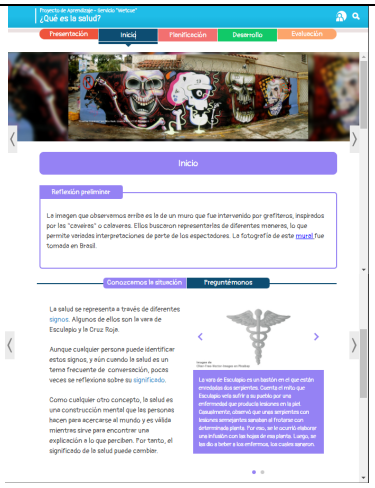
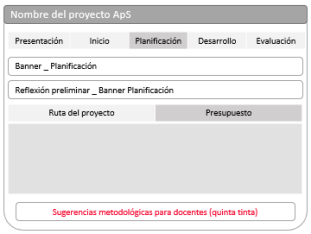
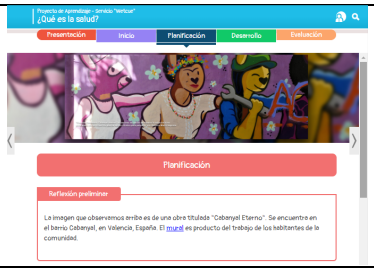
Therefore, it was conceived that the priority was to ask the question: What is health? In this sense, Huergo's (2009) suggestion was followed, which consists of promoting a "counter hegemonic" EHP, which begins by dismantling the dominant meanings about health.

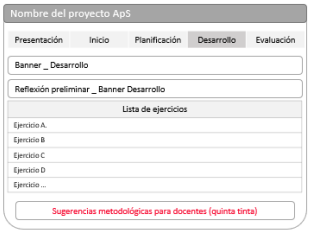
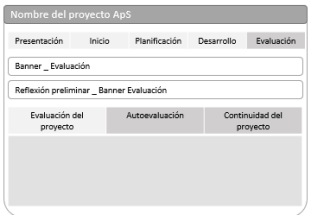
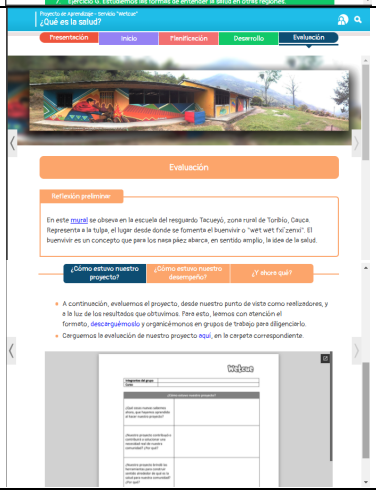
With the theme defined, the hypermedia sections were organized taking into account some suggestions from the Latin American Center for Solidarity Learning and Service. These adapted sections are initiation, planning, development and evaluation. In the hypermedia there is a preliminary stage, called "Presentation", which is not part of those established within an AS project, but which was placed to provide users with information on the rationale of the product and a quick navigation guide.

On the other hand, the structure of the hypermedia resource was organized as indicated through the following page layouts or screen plans, also known as *wireframes*. Table 3 shows sections of the hypermedia developed as a final product, which can also be found at the following link https://wetcue1.000webhostapp.com/ can be consulted in greater detail.

Table 3

Wireframes of the hypermedia resource and description of the contents per screen

Wireframe	**Final screen**	**Description**
		**Cover.** It presents the name of the project and a related image. The project was called *Wetcue*. This word was taken as a tribute to the indigenous communities of Colombia, who have been pioneers in the development of a conception of health in context, which is the main purpose of hypermedia.
		**Presentation.** It exposes, through a video, the generalities of the AS project by means of a brief justification. A quick navigation guide is also provided through a menu of video tutorials.
		**Home.** Contextualizes the problem that gives rise to the project and poses the key question. In addition, methodological suggestions are offered for teachers, including the presentation sheet, which sets out the conditions of mode, time and place in which the project activities will be carried out and specifies the topics and the academic and solidarity objectives to be developed.
		**Planning.** Clarify to the users what the product of the project will be and why, what for, how and with what they are going to do it. A budget template is also suggested and can be

		previewed or downloaded for editing.
		**Development.** It presents a list of exercises after which users will have succeeded in answering the key question of the project. For the achievement of each exercise, a set of inputs, an evocative activity to verify the exploration of the inputs, a deliverable documenting each exercise and an instruction to move towards the construction of the product are provided.
		**Evaluation.** It provides three moments of assessment: project evaluation, self-evaluation and project continuity. For evaluation and self-evaluation, downloadable materials are provided for students to edit the formats, while for continuity, a moment is proposed to celebrate the completion of the product and socialize it.

Counter-hegemonic concept of health, Popular Education and Relational Communication in hypermedia

In the hypermedia resource, different activities were proposed to allow users to recognize the conceptions of health present in their community. Inputs were also offered in response to Huergo (2009), who points out that, in order to forge an alternative and counter-hegemonic discourse on health, it is important to start from the historical, so as to obtain a kind of genealogy of the present, in the midst of modern culture. Also, to estimate that conceptions of health do not operate on nothingness nor are they foundational.

The above objectives were worked on throughout the exercises. For example, in the exercise "let's recognize the existing conceptions of health in the community", a historical review of the concept of health was presented, health was contextualized in terms of culture, society and idiosyncrasy, and some conceptions of health by reference authors were presented, all with the intention of promoting individual and group reflection on the concept of health.

In another exercise, called "let's socialize the conceptions of health of different communities", we presented what some religious and ethnic groups consider to be health. In the exercise "Let's analyze the conceptions of health held by regulatory entities", the positions on this concept of institutional authorities such as WHO and MSPS were listed, which were

accompanied by the presentation of some contrary positions offered in the exercise "Let's learn about some criticisms on health as understood by regulatory entities".

Finally, the exercise "Let's study the ways of understanding health in other regions" emphasized how, from different customs, health is conceived and experienced. All these exercises were proposed with the objective of cementing the concept of health that hypermedia users can build with their communities, based on the understanding of emerging health ideas and health practices within the health system. This is to understand that positions are not always opposed, but often influence each other and maintain relationships that may even overlap.

It is thus evident that examining different conceptions of health and not issuing one's own concepts without a general overview, appeals to the understanding that this process does not have fixed references and does not necessarily imply authoritarian points of view. To do otherwise would be to ignore the fact that today's ideas of health encompass multiple practices and knowledge that are recognized and defended, although not always put into practice.

However, only by questioning the meanings of health, which, within certain conditions of mode, time and place are hegemonic, will it be possible to "produce language fields that enable collective health experiences, which do not start from any enlightened intelligence or from the fragmented wills of small well-intentioned groups" (Huergo, 2009, p. 18), a commonplace when it comes to education and communication, in which experts position themselves in knowledge and, as its possessors, impart it as if this were what education was all about.

On the other hand, the purpose of the various activities proposed in the hypermedia was to promote dialogue, a fundamental element for PE. Thus, conversation is a tool that recognizes in others subjects with knowledge that are valuable; it also gives education the property of being a negotiation scenario, and it is, mainly, "a recognition of otherness, recognition of the other with whom the world can be transformed" (Zea, 2019, p. 64).

Therefore, the relevance of dialogue scenarios provided by participation mechanisms such as round tables, forums, community meetings, assemblies, town councils, among others, was considered, taking into account that they exhibit several desirable characteristics from PE, among which are the development of cooperative and reflective processes, the collectivization of particular knowledge and the enrichment of collaborative experiences based on individual experiences. Furthermore, in such mechanisms of participation there is a commitment to a critical subject, that is, to assume each person as a reflective being of his reality, who wonders about the possibilities of transforming himself and his circumstances while interacting with others.

Finally, in this hypermedia, by using relational communicative strategies, communication is not the transmission of messages, but the construction of meaning. This process is evidenced by treating the users of the resource as mere receivers of the messages it contains. On the contrary, they become producers of meaning when they give meaning to things and when they act so that these meanings are analyzed, interpreted and accepted by the community to which they belong, through participatory mechanisms such as those proposed in each exercise.

According to the above, relational communication strategies in hypermedia consisted of a three-part process: 1. Users access information about health: their concepts, conceptions, points of view, among others; 2. Users change their representations and perceptions about health based on the information given and through various processes of dialogue, reflection and participation; and 3. Users plan and carry out actions towards change. This triad is characteristic

of relational communication and differentiates it from Health Communication strategies framed within the diffusionist and informative paradigm (Díaz, 2010).

Similarly, when users become responsible for the construction of meanings around health, it becomes evident that "they are by no means the only valid interlocutors with the capacity to influence different population groups to promote the adoption of healthier habits and behaviors" (Díaz, 2010, p. 22). With this, all social actors producing meaning are taken into account, which breaks down barriers and can have a greater impact on the population.

Social appropriation of the product

One of the objectives of Research+Creation is to present the results and ensure the appropriation or transfer of a product for the benefit of society at large (Ministry of Science, Technology and Information, 2020, p.12).

With this in mind, after the hypermedia was finished, two ~~focus~~ group discussions were held with teachers and school administrators from two educational institutions: a private school with a vulnerable population in a low-stratum locality in Bogotá, calendar A; and a private school with a privileged population in a medium-high stratum locality in Bogotá, calendar B. The evaluation of the focus groups is summarized below.

- Attractive. The teachers agreed that the product is attractive. The interactivity, the variety of resources proposed, the different communication channels and the rationale of the project were positively evaluated.
- Understanding. The teachers understood the nature of the project and its purposes. They considered that the instructions at each stage were clear and that the proposed product, the podcast, was feasible.
- Identification. The teachers felt that the situations, images, scenarios and issues raised were familiar to them. It was evident that the teachers at calendar A school identify more with the product than those at calendar B school. In addition, teachers at school calendar A mentioned that their students might also identify with the product.
- Acceptance. Calendar A school teachers stated that the question of what health is is relevant, but as a prerequisite for a project of more interest to them: identifying and addressing the health needs of the school community, which are pressing, especially in relation to nutrition, sexuality and the consumption of psychoactive substances. On the contrary, the teachers of calendar B school expressed that this question was relevant. Both institutions considered that it would be valuable to implement the project, taking into account that they develop PBL Project Based Learning strategies, and that they could take this project as a pilot or as an example for other initiatives.
- Induction to action. Teachers at the two schools felt that the implementation of this project would bring about changes in the ways in which school communities understand health. However, given the length of the project, estimated for a full school year, its continuity would be difficult. Therefore, they suggested shortening it, so that it can be developed in a single two-month period, so that in one year not only a concept of community health can be built, but also the health needs in the context can be detected and then actions can be carried out to meet those needs, so that the induction to action is effective.

Discussion and conclusions

It is considered pertinent to begin by saying that this Research+Creation made a contribution to the establishment of theoretical relationships between communication, education and health, taking into account that this interest is emerging, and that it requires more revisions, contributions and explorations.

At the end of this process, it is considered that, although for communication, education and health the interest is to expand, acquire or reaffirm knowledge while intervening and modifying reality, it is necessary to configure the relationship between these three disciplines as an interface where they do not mix, but where their emphases coexist in such a way that they can benefit from each other, an approach that was taken to base the hypermedia product of this Research+Creation.

The above makes sense when reviewing Bañuelos, González and Ramírez (2016), who state that these three disciplines are evidently related, but the substantiation about this relationship is rather scarce, taking into account that:

> The intersection between health, communication and education is complex; it is a field still under construction and can and should be adequately aided by technological advances, but it must necessarily have theoretical and epistemic support that gives it its own strength, and not the sole strength of being supported by the separate approaches of each of the disciplinary areas that it tries to group in an interdisciplinary field. (p. 631)

It is proposed the interface from interdisciplinarity, which was achieved in the product of this research+Creation, by including in the hypermedia the designed activities recognizing that "health-oriented communication is the social, educational and political process that increases and promotes public awareness about health" (González and Bañuelos, 2013, cited by Bañuelos, González and Ramírez, 2016, p. 626). This interdisciplinarity is also evident in the specific contents of the hypermedia, such as the project presentation card, located in the "Presentation" screen, which explicitly presents the interdisciplinary relationships between the various exercises proposed throughout the resource.

~~However,~~ during the development of this product, it became evident that such an initiative, in practice, can contribute to the appropriation of health in a community, not through scientific dissemination or the relationship between science and the public, but through a deep and contextualized reflection on the concept of health and the conscious identification of the needs to which this reflection invites.

However, this contribution was confronted with a strong tendency among educators: traditional health education, focused on disease, inclined to the dissemination of information and detached from the learners' conception of health. This, taking into account the interest of the teachers with whom the product was socialized, focused on the strategies of teaching and learning about health as usual, and interested in the technicalities of the construction of the medium, and not the impacts, implications or instructional design required for the consolidation of the content.

Added to this obstacle is the widespread instrumentalization of educational media. In the hypermedia product of this Research+Creation, a conscious effort was made to base each of the components and contents, without ignoring important elements such as usability, interactivity, accessibility, among others. However, it is evident that the interest of educational users in the use of resources that focus on the form and not on the substance, or on the operational and functional aspects of the media, is more important.

Therefore, it is necessary to apply Communication-Education and health strategies in the first instance with teachers, so that they find sense in applying proposals such as those that this Research+Creation makes, so that they can open themselves to the possible inconveniences of continuing to be the ones who decide what students should learn about health, without prompting them so that they themselves, as subjects, ask themselves what health is and what they need to learn about it.

Despite these drawbacks, it can be stated that the realization of the hypermedia highlighted the linking of impactful pedagogical strategies in the design and construction of the product. Specifically, the AS pedagogy is presented as an option to give academic guidelines to a social proposal in the school environment. This is a factor of interest to potential teacher users, for whom solidarity activities are not necessarily an attractive part of their duties, particularly if this type of project is not regulated by the MEN. In turn, the *WQ* logic offers the possibility of applying one of the various educational trends that have been gaining strength due to the increasingly frequent education through digital media, in which the Internet is not a mere instrument, but acquires pedagogical meaning when teachers guide the search for information and propose actions in which students solve a question, a challenge, an activity or a project based on it.

In addition, it is worth noting that the product of this Research+Creation has a social innovation component, understood as

> the process through which value is created for society through innovative practices, management models, products or services that satisfy a need, take advantage of an opportunity and solve a social problem more efficiently and effectively than existing solutions, producing a favorable and sustainable change in the system in which it operates. (National Planning Department, 2012, cited by MinTIC, 2020, p. 23).

In view of the above, hypermedia is a product that takes advantage of several opportunities: the pandemic that brought to the table the issue of the conception and experience of health and being healthy; the opportunity to propose different ways of educating for health; and the *boom in* education strategies mediated by information and communication technologies.

In addition, the implementation of hypermedia could help "generate and strengthen social relationships, empathy, and a sense of belonging through responsive experience." (MinTIC, 2020, p. 20). This is due to the use of the various strategies proposed by the resource, such as participation mechanisms, reflections mediated by dialogue, cooperative learning and, mainly, the AS on which it is based.

The first step towards the previous objective was taken by constructing the medium, appealing to the social mediations it triggers. The continuity of this project is given by the opportunities to implement hypermedia with different working groups.

In addition, it is considered that this product should be part of a Health Communication-Education Program, in which, from this first HA project, at least two more projects will be triggered: one to identify the health needs of the user communities and the other to meet those needs. For this to be possible, it is important to have the support of public or private organizations that make these new developments possible.

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CLASSIFICATION AND FORECAST OF THE LEVEL OF SATISFACTION OF GRADUATES FROM HEALTH PROGRAMS IN THE CONTEXT OF A MACHINE LEARNING METHODOLOGY: A CASE ANALYSIS ORIENTED TO ONLINE POSTGRADUATE DEGREES FROM A LATIN AMERICAN EDUCATIONAL INSTITUTION

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Abstract. The purpose of this research article was to perform a classification based on neural networks to predict the level of satisfaction of a sample of graduates, corresponding to different graduate programs in the health area of a Latin American educational institution under an e-learning methodology. To this end, a Likert scale questionnaire model was instrumented which, after being validated, had a reliability of 0.791. Likewise, the average global satisfaction index of the graduates was 2.66/4, with a better score in the section on logistics of materials and in the management and technical support of the virtual campus, while the lowest scores referred to aspects related to extra-center communication and the facilities offered by the institution for the improvement of the participant's economic and social context. Finally, the probabilistic classification and prediction algorithm of the neural network obtained an accuracy

of 96.8%, indicating an excellent degree of model fit. The methodology followed and the rigor in determining the validity and reliability of the instrument, as well as the subsequent analysis of the results, endorsed by the review of the documented information, suggest that the instrument can be applied to other multidisciplinary programs for decision making with guarantees in the educational field.

Keywords: health, graduate satisfaction, Likert scale, neural network, postgraduate program

CLASIFICACIÓN Y PRONÓSTICO DEL NIVEL DE SATISFACCIÓN DE EGRESADOS DE PROGRAMAS DE SALUD EN EL CONTEXTO DE UNA METODOLOGÍA DE APRENDIZAJE AUTOMÁTICO: UN ANÁLISIS DE CASO ORIENTADO A POSGRADOS ONLINE DE UNA INSTITUCIÓN EDUCATIVA IBEROAMERICANA

Resumen. El propósito de este artículo de investigación fue realizar una clasificación basada en redes neuronales, para pronosticar el nivel de satisfacción de una muestra de egresados, correspondiente a diferentes programas de posgrado del área de salud de una institución educativa latinoamericana bajo una metodología e-learning. Con este fin, se instrumentalizó un modelo en un cuestionario de escala de Likert que, tras ser validado, resultó con una confiabilidad de 0.791. Asimismo, el índice global medio de satisfacción de los egresados fue de 2.66/4, observando una mejor puntuación en el apartado de logística de materiales y en el manejo y soporte técnico del campus virtual, mientras que las puntuaciones más bajas se refirieron a aspectos relacionados con la comunicación extra-centro y las facilidades ofrecidas por la institución para la mejora del contexto económico y social del participante. Finalmente, el algoritmo de clasificación y predicción probabilística de la red neuronal obtuvo una precisión del 96.8%, lo que indicó un excelente grado de ajuste del modelo. La metodología seguida y el rigor en la determinación de la validez y confiabilidad del instrumento, así como el posterior análisis de resultados, refrendado con la revisión de la información documentada, hace presuponer la aplicación del instrumento a otros programas multidisciplinares para la toma de decisiones con garantías en el ámbito educativo.

Palabras clave: salud, satisfacción de egresados, escala de Likert, red neuronal, posgrados

Introduction

The changing paradigm of distance education in the health field

Distance education - in its non-school and blended modalities - represents a paradigm of the teaching-learning concept, alternative to the traditional method, which allows reaching a greater number of people in a global scenario based on knowledge.

Implicit in this paradigm shift is the incorporation of virtual university models that offer students the advantage of being able to choose a time and place for learning. This is important in the field of postgraduate continuing health education, especially in those healthcare groups located in rural or inaccessible environments (Domínguez, 2021).

In this sense, research has focused more on establishing relationships between different variables than on specifically defining the profile of the graduate of a distance program (Pérez, Martínez, & Martínez, 2015; Álvarez, Chaparro, & Reyes, 2015; Surdez, Sandoval, & Lamoyi, 2018), hence the need for studies that serve to:

> [...] continue research along the lines of a more participant-centered model, implemented on reusable software platforms for specific learning contexts, with the purpose of offering "tailor-made" training for the intended user, especially in unexplored contexts (Fainholc, 2016).

Therefore, current trends in e-learning in health education will require a commitment on the part of educators to use technologies that facilitate this curricular shift toward learner self-regulated learning (Brydges et al., 2015).

However, it was not until a few years ago, with the advent of information and communication technologies (ICT), that a series of theories and models of e-learning training evaluation emerged with partial and global approaches, under different perspectives.

For example, the Knowlege, Process, Practice (KPP) e-learning training model, proposed by Shaw, Barnet, McGregor, and Avery (2015), for its application to different professional groups in the health area, proved to be flexible to technological progress by guaranteeing not only the delivery of knowledge, but also the way to process it through satisfaction assessment tools and application in practice.

In parallel, the World Health Organization (WHO, 2005) called on all member governments to adopt and use information technologies for the benefit of public health, through Resolution WHA58.28 eHealth, and in particular, to promote equitable enjoyment at an affordable price, reduce the digital divide and:

[to continue the extension to Member States of mechanisms such as the Health Academy, which promote healthy lifestyles and a better understanding of health-related issues through e-learning (p.128).

In this context, the term *e-Health*, also referred to as digital health, is a comprehensive concept that brings together a group of applications, associated with ICTs, that have helped to strengthen, advance and create opportunities in the performance of health-related fields (Shiferaw and Zolfo, 2012; WHO, 2018).

Despite this, the heterogeneous nature of the models and the lack of concreteness of the concept of quality in the context of evaluation in general, have prevented the definition of universal criteria for assessing student satisfaction (Pereira and Gelvez, 2018).

Models for measuring the level of student satisfaction in virtual training

The relationship between the satisfaction of graduates and the degree of educational quality constitutes one of the issues that has most concerned Universities, interested for years in improving their offer to attract new generations of students to the different higher education modalities (González, Tinoco and Torres, 2017).

In this context, knowing the level of satisfaction of postgraduate graduates can help educational institutions to: attract new generations of students (Gónzalez et al., 2016), respond to [national] and international university evaluation bodies (Pérez et al., 2015), find out their needs

(Mejías and Martínez, 2013) and, finally, obtain a better positioning in academic performance among higher education institutions (Surdez et al., 2018).

Consequently, it is important to contemplate quality management models and standards that indicate as a requirement the need to establish a process for measuring customer or user satisfaction (Pérez et al., 2015). However, compared to face-to-face education, there are few models aimed at e-learning training and even fewer that consider graduate satisfaction as an element to be taken into account in decision-making.

One of these few tools is the standard "Quality Management. Quality of Virtual Training (UNE 66181:2012)", which determines the three main factors involved in meeting the needs and expectations of students: recognition of training for employability, learning methodology and accessibility.

Table 1 shows a definition of the factors that have been considered most important during the development of this research.

Table 1

Factors that condition student satisfaction in virtual training

Factors	Description
Accessibility	Ability of the training program to meet the student's accessibility needs and expectations due to digital divide issues, disabilities.
Learning methodology	Ability for the training program to efficiently find solutions to complex problems, based on analysis and in the context of methodological planning
Cost	Monetary cost of the training program
Maintainability	Potential ability for the training program to be modified, expanded, etc.
Employability	Ability of the training program to facilitate entry into the labor market

Note: Adapted from UNE 66181:2012

Instrumentalization of the model

The measurement instrument must contain the measurement criteria and have a minimum level of abstraction, so it is necessary that the variables of the model undergo a process called "operationalization of variables", which moves from the general to the particular, from the abstract to the concrete.

On the other hand, the instrument must be valid and reliable. In this context, validity can be content, criterion and construct validity. In general, it is common for models to carry out content validity by means of a literature review and consultation with panels of experts (Mejías and Martínez, 2013). In relation to how reliable the model is, the reference indicator is the "Cronbach's Alpha" statistic, widely used in the university environment (González and Pazmiño, 2015), and where the approximation to unity is the most desirable.

Artificial intelligence: Machine Learning and Deep Learning

Artificial intelligence is an important tool to help close the gap between graduate satisfaction and educational quality, contributing to the paradigm shift that virtual education represents.

According to Pedemonte (2020), Artificial Intelligence (AI) is defined as a software technology that encompasses one or more capabilities related to perception, prediction, classification, decision making, diagnosis and logical reasoning, among others.

For its part, machine learning or Machine Learning refers to the ability of the machine to learn on its own based on experience, from the interpretation of a set of inputs, and thus provide one or more outputs to meet a given objective (Faggella, 2018).

The machine learning methodology has been used to develop what is now known as "Deep Learning", a machine learning system based on a sequential set of layers of artificial neural networks, which attempt to mimic the functioning of neurons in the human brain (Schmidhuber, 2015).

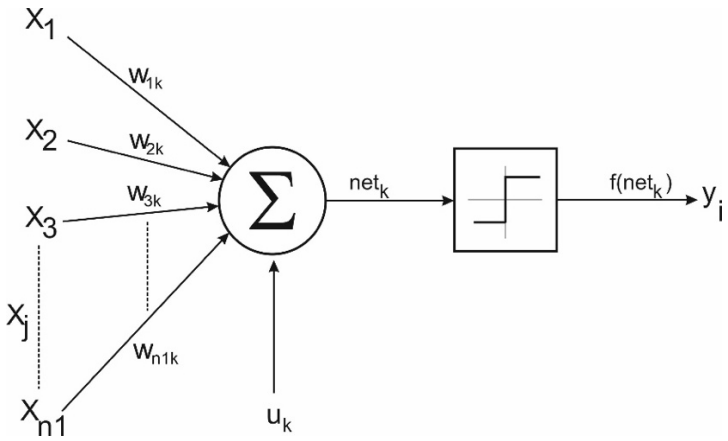
Simple architecture of the artificial neural network

In practice, the materialization of this methodology translates into a mathematical model consisting of a series of connected processing units or neurons, which attempt to mimic the functioning of the biological neural network of the human brain.

The simplest model of an artificial neural network (ANN), also called a perceptron, consists of an input layer, a neuron and a single output, whose connections are associated with weights (w_{jk}), which give an idea of the intensity of the input signal. Each neuron also has a threshold or bias (u_k) associated with it, which functions as a switch to turn the neuron on or off (Figure 1).

Figure 1

Simple perceptron model



In neural network models, a linear combination of the weights multiplied by the inputs is performed to subsequently determine the output based on the resulting sum, by means of a continuous, differentiable and nonlinear activation function (sigmoid, ReLu, hyperbolic tangent...), since the aim is to obtain values as close as possible to 0 and 1 at the output (feed-forward):

$$net_k = \sum_{j=1}^{n1} w_{jk} \cdot x_j + u_k \qquad (1)$$

and the exit:

$$y_i = f(net_k) \qquad (2)$$

where f is the activation or transfer function.

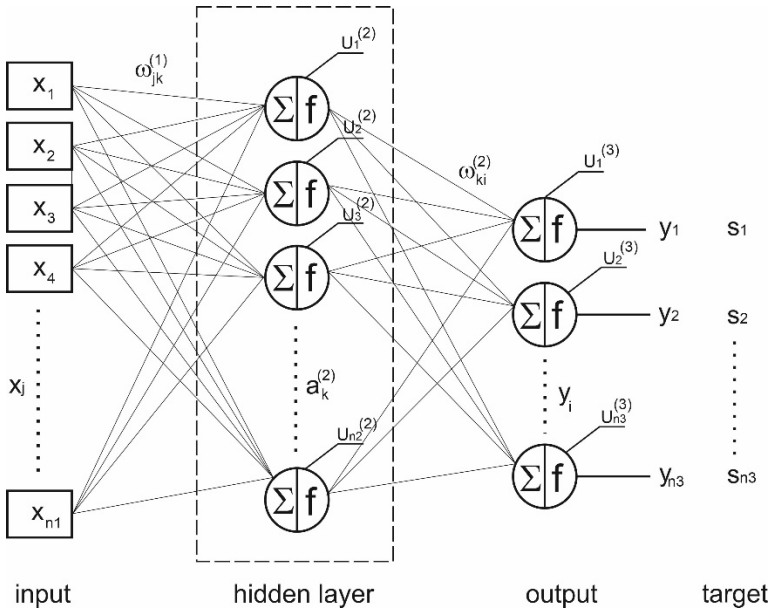
Architecture of a multilayer neural network

However, the applications of the simple perceptron are very limited, so it is common to add layers of neurons (called hidden) between the input and output, which adds complexity to the network.

In this sense, Figure 2 illustrates the architecture of a multilayer neural network composed of an input layer, a hidden layer and, finally, an output layer.

Figure 2

Architecture of a multilayer neural network. Note: Activation functions can be different for each layer



The choice of the number of hidden layers and their composition conditions the efficiency of learning and influences the generalization of the network (Castillo, Solórzano, & Moreno, 2018). Normally, in Machine Learning methodology, unlike Deep Learning, a single hidden layer is sufficient for the algorithm to converge, although its composition is determined by trial-and-error testing. However, as a guideline, the number of neurons in the hidden layer is usually chosen to be equal to the average of the number of neurons in the input and output layers.

Train, Validation and Testing

During network learning, overfitting problems may occur, where the network will perform excellently for the training patterns, but will have poor generalization capability, i.e., it will not be able to respond adequately for values outside the training.

In order to avoid overfitting, the input data set is divided into three parts: train (train+validation) and testing, so that for each epoch a training error and a validation error are provided. Obtaining the minimum validation error is the signal to finally exit the algorithm, avoid overfitting and start the test stage.

Testing data is used to test the model with new inputs that have not been trained and validated.

Research design

In previous sections, the importance of having a valid and reliable instrument to measure the level of satisfaction of the graduates of various online graduate programs in the field of health was highlighted. However, the heterogeneity of norms and standards has so far prevented the definition of universal measurement criteria for their application in practice.

Thus, once the problem was posed, the research question was as follows:

- is it possible to develop a deep learning methodology, which has as input parameters a set of measurement criteria, to classify and make predictions about the level of satisfaction of graduates of online graduate programs in the health area?

Table 2 shows the guidelines for this research.

Table 2
Research guidelines

Unit of analysis:	Satisfaction of graduates of online postgraduate programs in the health field
Dependent or output variable:	Level of satisfaction of graduates of online postgraduate programs in the health field
Operational definition of the variable	⇩
Values of the dependent variable:	high, medium, low
Independent or input variables:	Measurement criteria
how is the data collected?	⇩
Unit of observation:	Set of Likert-scale responses from graduates administered by panels of experts

Note: Adapted from Martinsuo & Huemann (2021) and Azcona & Manzini (2019)

In this context, the research sub-questions were as follows:

- Why is it necessary to operationalize the variables of a model?
- Which measurement criteria are most valued by graduates? Which ones need to be improved?
- Can artificial intelligence reduce the existing gap between the level of student satisfaction and the degree of educational quality in health postgraduate programs?

