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Keywords: galician teaching community, covid-19 aftermath, educational analysis, resilience assessment, jaded test design.

I. INTRODUCTION

The COVID-19 pandemic during the 2019-2020 academic year has resulted in a series of consequences for the educational community. This unique situation necessitated unprecedented measures to contain the transmission of the disease (WHO, 2019).

The first of these consequences necessitated a level of confinement that practically affected all students and teachers worldwide. This shift moved teaching and learning processes away from in-person presence, requiring them to be conducted through alternative means. Through the application of online learning, where ICT plays a relevant role *(Rial, 2023)*.

But not every student can access them on equal terms, either due to lack of material resources or economic resources, translating after analyzing the data from the PISA report *(EducacionyFP, 2016)* into a new socio-economic gap or perhaps a deepening of a previous gap that was considered already closed that significantly affected those students who had last educational problems, as indicated by the OEI (2020).

Another consequence that has been observed, especially in those countries with a high level of educational disaggregation, such as Spain, where educational powers have been transferred to the different autonomous communities, is the lack of involvement of the educational authorities to adopt standard short-term measures that facilitate the transmission of teaching-learning processes in situations of absence of presence, as occurred during the confinement stage, observing the lack of ICT resources directed as an educational platform that facilitates communication between the different agents

involved: teachers-students-parents, or specification of the tools to continue with the normal educational process, which required improvisation on the part of the teachers to determine which one or which ones should be selected.

Another immediate consequence of school confinement is, as indicated by OECD sources (2020) that each week that the school community spends in a situation of confinement, an enormous amount of human capital is lost, which results in medium and long-term lack of adequately trained professionals, since it must be regarded as that teachers must be considered, at the same time, students in constant training. As students, they are exposed to the same factors that influence the well-being of their peers, impacting not only their personal lives but also their professional development as a collective group. If the school confinement caused by COVID-19 revealed anything, it was the specific vulnerability faced by the teaching-learning processes and, consequently, all individuals involved in them, as highlighted by the OECD (2021).

Not to mention the rise in diseases and syndromes among the student and teacher populations after the school confinement, attributed in part to the lack of social interaction. Given the drift of the situation and the possibility of new confinements being carried out, on a greater or lesser scale, this is what has determined the need to carry out a research study that analyzes the actual educational situation, focusing on it at the level of the autonomous community and in all its dimensions: social, economic and educational as Trujillo (2020) suggests.

1.1 Contextualization of the Starting Problem

The situation under analysis is influenced by a fundamental element that has directly disrupted the usual progression of the teaching-learning processes. We are referring to the school confinement prompted by COVID-19, which shifted traditional, in-person teaching to an online format where Information and Communication Technologies (hereinafter referred to as ICT) played a significant role.

In this process, a fundamental agent must be taken into account, on which academic excellence is based *(Mosquera, 2020)* and on which a particular analysis has been carried out to determine what motivates him not to participate in the central study. Carried out to understand the educational reality, focused on the Autonomous Community of Galicia.

Considering all of the above, the performance of this particular analysis must allow and lead to the design of a tool that favors knowing, before to carrying out the analysis of the data collected, the degree of boredom of the participants in it, and Therefore, their participation or absence may condition the data received and therefore the results. The reality is that conditioning encompasses a spectrum of diverse outcomes, which manifest depending on the depth of observation and consideration of the provided responses, or the lack thereof, leading to monotony. Hence, the importance lies in its identification and subsequent consideration by the researcher conducting the study.

1.2 Analysis of the Results in Contextualization (Before-During-After)

Taking as the backbone of the analysis the breaking point of the teaching-learning processes that led to the adoption of school confinement due to COVID-19, distancing them from all face-to-face attendance, we adopt a statistical approach to the study, contextualizing it in three different scenarios.