- Is it possible to determine the probability of predicting the level of satisfaction of a graduate health graduate from the answers given to the measurement criteria of a questionnaire or instrument?

Method

The methodology followed in this research was descriptive and correlational, with a quantitative, non-experimental, transectional approach, since no hypotheses were posed and no variables were manipulated, but "[...] data were measured, evaluated or collected on various aspects, dimensions or components of the phenomenon to be investigated [in its natural work environment and in a single time]" (Hernández, Fernández & Baptista, 2003; Pérez et al., 2015).

The diagnosis of the level of satisfaction of graduates with the postgraduate programs in question consisted of different phases: first, a panel of experts from the University elaborated an abstract model using theories, models and evaluation tools for virtual training; second, after a process of operationalization of the variables, a set of 13 measurement criteria was obtained, which formed part of a satisfaction questionnaire on a Likert scale, which was applied, validated and its reliability determined on a total of 241 participants; finally, based on the measures of central tendency and dispersion, two decision thresholds were found to classify the results obtained into a high, medium or low level of satisfaction. This last result was used to train, validate and test a neural network, and to establish a forecast of the level of satisfaction of new students using Matlab R2021b® mathematical software.

The panel of experts was made up of two doctors in the area of health and nutrition, a professor in information technology and a doctor in projects, who previously established common guidelines to reach a good level of consensus.

Main theories, models and tools for e-learning

Table 3 shows the main bibliographic references used to determine the variables, dimensions, factors and indicators of the model.

As shown, the compilation of bibliography was oriented towards training activities and logistical and technological infrastructure.

Table 3

Main virtual education models and associated variables

Sphere of influence	Models	Variables
Training action	Systemic model of Vann Slyke et al. (1998)	– Institution implementing the training action – Capacity of training recipients – Adaptability of the *e-learning* system – Adaptation of users to the virtual campus
	Marshall & Shriver's (1994) five-level model, in McArdle (1999)	– Communication skills of the teacher – Course materials (difficulty, relevance...) – Content or Curriculum – Modular structure – Transfer of learning
	Kirkpatrik's four-level model (1994)	- Participant satisfaction - Assessment of learning, behavior and results
	Marcelo & Zapata Model (2008)	– Socio-cultural context of the participant – Design of objectives and strategies – Facilitation of resources – Virtual learning environment – Tutoring – Continuous evaluation – Follow-up
	Marciniak's (2015) virtual education evaluation model. *Benchmarking* Methodology	– Institution's strategic plan – Institutional context – Educational agents – Teaching-learning processes – Virtual platform
Logistics and technological infrastructure	SCORM	- Content aggregation - Execution environment - Sequencing and navigation
	IMS *(Global Learning Consortium)*	- Metadata - Sequencing - Virtual content design

Design of the instrument based on the measurement criteria

In its most abstract conception, the model investigated considered the following variables: "Gender", "Origin", "Program", "Age", "Entry Profile" and, finally, "Graduate Satisfaction".

The high degree of abstraction of the variable "Graduate Satisfaction" made it necessary to transform it, through a process called operationalization of variables, in order to make it more observable and measurable (Reguant and Martinez, 2014). In this way, five dimensions were considered to measure the degree of satisfaction of the graduates of the *online* postgraduates in question (Figure 3).

Figure 3

Dimensions of the variable "Graduate Satisfaction"

Although the degree of abstraction of the dimensions allows at this time to propose a graphic visualization, the same is not true if later on the variable has to be instrumentalized in a Likert scale questionnaire, so it is necessary to continue to submit the dimensions to a higher degree of concretization, progressively going from the general to the particular, based on the following sequential stages: factors, indicators and measurement criteria (Reguant and Martinez, 2014).

Once the list of factors and indicators was available, the measurement criteria for the diagnosis were developed through a bibliographic search and the contribution of a panel of experts.

In this way, 13 items or measurement criteria were obtained, which provided the basis for a Likert scale questionnaire, with categories "1. Strongly disagree"; "2. Disagree"; "3. Agreed" and "4. Totally agree", to measure the variable of graduate satisfaction with the reference postgraduate programs.

Population and Sample

Initially, the target population was a total of 325 graduates of postgraduate programs in the area of health at the Universidad Europea del Atlántico. In order to determine the necessary sample size, and given that the intention was to estimate percentage distributions of qualitative variables

in the statistical calculations, the following formula for finite populations was used (Torres and Karim, 2021):

$$n \geq \frac{N * Z^2_{1-\frac{\alpha}{2}} * (p * q)}{(N-1) * \varepsilon^2 + Z^2_{1-\frac{\alpha}{2}} * (p * q)} \qquad (3)$$

where:

- n = required sample size.
- N = population size.
- $Z_{1-\alpha/2}$ = 1.96 (Z-statistic, calculated at 95% confidence level).
- $p = q$ = 0.5 (typical values under worst-case conditions).
- Error (ε) = 0.05.

The sampling was convenience sampling, i.e., non-probability.

Substituting the values in the formula resulted in a required sample size for the study of $n \geq 176$

General characteristics of graduates

Once the Likert scale questionnaire was applied to 241 participants, a total of 54 missing values were reported in the items (22.4%), due to gaps in the answers which, added to an omission described in the "Origin" variable, totaled 55 cases, which were extracted from the analysis, so that the number of valid graduates included for the diagnosis was finally 186.

Table 4 shows the definitive general characteristics of the graduates, once the data for the analysis had been cleaned.

Table 4

General characteristics of graduate program graduates (N=186)

Nominal variables	Category	n	%	Ordinal variables	Category	n	%
Genre	Male	56	30.1	Age group (years)	20-29	50	27
	Female	130	69.9		30-39	70	37
Source	North America	54	29.2		40-49	39	21
	Central America	47	25.2		50-59	21	12
	South America	72	38.5		60-69	6	3
	Eurasia	13	7.2	Entry Profile	PhD	8	4.4
Program	Endocrinology and nutrition	20	10.6		Master's Degree	30	16.0
	Preparation of diets	13	6.8		Postgraduate	23	12.3
	Clinical psychology and nutrition	7	3.8		Grade/Dip/ Lic	125	67.3
	Physical activity and nutrition	31	16.6				
	Culinary techniques	31	16.6				
	Health and nutrition	85	45.6				

It was observed that 69.9% were female and the remaining 30.1% were male; 38.5% came from South America, 29.2% from North America, 25.2% from Central America and 7.2% from Eurasia. In relation to age, the 30-39 age group accounted for 37%, the 20-29 age group for 27%, the 40-49 age group for 21%, the 50-59 age group for 12% and the 60-69 age group for 3%. In reference to previous studies, 67.3% have completed a degree/diploma/licensure, 16% a Master's degree, 12.3% a postgraduate degree and 4.4% a doctorate. Finally, 45.6% have taken the Health and Nutrition program, 16.6% the Culinary Techniques program, another 16.6% the Physical Activity and Nutrition program, 10.6% the Endocrinology and Nutrition program, 6.8% the Diet Development program and 3.8% the Clinical Psychology and Nutrition program.

Variable "Level of graduate satisfaction"

The variable "Level of satisfaction" was created as a result of the sum of the items for each of the 186 participants, and was the one taken from now on as a reference for the study. This new

column (dependent variable or target) included the categorization of the corresponding level of satisfaction (low, medium, high) for each graduate.

Artificial neural network design and implementation

Spreadsheet data preparation

In this first stage, a matrix (186 x 13) was created in the Excel v2016® program, corresponding to the input set of the neural network, which contained the evaluations of the graduates in relation to the 13 questions or items.

For the purposes of its implementation in the algorithm, this column was coded into dummy variables (Table 5).

Table 5

Coding of satisfaction level categories in dummy variables

Level of satisfaction	Target coding
Under	0 0 1
Medium	0 1 0
High	1 0 0

Matlab R2021b® mathematical software matrix import

The next step consisted of importing the described matrix into Matlab R2021b® mathematical software and storing the input and target data in two different matrices.

Division of data

The data were divided into three sets: training, validation and testing.

- Seventy percent of the data was used for network training, i.e., for gradient calculation and updating of network weights and biases.
- Fifteen percent of the data was used for network validation. These data, which are also part of the training, were used to find the best (most likely) model and stop the training to avoid overfitting the neural network.
- The remaining 15% of the data were used to test the optimal generalization of the network using data not used during training.
-

Data normalization or scaling

Data normalization or scaling was performed according to equation 4 in the interval [-1 1]:

$$y = \frac{(y_{max} - y_{min}) \cdot (x - x_{min})}{(x_{max} - x_{min})} + y_{min} \qquad (4)$$

Creation of the neural network model architecture

Seventeen neurons were added in the input layer, corresponding to the assessments of each of the SDGs, another 10 in the hidden layer and, finally, 3 in the output layer.

The hidden layer activation and output functions were of type tansig and softmax, respectively, as these functions will provide the probability that the project has a high, medium or low level of sustainability.

Neural network training and validation

Once the data had been prepared and the architecture designed, the neural network training was performed.

The Matlab R2021b ® function "trainscg" was chosen for the update of weights and biases, according to the gradient descent method and, for the calculation of losses between predictions and target data, the function "crossentropy".

Parallel to training, Matlab R2021b ® performed the validation of the corresponding data set for each iteration, determining an average minimum validation error, which served to delimit the most probable best model, stop training and avoid overfitting, after confirming a decrease in the training error curve together with an increase in the validation error, consecutively, during six more iterations (early stopping technique).

Model testing

Once the network was trained, during the testing phase, data not used during training were introduced in order to check the optimal generalization of the model.

Results

Selection of nominal and ordinal qualitative variables for the model

The model was composed of nominal and ordinal qualitative variables. Among the first, "Gender", "Origin" and "Program" studied by the graduate were considered. In reference to the ordinal qualitative variables, "Age", "Entry Profile" and "Graduate Satisfaction" were identified.

Variables, dimensions, factors and indicators

Table 6 shows the indicators identified for the variable "Graduate Satisfaction", which will be used as measurement criteria for the development of the instrument.

Table 6

Variables, dimensions, factors and indicators identified for the "graduate satisfaction" variable

Variable	Dimensions	Factors	Indicators
Graduate satisfaction	Training	Initial expectations	Degree of satisfaction achieved
		Relevance for training	Degree of learning achieved
		Difficulty of the academic program	Level of difficulty of the academic program
	Participant's context	Economic status	No. of scholarships granted, payment facilities.
	Communication	Interaction between participants, tutors and other interested parties	Degree of participant satisfaction with the channels established for external communication
		Product and/or service information	Level of transparency and truthful information about the academic program
	Teaching-learning methodology	Academic Program	Academic program subjects
		Evaluation	Continuous evaluation activities
		Teacher evaluation	Degree of participant satisfaction with academic tutors
			Degree of participant satisfaction with the PFM mentor
	Resources	Accessibility to the product and other services offered by the institution	Number of shipments of teaching material, reception times, etc
		Virtual Campus	Ease of use of the virtual campus
			Technical support and number of incidents

Validation and reliability of the measuring instrument

Table 7 shows the measurement instrument adapted to a Likert-type scale.

Table 7

Measurement instrument or Likert scale questionnaire for measuring graduate satisfaction with the graduate program

Dimension	Item No	Measurement criteria
Training	1	The academic program has met my initial expectations
	2	The tutor has made this program relevant to my training and professional performance
	3	The degree of difficulty of the program has been higher than others I have taken
Participant's context	4	The Institution has granted me economic facilities to be able to carry out the study
Communication	5	I am satisfied with the attention received prior to enrollment
	6	I found the academic information provided during the program to be sufficient
Teaching-learning methodology	7	The curricular structure of the program seemed to me to be very appropriate
	8	My assessment of the continuous evaluation is very satisfactory
	9	My mentor has gone out of his/her way to help me
	10	My Master's Final Project director has been accessible
Resources	11	Delivery of didactic materials has been punctual and on time
	12	The handling of the virtual campus has been very user friendly
	13	My assessment of the technical support service of the virtual campus is very satisfactory

The validity of the instrument was determined from the pertinence, relevance and clarity of each of the items, by experts (Pérez et al., 2015), In the case of this research, since the dimensions were found from the literature review, we proceeded to perform the content validity by means of a binomial distribution test using panels of experts, although it would have been more appropriate to raise, from the beginning, the idea of conducting an exploratory factor analysis.

The reliability of the instrument was based on the determination of Cronbach's Alpha, and included all the ordinal qualitative variables with their associated dimensions.

The statistic provided a result of 0.791, considered an adequate internal consistency value (Rodriguez and Reguant, 2020).

Central tendency and dispersion metrics for ordinal qualitative variables

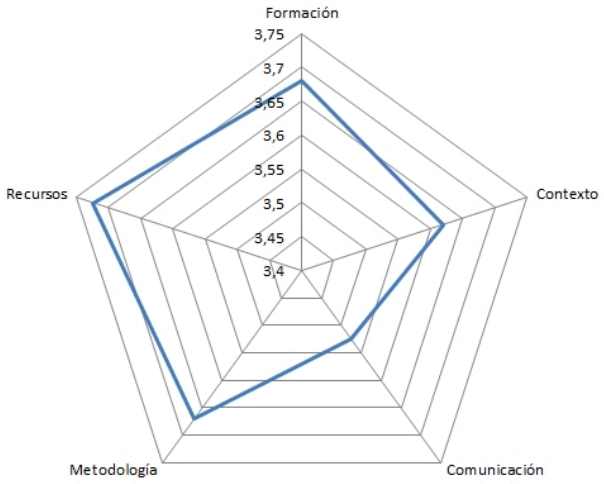
It could be observed that the mean overall satisfaction was 2.66/4 and that of the Age Group was in the range of 30-39 years. Likewise, the average entry profile was maintained between the Undergraduate/Diploma/Bachelor's Degree and the Graduate Degree.

In relation to the variable "Graduate Satisfaction", the item means ranged from 2.46 (item 5) to 2.79 (item 3).

The diagram in Figure 4 shows that the resources (delivery of materials and management and support of the virtual campus) were the most highly valued, in general, while communication and the possibilities of improving the social and economic context of the students were the least satisfactory aspects.

Figure 4

Radial diagram of the variable "Graduate Satisfaction"



Variable "Level of satisfaction"

Table 8 shows the descriptive data of central tendency and dispersion of this new variable.

Table 8

Basic statistics of the variable "Level of satisfaction"

	N	Minimum	Maximum	Media	Desv. Type
Satisfaction Level	186	25	43	33.7	5.53

Normality test

In order to determine the normal behavior of the variable and given that the sample was larger than 50 students, the Kolmogorov-Smirnov test was performed (De la Garza, Morales and González, 2013). The result is shown in Table 9.

Table 9

Kolmogorov-Smirnov normality test for the variable "Level of Satisfaction"

Normality tests						
Variable	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistician	**gl**	**Sig.**	**Statistician**	**gl**	**Sig.**
Level of satisfaction	0.193	186	0.000	0.810	186	0.000

Note: a. Lilliefors correction.

Since the resulting p-value (0.000) is less than 0.05, the null hypothesis of normal distribution of the data was rejected, so these values do not follow a normal distribution.

Categorization

The decision thresholds for the variable "Level of satisfaction" were determined on the basis of the following cut-off points (mean= 33.7, standard deviation= 5.53):

$$33.7 - 0.75*5.53= 29.55 \sim 29$$
$$33.7 + 0.75*5.53= 37.84 \sim 38$$

Thus, the data were grouped as shown in Table 10.

Table 10

Satisfaction level of graduates by grouping ranges

Level of satisfaction	Range	Frequency	%
Under	Values<=29	40	21.5
Medium	Values 30-38	112	60.2
High	Values>=39	34	18.3

Table 10 shows that 60.2% of the graduates have a medium level of satisfaction with the institution's *online* graduate programs, 21.5% have a low level of satisfaction and the rest feel highly satisfied after completing the corresponding graduate program.

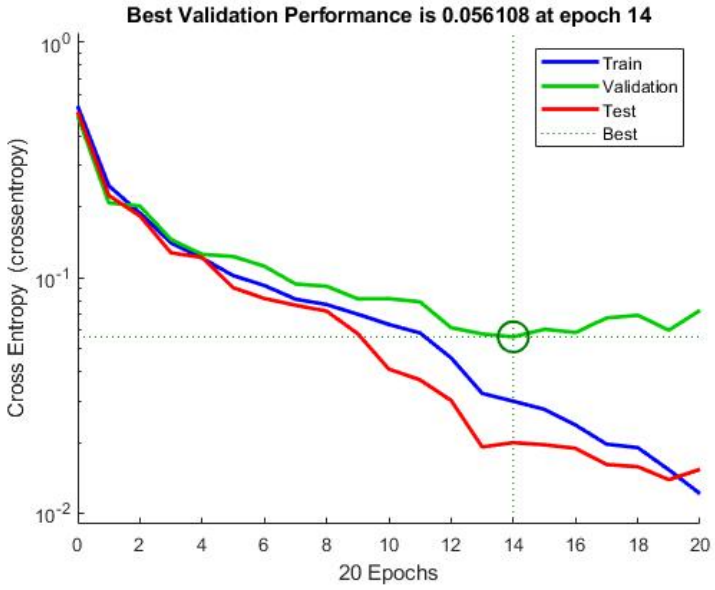
Neural network model performance

The performance of the model training, validation and testing data set is illustrated in Figure 5.

Cross entropy is preferred for classification, while mean square error is preferred for regression or predictions.

Figure 5

Cross entropy losses for training, validation and testing.



It was observed that training was terminated when the validation error did not improve during the six iterations following the 14thepoch, where the best training and validation results were obtained, with a minimum cross-entropy error value of 0.056108.

Also, after the 14th epoch, it is found that training follows a linear downward trend, while the validation loss function stabilizes in early stages, signifying some overfitting of the model to the training data. However, this overadjustment is not significant because the error is small.

Since the data to be obtained in the future are likely to be very similar to those used in the training set, the model can be considered valid; otherwise, other formulas should be sought to reduce overfitting.

Global confusion matrix

Once the training, validation and testing stages were completed, the global confusion matrix was obtained, which was used to analyze the sensitivity and accuracy of the model, among other characteristics (Table 11).

Table 11
Global confusion matrix

Output Class	*1*	**33**	**1**	**0**	97.1%
		17.7%	0.5%	0.0%	2.9%
	2	**1**	**111**	**4**	95.7%
		0.5%	59.7%	2.2%	4.3%
	3	**0**	**0**	**36**	100%
		0.0%	0.0%	19.4%	0.0%
		97.1%	*99.1%*	*90.0%*	*96.8%*
		2.9%	*0.9%*	*10.0%*	*3.2%*
		1	*2*	*3*	
		Target Class			

In the analysis by columns, it can be seen that, of the 34 graduates with a high level of satisfaction, 33 were classified correctly and only 1 incorrectly. Therefore, the false positive rate in this case was 2.9%. Similarly, of the 112 graduates with a medium level of satisfaction, 111 were classified correctly and 1 incorrectly, with a false positive rate of 0.9%. Finally, of the 40 graduates with a low level of satisfaction, 36 were classified correctly and 4 incorrectly, with a false positive rate of 10%.

In the analysis by ranks, it is observed that out of 34 projects identified as having a high level of sustainability, 33 were actually of high sustainability, which represents 97.1%, while the remaining 2.9% of the projects were actually of medium sustainability. Likewise, of the 116 projects identified as medium sustainability, 111 projects were actually medium sustainability,

while 1 was high sustainability and 4 were low sustainability. Finally, of the 36 projects identified as low sustainability, all of them turned out to be really at this level.

It is observed that the overall accuracy is 96.8%, which indicates that the classification performed by the model is very good.

Example of testing

Table 12 shows the fit of some of the test data. It can be seen that what is predicted in a classification are probabilities, unlike regression, where an exact value is provided. For example, in the first case, the probability that a graduate with the characteristics shown has a medium level of satisfaction is 98.23%.

Table 12

Predicted probability values of the model in the test run

Graduate	Measurement criteria													Predicted values			Ranking
	1	2	3	4	5	6	7	8	9	10	11	12	13	High	Medium	Under	
1	3	4	3	3	3	4	3	3	3	2	3	3	3	.0004	.9823	.0173	Medium
2	2	4	3	4	4	4	4	4	3	3	3	4	4	.0266	.9715	.0019	Medium
3	4	4	3	2	4	4	4	2	2	1	2	2	4	.0000	.0025	.9975	Under
4	4	4	4	4	4	4	4	4	4	4	3	4	3	.9775	.0225	.0000	High
5 ..	4	4	4	4	3	3	3	3	3	2	3	2	3	.0024	.9955	.0021	Medium

Note: Source: Own elaboration, 2022

Discussion

This article investigated the need to develop a model to assess the satisfaction of graduates of various *online* graduate programs in the field of health and nutrition, based on a series of variables and dimensions, as interdependent parts of the whole.

It is noted in the literature the existence of a large amount of documented information at different stages of graduate training, initiatives and other models and tools, aimed at the same objective (Gonzalez et al., 2016). However, the lack of a single criterion when approaching research means that there are different approaches, some more complex than others.

In order to constitute the abstract reference, the literature review resulted in a model composed of nominal and ordinal qualitative variables, which included socio-cultural and demographic aspects of the graduate (age, gender, origin, program studied and entry profile), as well as another specifically referring to their satisfaction with online graduate programs, including four dimensions: methodology, organization, academic expectations and teaching work. This means that it is not an exhaustive model, since other types of variables (administrative, auxiliary services, etc.) were not taken into account. In this sense, there are virtual or non-virtual models that refer only to student satisfaction with university tutoring (Pérez et al., 2015). Other more complex

research incorporates a greater number of dimensions and indicators; for example, at the margin of the teaching plan, teaching methodology and training, support services, administrative, enabling environment, level of self-realization, and infrastructure and facilities, among others (Fainholc, 2004; Álvarez et al., 2013; Mejías and Martínez, 2013; Pérez et al., 2015). It can be concluded that the lack of homogeneity of models focused on both virtual and face-to-face teaching means that there are different approaches, some more complex than others, and that, therefore, measuring the level of satisfaction of graduates turns out to be a complex task.

Obtaining a Likert scale measurement instrument, based on the degree of abstraction of the variables, is another point of disparity between models. This is because most of the bibliographic references consulted obtain the measurement criteria of the measuring instrument from indicators already contemplated in previous research by one or more authors. For example, this is the case of Álvarez et al. (2013), which are supported by the studies of Gento and Vivas (2003). In this research, however, the model variable "Graduate Satisfaction" was subjected to a process called operationalization, which underlies all the models instrumented, although its development is not made explicit in the literature reviewed (Reguant and Martinez, 2014). It is therefore necessary to obtain a measurement instrument that is as concrete as possible, without ambiguities, that allows the level of satisfaction of graduates to be measured directly by Pérez et al. (2015), rather than the difference between final perception and initial expectations (Mejías and Martínez, 2013).

In this research, when determining the reliability of the instrument, the results reflected a value of 0.791. This means that the instrument is consistent and provides good reliability (Rodriguez and Reguant, 2020). In this sense, all the models reviewed base the reliability of the instrument on the determination of the internal consistency coefficient "Cronbach's Alpha", applied to a test with a small number of students (Álvarez et al., 2013). The observed values in all cases are above 0.8 (Romo et al., 2012; Surdez et al., 2018), implying good reliability (Rodriguez and Reguant, 2020). It can be interpreted, therefore, as a high level of stability of the instrument due to the fact that there are not too many differences in results in its application to different realities.

The average overall satisfaction indicator was 2.66/4. This demonstrates a good level of participant satisfaction with the institution's *online* postgraduate programs in the field of health. It is also shown that about 80% of the participants presented a medium to high satisfaction with the health postgraduate programs in general. In this sense, it was found that there were no significant differences between the means of the dimensions of the "Graduate Satisfaction" variable, so these were attributed to chance.

In order to determine the strengths and weaknesses of the training process, the results showed that the management of the virtual campus, technical support and logistics for the delivery of didactic materials were the criteria most highly valued by the graduates, while communication and the facilities adopted by the institution to improve the socioeconomic context of the student were the lowest rated. This means that the institution must improve the external and internal communication channels with the student, as well as strengthen the policy of scholarships and other study aids, respectively. However, comparisons with other studies are disparate, since the reality is very diverse. For example, in the research by Álvarez et al. (2013) the variables that scored best, i.e., those in which students were most satisfied, were "Teachers' training and teaching skills" and "Students' level of self-realization". On the other hand, the "Infrastructure" and "Administrative services" variables were the items with the lowest level of satisfaction. Regarding the model of Romo et al. (2012), mention is made of a highly significant relationship between educational

quality and student satisfaction in certain aspects of training, faculty, curriculum design and administrative organization; however, no dependence of satisfaction on gender issues or the career pursued was found. Similarly, the results of the research by Surdez et al. (2018) showed that 53% of the students felt some degree of dissatisfaction -partial or total-, especially with regard to infrastructure and the state of facilities, furniture and equipment, which in turn had an impact on the teaching-learning process. However, satisfaction was found with regard to self-realization and respectful treatment of the student by the tutors. Nor were significant differences found between satisfaction and some dimensions such as gender, average years in college and school cycle. For their part, Kuo, Walker, Belland, and Schroder (2013) conducted a pretest with a set of 111 students in the United States to measure their satisfaction in an online course. The study concluded that satisfaction was conditioned by ICT skills and that there were differences between gender, academic level (undergraduate and graduate) and time spent. In view of these results, the predominance of face-to-face versus distance learning models is confirmed, many of which do not take into account the socioeconomic context of the student, unlike the model proposed in this research.

After training and validation of the neural network, a minimum cross-entropy error value of 0.056108 was obtained just at iteration number 14. Likewise, after the testing stage with unused data, an overall accuracy of 96.8% was obtained. This indicates that the classification and prediction performed by the model is excellent. In this regard, no studies of these characteristics applied to e-learning graduates have been found, however, it is important to highlight the way in which artificial intelligence can complement statistics for decision making.

Conclusions

In this research article, a methodology was developed to classify and predict the level of satisfaction of a group of graduates of graduate programs in the health field.

Despite the existence of some models and standards, the literature review revealed the existence of a gap between the degree of quality of e-learning training and the level of satisfaction of graduates, mostly caused by the heterogeneity of existing models and the insufficiency of a methodology to determine the level of satisfaction of students, in general, and graduates, in particular.

The development of an instrument based on the operationalization of the variables of the model contributed to answering the research question in the affirmative and to elaborating a classification that, together with the answers obtained from the questionnaire, formed part of a machine learning model based on a neural network, which made it possible to establish forecasts with a high level of accuracy of 96.8% on the level of satisfaction of graduates for decision making. In this sense, more than 80% of the graduates presented a level of satisfaction between medium and high; however, the importance of strengthening the Institution's commitment to the social and economic circumstances of the student, facilitating access to possible scholarships or making the schedules of certain scheduled tasks more flexible, for example, was also highlighted.

Therefore, and in response to one of the research sub-questions, it is clear that artificial intelligence plays a fundamental role in reducing the gap between educational quality and the level

of graduate satisfaction, as it can complement traditional statistics and interact with the most critical aspects that affect this context.

Recommendations

Finally, some recommendations are as follows:

- Perform a chi-square analysis to determine if there are relationships between variables, for example, to evaluate the degree of influence that variables such as origin, age groups, etc., have on the variable "level of graduate satisfaction", taking into account the non-normality of the data distribution.
- To verify the validity of the measurement instrument with an exploratory factorial design.
- Perform a comparison with other *online,* face-to-face postgraduate or undergraduate degrees (Pérez et al., 2015).
- Complement the results obtained with the opinions of the teaching staff (Llorent and Corbano, 2019).
- Expand the number of the sample with more participants, especially from the Eurasian area.

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A LOOK TOWARDS INCLUSIVE EDUCATION IN CAQUETÁ

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Abstract. Inclusive education adapts and embraces all children, adolescents and young people, with and without disabilities, it is adapted to their needs and contexts (economic, sexual preference, gender, ethnic, linguistic); it is a process of addressing and responding to the diversity of all students through participation in learning. The present study was carried out with the purpose of characterizing the student population with disabilities of urban and rural public institutions of the Department of Caquetá and its capital Florencia and to know through a documentary review those didactic teaching tools that allow the teacher to potentiate learning. of students with physical, intellectual, multiple and psychosocial disabilities. For the characterization, annex 6A was requested from the municipal and departmental education secretary. In the same way, through electronic sources, a literary search was carried out on the main studies that relate teaching practice and the potential of students with disabilities. The results reflect higher rates of disability in the student population between the ages of 11 and 14, particularly at the basic primary education level; with a higher incidence in males. Multiple, intellectual, physical and psychosocial disabilities are the most predominant and may be due to some individual and environmental particularities; if their clinical diagnosis, biochemical and genetic factors and variables that directly affect the behavior of these students are taken into account; it is possible to propose didactic tools that enhance their learning.

Keywords: Disability, Inclusive Education, Teacher Training, Inclusive Practices and Programs

UNA MIRADA HACIA LA EDUCACIÓN INCLUSIVA EN EL CAQUETÁ

Resumen. La educación inclusiva se adapta y abraza a todos los niños, niñas, adolescentes y jóvenes, con y sin discapacidad, se adecua a sus necesidades y contextos (económico, preferencia sexual, género, étnico, lingüístico); es un proceso de dirección y respuesta a la diversidad de todos los estudiantes a través de la participación en el aprendizaje. El presente estudio se realizó con el propósito de caracterizar la población estudiantil con discapacidad de instituciones públicas urbanas y rurales del Departamento del Caquetá y su capital Florencia y conocer a través de una revisión documental aquellas herramientas didácticas de enseñanza que le permite al docente potencializar el aprendizaje de los estudiantes con discapacidad física, intelectual, múltiple y psicosocial. Para la caracterización se solicitó a la secretaria de educación municipal y departamental el anexo 6A. Del mismo modo, a través de fuentes electrónicas se realizó una búsqueda literaria sobre los principales estudios que relacionan la práctica docente y las potencialidades de los estudiantes con discapacidad. Los resultados reflejan mayores índices de discapacidad en la población estudiantil con edades entre 11 a 14 años, particularmente en el nivel de educación

básica primaria; con mayor incidencia en el sexo masculino. La discapacidad múltiple, intelectual, física y psicosocial son las más predominantes y puede deberse a algunas particularidades individuales y del entorno; si se tienen en cuenta su diagnóstico clínico, factores bioquímicos, genéticos y variables que inciden directamente en el comportamiento de estos estudiantes; se logra proponer herramientas didácticas que potencializa su aprendizaje.

Palabras claves: Discapacidad, Educación Inclusiva, Formación docente, Prácticas y Programas inclusivos

Introduction

Colombia, a sovereign country located in the northwestern region of South America, is divided into 32 departments, including 1,123 municipalities and 5 districts; it currently has a population of approximately 51,049,000 inhabitants. In the year 2021, 3,974,522 persons with disabilities were registered, equivalent to 8.0% of the total population; among them, 45.3% were men and 54.7% were women, with a higher percentage in adulthood. While in the population with disabilities between 2 and 4 years it represented 4.6% of the total (UN Women, UNICEF, UNFPA, 2021). This prevalence varies according to geographic location: in the municipal capitals there is still a larger population of women with disabilities, while men are in the majority in populated centers and dispersed rural areas (DANE, 2022).

Regarding the Department of Caquetá, with a population of 502,410 inhabitants; among which 250,988 are men (50.0%) and 251,422 women (50.0%) (DNP, 2019), 13,575 persons with disabilities have been reported according to the Registry for the Localization and Characterization of Persons with Disabilities (RLCPDD), which corresponds to 2.73% of the total population (Bonilla et al., 2019); with Florencia being the municipality with the largest number (4,627 inhabitants), since 30% of the total population is concentrated in the capital city.

With regard to education, according to SIMAT (Integrated Enrollment System) records, 728 students with disabilities and exceptional talents were enrolled in the Department's educational establishments, which represented 18% of the total population registered in the educational system (Cuellar et al., 2021). In addition, it was estimated that 37.7% of people with disabilities have a primary school education, while this percentage is 26.9% for people without disabilities, a gap of 10.8 percentage points (p.p), 16.5% of people with disabilities have access to secondary education, 9.2 p.p. less than that of people without disabilities (25.7%). Higher education is represented with 14.3% of people with disabilities compared to 21.0% of people without disabilities, that is, a gap of 6.7 p. p (INCI, 2022), these gaps prevent access to the educational system; and one of the predominant reasons for not attending educational establishments is due to their disability condition.

In order to reduce the gaps that impede the access of students with disabilities to the educational system, the national government through the Ministry of National Education (MEN) and the Presidential Advisory Office have designed the Educational Attention Route, which seeks that all children, adolescents and young people have the opportunity to successfully enter the educational system. Through this program, differences are recognized as a value, which generates equitable learning environments without any type of discrimination.

Likewise, the national government has made alliances with the Ministry of Canada "Global Affairs Canada" and the Norwegian Refugee Council "Save the Children" in order to promote the "Vive la Educación" project, a project that has benefited hundreds of children from public schools in the department, guaranteeing the right to inclusive and quality education for the vulnerable population affected by the armed conflict. This program has an ethno-educational approach, aimed at the Afro-descendant community, allowing the construction of

a more inclusive, relevant and quality education in accordance with the needs, interests and social and cultural context (APC, 2020).

Here it should be specified that inclusive education is that which "adapts to and embraces all students" and adapts to their needs and contexts (economic, sexual preference, gender, ethnic, linguistic, etc.). In a broader sense it is seen as a process of addressing and responding to the diversity of needs of all learners through participation in learning (Ramirez, 2017, Camargo, 2018).

In an inclusive classroom a teacher faces the challenge of instructing students with different cultural and family backgrounds, socioemotional developments, as well as different learning approaches and, therefore; different educational needs, fostering the social well-being of all (Marchesi et al., 2021). In summary, from an inclusive classroom it is possible to enhance the skills and abilities of students with learning difficulties through the implementation of cooperative work, intelligences and socioemotional needs, considering their strengths and not their weaknesses, without the need to transform the children, since they have defined characteristics and the possibility of developing as individuals in a society. In short, what will a teacher require to improve the learning of his or her students and for the school to meet its goals and objectives of educational inclusion? The teacher will require; to be responsible and innovative, able to learn and design their own didactic teaching-learning tools, able to make flexible and make changes in curricular content (Gonzales and Triana, 2018), guarantee the permanence of students in the educational center, in addition to prioritizing the work between school and family.

Speaking of prioritizing the educational needs of students, it is worth highlighting the importance of some institutions that train and educate suitable people capable of instructing and teaching children, adolescents and young people with disabilities. A specific case is the National Institute for the Blind (INCI) which, in agreement with the departmental education secretary, has provided technical assistance to the educational community on the use and application of specialized technologies for blind and low vision people; teacher training in the practical technical use of Braille type printers, Braille line, magnifying glass and management of the JAWS screen reader and MAGIC magnifier, technological resources available at the Vive Digital point in the city of Florencia, which can be used as pedagogical resources for the teaching-learning of students with visual impairment (INCI, 2017). Likewise, it is important to highlight the importance of the "Luis Guanella" Foundation, which houses 130 children and young people with special needs, with severe hearing and cognitive disabilities and cerebral palsy; a foundation that emerged in 2008, due to the definitive closure of the Pilot Center for Special Education, a school that served people with disabilities (Luis Guanella Foundation, 2022).

In relation to the only research published in the last decade in the department of Caquetá on inclusive education, the study on the imaginaries and references that teachers have about the comprehensive educational care of students with disabilities in early childhood in educational institutions in the city of Florencia stands out; where it was evidenced that teachers do not know the current regulations on inclusive education, use few teaching-learning strategies or didactic tools and do not advance innovative organizational processes that allow the student to actively participate in the regular classroom. Therefore, of the 66 teachers surveyed, 59% stated that they were unable to comprehensively serve students with disabilities due to the lack of financial and technological resources, teaching materials and institutional infrastructure (Trujillo, et al; 2012). In another study conducted at the La Salle Educational Institution where the institutional inclusion index of 2.79 was measured taking as a reference the population of students with cognitive disabilities, it was concluded that the institution presents strengths and opportunities

for improvement, that the actions it develops in terms of inclusion are isolated and sporadic (Cubillos and López, 2022).

It is necessary to emphasize that teachers do not feel prepared to provide academic guidance to students with disabilities and that they require professional training to serve this population. However, there are educational establishments such as the Normal Superior, an official institution, which serves about 2,300 students, with the purpose of being trained for teaching at the preschool and elementary school levels. Currently, it advances courses on inclusive education and Flexible Educational Model (MEF), whose purpose is to empower students in training, with orientation in inclusive education, with differential approach (population with learning difficulties, ethnic, affected by violence, minors at social risk), from theoretical, pedagogical and normative foundations; and in the understanding of the conceptual bases of the Escuela Nueva system (Ardila, 2018).

For its part, the Municipal Secretariat of Education has the inclusive education program created for the attention of students with disabilities and exceptional talents according to Decree 366/2009; which regulates the pedagogical support services to this population at the levels, preschool, basic education, high school and middle school (Gámez, 2017). This regional entity provides psycho-pedagogical support in educational institutions where there are children classified as having a permanent disability; however, many teachers state that the Secretary of Education "is limited to making a characterization, but the accompaniment is occasional, they only classify and inquire and do not return".

In accordance with the diagnosis on inclusive education, the Development Plan year 2012-2015 "Prosperity for Florencians", states that; there is a deficient attention for the population with disabilities and exceptional talents that require to be attended in the regular classrooms of the Educational Institutions and teachers who serve as mediators or trainers (Gámez, 2017).

The purpose of this research is to characterize or typify the population of students with disabilities in urban and rural public institutions of the Department of Caquetá, including its capital city Florencia, and to know those inclusive practices (didactic tools or strategies) that allow teachers to enhance the learning of students with physical, intellectual, multiple and psychosocial disabilities.

Method

At the methodological level, this study was directed considering two approaches; 1) quantitative, supported by a non-experimental descriptive and comparative transactional design, 2) qualitative, based on the extraction of documentary information. Through the SAC (Sistema de Atención al Ciudadano) platform, an official letter was sent to the coverage offices of the municipal and departmental education secretariat, with the intention of requesting the databases of students enrolled in the SIMAT (Sistema Integrado de Matrícula), with any condition of disability. In addition, sociodemographic information on the population was requested, such as: municipality of residence, name of the educational institution where they study, level of schooling, age and sex (SAC, 2021).

For data analysis, principal component analysis was performed through multivariate statistics using IBM SPSS Statistics software and InfoStat student version, Excel for graphic design.

Finally, a synthetic analytical review was carried out to learn about inclusive practices aimed at enhancing the learning of students with disabilities, which involved a search of bibliographic information from previous studies extracted from documentary sources, such as academic and scientific databases, graduate theses and institutional repositories.

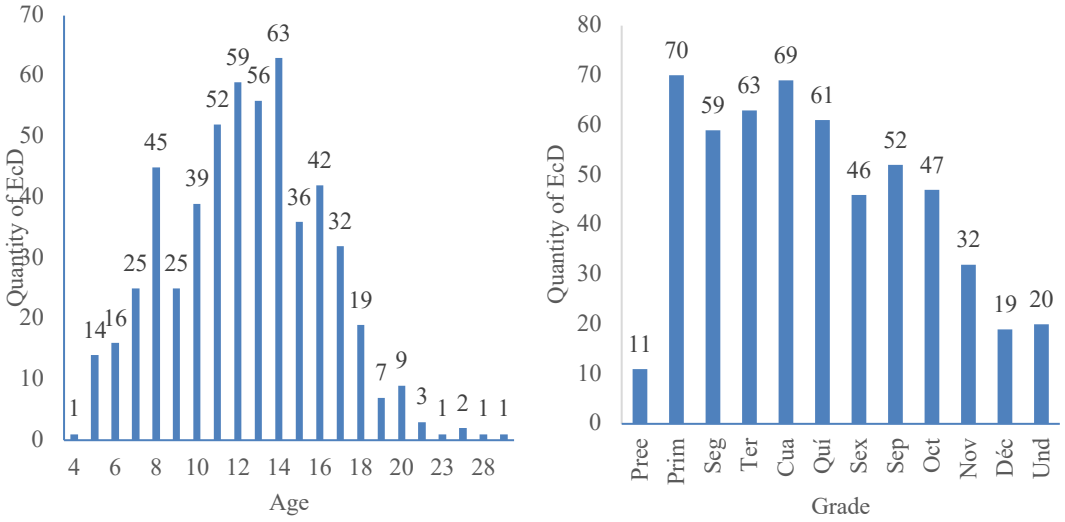
Results

Taking into account the databases provided by the municipal and departmental secretaries of education, students with disabilities (EcD) were characterized or typified according to the following categories indicated in Annex 6A of SIMAT (MEN, 2020); hearing impairment-user of Spanish (SAUC), physical limitation (L.F), multiple disability (D.M), hearing-user of Colombian sign language (SAULSD), psychosocial disability (DPS), systemic disability (D.S), visual disability-irreversible low vision (DVBVI), visual disability-blindness (D.V.C), permanent voice and speech disorder (T.P.V.H), autism spectrum disorder (T.E.A) and deaf blindness (S.C).

For the department of Caquetá, 549 EcD records were obtained (226 in the rural area and 323 in the urban area), represented in females (41%) and males (59%), aged between 4 and 32 years, with the student population aged between 11 and 14 years being the most affected by this type of condition (Figure 1a). The highest rates of disability are represented in elementary school (5 grades: first, second, third, fourth and fifth), with a total of 325 students, followed by junior high school with 174 students (Figure 1b). As for the city of Florencia, 646 cases of EcD were determined, enrolled in 30 urban and rural educational institutions; it should be noted that the municipal secretary did not provide the sociodemographic data of this student population.

Figure 1

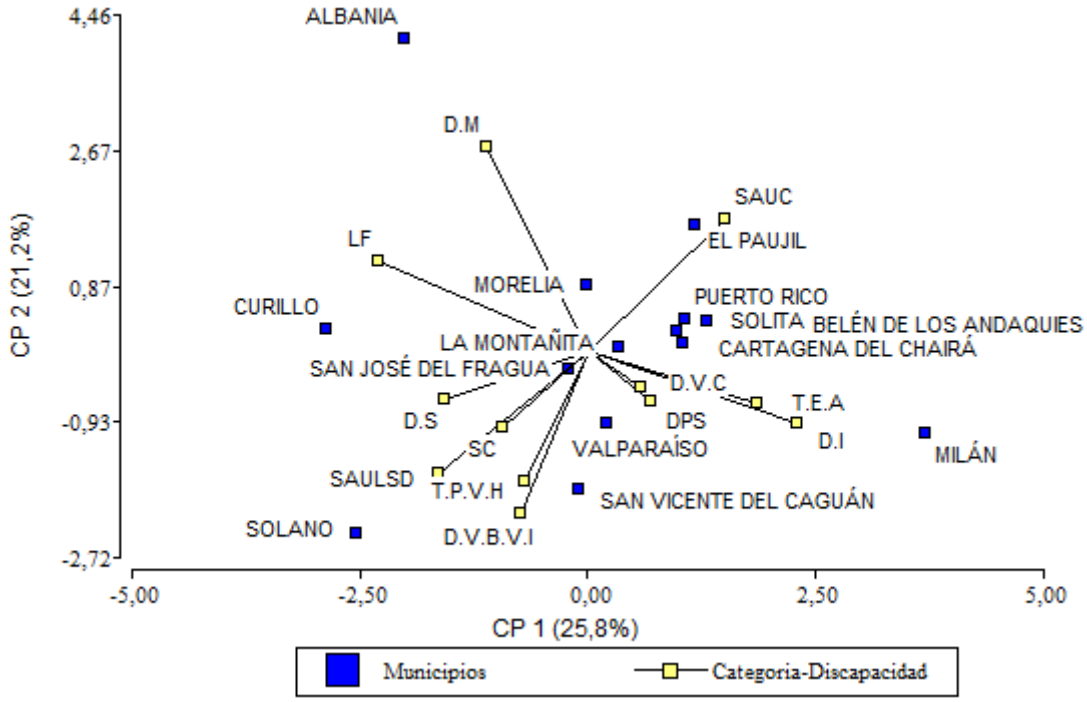
a) Age of students vs. number of EcD and b) Grade or academic level vs. number of EcD



Similarly, a Principal Component Analysis (PCA) was performed on the data matrix considering as classification criteria the municipalities of Caquetá, excluding its capital Florencia, and as quantitative variables, all the disability categories. This analysis explained 47% of the total variability for the two axes (Figure 2); the first principal component (CP1) contributed 25.8% of the total accumulated variability, with a characteristic root greater than unity, the SAUC category presented a higher incidence in the municipalities of Paujil, Puerto Rico, Solita, Belén de los Andaquies and Cartagena de Chaira, separating towards the negative end the disability categories D.S and LF, with a higher incidence in the municipalities of Morelia, Curillo and San José de Fragua. Meanwhile, the second principal component (CP2) explained 21.2% of the total variability, the D.M category, with incidence in the municipality of Albania, separated towards the negative end the categories SAULSD, SC, T.P.V.H, D.V.B.V.I, DPS, D.V.C, T.E.A and D.I; whose strong dominance is present in the municipalities of Solano, Valparaíso, San Vicente del Caguán and Milán.

Figure 2

Principal component analysis of the data matrix relating the municipalities of the department of Caquetá and the disability categories.

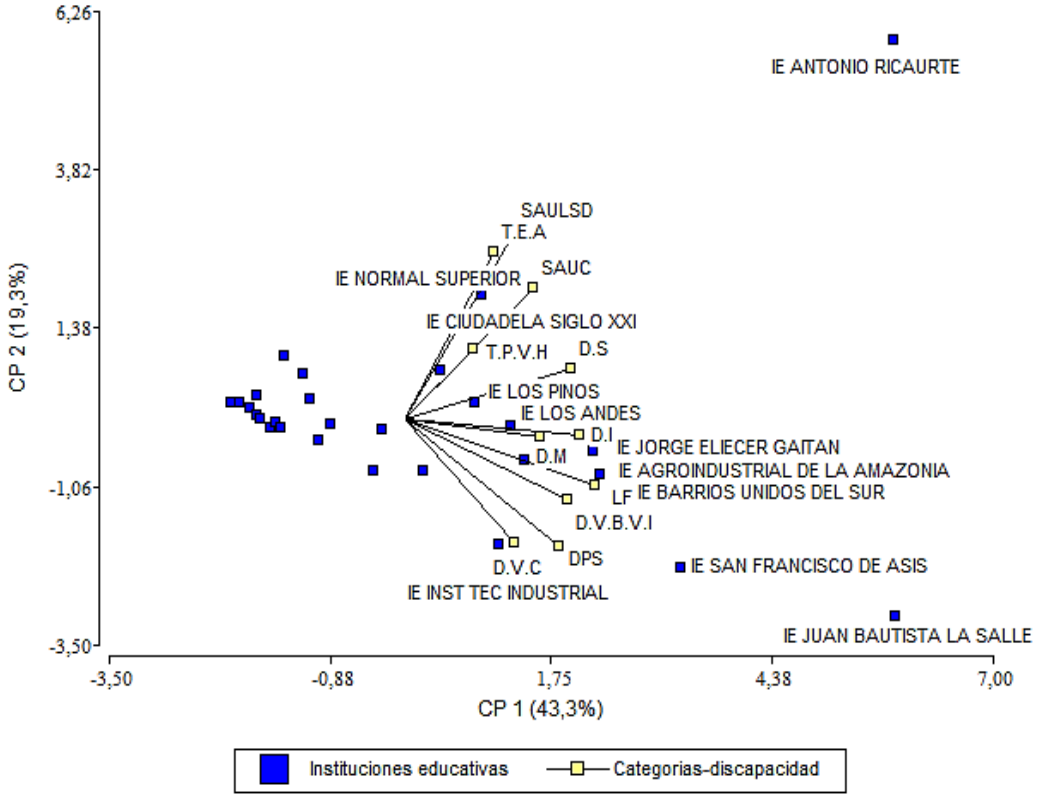


The categories of disability with the greatest predominance in the educational institutions of Caquetá are intellectual disability with a report of 218 students, followed by multiple disabilities with a record of 74 students, then physical limitations with a number of cases of 71 students and finally psychosocial disability with 35 students. Taking into account these disability categories, the educational establishments with the highest number of students enrolled are I.E instituto nacional de promoción social, I.E sagrados corazones, I.E verde amazónico, I.E Dante Alighieri, I.E agroecológico amazónico, I.E agroecológico mixto, I.E Internado rural de solita, I.E don Quijote, I.E Gabriela mistral and I.E Marco Fidel Suarez.

Regarding the PCA performed to the data matrix on the characterization or typification of students with disabilities, the educational institutions of Florencia (urban and rural) where EcD has been enrolled were taken as classification criteria and as quantitative variables, the categories of disability, which explained for the two axes 62.6% of the total variability (Figure 3); the first principal component (CP1) contributed 43.3% of the total accumulated variability, with characteristic root greater than unity, it was evidenced that the categories of disability DS, T.P.V.H, SAUD, T.E.A and SAULDS are closely correlated at the positive end of this component, with a higher incidence in Los Andes school, Los Pinos school, XXI century school and Superior normal school. Meanwhile, the other disability categories such as; DI, D.M, LF, D.V.B.V.I, DPS and D.V.C, are correlated at the negative end of CP2 (19.3% of the total accumulated variability), with higher prevalence in the IE Jorge Eliecer Gaitán, IE agro-industrial de la Amazonia, I.E Barrios Unidos del Sur, IE San Francisco de Asís, I.E Juan Bautista la Salle and the Instituto técnico industrial. In addition, it was found that the largest number of students with multiple disabilities are enrolled in these educational institutions (331 records), followed by intellectual disabilities (90 cases).

Figure 3

Principal component analysis of the data matrix relating the educational institutions of Florencia and the categories of disability.



Discussion and conclusions

Population characterization is a descriptive type of analysis based on a set of quantitative and qualitative data. In this study the characterization was carried out based on the population of students with disabilities, where some sociodemographic variables were considered such as; sex, age, place of study and academic level. The types of disability were considered as categories of analysis, understood as those codifiable qualitative expressions that allowed the analysis and interpretation of the results in a clear and precise manner.

Without further ado, disability can be defined as those negative results of the interaction between individual particularities (activities and participation, organic functions, anatomical structures and environmental barriers (physical, attitudinal, communicational, normative), which prevent their full participation in society (Cuenot, 2018; DANE, 2022). What according to the concept of disability itself, this disability is classified into nine groups: behavior, communication, self-care, locomotion, body disposition, dexterity, situation, aptitude and other activity restrictions (Diaz, 2017).

In the educational context, according to Jerez and Sandoval (2018), in August 2018 the enrollment of students with intellectual-cognitive disability in Colombia represented 53 % of the total enrollment, followed with 7 % psychosocial disability. This national trend is also evident in this study, when characterizing and typifying the population of students with disabilities in urban and rural public institutions in the department of Caquetá, including its

capital city. Of the 1,195 students enrolled, multiple disabilities (33.89%) and intellectual disabilities (25.77%) are the most common impairments, followed by physical disabilities (11.46%) and psychosocial disabilities (7.69%), with a higher incidence in children and adolescents between 8 and 16 years of age, and predominantly in males.

Likewise, this predominance according to age and sex is consistent with the results of Álzate and Perea (2020), in their first population and national bulletin on persons with disabilities, which showed that disability affects mostly men (50.1%), with respect to women (48.9%). Children and adolescents (0 to 14 years old) represent 8% of the total population, while adults represent 39%. According to sex, disability predominates in boys (9.3%) and young men (17.3%), with respect to girls (6.3%) and young women (12.8%). According to the main diagnosis, the most frequent diseases in children, adolescents and young people with disabilities are mental and behavioral disorders; understanding these as symptomatic, psychological development, mood and emotional disorders; mental retardation, schizophrenia that usually appear in childhood and adolescence (Álzate and Perea, 2020).

If we leave aside the statistical data and elaborate a diagnosis of the social reality in which these students live, we could consider some individual and environmental particularities that would provide answers to such statistics. For this reason, it is important to address the possible causes of the highest rates of intellectual, multiple, psychosocial and physical disabilities. Here it is worth mentioning that among the causes of disability are: 1) illness, 2) advanced age and 3) birth (DANE, 2022).

It is worth remembering that the department of Caquetá has witnessed a violent period derived from the armed conflict caused by illegal groups such as the FARC guerrillas, ELN and dissidents, United Self-Defense Forces of Colombia (AUC), Black Eagles and Commandos sin fronteras, which have caused terror, death, disappearances and forced displacement in a war for the control of cocaine corridors. For many farmers in Caquetá, illicit crops represent the product with the best economic demand, in areas where difficult access prevents better income from the sale or marketing of other food products.

The national government has opted for aerial spraying with glyphosate, a strategy designed to control and eliminate coca plantations quickly and safely. However, this strategy has been an eradicator of the environment, health and illicit crops. In terms of health, glyphosate spraying has resulted in fertility consequences, miscarriages and possible future physical and cognitive disabilities and autism in the fetus during pregnancy. With respect to autism findings demonstrated high urinary glyphosate levels (2.25 ug/g-34.4 ug/g creatinine) in triplets with autism and described contaminated or genetically modified foods as possible sources (Shaw et al., 2017). On the other hand, a study showed a significant relationship between a child's exposure to glyphosate in the first year of life and the possibility of intellectual disability (Ehrenstein et al., 2019). The above study coincides with that reported by Garry et al. (2002), who indicated that offspring of farming parents were 3.6 times more likely to have attention deficits compared to offspring of non-farming couples.

Researchers from the Universidad Univalle (Colombia), believe that the resumption of glyphosate spraying by the National Government to eradicate illicit crops is neither convenient nor prudent, since 79 research studies published in indexed scientific journals refer to the harmful effects of glyphosate on the reproductive health of men and women, as a consequence of direct or indirect exposure to this spraying at any stage of life. Harmful effects such as spontaneous and early miscarriages, as well as preterm births during gestational development. But also, several types of malformations, in addition to DNA damage, attention deficit and intellectual disability (Univalle, 2020).

Because of the armed conflict, many children, young people and adolescents suffered strong psychosocial impacts as they were disintegrated from the family nucleus, losing cultural and family practices, moral, socio-cultural and community damage, damage to the notion of justice and the institutions that represent it (Charry, 2016), which, generates stigma, fear and ignorance; limiting full participation on equal terms with others.

According to Álzate and Perea (2020), 15% of people with disabilities stated that they were victims of the armed conflict, and this affects the mental health of the majority of the Colombian population especially in rural areas (Bermúdez and Garavito., 2019). In relation to the problems originated by forced displacement, families may present various types of mental illnesses such as depression, anxiety and post-traumatic stress disorder, all related to exposure to violence (Bermúdez and Garavito, 2019). The most common disorder is post-traumatic stress disorder, followed by depressive and eating disorders. According to Barrera et al. (2017), children and adolescents with PTSD may have a poor neuropsychological profile on tasks of attention, memory, executive function, and emotional regulation.

It can be concluded that the armed conflict has led to the rupture of socio-affective ties and family fragmentation, affecting people's stability, well-being and health.

On the other hand, as described in this study, in the educational institutions of Caquetá and its capital city, Florencia, the highest rates of multiple disabilities, intellectual disabilities, physical and psychosocial limitations predominate; for this reason, it is important to know those inclusive practices that help teachers to enhance student learning.

In relation to multiple disabilities, it is a person who presents a combination of two or more disabilities grouped together, whether physical, sensory, mental or intellectual, with needs of different types, supports and reasonable adjustments, which require the application of activities and work techniques according to their condition. Such disability can exhibit different levels of performance, which allow exposing the performance in life as it is very different from one to another, this depending on the severity and the mix of their disabilities, their possibilities at the functional, communicative, social and learning level (Secretaría de Educación, 2018).

These levels of performance can be high level, determining students with multiple limitations who demonstrate skills in problem solving, capable of leading a normalized life and teaching; medium level, students who present some difficulty in problem solving, leading to a semi-independent life; and low level of performance, determining students who present serious limitations for their communication, in basic aspects and autonomy.

The academic performance of students with multiple disabilities can be heterogeneous and varied; some characteristics to consider: 1) exhibit generalized delays in their psychomotor development, which causes difficulties in movement and mobility; 2) lower than average cognitive capacity; 3) the two previous characteristics cause difficulties in the knowledge and organization of the world around them; 4) have difficulties in expression and communication (verbal and nonverbal), since most students tend to experience the world in different ways, their language is not defined by the common language they know but by gestures, objects, movements, among others; 5) alterations are generated at the sensory level (visual, tactile and auditory); 6) hypersensitivity or hyposensitivity to physical, social or emotional stimuli of the environment; 7) they may present unexpected or unusual emotional reactions, as well as excessive emotional dependence, also stereotypies, self-injury and aggression and 8) dependence for the performance of activities of daily living, difficulty or inability to establish social relationships (SEP, 2011).

Below are some didactic strategies or tools that have been used to carry out the evaluation of a student with multiple disabilities; first, the Bear/Star Project is highlighted: It is

an assessment strategy designed by Maria Bove, a school integration specialist at Castleton University in Vermont (USA), which is applied to children from 0 to 3 years of age; when applied to children from 4 to 12, it is called Project Star (Castillo et al., 2021). This is an activity in which the entire work team meets and shares the information they have about the student. It constitutes the starting point for the elaboration of the student's dynamic functional profile.

Secondly, the Basic Skills Inventory; this tool was designed by Silvia Macotela and Martha Romay, in order to evaluate in a descriptive and individual way children with probable developmental delays, this evaluation is very important for any student, since it allows identifying and describing developmental characteristics. The term "basic skills" refers to the behaviors contained in the inventory, which constitute the basis for the subsequent learning of more complex repertoires, and it is with these behaviors that an educational intervention should begin, using the content to delimit objectives and activities within the planning (Castillo et al., 2021). The Inventory evaluates 726 skills grouped into four areas of child development: basic area that includes cognitive skills related to learning in general; visual-motor coordination area that incorporates skills related to gross and fine body movements; personal-social area that refers to skills related to personal care and independence, as well as socialization skills, both related to adaptive behavior; and communication area that includes expressive and comprehensive language skills.

Finally, the communicative map designed by María Bove is a specific tool for students with disabilities who have not developed an oral or conventional language. For the realization of such a map, it is necessary to understand the definition of communicative functions and forms. Communicative forms refer to the way in which the person communicates what happens to, desires or dislikes him/her. There are seven: context cues, movement cues, object cues, natural gesture cues, associated objects, line drawings, pictures, formal signs/speech, reading and writing. Its elaboration takes two steps: data collection and elaboration of the map itself (Castillo et al., 2021).

For data collection, the communication teacher calls a meeting with different people who live with the student on a daily basis and know him/her, such as the group teacher, the interdisciplinary team, various family members and the evaluator, and will ask them different questions, each of which is represented by a figure. The figures and questions are: who is it and what is it like, pink heart? what things do you like, orange circle? what things don't you like or what are you afraid of pentagon green? what are your wishes, yellow star? what are your dreams, blue cloud?

For example: if the question is what things they like, give each participant three orange circles and they should write in each one the situation, activity, object, food, etc., that they think the student likes the most; afterwards, each participant reads the answers they wrote, sometimes they will agree on the answers, sometimes they will give information that a member does not know, or information that was not considered but that is convenient to do so because it describes the student better. From the answers given, the three answers that have been agreed upon by the greatest number of people and that describe the person are selected among all the participants; it may happen that a response is selected that, although it was not written by the majority of the people gathered, is considered representative of the student. This process is repeated with each question (Castillo et al., 2021).