- The first of these scenarios is the one that has been classified as “prior”, where educational presence is the distinctive element of the teaching-learning processes, corresponding to a contextualization before school confinement due to COVID-19.
- The second of the three scenarios, referred to as "during," pertains to the period of school confinement prompted by COVID-19. During this phase, teaching and learning processes occurred in the absence of in-person

instruction, instead conducted through online teaching methods.

- The third and final scenario is the return to the new normal *(DAAD, 2020),* characterized by the return to face-to-face teaching-learning processes.

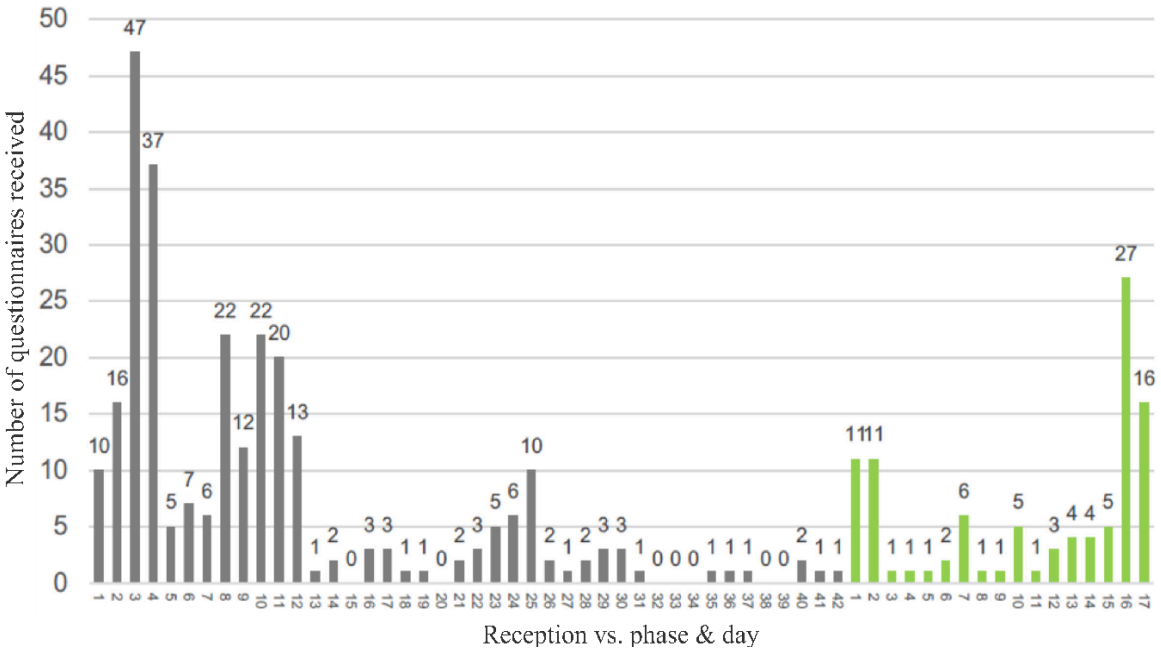
Taking all this into consideration, we have proceeded to determine the Gh (from now on, degree of boredom) based on the participation and sampling processes and the number of surveys received vs. submission phase, carried out to obtain the data that guarantee the reliability and viability required of the study.

1.3 Teacher Response/Behavior

After establishing the number of teachers required for participation in the study and allocating them proportionally according to the province and the type of affiliation of the Educational Centers, the relevant documents for study participation, along with information regarding their rights and obligations, have been sent to the respective Educational Centers where teachers perform their professional duties.

In the first phase of sampling participation, 273 responses were received from teachers, below the 373 required for the study to be relevant. After the closing of the timing of this first phase of sampling participation, we have considered the possible existence of professional fatigue to participate in a directed external study, in contrast to the obligation to participate in public processes such as those carried out by the INE, IGE or the Ministry of Education itself *(Romehu Consultores, 2021).*

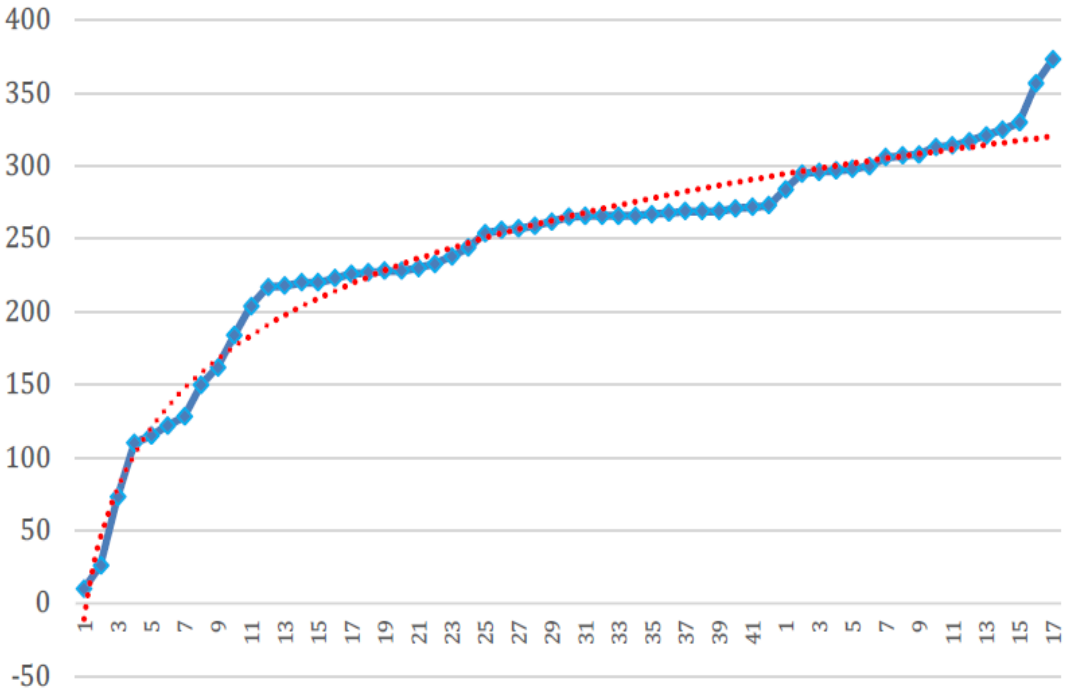
Figure 1 shows the participation of teachers in the two sampling-participation phases carried out in the study "Analysis of the educational reality of Galicia" in 2021.



Note: The graph depicts questionnaires received in the first phase of the survey in gray and those received in the second phase in green. The values on the 'x' axis represent each day in relation to the respective phases. Source: Rial (2023).

Figure 1: Participation vs. date of sending the questionnaire and sampling-participation process

Figure 2 shows the cumulative participation of participating teachers in the two sampling-participation phases carried out in the study "Analysis of the educational reality of Galicia" in 2021, showing the timing of the receipt of the questionnaires (41 days for the first phase in which the first 273 were collected and 17 for the second phase, in which the remaining 100 were collected).



Note: The red dotted line represents the trend of data received vs. cumulative reception, while the blue solid line indicates the actual accumulation of surveys received. The 'y' axis represents the ordinal days of receipt for each of the sampling- participation phases/waves. Source: Rial (2023).

Figure 2: Participation percentage vs. questionnaire sending day number

1.4 Goals

As a general objective, we have set out to determine the existence of a gap between the exercise of teaching practice and the professional-personal situation of the group that carries out its functions as in the Autonomous Community of Galicia (Spain) that results in a fed up/fed up situation.

At a specific level, we have set ourselves the following objectives:

- Determine the existence of boredom based on participation in a non-institutional study about the educational reality in the Autonomous Community of Galicia (Spain).
- Design an indicator that determines the degree of fatigue/fed up of teachers.
- Propose its application in situations limited to statistical participation processes.