Intellectual disability or intellectual development disorder is characterized by a low capacity to reason and understand abstract or complex information, which has a negative impact on school learning. It is characterized when the person does not learn quickly, nor remembers things as well as other people of his age, and his ability to relate to others is altered. In addition, this type of disability limits the students' ability to adapt or interact with their environment

(family, cultural and institutional), which can be an obstacle or an enabler. This limitation has a close relationship with other neurodevelopmental disorders, such as autism, motor or sensory disorders (hearing, vision), severe sleep or feeding disorders, epilepsy, anxiety, depression and emotional regulation disorders (Portes, 2020).

The multidimensional assessment is a good didactic strategy that the teacher can use to assess the learning of a student with intellectual disabilities, since it manages to incorporate in this instrument the intellectual abilities, adaptive behavior, physical, mental and social health of the learner (Tapia, 2013). In this way, it is possible to propose appropriate strategies for learning, accompaniment and professional support, which leads to a better quality of life and greater participation in society (Portes, 2020).

For the design of new didactic tools, it is suggested to intervene in the student population with moderate cognitive disabilities; therefore, the aim is to improve their academic performance, train their attention and memory by using adapted psychoeducational strategies, taking into account brain plasticity and multisensory methodologies.

On the other hand, physical disability is classified as sensory, corresponding to the type of people who have lost their visual capacity (blindness or low vision), hearing (mild, medium, moderate, moderate, profound, cophosis), those who have problems when communicating or using language and motor limitation (upper and lower limbs, etc.) (MEN, 2020). To understand in depth this type of disability, it is important to know some functions of the central nervous system, mainly "the brain."

Anatomically, the cerebrum is known to be part of the encephalon, which consists of three main areas: the cerebrum itself, the cerebellum and the brain stem. The brain is located at the end of the spinal cord, inside the skull, it is an organ that centralizes the activity of the nervous system, it is located in the head; near the main sense organs such as vision, hearing, balance, taste and smell. It controls what is thought and felt, what is learned and remembered, even how we move (Hirsch, 2019). In addition, in it resides the ability to dictate the orders that regulate the human body, i.e., movements, sensations (feelings).

The brain is divided into two parts, the left and right hemispheres. Both are necessary and important for coordinating the body's functions, including learning, movement, sensitivity, behavior and the senses, which in turn are composed of the temporal, parietal, frontal and occipital lobes (Huang, 2021)

In terms of frontal lobe functions, the frontal lobe is characterized by its role in the processing of cognitive functions such as planning, coordination, execution and control of behavior. It also makes goal setting, foresight, language articulation and emotion regulation possible (Triglia, 2015). If a student has difficulties in the central part of the frontal lobe, they may become apathetic, inattentive and unmotivated. Thinking slows down and answers to questions are very slow. In addition, this lobe may have seizures or frontal lobe epilepsy, which may be due to abnormalities such as tumors, stroke, infection or traumatic injury. Depression and anxiety are common conditions in people with epilepsy.

Similarly, the parietal lobe, is responsible for processing sensory information coming from all parts of the body, such as touch, temperature sensation, pain and pressure (Beltran, 2018a). Verbal language production, memory development and mathematical reasoning. It also makes movement control possible due to its proximity to the frontal lobe planning centers.

According to the latest research, the parietal lobe is one of the brain regions most involved in the development of consciousness, that is, our "self". This structure contributes enormously in everything that has to do with human consciousness, from the development of moral values to reflection about what is happening around us or our personality (Beltrán,

2018a). This lobe is strongly involved in determining our mood and self-concept. In other words, much of what makes us human is born in this parietal lobe.

Likewise, the occipital lobe; it is in charge of processing visual information (Triglia, 2015). It plays a crucial role in the recognition of objects whose light is projected onto the retina, although by itself it does not have the ability to create coherent images. Occipital lobe disorders can cause visual hallucinations and illusions such as a) visual hallucinations (visual images without external stimulus) and b) visual illusions (distorted perceptions) can take the form of objects that appear larger or smaller than they actually are, objects that lack color or objects that have abnormal color (Huang, 2021).

Finally, the temporal lobe has the functions of generating memory and emotions, processing immediate events in recent and long-term memory, storing and retrieving remote memories, interpreting sounds and images, allowing us to recognize other people and objects, and integrating hearing and speech (Huang, 2021). The auditory cortex is the set of neurons in the temporal lobe specialized in receiving information coming from the sense of hearing in the form of nerve impulses and "decoding" it, i.e., transforming these electrical signals into the perception of sounds as such (Beltran, 2018b). Without this area of the temporal lobe, we would not be able to hear.

William James, father of psychology in the United States, wrote in his book "The energies of men" (1907) that we make "use of only a small part of our possible mental and physical resources."

On the other hand, physical-motor disability involves brain functions that send information to the body through the nerves, about how to move, these are; sensitive, the brain can feel certain changes or internal and external stimuli; integrative, sensitive information is analyzed and stored, then decisions are made and motor, is the response derived from all the stimuli obtained (Secretaria de Atención a Personas con Discapacidad, 2015).

In many school spaces, students can be observed with difficulty walking, some do not move their arms and hands properly, but they can perform various academic activities. Given this circumstance, it is worth asking: what indicators should be taken into account when observing the physical movements of students, in order to determine their possibilities of participation? These movement indicators can be: static positions (student stands on his/her own, maintains balance, someone holds him/her while walking, changes position; from standing to sitting, from sitting to floor, from floor to standing, etc.), ball skills (catching, throwing, kicking), grasping and manipulation (ability of the hand to hold an object, muscle tone and strength in the hands, trunk and head control, ability to release and bilateral development, and perceptual functions, such as visual acuity, visual field and visual tracking (Sáez, 2010).

Students with physical disabilities present high and low levels of self-concept (an individual's idea or image of him/herself). This level of self-concept decreases in students when activities requiring motor competence, such as physical education or athletics and low contingency persist, as they have difficulty differentiating between factors leading to success or failure (Varsamis, & Agaliotis, 2011). Although they are more focused on task accomplishment and self-improvement.

The didactic learning tools that the teacher can use to enhance oral language in students can be: communication boards, product labels, miniature objects, cut-outs, wrappers, stamps or photographs. However, it is recommended to design didactic tools for the learning of children diagnosed with physical disabilities (fine and gross motor skills).

Finally, psychosocial disability is a condition itself of mental or psychological illness caused by a set of behavioral or psychological symptoms that cause distress in a person's social and occupational functioning (Suarez and Chalarca, 2019). Similarly, psychosocial disability is derived from a mental disorder and its inadequate interaction with its environment (educational, social, work and family activities), but is not related to intellectual disability, in which it has biochemical and genetic factors, where symptoms usually present in adolescence (López et al., 2021). Nor is it related to sensory and physical limitations. A person with psychosocial disorder presents great difficulty in knowing themselves, since they do not have clarity of thought and reasoning, they do not realize their real situation (Vega, 2018).

Students with psychosocial difficulties suffer from stigmatization, social attitudes, stereotypes, discrimination, prejudice; derived from social phenomena such as attitudes (cognitive, affective and behavioral), which are differentiated but interrelated and basically refer to how we classify or categorize people or things in terms of good/bad, desirable/undesirable and approachable/rejectable. As for social stigma, it is understood as "a set of attitudes, of negative connotation" towards a minority social group due to their differential condition, which creates in the social consciousness a negative stereotype towards them (Vega, 2018). Within mental illnesses there can coexist different types of alterations, which can be of thinking, emotional, behavioral, perception and interpersonal relationships. These disorders include depression, generalized anxiety, schizophrenia and personality disorder (bipolar obsessive-compulsive), which can affect anyone, regardless of age, race, religion or social class (WHO, 2020).

The limitations faced by people with psychosocial disabilities are not only medical issues, but involve multiple social domains including school, work, family life, social participation, and contacts with social welfare agencies (Lindqvist and Sépulchre 2016). In this study we were unable to find bibliographic information on didactic tools for teaching students with psychosocial disabilities. For the design of these tools, it is suggested to take into account the cultural patterns, social dynamics, intrapersonal and interpersonal intelligences of these students.

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BIBLIOMETRIC ANALYSIS OF THE CORPUS LINGUISTICS APPROACH TERMINOLOGY AND LEXICOLOGY STUDIES IN THE WEB OF SCIENCE CATEGORY *LINGUISTICS*

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Abstract. Corpus linguistics makes it possible to analyze, describe and unveil the functioning of language, as well as to reorient its study based on the exploration of its actual use. The aim of this article is to present a descriptive bibliometric study to identify trends in the implementation of corpus linguistics in the most relevant publications in Terminology and Lexicology in the Linguistics category of the Web of Science (WoS) database between 2012 and 2021. Bibliometric elements and text-mining techniques are used to account for the most relevant authors, the institutions with the most publications and the most productive journals. Indicators of productivity, collaboration and scientific leadership are also described and plotted using the VOSviewer tool. The results show that there has been an exponential increase in the productivity of research based on corpus linguistics in the last decade and that Spain, with the University of Granada, and Belgium, with Ghent University, lead this productivity. It was also possible to determine that the most relevant authors are Hoste, Lefever, Rigouts Terryn, Faber, Rojas and Tercedor-Sánchez, and that the independent journal Terminology leads the number of publications in the area. In addition, through the Tree of Science (ToS) tool, it was possible to determine that automatic term extraction, corpus methodology, frame semantics, and lexicology and terminology work in specialized fields are the areas with the greatest research prospects.
Keywords: Corpus linguistics, Terminology, Lexicology, Bibliometric analysis.

ANÁLISIS BIBLIOMÉTRICO DEL ENFOQUE DE LA LINGÜÍSTICA DE CORPUS EN ESTUDIOS DE TERMINOLOGÍA Y LEXICOLOGÍA EN LA CATEGORÍA *LINGUISTICS* DE WEB OF SCIENCE

Resumen. La lingüística de corpus permite analizar, describir y develar el funcionamiento de la lengua, así como reorientar su estudio a partir de la exploración de su uso real. El objetivo de este artículo es presentar un estudio bibliométrico descriptivo para identificar las tendencias sobre la implementación de la lingüística de corpus en las publicaciones más relevantes en Terminología y Lexicología en la categoría Linguistics de la base de datos Web of Science (WoS) entre 2012 y 2021. Se utilizan elementos bibliométricos y técnicas de minería de texto para identificar los autores más relevantes, las instituciones con más publicaciones y las revistas más productivas. También se describen los indicadores de productividad, colaboración y liderazgo científico y se grafican mediante la herramienta VOSviewer. Los resultados muestran que se ha presentado un aumento exponencial en la productividad de las investigaciones basadas en lingüística de corpus en esta última década y que España, con la Universidad de Granada, y Bélgica, con la Universidad Ghent, lideran dicha productividad. También se determinó que los autores más relevantes son Hoste, Lefever, Rigouts Terryn, Faber, Rojas y Tercedor-Sánchez y que la

revista independiente Terminology encabeza el número de publicaciones en el área. Adicionalmente, al identificar los estudios más actuales mediante la herramienta Tree of Science (ToS), se estableció que la extracción automática de términos, la metodología de corpus, la semántica de marcos y el trabajo de lexicología y terminología en ámbitos de especialidad son algunas de las áreas con mayor perspectiva de investigación.

Palabras clave: Lingüística de corpus, Terminología, Lexicología, Análisis bibliométrico.

Introduction

Corpus linguistics consists of a series of procedures and methods implemented to study the actual use of language from compiled texts and by means of computer technologies. The importance of the development of corpus linguistics lies in the fact that it has the potential to reorient some theories of language, facilitate the elucidation of its features, and provide a more detailed description of its structure, functions and lexical repertoires, among others. Corpus-based studies use data derived from corpora in order to explore theories or hypotheses, especially those already established in the current literature, for the purpose of validating, refuting, or refining them (McEnery and Hardie, 2011).

Disciplines such as Terminology and Lexicology have been closely related to the increased use of the corpus linguistics approach. For years, traditional dictionaries contained made-up examples, without a natural context and were compiled primarily on the basis of intuition and introspection by dictionary compilers (Hanks, 2012). Then, the use of corpora in lexicography changed this situation as corpus analysis offers lexicographers the possibility to build dictionaries based on empirical data and authentic data (Hanks, 2012).

Considering the importance and advantages of the corpus-based approach to unveil the complexities of the study of language and the fact that, to date, there has been no review of the evolution of the relationship between this approach and the areas of Lexicology and Terminology, this bibliometric analysis was developed in order to present the most relevant documents and their contributions in this regard. For this purpose, a search was made in the Web of Science (WoS) database using the *Linguistics* category by means of an equation that included the concepts of interest, which ensures the inclusion of the most important specialized journals and the identification of the articles that deal with the subject matter.

In addition, network analyses were performed to determine research productivity, evolution, and visibility, as well as the scientific activity and impact of the sources. The VOSViewer tool was also used to plot the data obtained. Although the time period is restricted to 10 years, the analysis of the information provides some of the most important sources of data, offers quantitative data and shows behaviors of the subject, so it is hoped that the results presented here will contribute to the orientation of further research in the areas analyzed.

Method

The documents that formed the corpus for the bibliometric analysis were retrieved using the *Linguistics* category of the Web of Science (WoS) database, in a time window between 2012 and 2021. A search was made under the concept of canonical equation, i.e., "that which combines two or more concepts, with at least one of them needing to be represented by two or more synonyms" (Codina, 2020, p. 5).

Thus, the following search equation[1] was established for document extraction: (ling??stica de corpus OR corpus OR metodolog?a? corpus OR corpus linguistics OR corpora OR corpus method*) AND (terminolog?a OR lexicolog?a especializada OR lexicograf?a especializada OR terminograf?a OR terminology OR specialized lexicology OR specialized lexicography OR terminography) in the TOPIC field (*title, abstract, author keywords, and Keywords Plus*) and typologies *Article, Review, Early access, Proceedings papers*.

Table 1 shows the description of the indicators analyzed on the implementation of corpus linguistics in studies in the areas of Terminology and Lexicology.

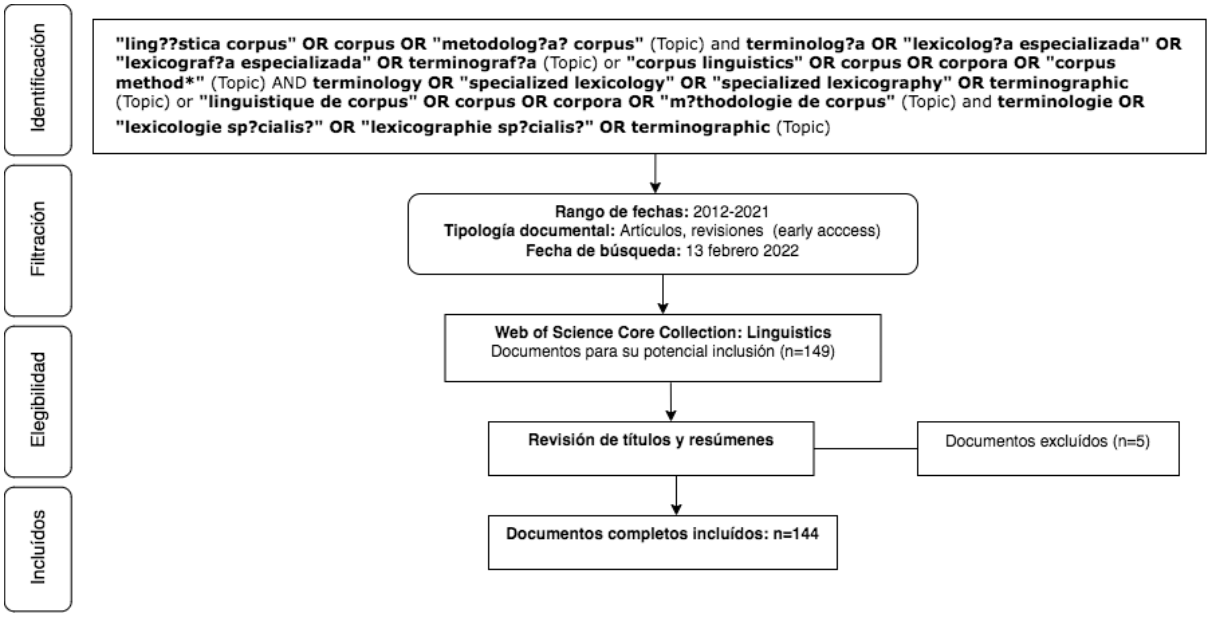
Table 1
Description of the indicators analyzed

Indicator	Description
Behavior of scientific production	Reveals regularities and trends. The Price model was used to evaluate the rate of growth of scientific information in the area of interest.
Productivity of authors and countries	It shows whether a smaller number of authors gathers a larger amount of scientific production. For this purpose, Lotka's law was used, which shows that there is an unequal distribution since most of the articles are concentrated in a small number of highly productive authors, and a negative relationship with respect to their productivity of plus or minus equal to two.
Production by magazines	Establishes the source journals of scientific production and their visibility and impact indicators. The Bradford model is used, which establishes that there is a highly unequal distribution in the production of articles in journals because most of the articles are concentrated in a small number of journals.
Co-authorship network	It consists of a representation of the system that arises from the collaborative relationships between authors researching in a certain area of knowledge.
Collaboration patterns	Indicates how the authors relate to the writing process and the degree of openness of the research.
Scientific leadership	It marks the authors, countries and institutions that lead the participation in research and, therefore, the production of documents.
Keyword network	It shows the names of the main descriptors in the documents reviewed to facilitate the analysis of the thematic focus and research areas from the creation of the clusters.
Research perspectives	Reveals the most recently published papers in the area that allow to determine the future of studies in the area.

Figure 1 shows the selection process that resulted in 144 documents. The variables author, institution, country and keywords were normalized because they are the basis for generating bibliometric indicators. This search strategy made it possible to retrieve 149 documents that underwent a metadata normalization process; 5 documents were eliminated because they did not meet the inclusion criteria of the present study, especially in terms of subject matter (*corpus christi, corpus callosum*, for example).

[1] Truncators or masks were used to broaden the search in case of plurals and accents (example: terminolog?a and the truncator *(asterisk) to broaden the search for the root of a word (example: method*)).

Figure 1
Planning the document search and selection process



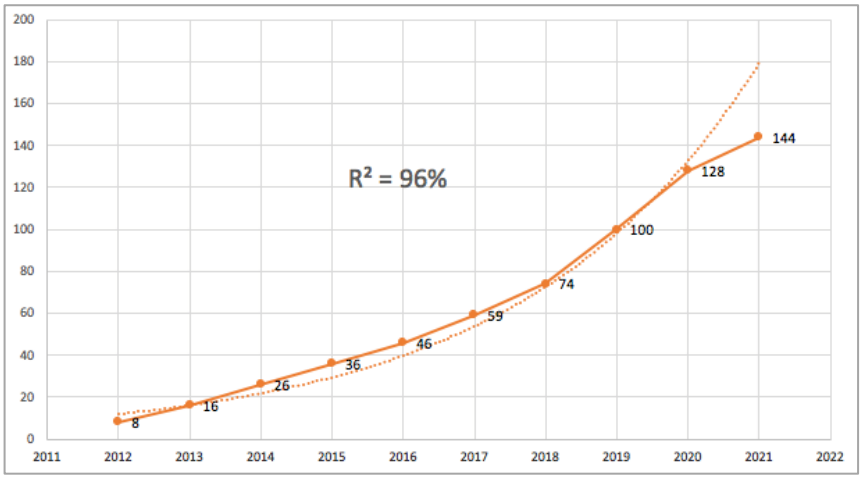
Results

Annual production performance

The cumulative scientific production was determined using Price's exponential model with an average interannual variation rate, i.e. the relative variation compared to the initial value of the variable, of 11% and a goodness-of-fit index, i.e. the discrepancy between the observed values and the values expected in the study model, of 96%.

Figure 2 shows that the subject of interest for this study has an exponential growth trend in terms of publications in the established time period, i.e., 136 between 2012 and 2021.

Figure 2
Cumulative scientific production 2012-2021

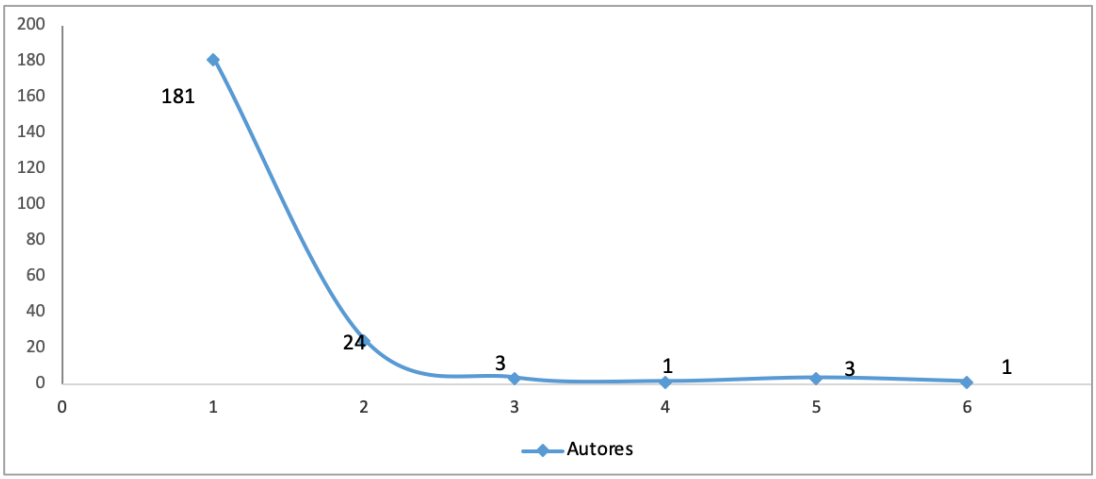


It can be observed that between the intervals from 2012 to 2013 (8 publications in each year), from 2014 to 2016 (10 publications in each year) there was no growth in production. The increase in productivity started to occur in 2017 with 3 more publications, 2018 with 2 more, 2019 with 11 more, and 2020 with 2 more. In contrast, 2021 was the only year whose publications decreased by 12. It was also established that between 2018 and 2019 there was the highest average growth in scientific productivity (73 %), while between 2020 and 2021 there was the lowest (-43 %).

Scientific productivity leadership by author

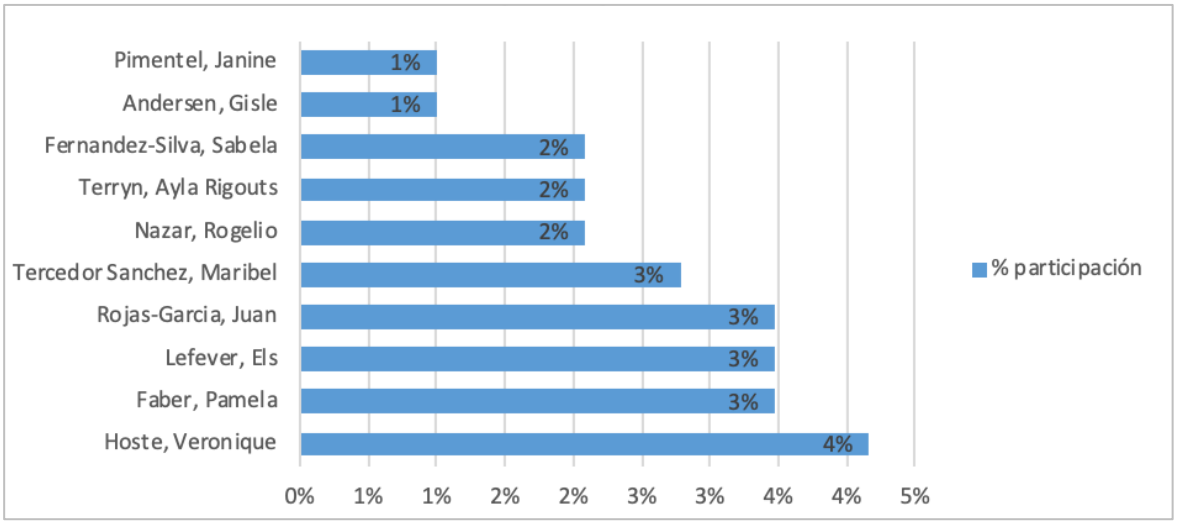
This indicator was obtained by applying Lotka's Law, which describes the quantitative relationship between authors and the frequency of their contributions in a given field over a period of time. Figure 3 shows that the production ratio of the 213 authors involved in the 144 papers retrieved is as follows: 181 authors contributed to 1 paper, 24 authors contributed to 2 papers, 3 authors contributed to 3 papers, 4 authors contributed to 1 paper, 5 authors contributed to 3 papers and 1 author contributed to 6 papers.

Figure 3
Authors' productivity



Thus, with the applied inverse distribution model, the production nuclei are identified and the elite researchers are highlighted through their contributions. It can be established that the 8 most productive authors, with a number greater than 3 publications, participate in 34 documents and compile 23% of the scientific production for the universe of this research, i.e., the closer the authors are to the X axis, the greater the productivity in the subject. Figure 4 shows the percentage of productivity of the most specialized authors in the subject.

Figure 4
Percentage of authors' productivity



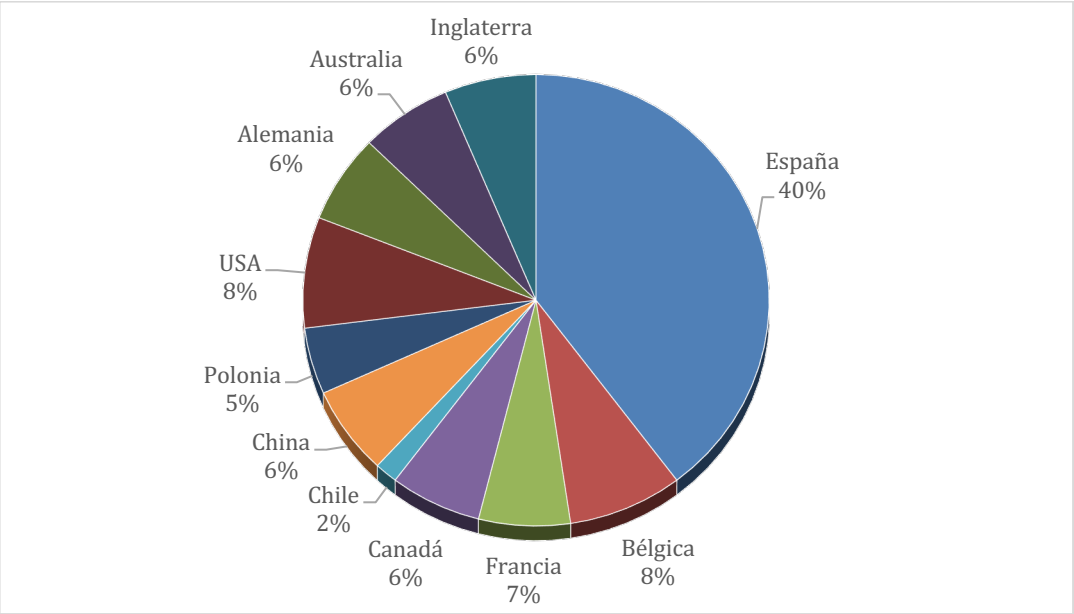
In this case, Veronique Hoste, with contributions in 6 papers and 40 citations, Pamela Faber, with participation in 5 papers and 37 citations, Els Lefever, with participation in 5 papers and 13 citations, Juan Rojas-García with participation in 5 papers and 4 citations and Maribel Tercedor-Sánchez with participation in 4 papers and 13 citations are the authors who lead the productivity with contributions above 3 papers. Rogelio Nazar, Ayla Rigouts Terryn and Sabela Fernández-Silva have participated in 3 documents each, and 9, 2 and 1 citation, respectively.

Scientific productivity leadership by country

Scientific leadership by country is determined by the corresponding author who is the main contact and determines the institutional affiliation and, therefore, the nation to which he/she belongs. This factor also makes it possible to establish the scientific capabilities of a country in the research context. In this study, 25 Spanish and 5 Belgian institutions account for a total of 47% of the productivity in the subject of this analysis.

In addition, the productivity percentage of the countries was identified according to the number of institutions. The prevalence of the English language was also evident with 78.5% of the publications, followed by the Spanish language with 15%. Figure 5 shows the 12 countries contributing more than 3 documents in the area studied.

Figure 5
Percentage of productivity by country according to institutions



With respect to the 144 basic documents of this study, Spain is consolidated as the leading country in productivity with 57 documents published by 25 institutions (40 %), followed by Belgium with 10 documents published by 5 institutions (8 %). This is followed by France with 6 papers published by 4 institutions (7 %), Canada with 5 papers published by 4 institutions (6 %), Chile with 5 papers published by 1 institution (2 %), China with 5 papers published by 4 institutions (6 %), Poland with 5 papers published by 3 institutions (5 %), the US with 5 papers published by 5 institutions (8 %), Germany with 4 papers published by 4 institutions (6 %), Australia with 4 papers published by 4 institutions (6 %) and England with 4 papers published by 4 institutions (6 %).

Scientific productivity leadership by institution

Considering that contemporary universities have three inherent functions: teaching, research and extension, it is important to make visible their leadership in scientific research productivity. This indicator is also determined through the institutional affiliation of the author of the correspondence and allows establishing the scientific capabilities of an institution to make contributions in different areas of the research context. This study found 89 institutions that have published papers related to corpus linguistics. Table 2 presents the institutions with a number of publications greater than 3, the country to which they belong and the number of documents they contribute.