II. METHODOLOGY

"The employed methodology encompasses a mixed-methods statistical study, combining both quantitative and qualitative approaches. This approach facilitates the collection of comprehensive information regarding the educational landscape in the Autonomous Community of Galicia (Spain), specifically focusing on the events that transpired before, during, and after the confinement period spanning the months from March to June 2020.

2.1 Determination of the Studied Sample

The analysed sample has been extracted from the target population, made up of the group of teachers who carry out their professional practice in the Autonomous Community of Galicia (Spain) with complete independence of the affiliation of the Educational Centers and its typology, whether of a public, private or concerted nature and covering the educational stages between early childhood and secondary education respectively, as they are considered stages of mandatory observance by Spanish educational legislation.

Considering these conditions and the fact that the target population consists of 12,500 teachers during the 2019-2020 academic year, as reported

in the educational inventory by the Department of Education of the Autonomous Government of Galicia *(Edu.Xunta.es, 2020)*, a simple random probabilistic sampling has been conducted using a custom-developed Java class *(Rial, 2023, pp. 360-365)*. With this data in mind, the analysis of teacher distribution is based on two variables: the typology of the assigned Educational Centers and the province where they fulfil their roles, as illustrated in Table 1.

Table 1: Distribution of schools by type of Educational Centers and province in which they are located

Educational Centers typology	Coruña, La	Lugo	Ourense	Pontevedra
Baccalaureate	121	40	35	98
Training Cycles	109	35	30	87
Secondary	185	67	55	175
Primary	324	119	112	314
Totals	739	261	232	674

Note: The Table shows the breakdown of Educational Centers in the Autonomous Community of Galicia, regardless of their ownership (public, private, subsidized).

Given that the target population has a finite cardinality, meaning it is quantifiable and numerically ordered, the sample determination was conducted in accordance with Equation 1.

$$n = \frac{k^2 * p * q * N}{e * (N-1) + k^2 pq} \quad (1)$$

In it, n indicates the value of the sample that should be considered, k is the level of confidence that is initially adopted by the study (95%), e is the percentage of accepted sampling error, p is the estimated proportion of the population that will coincide with the value of q, i.e., p=q=0.5 and N the cardinality of the target population, which, as indicated, amounts to 12,500 teachers.

Based on the provided data, the calculation has been performed to determine a heterogeneity percentage of 50%, a margin of error of 5%, and a confidence level of 95%. This calculation results in 373 teachers as the target for the study.

Since the survey was directed proportionally to each of the four provinces comprising the Autonomous Community of Galicia, considering the teachers performing their duties in each, a distribution was established. This distribution aligns with the various typologies of Educational Centers that constitute the educational landscape at the provincial level, as illustrated in Table 2.

Table 2: Proportional distribution of surveys vs. Educational Centers and Province

Educational Centers typology	Coruña, La	Lugo	Ourense	Pontevedra	Totals
Baccalaureate	24	8	7	19	58
Training Cycles	21	7	6	17	51
Secondary	36	13	11	34	94
Primary	64	23	22	61	170
Totals	145	51	45	132	373

Note: The Table shows the distribution of the surveys proportionally concerning to the data reflected in Table 1.

2.2 Reliability of Data through the Application of Alpha-Cronbach

The Alpha-Cronbach is a statistical test that seeks to determine how reliable the data collected through the information collection tool is by measuring the consistency of a sample of the population *(Oviedo and Camp-Arias, 2005)* with complete independence of the format: paper or electronic and the target population and extracted sample, but conditioned by the type of responses and the number of items in them *(Toma, 2021)*.