Table 2
Scientific leadership by institution

University	Country	Doc.	%
Granada University	Spain	15	10 %
Ghent University	Belgium	6	4 %
Pontifical Catholic University of Valparaíso	Chile	5	3 %
Córdoba University	Argentina	4	3 %
Polytechnic University of Valencia	Spain	4	3 %
Valladolid University	Spain	4	3 %
Vigo University	Spain	4	3 %
Hong Kong University	China	3	2 %
Paris University	France	3	2 %

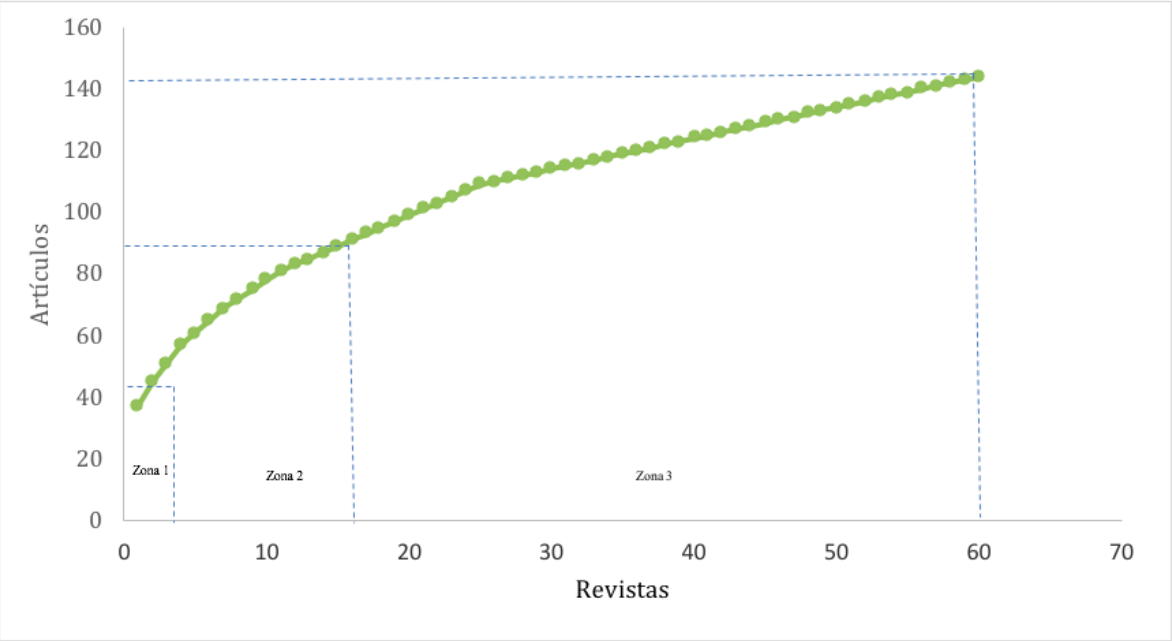
The University of Granada (Spain) leads with 15 published papers (10%), followed by the University of Ghent (Belgium) with 6 published papers (4%). Authors contributing more than 5 papers belong to these two institutions.

This is followed by the Pontificia Universidad Católica de Valparaíso (Chile) with 5 published papers, followed by the Universidad de Córdoba (Argentina), the Universidad Politécnica de Valencia (Spain), the Universidad de Valladolid (Spain), and the Universidad de Vigo (Spain), each with 4 published papers (3% each). They are followed by the University of Hong Kong (China) and the University of Paris (France), each with 3 published papers (2% each). Finally, the remaining 80 institutions contribute 1 or 2 published articles (1%) to the total data.

Scientific productivity leadership by journals

The Bradford dispersion model made it possible to identify the most relevant periodicals and to observe the location of the journals most used by researchers in the topic of interest in the core zone, the intermediate zone or the peripheral zone, which show the productivity of the journals from highest to lowest. Figure 6 shows the logarithmic distribution of the 60 journals that published articles on the subject of interest of this study.

Figure 6
Distribution of magazines by zones according to the Bradford model



The application of the aforementioned model in this analysis made it possible to establish that in Zone 1 (core) there are 2 journals with 45 articles, which account for 31% of the total number of publications in the sample. Meanwhile, in Zone 2 (intermediate) there are 15 journals with 48 published articles (33%) and in Zone 3 (periphery) there are 43 journals with 51 published articles (35%).

Table 3 shows the characteristics of the 2 journals located in Zone 1. These are *Terminology*, published by John Benjamins Publishing Company and *Onomázein*, published by the Pontificia Universidad Católica de Chile. The academic level of the papers published in both journals is guaranteed by the objective review of external international judges, recruited from the international community of specialists.

Table 3
Description of Core Zone magazines

Magazine	Number of documents	% 144	Quartile category: *Linguistics WoS*	JIF 2020	H-index
Terminology	37	26 %	Q2	0.826	25
Onomázein	8	6 %	Q2	0.419	12

According to the Scimago website, *Terminology* is an independent cross-cultural and interdisciplinary journal. It focuses on the discussion of (systematic) solutions, not only to the linguistic problems encountered in Translation, but also, for example, to the (monolingual) problems of ambiguity, reference and development in multidisciplinary communication. In the *Linguistics and Language*category, *Terminology* is currently ranked Q2.

According to the Scimago website, *Onomázein* –Journal of Linguistics, Philology and Translation– welcomes previously unpublished papers originating from scientific research in the different branches of Theoretical and Applied Linguistics, in Classical, Indo-European, Romance and Hispanic Philology, as well as in Translation Theory and Terminology, and relevant studies in indigenous languages. In the *Linguistics and Language* category, *Onomázein* is currently ranked Q2.

Collaboration networks between authors and between institutions

From the 213 authors identified in the 144 documents, those with at least 3 collaborations were selected for the construction of the co-authorship network; this resulted in 8 authors that formed 4 clusters. Next, a co-authorship matrix is constructed in which the times that these top authors worked together are identified.

Figure 7 shows that the red cluster consists of authors Veronique Hoste, Ayla Rigouts Terryn and Els Lefever, linked to Ghent University. The blue cluster is formed by Sabela Fernández (Universidad Católica de Valparaíso) and Maribel Tercedor-Sánchez (Universidad de Granada). The green cluster is formed by Pamela Faber and Juan Rojas-García (University of Granada) and, finally, Rogelio Nazar of the Catholic University of Valparaíso with a solo contribution.

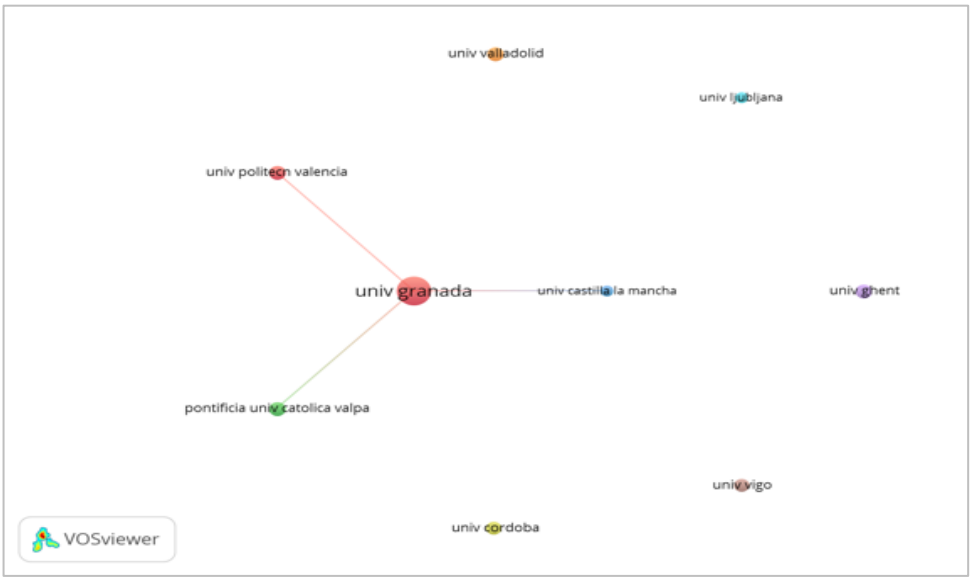
Figure 7
Co-authorship network

Note. minimum bond strength of the items: 0. Of the 213 authors, 8 met the threshold (3 papers); standardization method: association strength; attraction: 1; repulsion: -2; grouping resolution: 1,0.
Result: items: 8; clusters: 4; Links: 5; *Total Link strength*: 15.

Of the 116 institutions participating in the publications of this analysis, 9 were identified by means of a minimum cut-off point of 3 papers per institution (citation was not included) to construct the institutional collaboration network. Figure 9 shows that the University of Granada leads the production of this topic in the *Linguistics* category and, therefore, is established as the point of institutional collaboration with the Universities of Castilla de la Mancha and Valencia, both in Spain, and the Pontificia Universidad Católica de Valparaíso in Chile.

In addition, there was joint participation in 20 documents and leadership of 15 institutions.

Figure 8
Collaboration network between institutions



Note: minimum bond strength of the items: 0. Of the 116 institutions, 9 met the threshold (3 documents); standardization method: *association strength* ; attraction: 4; repulsion: -5; grouping resolution: 1,0
Result: items: 9; clusters: 8; Links: 3.

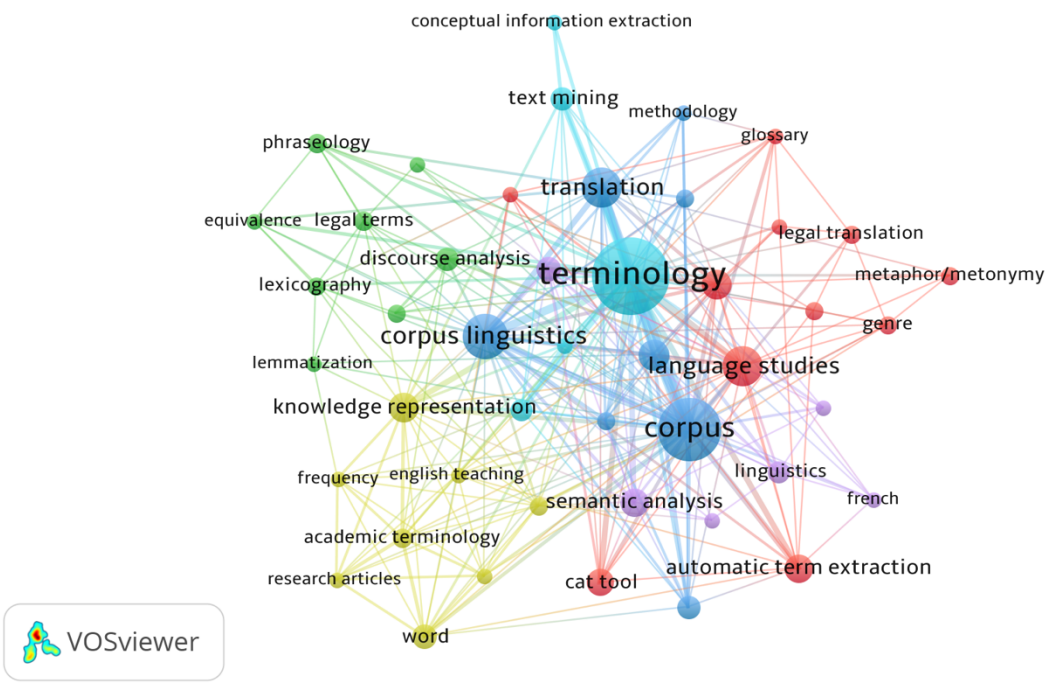
Notably, the article "Pragmatic borrowing" by author Andersen Gisle of the Norwegian School of Economics has the highest number of citations in the entire dataset (45 citations in total). This article explores the notion of pragmatic borrowing, that is, the incorporation of pragmatic and discursive features of a source language into a target language. The study illustrates how pragmatic functions are transferred cross-linguistically, through notions such as functional stability, adaptation, narrowing, broadening and change. It also illustrates the extent of borrowing of set phrases and colloquialisms, focusing especially on expletives, interjections, and English discourse markers that have recently appeared in Norwegian.

Cooccurrence networks

In the sample of 144 articles, 634 keywords were obtained, which were normalized to 453 after creating and applying a list of terms or thesaurus. To simplify the representation of the knowledge structures, only those keywords whose frequency was ≥3 were considered (a lower threshold would have generated a very long list of keywords). Before creating the co-word network, the keywords *named river* and *wine testing notes* were manually removed because they were related to the word corpus, but in a different field than linguistics.

Figure 9 shows the 6 clusters obtained. The interpretation of the map took into account the number of keywords within each thematic group, the number of occurrences of each keyword, their interrelation and their spatial location.

Figure 9
Keyword co-occurrence clusters



Note: minimum bond strength of the items: 0. Of the 634 keywords (author + keyword plus), 453 met the threshold (3 occurrences); normalization method: association strength; attraction: 1; repulsion: -3; grouping resolution: 1,0.

The colors indicate clusters of keywords with some kind of relationship between them according to the association obtained through the VOSviewer program. An analysis was also made of the thematic focus of each cluster based on the concepts conveyed by its key words. Table 4 shows the clusters and the thematic focus of each cluster, their keywords, the number of occurrences.

Table 4
Clusters and thematic approaches

Cluster	Keyword	Occurrences	Thematic focus
Cluster 1. Red	automatic term extraction	10	
	cat tool	9	
	comparable corporate	4	
	español	11	
	genre	4	
	glossary	3	
	language studies	20	Translation
	legal translation	4	
	metaphor/metonymy	4	
	natural language processing	3	
	standardization	3	
Cluster 2. Green	discourse analysis	7	Translation studies
	equivalence	3	
	eu terminology	3	
	legal terms	5	
	lemmatization	3	
	lexicography	4	
	phraseology	5	
	science	4	
Cluster 3. Blue	corpus	49	Specialized translation
	corpus linguistics	25	
	lexicology	12	
	medical terminology	7	
	medical translation	4	
	methodology	3	
	spanish	4	
	translation	20	
Cluster 4. Yellow	academic terminology	5	
	collocation	4	Didactics of languages
	engineering english	3	
	english teaching	3	
	frequency	3	
	knowledge representation	11	
	research articles	3	
	word	8	
Cluster 5. Purple	distributional semantics	3	Terminology
	french	3	
	grammar	3	
	linguistics	6	
	semantic analysis	10	
	term extraction	8	

Cluster 6. Light blue	conceptual information extraction	3	Terminotics
	FunGramKB	6	
	ontology	7	
	terminology	4	
	text mining	7	

Research perspectives

Using the methodology proposed by Robledo, Osorio and López (2014), the retrieved documents were uploaded to the *Tree of Science* (ToS) web platform in order to classify the articles according to their position in the tree, an analogy used by the aforementioned authors to determine the following three groups:

- The root with the theoretical referents of the subject, i.e., the classic authors who laid the foundations in this field of study and who are cited more frequently than the rest of the authors. These articles are dated between 1991 and 2010.
- The trunk with structural items based on the root items, but with a more elaborate theoretical framework. These items have dates between 2012 and 2019.
- The leaves with those articles that show the different current perspectives on the subject, using the findings of the root and stem articles. These items are dated between 2013 and 2021.

Table 5 shows this last category as it is the most relevant for the present study. The leaf articles are also characterized by having as reference the writings that make up the roots and the trunk.

Table 5
Most current articles on the subject

Author	Article
Rojas-García, J. (2021).	Extraction of Terms Semantically Related to Colponyms: Evaluation in a Small Specialized Corpus.
Kwong, OY. (2021).	User-driven assessment of commercial term extractors.
Rojas-García, J. (2020).	Application of Topic Modelling for the Construction of Semantic Frames for Named Rivers.
Ortego-Anton, MT. (2021).	e-DriMe A Spanish-English frame-based e-dictionary about dried meats.
Terryn, AR. (2021).	HAMLET Hybrid Adaptive Machine Learning approach to Extract Terminology.
Unzalu, IZ. (2021).	[en] Current challenges in the development and learning of the oral and written academic registers in Basque.
Polyakova, O. (2021).	An integrated approach to the higher education terminology in Spanish-Russian university texts.
Trigo, ES. (2021).	The terms manifestation (fr) and manifestation (es) in biomedical journal articles: a corpus-based research.
Rodriguez, CIL. (2020).	Predicative frames for the concept SIGN AND SYMPTOM in Spanish Medical Texts.
San Martin, A. (2020).	Present and future of the terminological knowledge base EcoLexicon.

Hoste, V. (2019).	The trade-off between quantity and quality. Comparing a large crawled corpus and a small focused corpus for medical terminology extraction.
Rieder-Bunemann, A. (2019).	Capturing technical terms in spoken CLIL A holistic model for identifying subject-specific vocabulary.
Cardenas, BS. (2019).	Eliciting specialized frames from corpora using argument-structure extraction techniques.
Santos, IG. (2019).	The economy is sick - l'economie est malade. The chronology of the crisis through terminology.
Terryn, AR. (2019).	Validating multilingual hybrid automatic term extraction for search engine optimisation: the use case of EBM-GUIDELINES.
Perinan-Pascual, C. (2018).	A framework of analysis for the evaluation of automatic term extractors.
Ghazzawi, N. (2018).	Automatic extraction of specialized verbal units A comparative study on Arabic, English and French.
Costa, LA. (2018).	Explicit term variation in Brazilian lexicography: proposal for its representation in the micro structure of the Brazilian Lexicography Dictionary.
Perinan-Pascual, C. (2018).	DEXTER: A workbench for automatic term extraction with specialized corpora.
Gagne, AM. (2016).	Opposite relationships in terminology.
Nazar, R. (2016).	Distributional analysis applied to terminology extraction First results in the domain of psychiatry in Spanish.
Hanoulle, S. (2015).	The efficacy of terminology-extraction systems for the translation of documentaries.
Lefever, E. (2014).	HypoTerm Detection of hypernym relations between domain-specific terms in Dutch and English.
Silva, SF. (2013).	The influence of the disciplinary field on terminological variation: A corpus-based study in the interdisciplinary domain of fishing.

Note: Own elaboration.

Once the most recent articles were identified, a simple data mining process was performed using the article titles and a word cloud was created using the Voyant tool. This was done in order to determine the topics that are currently being worked on and that, in turn, lay the groundwork for future research. Figure 10 shows the terms with the highest frequency in each title.

Figure 10
Word cloud from the titles of the articles "leaves"

Note. Source: Voyant tools.

It can be seen that the most relevant topics are related to automatic term extraction dynamics, corpus methodology, frame semantics, and lexicology and terminology work in specialized fields.

Discussion and conclusions

Text mining techniques are highly relevant to academic research because they facilitate the elaboration of a wide range of analyses that allow for a thorough and detailed exploration of textual corpora. In addition, it is important to bear in mind that a bibliometric analysis represents a fundamental tool that provides reliability to the research process, since it makes it possible to investigate the results of previous studies.

All these exploratory processes of previous works, therefore, have become a fundamental part when setting objectives, planning methodologies and proposing research designs, among others, in order to guarantee the relevance of the contributions. Delimiting the information to be extracted, the appropriate procedure and the type of data to be obtained allows the researcher to optimize each step in terms of time and quality.

For these reasons, the combination of data mining techniques with bibliometric elements and the tools used in this study made it possible to establish that corpus linguistics has been consolidated as a fundamental approach in studies in areas such as Terminology, Lexicography, Translation and language teaching, among others. Specialty languages are another area that deserves special mention, since a significant volume of research was found in fields such as medicine, engineering or administration, whose objectives revolve around the resignification, use or standardization of terms. It was also possible to observe that studies involving processes with corpus linguistics had a steady increase between 2012 and 2021, except between 2020 and 2021. This could be attributed to the containment measures adopted worldwide in the face of the COVID-19 pandemic.

As for the results of scientific productivity leadership by author, they were in line with the applied distribution model of Lotka's Law, which establishes an inverse relationship in which a few authors specialize in a field of knowledge and, therefore, concentrate the greatest volume of publications, while many authors will publish very few publications.

It is noteworthy that the results of scientific productivity reflect the coordinated efforts of institutions and academics in the search for interdisciplinary and increasingly detailed descriptions of linguistic phenomena. It was found that the total production is represented in 60 scientific journals with a participation of 213 authors. Although for the purposes of this study the quantitatively most outstanding data are mentioned, it is important to note that, apart from Spain and Belgium, 13 other countries contribute three or more documents to the publications per country.

In terms of productivity by country, Spain justifies its leadership, since the University of Granada is among the top ten; it has also been ranked first in translation and interpretation studies for several years, and has programs for teaching languages such as Portuguese, Italian, Danish, Dutch, Czech, Polish, Romanian, Bulgarian, Russian, Modern Greek, Hebrew, Arabic and Turkish. It also houses the only Russian Center that the Russkiy Mir Foundation maintains in Spain. The University of Granada is one of the best public universities in Spain and is ranked 494th in the QS *Academic Ranking of World Universities* 2023. For its part, Belgium is in second place in this leadership, with Ghent University in the lead. This institution ranks 74th in this list of more than 2500 research institutions worldwide in 2022 and is the highest ranked Belgian university in the *Academic Ranking of World Universities*.

In relation to the leadership of scientific productivity by journals, the present analysis has correspondence with the hypothesis of Bradford (1934), who postulated that most of the articles on a specialized subject could be published by a few journals especially dedicated to that subject, in conjunction with certain frontier journals and other general or dispersion journals (Urbizagástegui Alvarado, 2015). In this case, *Terminology* and *Onomázein* are at the forefront of publications in the area of interest of this analysis.

According to its website, *Terminology* pays special attention to new and developing subject areas such as knowledge representation and transfer, software tools, expert systems and terminology databases. *Terminology* covers general (theory and practice) and specialized fields (LSP), such as Physics, Biomedical Sciences, Technology, Engineering, Humanities, Management, Law, Arts, Business Administration, Commerce, Corporate Identity, Economics, Methodology and any other area where Terminology is essential to improve communication. *Onomázein* is aimed primarily at specialists and is intended to serve as an effective vehicle for scientific exchange among researchers in the linguistic sciences.

One of the already published papers that has similar findings was by Liao and Lei, who in 2017 developed a bibliometric analysis of the WoS SSCI (*Social Science Citation Index*) using the *Linguistics* OR *Language Linguistics* category, between the years 2000 and 2015. Its purpose was to know the number of documents implementing corpus methodology. The results showed that the production of publications related to the corpora had increased considerably during those 15 years. In addition, it was noted that while traditional scientific powers, such as the United States, play a leading role in this area, countries such as China also have an impact in the field. The most important result was related to the fact that corpora have permeated a wide range of research areas in linguistics and have changed, at least in terms of methodology, these areas.

Even when this analysis only includes a ten-year interval, the results obtained through text mining tools and biometric analysis techniques were consistent. Further research could be

developed by increasing the volume of information and using additional tools to expand the results and reveal other trends associated with the topic studied.

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A FLIPED CLASSROOM EXPERIENCE TO ANALYZE LANGUAGE INTERACTION IN A GROUP OF STUDENTS OF ENGLISH AS A FOREIGN LANGUAGE

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Abstract. This paper reports a research project carried out with eighth graders at the Pierre de Fermat School in Bogotá. The main objective was to analyze how this EFL learner highlighted linguistic interaction through a flipped classroom experience in a blended learning environment. The type of research design was action research and the instruments used to collect data were video recordings, students' production tasks in a virtual environment, and a journal. Considering the data gathered, this research attempted to evidence how eighth graders, by participating in activities based on task-based instruction, interacted in the language classroom and beyond it within a virtual environment. The findings suggest that language interaction was noticeable in different and meaningful ways when exposing learners to a blended-flipped scenario, unveiling signals and features that demonstrated students were able to perform a conversation by using different resources with their interlocutors. Negotiation of meaning, social communication as well as learning strategies, real-world contexts and materials, and collaborative work were the most remarkable patterns of interaction found in the context of this research project. The implementation of technology also played an important role which attempts to open a path for further research on the implementation of ICTs in language teaching and learning.

Keywords: Language interaction, blended learning, flipped classroom, EFL learners.

UNA EXPERIENCIA DE AULA INVERTIDA PARA ANALIZAR LA INTERACCIÓN LINGÜÍSTICA EN UN GRUPO DE ESTUDIANTES DE INGLÉS COMO LENGUA EXTRANJERA

Resumen. Este documento reporta un proyecto de investigación llevado a cabo con estudiantes de grado octavo en el colegio Pierre de Fermat en Bogotá. El objetivo principal fue analizar cómo este grupo de estudiantes de inglés como lengua extrajera resaltaban la interacción lingüística a través de una experiencia de aula invertida en un ambiente de aprendizaje semipresencial. El diseño de la investigación fue investigación acción y los instrumentos utilizados para la recolección de datos fueron grabaciones de video, producción de tareas de los estudiantes en el ambiente virtual y un diario. Teniendo en cuenta los datos recogidos, esta investigación intentó evidenciar cómo los estudiantes de octavo grado, al participar en actividades apoyadas en instrucción basada en tareas, interactuaron en el salón de clase y más allá de éste, dentro de un ambiente virtual. Los resultados sugieren que la interacción lingüística se percibió de formas diferentes y significativas cuando se expuso un escenario semipresencial, revelando señales y características que demostraron que los estudiantes eran capaces de llevar a cabo una conversación utilizando diferentes recursos con sus interlocutores. La negociación de significados, las estrategias sociales de comunicación, así como las estrategias de aprendizaje, los contextos y materiales del mundo real, y el trabajo colaborativo fueron los patrones de interacción más notables encontrados en el contexto de este

proyecto de investigación. La implementación de la tecnología también tuvo un papel importante, el cual pretende abrir un camino para futuras investigaciones sobre la implementación de las TIC's en la enseñanza y el aprendizaje.

Palabras clave: Interacción lingüística, aprendizaje semi-presencial, aula invertida, estudiantes de inglés como lengua extranjera.

Introduction

Education in the 21st century is framed around the technological resources students and teachers have at their disposal. Advances in technology have opened possibilities for the educational field and for teaching and learning of foreign languages. Considering these insights and advances, language classrooms are called to the innovation in resources and methodology considering the rapid growth of Information and Communication Technologies (ICT's). That is why, in recent decades, technology has been included and adapted for the educational field. It has also supported somehow the traditional resources of a language classroom such as books, dictionaries, and posts mainly for visual and interactive resources or Multimedia. Language classrooms nowadays are far from what most of us would consider traditional, and thanks to technology, learning a foreign language has been extended beyond a classroom.

However, technology is not a tool that works on its own. The inclusion of technological resources must be combined with relevant methodologies for the teaching and learning process of a foreign language. Technology in the classroom should not simply be used as another one of the resources of a list of materials, but with a pedagogical purpose. That is why, in the context of this research project, technology was articulated within a blended learning environment to offer students a flipped classroom experience to interact in the target language in and beyond the classroom.

The participants of this research proposal are eighth graders at the Pierre de Fermat School in Bogotá. In this school, foreign language lessons have been reduced to a teacher-centered approach and the lack of resources has affected the development of foreign language learning. Furthermore, the inclusion of technology as a piloting stage, in the previous academic year yielded some premises to be analyzed considering students' needs and perceptions of language learning which were stated by them in terms of trying a methodology different from the one used in their current lessons. Certainly, eighth graders' perception of foreign language learning is related to the learning of a language as part of a social practice in which they can participate and communicate.

Eighth graders claimed the inclusion of their reality in their everyday language lessons. Their reality was reflected in the use of technological resources for communicating in a foreign language, which means putting language into function in their own world. Therefore, they considered it was boring and meaningless to work on textbooks with fill-in-the-gaps activities, to translate dialogues into Spanish, or to develop activities through Edmodo disconnected from their current lessons, without feeling engaged in a meaningful conversation or expanding their points of view either in a conversational thread online or in onsite-classes. Contrary to what they used to do beyond the classroom, through websites about videogames, social media trends, and chats, they stated the need to interact in English with other teenagers around the world in order to succeed in different games online or to meet new people who also shared their preferences regarding their favourite videogames, hobbies and topics of interest. That is why, this research implemented flipped learning instruction through a blended learning environment considering the technologies eighth graders were familiar with and their interests so that

students could establish interactions in the foreign language. This implementation aimed to analyze language interaction through a flipped classroom experience.

The theoretical background embraces dimensions corresponding to: language interaction, blended learning as a model for language teaching and learning, and flipped learning instruction in English language teaching.

Interaction implies a collaborative exchange, this process entails active and productive communication between different speakers, which results in social interaction. Duensing, Stickler, Batstone, and Heins (2006, p. 35) contend that "for language learning to take place there also has to be interaction as a social activity […], it is to say, a social reciprocal action involving two or more people". Therefore, interaction is not only a collaborative exchange, but it is also a social action, natural for human beings.

It would be a contradiction then, to learn a language but not to interact with it or using it. Indeed, learners are part of a society that interacts and communicates. The ability to share a language is imbued with knowledge and culture. Then, the classroom needs to reflect as closely as possible outside sociocultural and institutional realities (Yu, 2008, p. 48) so that learners can explore with peers and through language the knowledge and culture present in their immediate contexts.

Interaction also entails some linguistic and cognitive dimensions of the EFL learning process that are implicit in the social ones (Pica, 1996; Pica, 2005). These linguistic and cognitive dimensions are outlined or framed around the context in which necessarily social interaction in communicative language teaching takes place. In the setting of the present project, the contexts that were presented to learners in the blended learning environment to promote language interaction were: the language classroom and the virtual environment at MoodleCloud.

To go further language interaction in the classroom and in regard to eighth graders' interests and needs expressed by themselves in the EFL classroom, which implies for this research project the integration of technological resources and the student's exposure to a virtual environment as part of the language lessons, the next theoretical construct describes blended learning which means students' exposure to on-site classes with virtual environment work.

Blended learning is a type of e-learning that combines instructional modalities, methods, or what we know as face-to-face instruction with online instruction or virtual environments exposure (Bonk and Graham, 2005, p. 3). Thus, blended learning combines the instruction from two historically separate models of teaching and learning: traditional learning methods, which have been around for centuries; and recent 21st learning trends, which have begun to grow and expand in exponential ways as new technologies have expanded the possibilities for communication and interaction through the central role of technology applications.

Several reasons justify why blended learning was chosen as a type of e-learning to carry out this research project. As Marsh (2012) states, teachers should include blended learning in their teaching process because it provides mainly pedagogical richness, access to knowledge, and social interaction.

Indeed, interaction in blended learning environments includes interaction in both, during the on-site class and the virtual environment. Swam (2001, cited in Brindley, Walti and Blaschke, 2009) defines virtual environments as the connection between learners with content, instructors, or peers in a virtual course. Virtual environments offer the opportunity to create a social learning scenario characterized by participation and interaction for both students and teachers. In such a way, interaction leads to collaborative work among learners. Thus,

collaborative learning in a virtual environment can take the form of discussion among the whole class or within smaller groups.