Therefore, adhering to the test definition and applying Equation 2.

$$\alpha = \frac{k}{k-1}\left(\frac{\sum_{I=1}^{K}\sigma^2_{y_I}}{\sigma^2_x}\right) \qquad (2)$$

In this context, where K represents the number of items in the scale, $\sigma^2_{y_I}$ denotes the variance of item i-th, and $\sigma^2_{y_I}$ signifies the variance of the observed scores of the individuals, the outcome displayed in Table 3 has been achieved. This outcome ensures, as depicted in Table 4, a high degree of reliability. In this particular case, the data and its implications are considered highly reliable.

Table 3: Reliability statistics set of grouped variables

∝-Cronbach	Elements number
0,902	72

Table 4: Cronbach's Alpha Consistency/Reliability Intervals

Alfa-Cronbach				
Very Slow	Slow	Moderate	Good	High
[0-0.2]	(0.2-0.4]	(0.4-0.6]	(0.6-0.8]	(0.8-1.0]

Note: Given that the ∝-Cronbach value is 0.902, the degree of reliability of the study carried out is considered "high reliability" Source: Rial (2023)

2.3 Proposal for an Indicator of the Degree of Boredom

The design of the new indicator is determined by the following factors that directly intervene in it: sample size, number of sampling-participation processes carried out, and effective participants in each process.

Taking this into account, we define the indicator "Degree of boredom" as:

$$G_h(n) \rightarrow (M\ ,\ P)$$

Where n is the cardinality of the sample, i.e., the number of data that make up the sample and (M , P) the cardinality of the different Sampling-Participation processes carried out, or what is the same, the set of responses made in each of the phases in which the reception of responses was undertaken. With the definition made, the indicator can be calculated based on Equation 3.

$$G_h = \sum_{i=1}^{k} \frac{participants_i}{sample - \sum_{i=1}^{i-1} participants_{i-1}} \qquad (3)$$

A series of restrictions determined by:

Participation necessitates expanding the initially obtained sample size to encompass the entire target population, as the initially projected size has not been achieved.

The degree of participation, denoted as G_h, will establish a scale that correlates each interval with the corresponding statement regarding the teacher's situation, as delineated in Table 5.

Table 5: Degree of participation determined by Equation 1

Interval	Grade of boredom	Scale
[0-0,3)	Extrem	
[0,3-0,5)	Excesive	
[0,5-0,7)	Very high	
[0,7-0,8)	High	
[0,8-0,9)	Half	
[0,9-1]	Low	

Note: This $G_h \rightarrow$Interval link determines the degree of boredom of the study participants. Table 6 serves as an example, which shows four examples of the application of the calculation of the degree of boredom and the association with the corresponding interval that determines how fed up the participants are.

Table 6: Degree of participation determined by Equation 1

n	n1	n2	n3	n4	x1	x2	x3	x4	gh
373	373[1]				1				1,0000
373	273[2]	100			0,7319	1,0000			0,5774
373	200[3]	100	73	0	0,5362	0,5780	1,0000		0,4730
373	173[4]	90	70	40	0,4638	0,4500	0,6364	1,0000	0,3921

Note: In Case 1, where only one sample participation was required, the boredom index is 1.0000, indicating that participants in this scenario have a low level of boredom. Moving on to Case 2, involving two sampling-participation phases, the boredom index is 0.5774, signifying a very high level of boredom. In Case 3, entailing three participation sampling phases, the boredom index is 0.4730, classifying the boredom level as excessive. Finally, in Case 4, the boredom index is 0.3921, once again indicating excessive boredom, as observed in the preceding case.

III. CONCLUSIONS

The school confinement due to COVID-19 has brought a series of consequences on the school community, among which is the absence of presence in the transmission of teaching-learning processes, being assumed by a new educational model of online teaching, never before applied in certain stages.

This has required teachers to exert extra effort in fulfilling their responsibilities to ensure that students have a normal educational experience during this period. Consequently, the time that teachers allocate to their personal lives has been diminished, compromising a more balanced allocation between personal and professional commitments.

Educational changes, reforms, and decisions within each temporal context studied suggest a

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