Online technologies such as asynchronous discussion forums provide the opportunity for learners to engage in social interaction by interacting with partners, content and teacher (Gallini and Barron, 2002, cited in Song and McNary, 2011, p. 1). However, previous research contends that the depth of such online interactions is not equivalent to traditional face-to-face class sessions. It is indeed the difference what makes blended learning environments a good option for teachers when mixing resources to promote interaction in and beyond the language classroom.

Precisely, blended learning stands as a tool that helps teachers and students overcome some constraints coped in face-to-face interactions in the language classroom, or as Wang (2010, p. 832) contends "as an alternative to traditional face-to-face instruction and online tasks, blended learning represents an attempt to amplify the strengths of each environment while at the same time minimizing their weaknesses."

Considering this, Lee (2002, p. 17) presents a summary of recent research that points to the benefits of online interactions when combined with face-to-face interaction. She states that the former interaction provides for more equal participation than face-to-face interactions due to time constraints in the language lessons and consequently the availability of technological resources for learners.

Attending to eighth graders' needs at the Pierre de Fermat School and their experience with Edmodo, the virtual environment they were familiar with in their language lessons, both synchronous and asynchronous activities took place while carrying out this research project in a more-elaborated platform at MoodleCloud. In the opinion of Kitade (2008, cited in Wang, 2010, p. 831), asynchronous tasks enable language learners to engage in interactions with a wider range of interlocutors because blended learning environments are not bounded by limits of time or space. This type of interaction moves participation among students because it allows all students an equal opportunity to respond to a topic. Furthermore, the asynchronous features also give learners more time to think and edit as students involved in online discussions create more thoughtful responses because they have more time to process input and reflect on what they want to express.

Hence interaction in blended learning environments is justified in the sense that integrating technology into the flow of the instruction in the classroom provides learners with ample time to foster habits of reflection and articulation of their viewpoints, which can subsequently promote further interaction in class and outside class (Wang, 2010, p. 832).

Based on the language learning needs identification and data obtained through classroom observation, it revealed that eighth graders faced a lack of language learning contextualization from their reality, content isolation, and a deficiency of connection between what they did in the language classroom and what they did in the online environment. Therefore, the last theoretical construct I propose to describe is flipped-classroom instruction.

In accordance with Egbert, Hermand and Lee (2015, p. 3), "in its most basic form, flipped instruction consists of pre-recorded direct-instruction lecture content which is made available online for students to access at home." It means that teachers do not use face-to-face time to deliver instruction; instead, direct instruction is delivered asynchronously (Stephens, n.d., p.4). Meanwhile, students watch and study the content online as homework, learn the content on their own time, and get ready before class, so that class time is spent on other activities related to the topics they studied in advance.

The flipped classroom is also known as "reverse teaching" or "the inverted classroom." In Slomanson's (2014, p. 95) words, a simplified description of a flipped classroom is that the professor's lecture is delivered at home by presenting new content online through out-of-class videos and the student's homework is done in a class where the focus is on activities enhancing the overall learning environment.

It is worth mentioning that, in the context of this research proposal, eighth graders perceived a disconnection between what they did in their face-to-face lessons and what they did online, in their virtual environment. Honeycutt and Glova (2013, p. 19) contend that:

> Flip moves away from being defined as only something that happens in class vs out of class. Instead, we focus on what students are doing to construct knowledge, connect with others, and engage in higher levels of critical thinking and analysis. This applies to both the online and face-to-face environments.

Several authors have conducted studies on the implementation of the flipped classroom model. Certainly, the origins of the flipped classroom model are attributed to the frustrations experienced by a university professor from a private college in Ohio (Baker, 2000, cited in Moran and Young, 2014, p. 164). After noticing that students did not process the information that he delivered by means of PowerPoint slides, but they copied such information verbatim he decided to ask students to read the slides before attending class. According to Moran and Young (2014, p. 164), "his idea, launched in 1995, was to use four key concepts to drive the model."

The first concept was *clarifying*. When students reviewed the material on the slides before class, the professor clarified and explained the concepts at the start of the class. The second concept was *expanding*. Once the professor was explaining the main issues, he expanded on the basic information in the slides. The third and fourth concepts were *applying* and *practice.* Students broke into small groups to apply and practice the concepts.

After his implementation, Professor Baker surveyed his students and found out that "they felt they had learned a great deal from their peers through the collaborative activities. He dubbed the new process the "Classroom Flip" and presented a paper on the idea at a conference in 2000" (Moran and Young, 2014, p. 164).

Simultaneously, another group of university instructors at Miami University in Ohio launched an "inverted classroom" in an attempt to differentiate their microeconomics lessons for different learning styles. The availability of technology was the spark that ignited the idea and allowed the researchers to invert their classroom (Lage and Plat, 2000, cited in Moran and Young, 2014, p. 164). Also, in 2000, a group of researchers revealed the success of the flipped classroom and described the key elements of this model. The authors mentioned that peer-to-peer assessment allowed students to acquire new knowledge and experience and improved their understanding of the subject studied (Brandsford, Brown and Cocking, 2001, cited in Evseeva and Solozhenko, 2015, p. 209).

In 2007, Bergmann and Sams (2012, p. 51), two high school chemistry teachers, began a collaborative effort to teach their content with the aid of screen capture software that allowed them to record lectures and spend class time working one-on-one with students. From their experience, they started to use the concept of *Flipped Mastery* in which "asynchronous learning takes place as students work simultaneously but at different paces on multiple projects."

In a flipped classroom study conducted by Enfield in 2013 (cited in Basal, 2015, p. 30), the author found that this model was effective in helping students learn the content and increased self-efficacy in their ability to learn independently. On the other hand, Muldrow (2013, cited in Evseeva and Solozhenko, 2015, p. 209) wrote an article called "A New Approach to Language Instruction – Flipping the Classroom" sharing her experience of using

flipped classroom technology. The author states that moving from the traditional to the flipped classroom involves great adaptations by the teacher and students.

Although there are numerous studies devoted to the flipped classroom, I could evidence that almost all the published research to date has been conducted in areas such as Science, Technology, Engineering, and Math. Furthermore, most of those studies were conducted at higher education institutions. Regarding foreign language learning and teaching, I found a study conducted by Basal (2015) whose aim was to gain insights into the perceptions of prospective English language teachers at a state university in Turkey on flipped classrooms and to introduce the implementation of a flipped classroom into an English language class. However, there is a lack of studies conducted to address the issue of foreign language interaction in flipped classrooms.

Then, considering the state of the art and the needs expressed by eighth graders in their foreign language lessons, I find the development of the current study valid and purposeful in the school setting of the participants.

Method

Twenty 8th graders in the age range of 13 to 15, were part of this Project. Considering the type of questions and the objectives proposed, the research type selected to carry out this research project is action research. Chamot, Barnhardt and Dirstine (1998, p. 1) define action research as "classroom-based research conducted by teachers to reflect upon and evolve their teaching." The purpose of teacher-research in this methodology is to gain an understanding of teaching and learning within one's classroom and to use that knowledge to increase teaching efficacy and/or student learning.

Action research moves through four stages observing, planning, acting and reflecting (Dawson, 2002, p. 17). I followed the same four stage plan to develop the research procedure below.

In the first stage (observation) I identified the needs of the population, as well as their interests in articulating technological resources in their English lessons. For his stage I designed and implemented a classroom observation format adapted from the scheme proposed by Spada and Fröhlichs' (1995, cited in Zoltán, 2007, p. 182) to observe and have a general idea of what actually happened in the language classes, the content students followed, the materials, and the management of the classroom.

The second stage in the action research cycle is planning. For this stage and having in mind the data collected in the previous stage, I designed an open-ended questionnaire and when I applied it, I could determine that eighth graders find technology useful to communicate and interact with teachers and classmates, to work in pairs and to solve doubts regarding the tasks of the subject. They also stated Edmodo (the website they work on within their language lessons) was useful to share with their teacher and classmates beyond the classroom. Besides, they considered the use of Edmodo as an easier and more fun way to do tasks compared with the ones they develop in their notebooks and textbooks. They valued the readiness and practicality of the application to share content and to explain different subject matters. Most of them want to continue using technologies like Edmodo in their language lessons.

Although eighth graders agreed with the richness and innovation of their language lessons through Edmodo, most of them stated it was difficult to contact their partners to work in groups. Indeed, Edmodo has not the possibility to send private messages to classmates.

Students can contact the teacher privately, but they are not able to send private messages to their classmates. Besides, Edmodo is an educational social network, then, resources such as forums or web-conferencing are not available on that platform. Even though teachers can implement forums or web-conferencing through external links, students expect to find a complete and integrative platform.

The next stage in action research is acting. In this stage, students were exposed to a blended learning environment designed and supported through MoodleCloud by following the insights of flipped instruction. The instruments that were used in this stage were video recordings to gather data about students' interaction in the language classroom, as well as students' intervention registered on the virtual platform at MoodleCloud. Finally, the last stage in the action research cycle is reflecting. For this stage and during the whole process I used a diary.

The research tools described above were analyzed under the Content Analysis approach. As the present project follows an action research cycle, each stage of the action research requires collecting data at a specific moment. Once the data has been collected, the analysis is carried out. Content analysis allows the researcher to analyze qualitative data by systematically working through each transcript or note was taken. Once the researcher finds specific characteristics within the text, she or he can assign codes, which may be numbers or words recurrent in the data collected. Those codes allow the researcher to establish categories that may emerge from the data or may emerge from a list of pre-established categories (Dawson, 2002, p. 118).

Using codes to establish categories was the first step to analyzing and interpreting data. Seedhouse (2005, p. 165) states that "conversation analysis is a methodology for the analysis of naturally-occurring spoken interaction." Then, having in mind that the main interest of this research project focuses on language interaction, the analysis of data gathered to establish the emerging categories underpins the insights of the conversation analysis approach as well, considering the scope of the research on its questions, objectives and theoretical framework.

What conversation analysis offers in the words of Forrester and Reason (2006, p. 44), is the ability to highlight the most common processes involved in talk-in-interaction so that the main interest is not collecting a large number of examples of conversation to make general claims about what is going on, but to focus on the micro-detail of specific conversations. Therefore, when the researcher identifies those micro-details, they can be used to understand the immediate context of interaction and the sense people make out of their everyday lives.

Results

Considering the criteria to analyze data, the emerging categories to respond to the research questions stated in this research proposal are summarized in Table 1 below:

Table 1

Findings and categorization

Main Research Question How does an EFL group of eighth graders at Pierre de Fermat School highlight language interaction through a flipped classroom experience in a blended learning environment?

Sub Questions	Final Categories	Sub-categories
How does language interaction take place when learners are exposed to a flipped classroom setting in a blended learning environment in an EFL group of eighth graders?	a. Learners interact socially and negotiate meaning.	• Learners and teacher asking for clarification. • Learners and teacher confirming their understanding. • Learners and teacher formulating questions and statements to check their interlocutor understanding.
	b. Learners' use social communication strategies in language interaction.	• Learners using paraphrase in order to communicate a desired word or concept. • Learners and teacher's interaction mediated by the use of their native language and non-verbal communication.
	c. Learning strategies used by learners in the process of language interaction.	• Self-correction and peer-correction as monitoring techniques to interact in the target language. • Learners using repetition as a cognitive technique for organizing ideas.
How does an EFL group of eighth graders move their interaction through tasks designed in a flipped classroom experiment through a blended learning environment?	d. Learners interact in the target language thinking of a real-world context.	• Learners' language interaction through role plays and simulations. • Learners' interaction mediated by the use of visual aids and realia.
	e. Learners' interaction as collaborative work.	• Learners appealing for assistance. • Learners and teacher offering help when interacting in the Foreign Language.

	f. Learners' interaction increases with contents of their interest.	• Learners communicate and link content with their own experiences.

Note. Adapted from Dawson (2002).

Learners interact socially and negotiate meaning.

The category *social interaction and negotiation of meaning* was the first that emerged to answer the first research sub-question which had to do with how language interaction takes place when learners are exposed to a flipped classroom setting in a blended learning environment in an EFL group of eighth graders at the Pierre de Fermat School.

In the first place, social interaction is conceived by Chen, Caropeso, and Hsu (2008, p. 4) as "a dynamic, changing sequence of social actions between individual groups who modify their actions and reactions due to the actions by their interaction partners." When interacting in a foreign language, those actions and reactions are activated in the process of understanding and being understood by an interlocutor. Several actions and reactions may emerge because of keeping social contact or a connection between people and groups who participate in a dynamic exchange.

Then, considering social interaction as the activation of actions and reactions between people and groups who communicate with each other, the first action observed in eighth graders when interacting in the target language was the negotiation of meaning.

Negotiation of meaning is a feature underpinning language interaction and is described by Yufrizal (2001, p. 63) as "a series of activities conducted by addressor and addressee to make themselves understand and be understood by their interlocutors." Therefore, negotiation of meaning is an activity through which L2 learners and interlocutors work together in order to reach a mutual comprehension of the message. Certainly, one of the most characteristic features of the negotiation of meaning is that it alters the structure of interaction between two or more interlocutors as they engage in discourse (Pica, 1994, p. 518).

Negotiation of meaning was evident in the process of language interaction when exposing eighth graders to a blended-flipped classroom. The following excerpts taken from the video recordings in the language classroom illustrate how each one of the utterances in eighth graders' interaction can serve as features of negotiation of meaning (Pica, Doughty, and Young, 1986, p. 125).

The first sub-category that emerged from the first category was *learners and teacher asking for clarification*. Clarification request is one of the features highlighted by Pica et al. (1986, p. 125) in the process of meaning negotiation. The author contends that clarification requests are moves by which one speaker seeks assistance in understanding the other speaker's preceding utterance. When asking for clarification, the addressee can use the statements "I don't understand, please repeat, what?" as well as the use of rising intonation. Excerpt 1 taken from the video recordings in the language classroom while students were participating in a task evidenced how a student asked for clarification from the teacher in the explanation of the information gap task; and how a student asked her partner for clarification at the same time:

Excerpt 1: A student looking for clarification to develop the task

S1: What is 'devices connect through it'?

S2: Devices… you talk of the devices?

T: You have to look this part of your sheet.

S1: What?

T: This part of your sheet (pointing out to the piece of paper). Why are you asking about the devices? You have to ask her about the story of the invention.

S1: I don't understand. T: No tienes que leer lo que ya tienes. Tú necesitas una información que ella tiene.

S1: Ah!... What is the history of the bulb?

The second sub-category that emerged was *learners and teacher confirming their understanding*. The second feature of negotiation of meaning has to do with confirmation checks. They are moves by which one speaker seeks confirmation of the other's preceding message (Pica et al., 1986, p. 125). There are several ways of confirming understanding in the process of negotiation of meaning: through repetition, rising intonation, nodding, or saying "yes". The next excerpt, taken from the language classroom includes evidence on how eighth graders seek to confirm their understanding when interacting with the teacher and classmates in a blended-flipped classroom by repeating all or part of the message:

Excerpt 2: A student repeating part of the message

S1: How? ¿La tercera sería tiempo en el que se utilizó el invento?

T: (Teacher shakes her head)

S1: No?

T: It's related to the time people spend using that device…time

S1: Tiempo

T: Yes… people spend using that device… how much time… the question is how much time people or how long people spend using that device.

S2: People typically spend 4 or 8 hours using it per day.

The last sub-category was *learners and teacher formulating questions and statements to check their interlocutor understanding*. The third feature of meaning negotiation is comprehension checks. Comprehension or understanding checks are moves through which one speaker attempts to determine whether the other speaker has got and understood a preceding message (Pica et al., 1986, p. 126). There are no specific ways for doing comprehension checks since it depends on the context and content in which the negotiation of meaning takes place. In the current study, comprehension checks are evident by the means of statements such as "Did you understand?", "Do you know…?", and What is the meaning of?"

Learners use social communication strategies in language interaction.

Communicative strategies have been defined by several authors from different perspectives. For example, Brown (1994, cited in Wei, 2011, p. 12) looks at communication strategies from the perspective of error resources while Færch and Kasper (1983, cited in Wei, 2011, p. 12) perceive communication strategies from a psychological approach. On the other hand, Tarone (1980, cited in Wei, 2011, p. 12) studies communicative strategies from the interactional perspective. Then, considering the focus on interaction in this research project, it is the last perspective that will guide and support the emerging findings on explaining how language interaction took place when eighth graders were exposed to a flipped classroom model in a blended learning environment.

Learners using paraphrase in order to communicate a desired word or concept is the first sub-category. The paraphrase strategy means that the learner replaces an L2 item by

describing or exemplifying it. Tarone (1980, cited in Wei, 2011, p. 18) contends that paraphrasing includes three subcategories: approximation, word coinage, and circumlocution. When exposing eighth graders to a blended-flipped classroom, two subcategories of paraphrasing emerged in the process of language interaction. The first one was approximation and the second one was word coinage. The following excerpts taken from the language classroom illustrate these subcategories:

Excerpt 3: A student uses the word "pollution" instead of "pollute" (approximation)

S1: Now, my friend Luis Vital.

S2: Good morning, Esteban. The majority people pollution the air… in the Antartida is people to make bonfire, smoke and recycle.

T: they don't recycle.

S2: (he nods)

Excerpt 4: A student creates the word "deports" due to its similarity with the Spanish word "deportes" (word coinage)

T: yeah, but in your words, what could be the treatment?

S1: The treatment of?

T: of obesity

S1: Mmm

T: Imagine I am fat

S1: oh, yeah

T: and you are the doctor

S1: eat much vegetables and do deport.

Learners' and teacher's interaction is mediated using their native language.

and non-verbal communication corresponds to the second sub-category. Following the interactional perspective provided by Tarone (1980, cited in Wei, 2011, p. 18), she includes the use of the students' L1 and the non-verbal communication within a broader category called "transfer." Transfer is one of the three main types of communicative strategies (Tarone, 1980, cited in Wei, 2011, p. 19). It can be evidenced through four elements: literal translation, language switch, appeal for assistance, and mime.

When exposing eighth graders to a blended-flipped classroom two elements were predominant: the use of their native language and non-verbal communication. In the context of this research and considering eighth graders' level of proficiency in the target language, they resorted to their native language because they had not developed the necessary skills yet to keep a conversation entirely in English.

On the other hand, evidence on non-verbal language were not exclusive of the language classroom. The virtual environment at MoodleCloud presented students with a variety of icons that could serve as non-verbal language. Besides, in their written tasks I could evidence learners replace sounds and non-verbal actions with written words so that they could enrich their dialogues.

Learning strategies used by learners in the process of language interaction

Language learning strategies are used by learners to complete a given activity in a language lesson. As for Kinoshita (2003, p. 1), "recognizing that there is a task to complete or

a problem to solve […] language learners will use whatever metacognitive, cognitive or social/affective strategies they possess to attend to the language-learning activity." In the context of this research proposal, two learning strategies were remarkable when exposing learners to a blended-flipped classroom. The first one was the metacognitive strategy monitoring and the second one was the cognitive strategy repetition.

Self-correction and peer-correction as monitoring techniques applied by learners to interact in the target language emerged as the first sub-category. While learners interacted in the target language, video recordings evidence how they corrected themselves when errors emerged, and in turn, those errors were sometimes highlighted and corrected by their peers. That is to say, self-correction and peer-correction took place in the process of language interaction while they monitored the development of the different language tasks in which they participated.

Learners using repetition as a cognitive technique for organizing ideas correspond to the second sub-category. Learners do not only use repetition as a signal to negotiate meaning when asking for clarification or confirming understanding. Repetition was also used by eighth graders in the blended-flipped classroom as a technique for organizing their ideas.

Learners interact in the target language thinking of a real-world context

This category was the first that emerged to answer the second research sub-question which had to do with how eighth graders move their interaction through tasks designed in a flipped classroom experiment through a blended learning environment. When exposing eighth graders to the blended-flipped classroom, they had the opportunity to gather information during the pre-task stage in the virtual environment at MoodleCloud. During this information-gathering process, they chose the resources they had an interest in and read to develop their knowledge. Yet, during the while and post-tasks stages, learners presented their tasks using the materials, resources, and methodologies of their preference. In the development of those tasks, students framed the topics within real-world contexts by means of role-plays and simulations within an environment enriched with visual aids and realia.

Learners' interaction as collaborative work

This category corresponds to the second one to answer research sub-question number two. During the development of the tasks, students evidenced a central role in interaction that not only involved asking and offering help but implied a collaborative attitude. Eighth graders recognized in their role that the teacher was not the center of the process, but that they can find support in their classmates and be active participants of their own language learning.

Learner's interaction increases with the contents of their interest

One of the purposes of including a flipped learning environment was to make students' interaction expand from the physical language classroom to the virtual environment. More exactly, the virtual environment at MoodleCloud sought students' involvement regarding the several proposed topics and the resources to interact with content such as reading texts and videos as well as to extend students' participation by making a linkage between the topic and their own experiences, by making the contents of the language classroom flexible and extensible. Such flexibility allowed me to choose the topics from the syllabus which were relevant to the learners in order to promote language interaction.

In the students' new and central role, their participation increased significantly, and the content of the tasks created a medium for communicating and linking content with their own experiences. When students felt identified with the contents their participation increased and it contributed to building a language community where they could share their opinions, perceptions, and own experiences.

Discussion and conclusions

Taking into account the main research question stated in this Project which dealt with how an EFL group of eighth graders at the Pierre de Fermat School highlight language interaction through a flipped classroom experience in a blended learning environment, I found learners' interaction emerged thanks to the tasks and resources proposed which resulted as a vehicle to determine how language interaction took place and how it moved in a blended-flipped scenario.

The reasons that justify the use of the flipped model in the context of this research to analyze how language interaction was highlighted by eighth graders are tackled by Honeycutt and Glova (2013, p. 20). They analyze and evaluate the benefits of both settings: the language classroom and the virtual environment. In accordance with the authors, the challenges and benefits of teaching and learning with technology are undeniable. However, "there is something special about the learning experiences teachers share with their students in the face-to-face classroom. The face-to-face learning experience just cannot be replicated, yet many of us keep trying to recreate it with technology." Then, the idea of flipping a classroom is far from replicating language classroom experiences in a virtual scenario. Instead, "we should try to find the technological tools that allow us to adapt the strategies we use in our face-to-face classes to engage with and connect our students in the online environment, just in a different way" (Honeycutt and Glova, 2013, p. 21).

To embrace flipped classrooms, according to Bart (2013, p. 18), "include the ability to provide a better learning experience for students, greater availability of technologies that support the model and positive results from initial trials." This author reports some of the greatest faculty advantages of flipped classrooms which were evidenced in this project. Some of them are more classroom activity, classroom discussion, collaboration, the ability to adjust instruction styles on a per-student basis, and better students' performance.

As the focus of this research project was on language interaction, according to the findings it occurred when exposing eighth graders to a blended-flipped scenario in different and meaningful ways. They interacted to negotiate meaning and such interaction unveiled many signals and features, that despite the learners' proficiency level in the target language, demonstrated they were able to sustain a conversation by using different resources with their interlocutors.

Although at the beginning I was really concerned with the use of the L1 when learners interacted, when analyzing data, it turned out that L1, or students' mother tongue was a resource that did not prevail with the interaction in the target language. Conversely, the use of the learners' native language was support for students when they did not have the ability to use English to communicate.

Another important aspect found in learners' interaction was the use of non-verbal communication for interacting. The non-verbal language was as significant as written and spoken pieces of language. They demonstrated how learners felt and how they reacted toward the content studied in both the language classroom and the virtual environment at MoodleCloud.

One of the advantages of working in a blended-flipped scenario in the current study was that time constraints were reduced, and classroom management time was better distributed. In the observation stage as students worked with textbooks, reviewing in-class activities or homework was sometimes time-consuming and purposeless. In contrast, while eighth graders were participating in the different tasks proposed under the flipped model, they had the chance to use the language to communicate in the context of the task. Such a communicative process led them to use communicative and learning strategies to get feedback from their peers and

from the teacher. In the same way, they realized they could correct themselves when errors appeared.

Time deployed ineffectively was only one of the shortcomings evidenced during the classroom observation stage in this action research project. Another remarkable fact had to do with the topics of the tasks that were delimited by the contents in the book which were far from students' reality and at the same time, those contents were scarcely shared by the students' activities in a virtual scenario.

With the implementation of a blended-flipped setting, students moved their interaction in the target language by thinking of a real-world context. When presenting their tasks, they used role plays, simulation, visual aids, and realia to represent and expose the topics they dealt with within a delimited context of real life. Language interaction, in this research project, did not occur because of the integration of productive and receptive skills but, because from the beginning of the proposal, it focused on tasks. The products students studied and produced were useful to provide a setting that served several purposes in the context of this research project: to engage learners in the process of language interaction in and beyond the language classroom, to establish a linkage among relevant content and resources with their immediate context so that they can establish a sustainable communicative process.

When students interact with the contents of their interest, they assume an active role in language interaction. I found in this study that the flipped classroom model allowed learners to shift their roles. This finding is supported by Bart (2013, p. 18) who contends that "the flipped classroom model is critical in shifting our educational approach from a passive one to an active one that better prepares students by engaging them in the [content and] material."

Language interaction should be treated and enriched in the language classroom having in mind that language teaching and learning involves communicating, participating, and discussing. Learners in the setting of this research proposal faced language lessons delivered with repetitive drills and traditional materials. That is why such a perspective of language learning and teaching allowed me to take the risk to propose a change from the traditional English language lessons into lessons oriented to be more communicative and meaningful for learners.

On the other hand, language interaction unveils communicative processes that make each classroom interaction among learners-learners, learners-teacher, and learners-content unique and valuable for the features one can find in naturally occurring talk-in interactions. Having in mind that interaction is a huge matter to be analyzed and studied in detail, the data gathered in this research project corresponds to the way learners did and said in the task-based instruction tasks in the blended-flipped environment.

More features and patterns might be included in the context of this research proposal. However, five task-based lessons delivered in the blended-flipped environment were not enough for achieving such a complete analysis. Some factors such as time delimited for data collection as well as students' proficiency in the target language contribute to delimiting the research proposal findings in order to focus only on two important factors, which are my main inquiries: how eighth graders' interaction took place when exposing them to a flipped classroom setting in a blended learning environment and how they moved their interactions through tasks designed in a flipped classroom experiment.

That is why the finding of this research project attempt to open a pathway for further research on language interaction. For example, one aspect that comes out for other teacher researchers is a feature of language learning known as "interlanguage." The context of this research proposal, as well as its findings, can portray a vehicle for making research focusing on

student interlanguage to identify and analyze within the conversational analysis approach how learners manipulate interlanguage in creative, complex, and more target-like ways in language interaction when including a blended-flipped scenario.

Although the flipped classroom model is not new by itself, it is worth remembering that as a model of instruction of blended learning, it involves the use of technology tools that are constantly evolving. Therefore, as the flipped classroom becomes more popular in language learning, new tools may emerge to support the out-of-class portion of the curriculum. In particular, the ongoing development of powerful mobile devices may put a wider range of rich, educational resources into the hands of students, at times and places that may be most convenient for them. It would be interesting to analyze interaction with the inclusion of those mobile apps resources.

Further research is also suggested based on the possibility of conducting a research proposal based on the frame constructed for carrying out this project in order to analyze interaction just focused on virtual environments or from any other resources from the web or from online learning. It may also be viable to conduct a research proposal in a blended-flipped scenario with a pedagogical implementation focused on content-based or project-based instruction.

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IDENTIFICATION, IMPLEMENTATION AND EVALUATION OF GENERIC COMPETENCES IN THE CURRICULUM OF THE MIXED AND NON-SCHOOL DEGREE AT THE UNIVERSIDAD DEL VALLE DE MÉXICO

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Abstract. The general objective of this research was to identify, implement and evaluate the new generic competences by 2025-2030, within the framework of the general curricular update of the plans and degree programs in mixed and non-school modality of the Universidad del Valle de México. The research design is based on the action research model, providing information that guides decision-making and change processes. The research approach was qualitative in conjunction with quantitative research. The sample data were the students enrolled in the new curricular model per school year in the mixed and non-school modality during the 2020 and 2021 period, as a result of the development of work to identify the generic competences to be innovated, derived from internal educational research and supported by an external consulting group that carried out interviews and group participatory techniques, the results of which allowed the redesign of the generic competencies for the new institutional Educational Model that are part of the new curricular model; accompanied by an innovative model of instructional design for the operation of the subjects 100% online, developing rubrics to evaluate the achievement of the mastery levels of the proposed competencies. In conclusion, the implementation and operation of a new curricular model has been achieved with new and innovative generic competencies that will strengthen the graduation profile of students who graduated in the second half of this decade.

Keywords: curriculum, professional skills, lifelong learning

IDENTIFICACIÓN, IMPLEMENTACIÓN Y EVALUACIÓN DE LAS COMPETENCIAS GENÉRICAS EN EL CURRÍCULO DE LAS LICENCIATURA MIXTA Y NO ESCOLARIZADA EN LA UNIVERSIDAD DEL VALLE DE MÉXICO

Resumen. El objetivo general de esta investigación fue identificar, implementar y evaluar las nuevas competencias genéricas hacia el 2025–2030, dentro del marco de la actualización general curricular de los planes y programas de licenciatura en modalidad mixta y no escolarizada de la Universidad del Valle de México. El diseño de la

investigación se basa en modelo de investigación acción, aportando información que guíe la toma de decisiones y los procesos de cambio. El enfoque de la investigación fue cualitativo en conjunto con la investigación cuantitativa. Los datos muestrales fueron los alumnos inscritos en nuevo modelo curricular por ciclo escolar en la modalidad mixta y no escolarizada durante el periodo 2020 y 2021, como resultado del desarrollo de trabajo de identificación de las competencias genéricas a innovar, derivadas de una investigación educativa interna y apoyados con un grupo consultor externo que llevó a cabo entrevistas y técnicas participativas grupales, cuyos resultados permitieron el rediseño de las competencias genéricas para el nuevo Modelo Educativo institucional que forman parte del nuevo modelo curricular; acompañadas con un innovador modelo de diseño instruccional para la operación de las asignaturas 100% en línea, desarrollando rúbricas para evaluar el logro de los niveles de dominio de las competencias propuestas. Como conclusión, se ha logrado la implementación y operación de un nuevo modelo curricular con nuevas e innovadoras competencias genéricas que fortalecerán el perfil de egreso de los estudiantes egresados en la segunda mitad de esta década.

Palabras clave: currículo, habilidades profesionales, competencias para toda la vida

Introduction

The phenomenon of generic competencies, also known as soft competencies or in the English term, *long life learning* , have taken great relevance since the beginning of the century, because although technological advances have created an endless need for technical disciplinary competencies with great changes, there are competencies that regardless of these technological advances, remain constant in their general definitions, but adapted in organizations to the great challenges of the future: leadership, communication, emotional intelligence, digital literacy and others have currently taken on great relevance.

What is important about these competencies is that by developing them, they not only meet labor needs, but also act in the personal spheres of individuals, both in intrapersonal situations and in family and social situations, improving the individual as a person and, as a consequence, improving the society in which he/she lives.

It is here where universities, in addition to ensuring the development of basic or disciplinary competencies, are also committed to developing generic competencies in their students in order to fully form the graduate in their graduate profile of the study plans that will allow them to be more competitive in the personal, social and labor spheres.

This approach to this type of competencies has had great moments at the beginning of this century with the work of *Tuning* Europe or in the second decade of this century with the work of *Tuning* Latin America, which have tried to linearize and standardize the frame of reference of generic competencies, up to the interest of researchers and academics in this phenomenon, this is the case of the work of Villa and Poblete or Díaz Barriga in Mexico, great exponents of the available research, not only in the conceptual part, but in an integral way, including the management and evaluation of competencies.

This research work, has gone hand in hand with the general updating of the undergraduate curricula at the Universidad del Valle de México, allowing to clarify step by step the paths to follow for the curricular redesign from the planning of the educational project during 2019 to achieve the operation and evaluation of the professional skills subjects that contain the generic competencies mentioned during 2020 and 2021.

In this case and due to the application of the research at the Universidad del Valle de México, the methodology to be used followed the principles of qualitative and quantitative research methodology; qualitative from the vision of working with the methodology of action

research and through collaborative group sessions along with the analysis of internal and external documents and quantitative, by analyzing the information generated by the learning platforms called LMS, in this case Blackboard SaaS, which generates a series of data automatically that can be analyzed through general tools such as excel to more sophisticated *software*.

The starting constraints were the time in which curricular changes are implemented in private educational institutions, the pandemic of COVID 19 that came to generate new challenges since 2020 and that apparently will leave new educational realities, the changes in the political environment in Mexico that impacted the changes also in the Ministry of Public Education and in the publication of a new General Law of Higher Education that will surely also modify the agreements 17/11/17 and 18/18/18 under which the actions of higher education institutions were alienated and finally, the speed with which technological change is advancing in humanity where the most constant thing is change itself.

Objectives

The general objective of this research was to identify, implement and evaluate the new generic competencies towards 2025-2030, within the framework of the general curricular update of the undergraduate plans and programs in mixed and non-school-based modality at the Universidad del Valle de México.

Specific objectives:

- Identify from the diagnosis of the current curriculum related to the competencies of the current Educational Model
- Determine the generic competencies that will prevail as an institutional objective in 2025-2030 for the competitiveness of graduates
- Integrate the selected generic competencies in the updating of the institutional Educational Model
- To specify the generic competencies previously indicated in the updated Institutional Educational Model in the curriculum of the updated mixed and non-school curricula
- Determine the correct instructional design of subjects that should be designed to be more effective in the achievement of competencies
- Ensure the correct operation of multicampus curricula with curricular products
- Propose the generic competencies evaluation model according to the reality and characteristics of the institution

Method

For this research, from its preponderant qualitative characteristic, the design called action research has been selected; a description of this design by Sandín (2003) is given below.

The research approach is mixed, qualitative because it contains the following characteristics (Hernandez, Fernandez and Baptista, 2010): explores phenomena in depth; it is basically conducted in natural environments; meanings are extracted from the data; it is not based entirely on statistics and qualitative because it states hypotheses, dependent and independent variables contrasting hypotheses.

The nature of the study will be predominantly qualitative, based on two strategies: the first, documentary analysis of the main future trends related to competencies, and the second

strategy will be to analyze the current status of the subject nationally and internationally, which will be carried out by an external consulting group in order to avoid a possible bias derived from the so-called workshop blindness. In general, calls were made with students and employers in Mexico City as a representative entity of the national educational offer, and digital diaries were made with students in Guadalajara and Monterrey. In addition, two working sessions were held with focus groups, to which the most influential and experienced academics in the institution were invited. Finally, it was complemented with the ethnographic methodology of surveys in Mexico City, Monterrey and Guadalajara and focus groups with applicants and parents.

For the quantitative data, we intend to use statistics as a tool to cross-reference the information variables generated by the reports generated by the learning platform called *Blackboard* and also the information generated by the automated rubrics that will be designed in the instructional design of the corresponding online course.

Finally, within the bibliographic method, the documentary analysis technique will be used and as an instrument the design of tables and matrices will be used to observe and clarify the trends related to generic competencies.

The process is inductive, because particular phenomena are analyzed and investigated to obtain general conclusions; recurrent, since the curriculum design cycle is a continuum with several stages within the process; it analyzes multiple subjective realities; it has no linear sequence, because, during the research itself, new situations are encountered that lead to rethinking the reality that was perceived at the beginning, returning or advancing along the initial path indicated or even adapting new investigative paths.

The scope of the research will be descriptive, according to its characteristics, it is mentioned (Hernández, 2010) that these studies seek to specify the properties, characteristics and profiles of people, groups, communities, processes, objects or any other phenomenon that is subjected to analysis.

The working hypothesis will be the updating of the subjects of the curricular area of professional skills will comprehensively develop the generic competencies for the graduation of students in blended and non-school-based programs that are considered necessary for the present decade.

The population will consider the enrolled students of the mixed and non-schooled bachelor's degrees at the Universidad del Valle de México, as a reference point to 2020-2021, we have the following data:

- 13,347 students in co-educational and non-schooled undergraduate programs
- +24 years
- 95% work and study
- Seeking a degree to improve their working conditions
- Average socioeconomic level
- Upon graduation, 80% in less than two years obtain a change in their level of employment and income
- Attend two or three days a week of classes at night or during the day, but on weekends

The sampling element are students of the Universidad del Valle de México who are enrolled in the undergraduate level, the type of sampling will be probabilistic and the sample will be selected by sampling units (Hernandez, Fernandez, and Baptista, 2010) called groups or sections in which are listed the students enrolled in a mixed or non-school bachelor's degree of the new UVM 2020 model in the courses corresponding to subjects of the curricular area of

professional skills in the non-school and mixed modality in a given school cycle in Module A in our educational platform.

In this sense, the minimum sample presents an acceptable error of 5%, taking into account that we do not have the estimated percentage of the previous sample, taking 50%; in addition, a confidence level of 95% is desired.

Results

Determination of cross-cutting generic competencies for all undergraduate curricula in mixed and non-school modalities

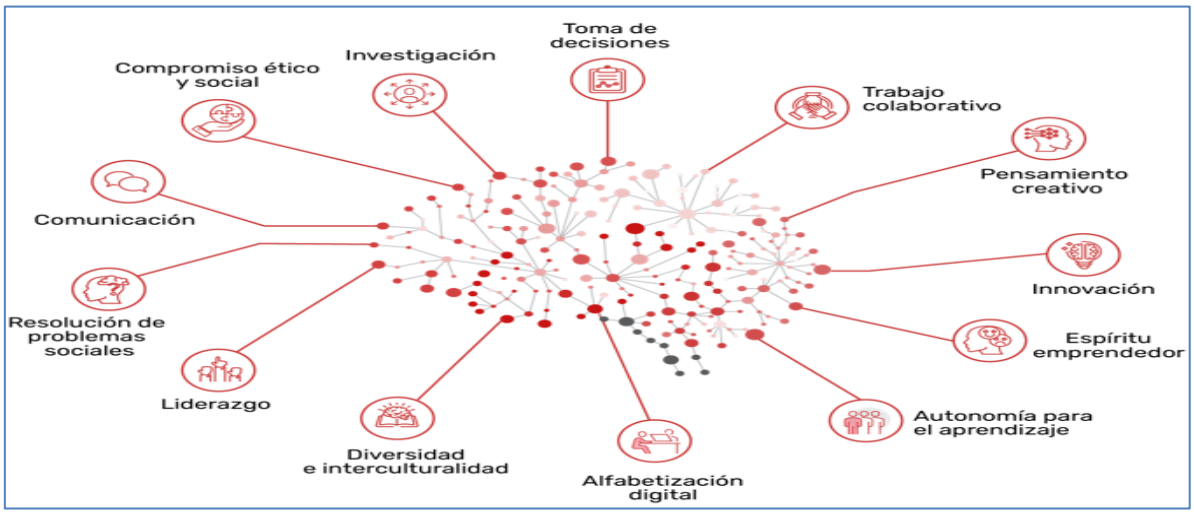
Thirteen generic competencies of the general graduate profile of UVM students were determined. The following is a conceptualization of each of the generic competencies that will be part of the new UVM 2021 Educational Model:

1. Digital literacy
2. Innovation
3. Creative thinking
4. Collaborative work
5. Diversity and Interculturality
6. Social problem solving
7. Ethical and social commitment
8. Decision making
9. Entrepreneurship
10. Communication
11. Leadership
12. Autonomy for learning
13. Research

All generic competencies are part of the update of the new UVM 2021 Educational Model (see Figure 1):

Figure 1

Generic competencies in the new Educational Model UVM 2021



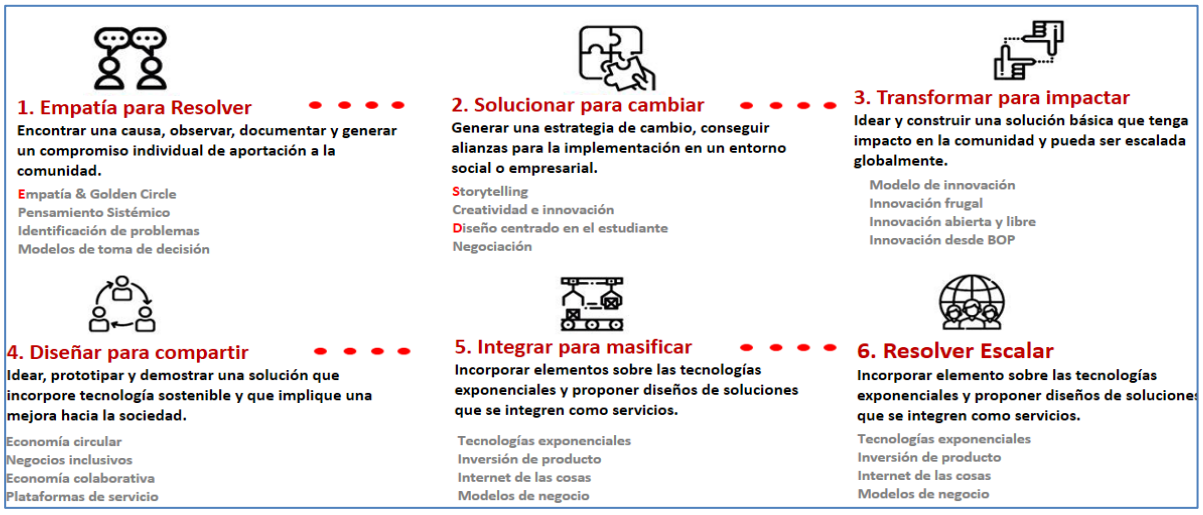
Note. Taken from Modelo Educativo 2021, Universidad del Valle de México.

Insertion of innovative generic competencies into the new curricular model through the curricular area of professional skills

Six of the nine subjects, called Ilab UVM, are presented below (see Figure 2).

Figure 2

Ilab UVM subjects and their agile-like methodologies and tools



Note. Taken from Modelo Educativo 2021, Universidad del Valle de México.

Subsequently, they were inserted in each of the plans in series from the second to the seventh cycle, as shown in a curriculum map (see Figure 3).

Figure 3

Curriculum Bachelor's Degree in Business Administration, mixed modality

Note. Taken from the institutional WEB page of the Universidad del Valle de México https://uvm.mx/oferta-academica/licenciaturas-ingenierias/negocios/licenciatura-en-administracion.

The procedures were carried out before the Ministry of Public Education to obtain the Official Student Records of Validity and commercial materials were developed for the new model (see Figure 4) were developed (see Figure 4).

Figure 4

Institutional Video new curricular model UVM (2020)

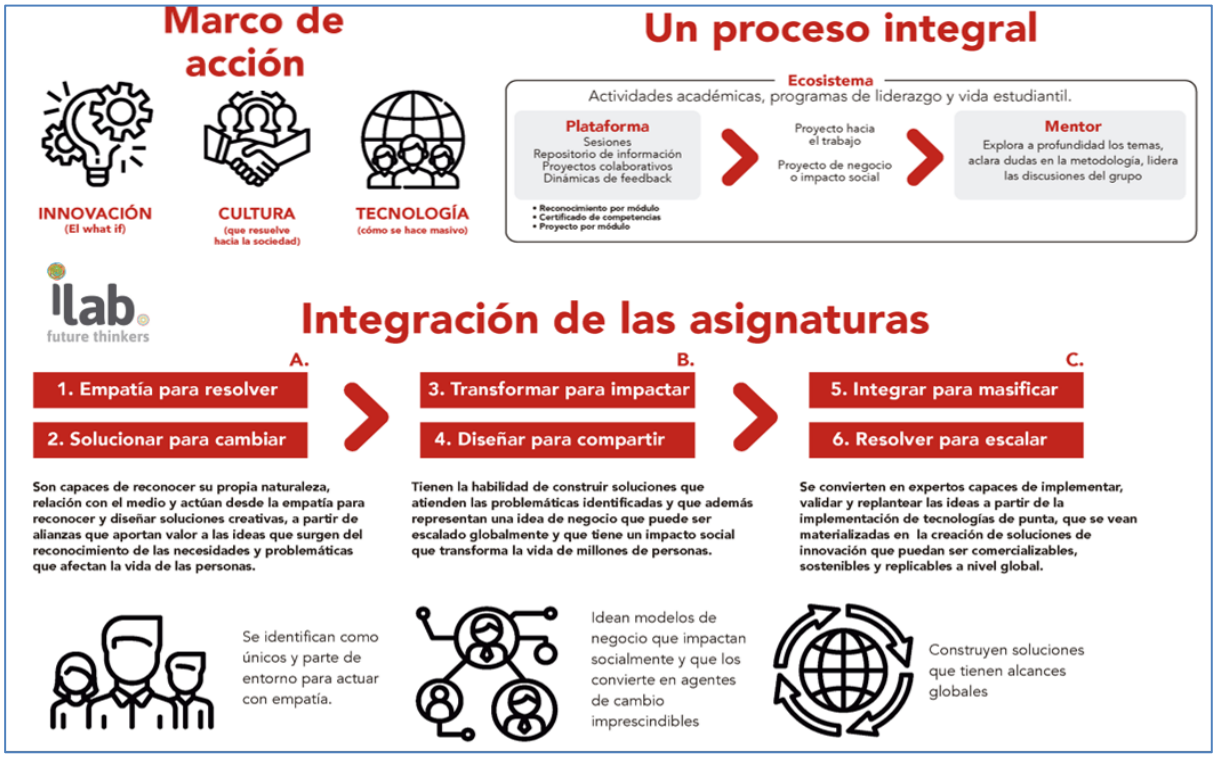
Note. Taken from the institutional WEB page of the Universidad del Valle de México https://uvm.mx/la-uvm/nuevo-modelo-educativo.

Innovation in the curricular design of subjects Ilab UVM

The instructional design of the online subjects was carried out by the team of UVM content designers and the academic partner Ilab, with the purpose of inserting the previously established teaching methodologies and gathering the digital resources to achieve the learning objective of each subject. (See figure 5).

Figure 5

Integration of the 6 Ilab UVM professional skills courses

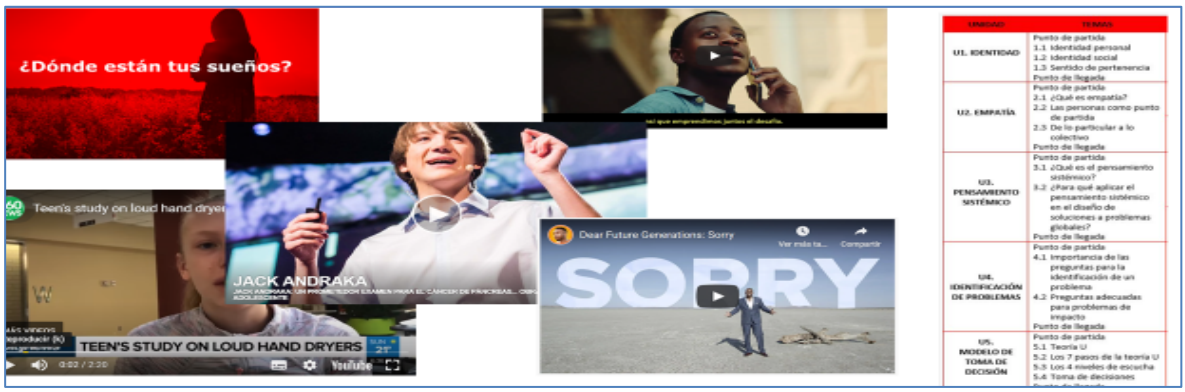


Note. taken from Castro, R. (2021). Direction of Curricular Design and Innovation, Universidad del Valle de México, Mexico City.

The following is an example of one of the thirteen instructional designs designed to strengthen didactics during the teaching of Ilab UVM subjects (See Figure 6):

Figure 6

Subject 1 Ilab UVM Empathy to Solve

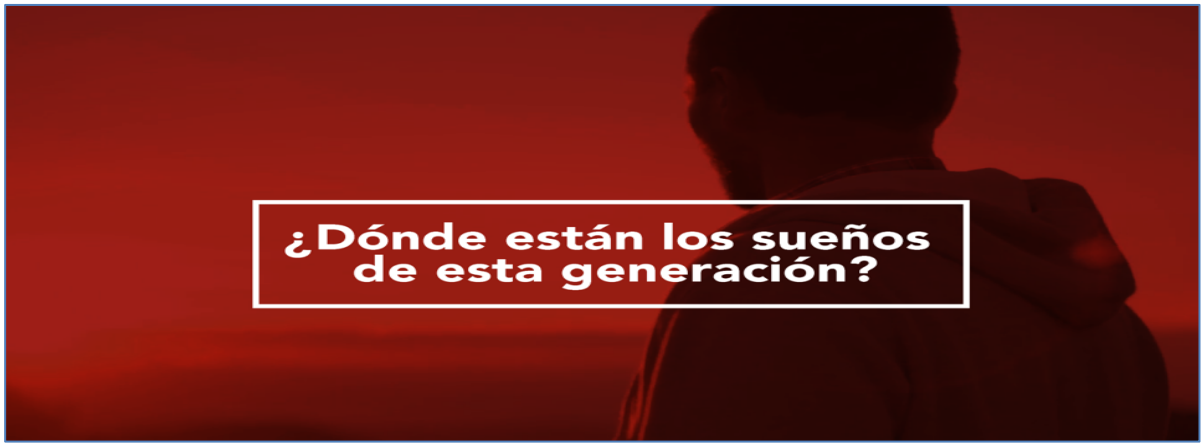


Note. taken from documents in the educational platform of the Universidad del Valle de México.

Each of the six subjects was developed from an instructional model that wanted to be innovative and disruptive, for example, in the first subject called. In the initial part of the course he is questioned about his life and career expectations and even if the career he has chosen is really the one that will lead him to be an agent of social change in the future (see Figure 7).

Figure 7

Introduction to the course Empathy to Solve Ilab UVM



Note: taken from elements of Instructional Design for online courses Ilab UVM (2020). Universidad del Valle de México. Mexico City.

Data analysis 2020-2021 Ilab subjects

The following are the results related to the number of students enrolled since the implementation of the subjects of the new curricular model in the Ilab UVM subjects, according to the total number of students from 2020 to 2021 according to their curricular progress. Starting in C1 2020, the first UVM I lab students began with the subject Empathy to Solve, and as the four-month cycles progressed, they increased geometrically until reaching the sixth cycle in which all 6 subjects are already operating and where the graph shows that the first subject Empathy to Solve represents 48% of the total enrollment (see Table 1).

Table 1

Total number of students and % Cycle 1 2020 and Cycle 3 2021

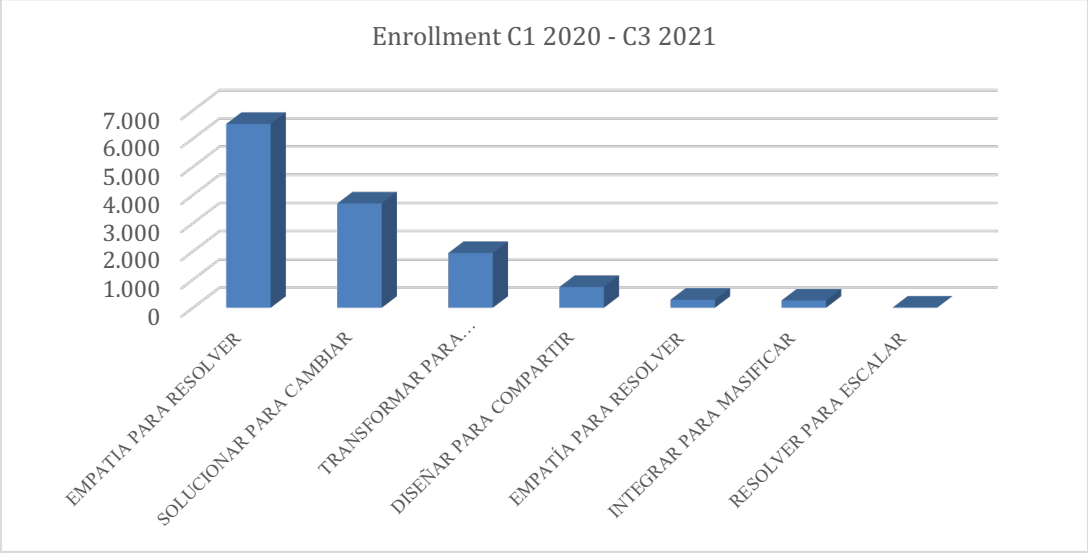
SUBJECT	REGISTRATION	%
Empathy to solve	6,521	48%
Solve for change	3,699	28%
Transforming for impact	1,942	14%
Design for sharing	736	5%
Empathy to solve	284	2%
Integrating for massification	259	2%
Solve to scale	6	0%
Grand total	**13,447**	**100 %**

Note: taken from Blackboard platform reports. Universidad del Valle de México.

The implementation was a challenge due to the number of students enrolled in the subjects, more than 13,000 students have been enrolled, but when the time comes for the new curricular model to mature we will be talking about around 100,000 students per year (see Figure 8).

Figure 8

Total number of students per four-month cycles Cycle 1 2020 and Cycle 3 2021



It is important to determine the students enrolled in each study cycle for each subject, in order to know by program when the results of the competency assessment are obtained, which curriculum is in the first places and which curriculum needs to be improved (see Table 2).

Table 2

Enrollment per four-month cycle by subject C1 2020 and C3 2021

SUBJECT ILAB UVM	ENROLLMENT BY CYCLE
Empathy to solve	**652**
2020 C1	64
2020 C2	290
2020 C3	499
2021 C1	2,008
2021 C2	1,785
2021 C3	1,875
Solve for change	**3,699**
2020 C2	51
2020 C3	381
2021 C1	586
2021 C2	1,291
2021 C3	1,390
Transforming for impact	**1,942**
2020 C3	18
2021 C1	315
2021 C2	524
2021 C3	1,085
Design for sharing	**736**
2021 C1	14
2021 C2	272
2021 C3	450
Empathy to solve	**284**
2020 C2	284
Integrating for massification	**259**
2021 C2	12
2021 C3	247
Solve to scale	**6**
2021 C3	6
Grand total	**13,447**

Note. taken from Blackboard platform reports. Universidad del Valle de México. Mexico City

It is important to determine the average final and total grade for each of the 6 Ilab UVM subjects in each of the campuses, in order to analyze any significant differences, as well as in due course to be able to go into more detail as a final average grade per cycle and analyze the reason for these possible variations in order to elaborate the corresponding corrections, for example, details in the instructional design of the subject or teacher training (see Table 3).

Table 3

Final grade by program of studies by subject of the four-month cycle Cycle 1 2020 to Cycle 3 2022

Subject	Final rating
Integrating for massification	9.61
Design for sharing	9.48
Solve to scale	9.46
Transforming for impact	9.40
Empathy to solve	9.40
Solve for change	9.17
Empathy to solve	9.08
Grand total	**9.19**

Note. taken from Blackboard platform reports. Universidad del Valle de México.

Taking into account two important variables: total enrollment and final grade, using the R2 coefficient to measure the strong or weak correlation between these two data and according to the result of 0.83, they have a strong positive correlation, since the positive limit is from 0 to 1, which means that the result of the evaluation depends strongly on the number of total students enrolled. Likewise, a standard deviation analysis was performed between the final grade of the 6 subjects, with a minimum standard deviation, which leads us to reliable results of more than thirteen thousand data with a variability index (see Table 4).

Table 4

Subject with enrollment and final grade, including correlation coefficient and standard deviation of total grades

SUBJECTS	TOTAL ENROLLMENT	FINAL GRADE
Empathy to solve	6,521	9.08
Solve for change	3,699	9.17
Transforming for impact	1,942	9.40
Design for sharing	736	9.48
Empathy to solve	284	9.40
Integrating for massification	259	9.61
Solve to scale	6	9.46
Grand total	**13,447**	**9.19**
Coefficient R2	0.836383668	
Standard deviation		0.187323537

Implementation of curricular evaluation model and generic competencies of professional skills subjects new UVM model

A. Proposed updated curriculum evaluation plan

To design an instrument to internally evaluate the curricular design of the curricula in force at Universidad del Valle de México in order to guide decision making to maintain, restructure or replace the components of the curricular system, guaranteeing the educational quality of its operation and orienting them towards academic excellence.

B. Proposals for the implementation of an evaluation of generic competencies

Three evaluation instruments are proposed, which are detailed below and are mainly based on the work of Villa and Poblete (Poblete and Sanchez, 2011) in their research work related to the evaluation of generic competencies, but these proposals are specified according to the institution's own reality, making the corresponding adjustments in each of the generic competencies, their definitions, their levels of mastery and their performance indicators

1. Competency-focused learning assessment questionnaire

This questionnaire replaces the initial idea of interviews, to provide a systematic response on learning assessment, its approach and direction.

Students using an automated questionnaire designed with a rubric-type evaluation instrument with *feedback* on their answers in the first and last week of classes must:

- Complete both questionnaires, with an evaluative mark each to ensure their completion
- To answer the questionnaires in order to obtain reliable data on the resources mobilized by the student in the performance of the required competencies
- Evaluate each student

The following is an example of the design of the questionnaire to assess collaborative work competency from the work of Villa and Poblete (Poblete and Sanchez, 2011):

Definition of collaborative work competency:

Integrate and collaborate actively in the achievement of common objectives with other people, areas and organizations.

Levels of mastery:

1. Actively participate and collaborate in team tasks and foster trust, cordiality and joint task orientation.

2. Contribute to the consolidation and development of the team, favoring communication, balanced distribution of tasks, internal climate and cohesion.

3. Lead work groups, ensuring the integration of members and their orientation to high performance.

Performance indicators:

1.- Performs the tasks assigned to him/her within the group within the required deadlines

2.- Participates actively in the team's meeting spaces, sharing information, knowledge and experiences

3. Collaborates in the definition, organization and distribution of group tasks

4. It is oriented to the achievement of agreements and common objects and is committed to them

5.- Takes into account the points of view of others and provides constructive feedback

Procedure:

A classification of competencies assigned to each subject will be made. In the case of Collaborative Work, for the first domain level "Participate and collaborate actively in team tasks and foster trust, cordiality and joint task orientation", it is assigned to the subject "Integrate to massify".

The student will know, from the beginning of the course, the two to five indicators that are inserted in the design of the evaluation rubric, the basis for the questionnaire to be answered in *blackboard*. For example, if indicators 1, 2 and 4 were selected, these will be the ones included in the questionnaire.

In the questionnaire, questions are elaborated around the indicators in order to obtain evidence on their performance. These questions will have according to their answers a message and orientation for the final result. Automated responses in BB may suggest additional questions that will help explore the scope of the corresponding indicator.

Figure 9
Indicators of teamwork competence

Competencia	Indicadores	Posibles preguntas	Respuestas del estudiante
Trabajo en equipo: Integrarse y colaborar de forma activa en la consecución de objetivos comunes con otras personas, áreas y organizaciones **Primer nivel de dominio:** ***participar y colaborar activamente en las tareas del equipo y fomentar la confianza, la cordialidad y la orientación a la tarea conjunta***		Habla sobre una experiencia de trabajo en equipo, sobre algún grupo en el que hayas trabajado para hacer una tarea de clase	
	Realiza las tareas que le son asignadas dentro del grupo en los plazos requeridos	¿Qué tareas concretas te correspondió realizar? ¿Cómo te organizaste para hacerlas? ¿Quedasteis en un plazo de tiempo para hacerlas? ¿Cuál fue dicho plazo? ¿Entregaste en el tiempo estimado o te atrasaste? ¿Cuáles fueron las causas?	
	Participa de forma activa en los espacios de encuentro del equipo, compartiendo la información, los conocimientos y las experiencias	¿Sueles asistir a todas las reuniones del grupo de trabajo? ¿Por qué? ¿Tomas la iniciativa en los debates o prefieres escuchar y hacer lo que te parece más adecuado? Explica alguna de tus aportaciones al grupo	
	Se orienta a la consecución de acuerdos y objetivos comunes y se compromete con ellos	¿Cuál era el objetivo principal del trabajo que estás comentando y cuáles eran tus objetivos personales? ¿Cuál fue el acuerdo del grupo que más te costó aceptar? ¿Por qué?	

Note. taken from Villa Sánchez, A., and Poblete Ruiz, M. (2011). Evaluation of generic competencies: principles, opportunities and limitations. Bordon. *Revista De Pedagogía*, 63(1), 147-170. https://recyt.fecyt.es/index.php/BORDON/article/view/28910

Figure 10
Indicators of teamwork competence

CUADRO 9. Valoración de la información aportada sobre los indicadores de competencia

Indicador	1	2	3	4	5
Realiza las tareas que le son asignadas dentro del grupo en los plazos requeridos	No cumple las tareas asignadas	Cumple parcialmente las tareas asignadas o se retrasa	Da cuenta en el plazo establecido de los resultados correspondientes a la tarea asignada	La calidad de la tarea asignada supone una notable aportación al equipo	Además de cumplir la tarea asignada, su trabajo orienta y facilita el del resto de los miembros del equipo
Participa de forma activa en los espacios de encuentro del equipo, compartiendo la información, los conocimientos y las experiencias	En los trabajos de grupo se ausenta con facilidad y su presencia es irrelevante	Interviene poco, más bien a requerimiento de los demás	En general se muestra activo y participativo en los encuentros de grupo	Con sus intervenciones fomenta la participación y mejora la calidad de los resultados del equipo	Sus aportaciones son fundamentales tanto para el proceso grupal como para la calidad del resultado
Se orienta a la consecución de acuerdos y objetivos comunes y se compromete con ellos	Persigue sus objetivos particulares	Le cuesta integrar sus objetivos personales con los del equipo	Asume como propios los objetivos del grupo	Promueve la definición clara de objetivos y la integración del grupo en torno a los mismos	Moviliza y cohesiona al grupo en aras a objetivos más exigentes. Los grupos en los que participa sobresalen por su rendimiento y calidad

Note. Taken from Villa Sánchez, A., and Poblete Ruiz, M. (2011). Evaluation of generic competencies: principles, opportunities and limitations. Bordon. *Revista De Pedagogía*, 63(1), 147-170. https://recyt.fecyt.es/index.php/BORDON/article/view/28910.

Scale of results

If it is desired to approximate the evaluation to the traditional criteria (from 1 to 5 or from 1 to 10) the general evaluation for all types of indicators can be as follows:

- Insufficient: the student does not have a sufficient level of mastery of the assessed competency.
- With doubts: it is necessary to question the student's preparation with respect to the assessed competence, considering how to overcome the insufficient aspects evidenced by the questions on some of the indicators, as well as the learning activities that he/she should perform.
- Sufficient: the respondent performs the competency (competency indicators) at an acceptable level.
- Good: demonstrates a good level of mastery with respect to the assessed aspect.
- Excellent: demonstrates an exceptional level of competence.

2. Automated competency-based learning assessment interview integrated in the 8th cycle

An automated interview will be carried out by means of an integration of all the evaluation rubrics of all the generic competencies to be evaluated.

The student should have developed his/her generic competencies not only in the professional skills subjects from 2 to 7 cycles, but also in basic and disciplinary subjects from 1 to 8 cycles, so that this evaluation would seek evidence of the level of achievement of the competencies at the end of his/her career.

3. Portfolio of evidence

The portfolio of competences that the student must present in order to pass the final thesis contains two parts: the first one will contain the portfolio report and the second one will include the evidences represented by the material that documents the different levels of achievement of the competences argued in the report

Implementation of automated rubrics to assess the generic competencies of the professional skills curricular area

For this article, an example of one of the 13 developed rubrics that will be found in an automated way in the *Blackboard* platform and which will be assigned to each of the subjects that develop this competency will be taken

Digital literacy

Table 5

A1 Digital Literacy Rubric

MASTERY LEVELS	INDICATORS	DESCRIPTORS				
		1	2	3	4	5
Second level of mastery: Plan consultations in digital libraries and specialized databases based on criteria that allow them to refine the selection and processing of resources extracted from the Internet, in order to develop and share the requested task through the educational platforms at their disposal.	Performs consultations in digital libraries and specialized databases.	Consult and perform basic searches in digital libraries.	Locates specific information on Internet sites as a supplement to research in print sources.	Search for information resources based on their format: document, image, web page, video.	Performs queries in specialized databases.	Selects the information obtained based on its relevance, timeliness and reliability of the source, and cites information and resources extracted from the Internet.
	Use the communication tools (chat, messaging, teamwork) of *Teams* and *Blackboard*.	Recognizes the communication tools available in *Teams* and *Blackboard*.	Identifies publications and announcements about assignments during the course of the assignment.	Identifies channels (publications, files, notepads, tasks) within a team for the organization of tasks.	He shares files related to the subject and uses the channels for the management of his assignments.	Create teams within *Teams* and communicate with colleagues via private message in Blackboard
	Use the package to process information.	Selects page view modes.	Save the file in a different format from the source.	Insert special characters and graphic objects,	Get to apply design to tables: colors, styles and alignment.	Adding and omitting words from the dictionary.

MASTERY LEVELS	INDICATORS	DESCRIPTORS				
		1	2	3	4	5
	Performs editing of images, audio and/or video files and identifies the characteristics that distinguish video, audio and image files.	Identifies image, audio and video formats.	Identifies and uses image banks, audio, video files.	Cite the digital sources from which the images, audios and/or video files are extracted.	Edit images, audio and/or video files.	Save an image, audio, and/or video file in a format other than the source format.
	Uses educational platforms to implement their learning activities.	Recognizes the characteristics of the various workspaces in *Teams* and *Blackboard*, as well as UVM Portico.	Locate, download and use resources and materials in *Teams* *Blackboard* and Portico UVM.	Participate in discussion forums and work in *Teams* and *Blackboard*.	Use the communication tools of the *Teams* and *Blackboard* platforms.	Get to send automated tasks and reply with specific features, such as number of attempts

Note: taken from the Curricular and Instructional Design Manual 2021 Universidad del Valle de México.

Table 6

Competencies vs. levels of mastery

COMPETENCY	FIRST LEVEL OF MASTERY	SECOND LEVEL OF MASTERY	THIRD LEVEL OF MASTERY
Digital Literacy		x	
Innovation			x
Creative Thinking			x
Collaborative work	x		
Diversity and Interculturality			x
Social problem solving			x
Ethical and social commitment			x
Decision making		x	
Entrepreneurship			x
Communication			x
Leadership			x
Research			x

Figure 11

Obverse side of the certificate that will be awarded to students upon completion of the sixth course Ilab UVM

Figure 12

Reverse side of the certificate that will be awarded to students upon completion of the sixth course Ilab UVM

Figure 13
Generic competency Leadership to be assessed within the subject of Ilab UVM Solve to scale

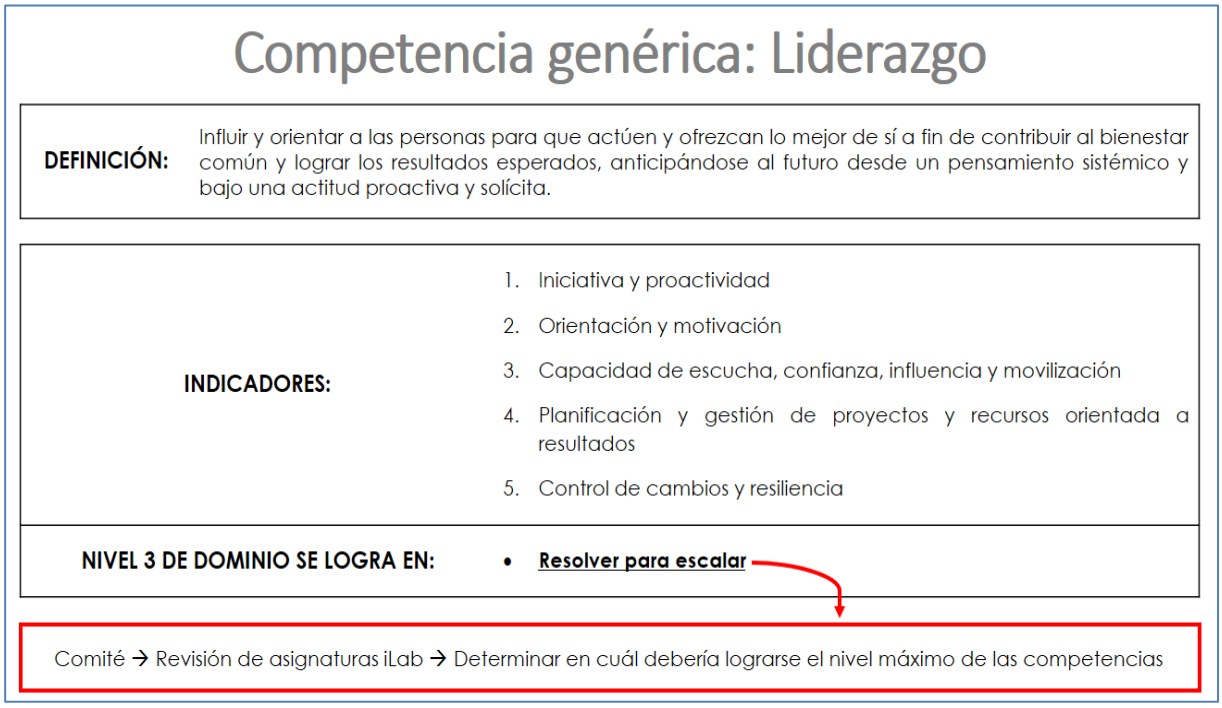


Figure 14
Levels of mastery of the Leadership competency to be developed within the Ilab UVM course Solve to scale

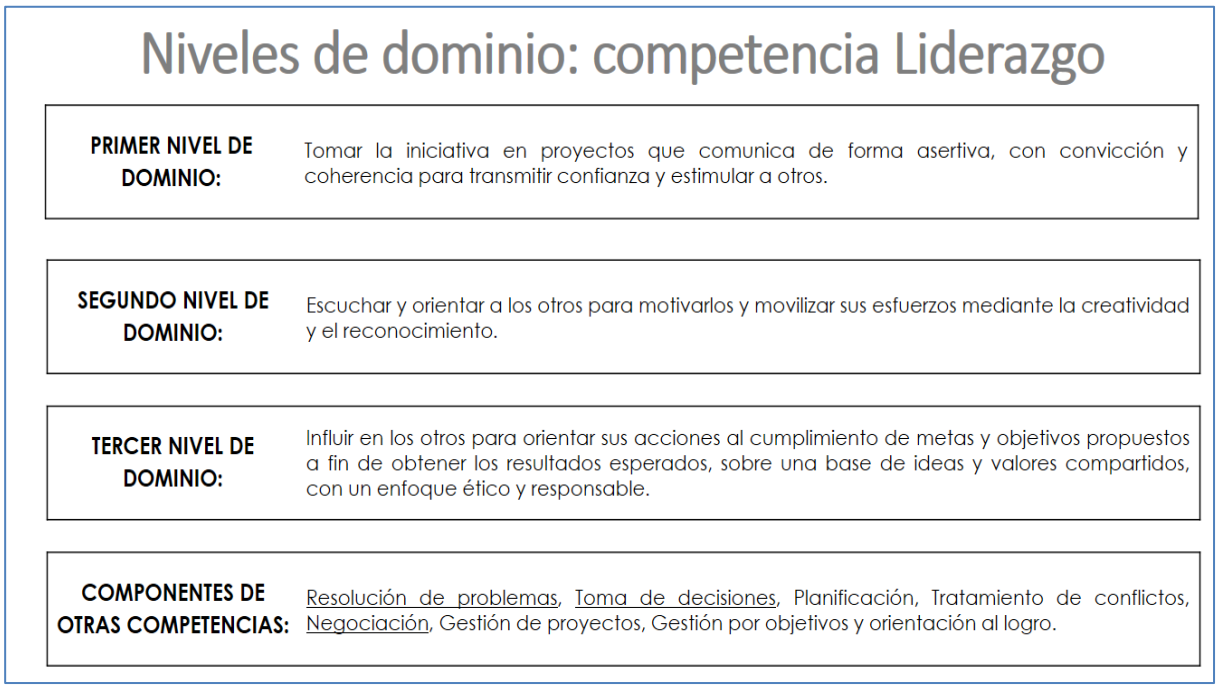
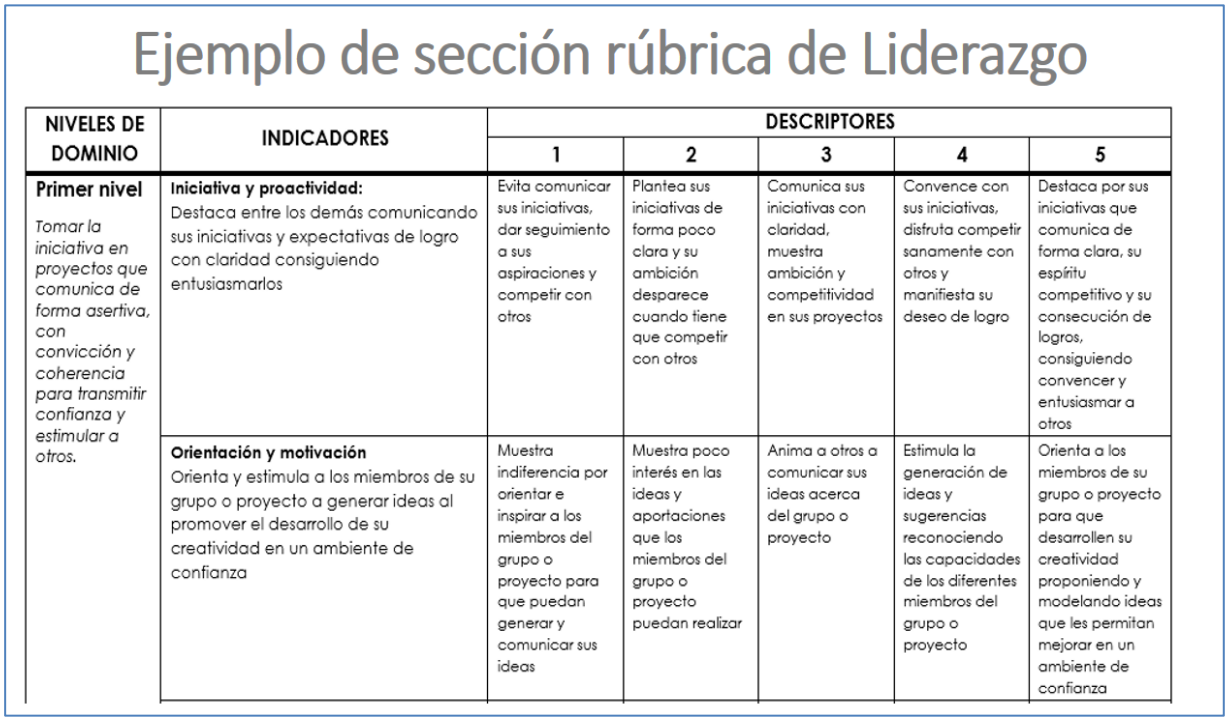


Figure 15

Example of rubric for the generic competency Leadership to be assessed within the Ilab UVM course Solve to scale



Ejemplo de sección rúbrica de Liderazgo

NIVELES DE DOMINIO	INDICADORES	DESCRIPTORES				
		1	2	3	4	5
Primer nivel *Tomar la iniciativa en proyectos que comunica de forma asertiva, con convicción y coherencia para transmitir confianza y estimular a otros.*	**Iniciativa y proactividad:** Destaca entre los demás comunicando sus iniciativas y expectativas de logro con claridad consiguiendo entusiasmarlos	Evita comunicar sus iniciativas, dar seguimiento a sus aspiraciones y competir con otros	Plantea sus iniciativas de forma poco clara y su ambición desparece cuando tiene que competir con otros	Comunica sus iniciativas con claridad, muestra ambición y competitividad en sus proyectos	Convence con sus iniciativas, disfruta competir sanamente con otros y manifiesta su deseo de logro	Destaca por sus iniciativas que comunica de forma clara, su espíritu competitivo y su consecución de logros, consiguiendo convencer y entusiasmar a otros
	Orientación y motivación Orienta y estimula a los miembros de su grupo o proyecto a generar ideas al promover el desarrollo de su creatividad en un ambiente de confianza	Muestra indiferencia por orientar e inspirar a los miembros del grupo o proyecto para que puedan generar y comunicar sus ideas	Muestra poco interés en las ideas y aportaciones que los miembros del grupo o proyecto puedan realizar	Anima a otros a comunicar sus ideas acerca del grupo o proyecto	Estimula la generación de ideas y sugerencias reconociendo las capacidades de los diferentes miembros del grupo o proyecto	Orienta a los miembros de su grupo o proyecto para que desarrollen su creatividad proponiendo y modelando ideas que les permitan mejorar en un ambiente de confianza

Figure 16

Scale to evaluate the generic competency Leadership that will be evaluated within the Ilab UVM subject Resolve to scale

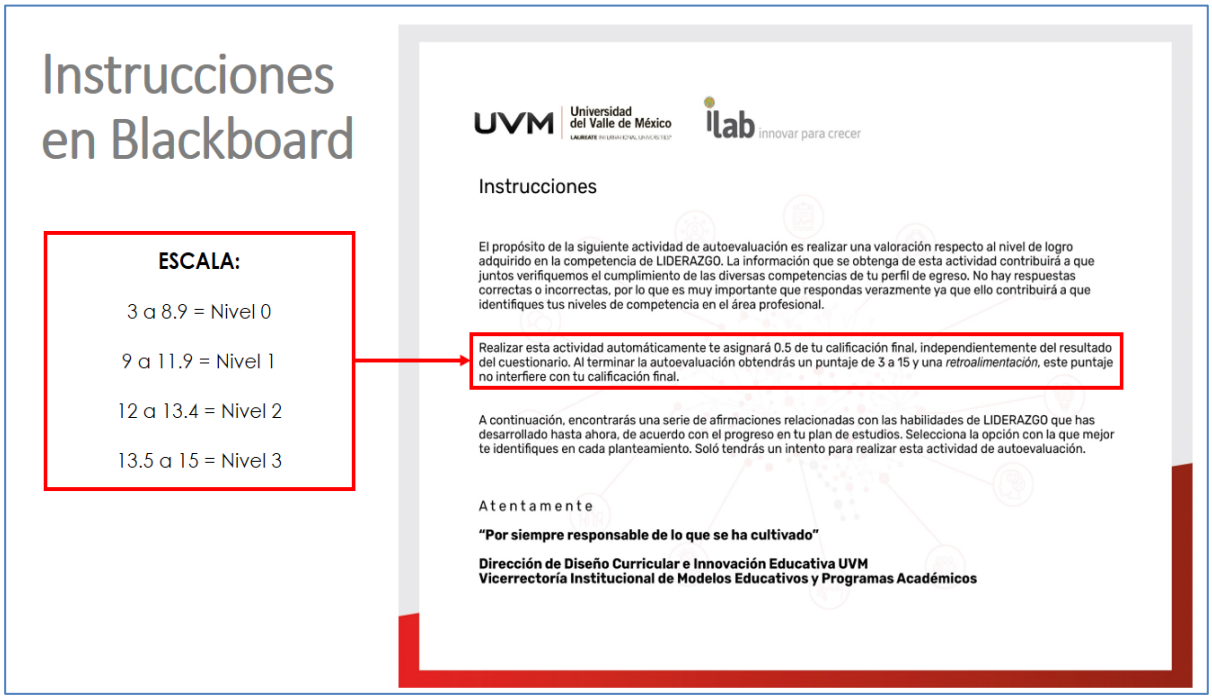


Figure 17

Example of the automated rubric integrated in Blackboard to assess generic competency Leadership to be assessed within the Ilab UVM course Solve to scale

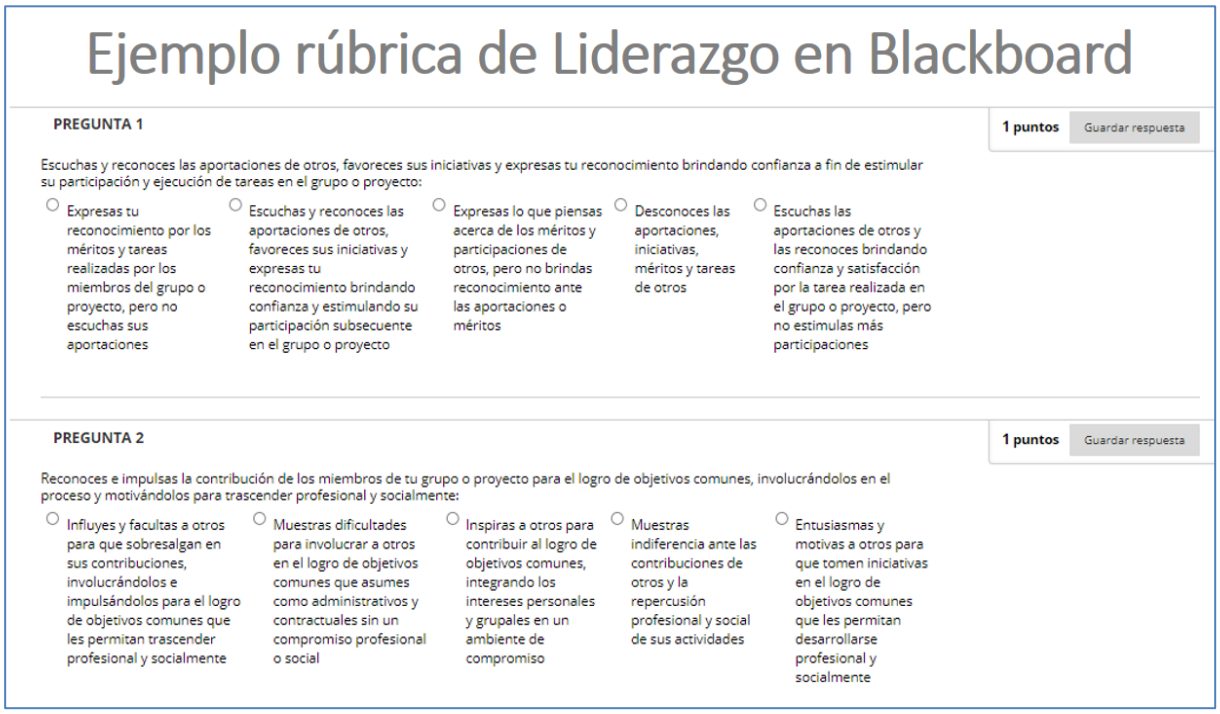


Figure 18

Message that automatically appears to the student in Blackboard as a result of their level 0 assessment of the generic competency Leadership that will be assessed within the Ilab UVM course Resolve to scale

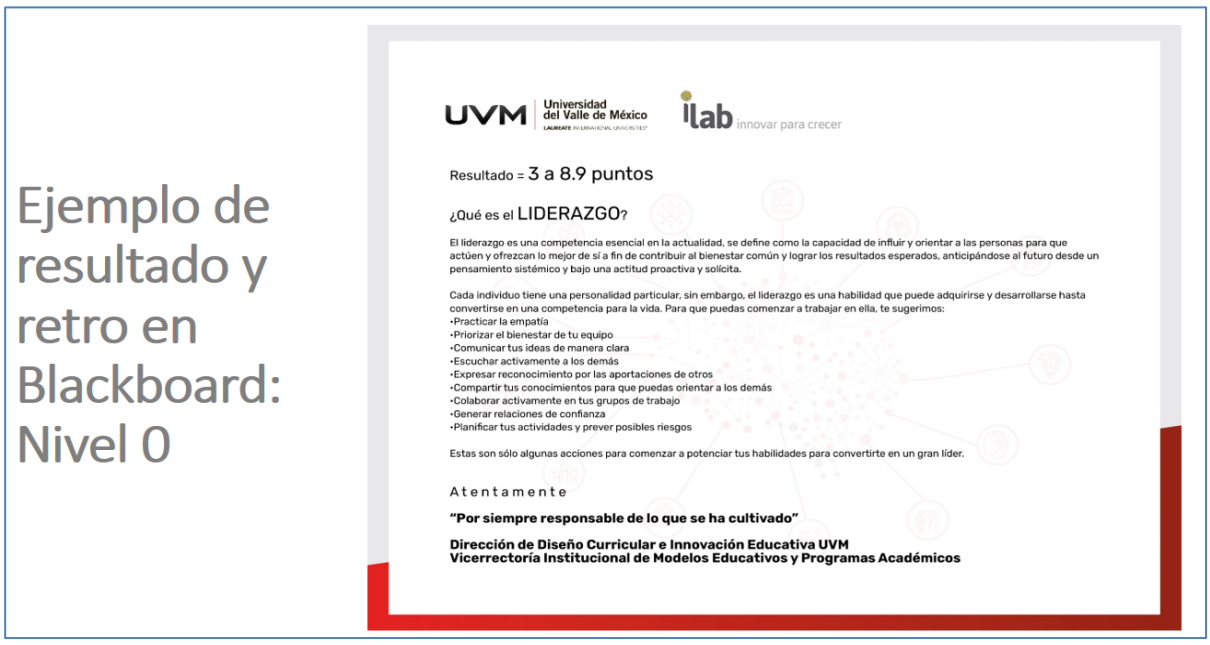
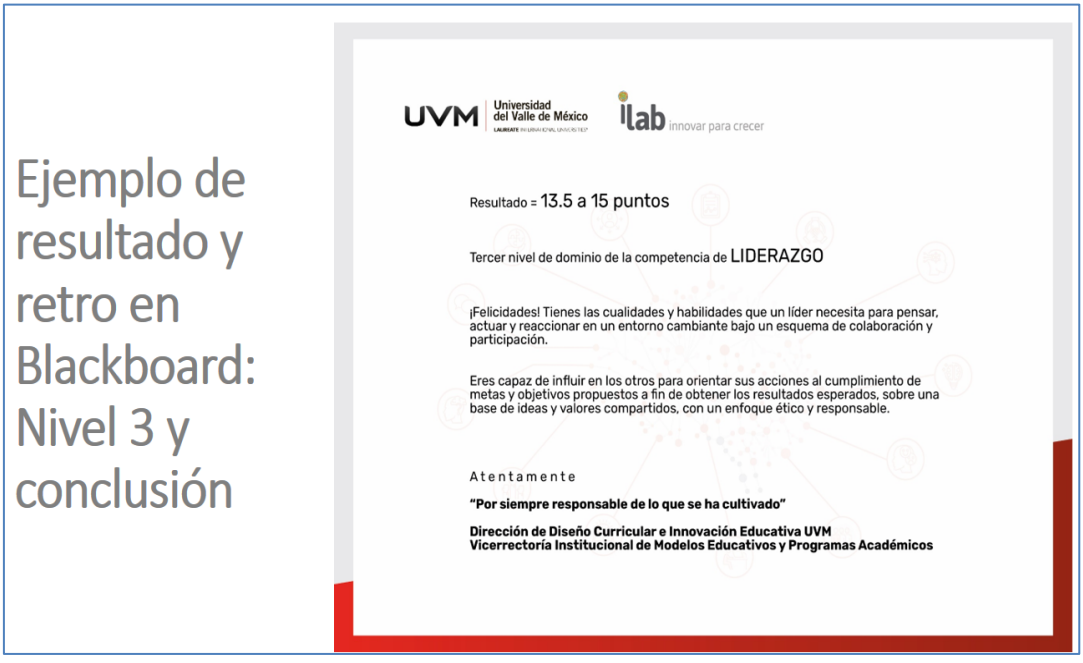


Figure 19

Message that automatically appears to the student in Blackboard as a result of their intermediate level assessment and progression of the generic competency Leadership that will be assessed within the Ilab UVM course Resolve to scale

Figure 20

Message that automatically appears to the student in Blackboard as a result of their level 3 assessment and completion of the generic competency Leadership that will be assessed within the Ilab UVM course Resolve to Scale.



Discussion and conclusions

The generic competencies that were considered in the update of the Educational Model 2021 of the Universidad del Valle de México were identified and implemented within the curricular innovation within the curricular area of professional skills transversal to all degree plans

Four learning methodologies and agile tools were included for each subject, with a design to be taught on the *Blackboard* educational platform, with an innovative instructional design that allows the achievement of the levels of mastery of the generic competencies initially proposed for 13,000 students and is expected to reach a total of 100,000 students per year in the coming years, strengthening the development of the generic competencies developed in each subject, evaluating them for their control and updating process and contributing to the strengthening of the graduate profile of the graduates in each study plan

In relation to academic quality and control, a proposal was developed for a comprehensive evaluation system of the generic competencies to be developed in the student, consisting of evaluations for each subject and their levels of mastery to be developed, a portfolio of evidence of integrative products of knowledge, skills and attitudes and a comprehensive exit exam that identifies the level achieved in each of the 13 updated competencies of the UVM 2021 Educational Model.

With regard to the specific objectives, the generic competencies of the new curriculum model were determined, taking into account different public and private organizations and extensive documentary research related to the subject, supported by an external consulting group

In addition, the results of the diagnosis of the current curriculum were analyzed and contrasted with the proposed generic competencies of the future

Likewise, the generic competencies were implemented in cross-cutting subjects in the curriculum map of the programs to be updated and the instructional design was made according to the non-school-based teaching modality of the cross-cutting subjects of generic competencies.

In addition, a generic competency evaluation model was established for the student. Additionally, 13 rubrics were designed to be placed in the previously defined subjects that are aligned to the performance indicators developed for each generic competency.

Finally, a strategy was developed for the following cycles to evaluate each of the generic competencies in their respective levels of mastery, providing concrete results of this implementation and helping to make corrective decisions.

The limitations of this work were the dynamics with which the curriculum design is developed and the complexity of an institution with so many campuses, modalities and study plans, under the operation of communication and learning platforms such as *Teams* or *Blackboard*.

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