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Challenges for Post-Pandemic Virtual Education in Latin America: A Comparative Analysis of the Emergency Remote Higher Education Process in Chile, Mexico, and Ecuador

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Abstract: The COVID-19 pandemic forced Higher Education institutions all around the world to revise their praxis and update tools and numerous procedures. This study offers a comparative analysis of three Latin American students' and instructors' perspectives on a selection of both the pedagogical and emotional aspects of higher educational life that were affected. The report is about the participants' perception of others' empathy, their evaluation of the organization of teaching and learning and of collaborative learning experiences, their appreciation of the quality of learning assessment practices, and, eventually, their perception of learning. An exploratory study was carried out, based on survey research in Likert-scale form, responded to by 2742 students and 926 instructors. Significant differences were found among subsamples, with Chilean students and instructors having less favorable views in all dimensions compared with their Mexican and Ecuadorian counterparts; also, differences were found with respect to educational levels, discipline areas, and participants' gender. This study contributes with a double-sided view of both protagonists' perspectives (students' and instructors') to reinforce the importance of instructional design, instructor-student bond, meaningful and realistic assessments that allow for the application of knowledge, and opportunities for feedback in post-pandemic virtual education.

Keywords: higher education; pandemic; remote education; Latin America; comparative analysis

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1. Introduction

Numerous studies have been published to date about emergency remote in higher education (ERHE) during the COVID-19 pandemic [1–4]. Consequences for Higher Education (HE) institutions were devastating at a broad range of levels, from a human and also an economic perspective [5]. Up to this date, we find reports from all continents and a huge diversity of countries from East to West and North to South (e.g., Pakistan [6]; Turkey [7]; United States of America [8], Russia [9], South Africa [10], New Zealand [11], India [12], and United Arab Emirates [13] among many others, even multinational comparisons [14]. Both large-scale, even global [1,15–17] and small-scale, qualitative studies [18] have been undertaken. Certain studies have focused on partial, subjective perspectives of the educational participants, either from the instructors' side [9] or from the students' [10]. Some studies have contributed to a better understanding of particular pedagogical techniques and tools in the e-learning context [19,20], while other researchers focused on mental health risks [8] and emotional coping strategies [21]. With our study, we want to contribute to this massive body of knowledge that should help us all together to be better prepared to overcome likely new ERHE situations in the future.

In Spanish-speaking countries, there are also a great deal of studies [22–26]. We find, for example, Navarro and colleagues' study [26] addressing instructors' related variables in the successful perception of ERHE, while others [21] focus attention on the student's

perspective. Each of these studies, however [21,26], addresses different issues, such as digital teaching competence on the instructor's side and emotional coping strategies on the student's side. They do not contemplate the very same issues for both instructors and students so that their results can be considered cumulative in a certain way but not contrastive to each other. To our knowledge, studies comparing students' and instructors' perspectives are still very scarce and of a limited scope regarding participating samples [27,28]. In that sense, our study responds to a current need, providing a comparable perspective of both participants' sides.

Conceptual Considerations Regarding HE and ERHE

Globally considered, HE institutions already had adopted and mainly integrated information and communication technologies for teaching and learning by 2020. However, this was not necessarily the case worldwide. Up to the pandemic, HE institutions in Latin American countries functioned predominantly traditionally, face-to-face [29]. Hence, the emergency forced the HE institutions in these countries to cope with unexpected challenges at the highest velocity, and all instances of the educational community (instructors, students, and administrators) had to adapt themselves to this new situation. Debattista [30] offers good practice principles for instructional design, such as encouraging student-faculty interaction, promoting inter-peer cooperation, facilitating active learning, offering prompt feedback, emphasizing time on task, communicating high expectations to the learners, and respecting and catering to diverse talents and ways of learning.

Certainly, these principles do not differ much from face-to-face quality teaching and learning practices. Previous literature on e-learning and blended learning points to the need for specific so-called techno-pedagogical design [31]. In other words, teaching and learning processes in the virtual context require specific instructional decisions to promote and enhance learning chances, as ICT by itself does not warrant positive learning processes [32–34]. Even the assessment processes must be subject to particular design in the e-learning and blended learning contexts [35]. As some underline, managing time is probably the biggest challenge in the online setting [36]. Last but not least, human interaction must be taken care of in the virtual learning context [37] in order to promote quality learning. All of these instructional decisions were compromised in the emergency context.

As the global study of Aristovnik and colleagues reported [17], the student population from Latin American countries had less favorable studying conditions and more basic infrastructure, such as fragile and unstable access to the internet, compared to richer countries in the Northern hemisphere. In the case of instructors, the lack of the so-called digital competence, that is, the ability to plan and manage teaching and learning situations mediated by e-learning components, was probably the biggest problem to tackle globally, but especially in those places where ICT e-learning components were not yet common ground [38].

Studies prior to the pandemic situation already reported students' difficulty in communicating with peers in the e-learning context [39,40]. As the literature claims, the online interaction between instructors and students feels easier for the students themselves, compared to the need to interact with peers in a constructive manner. In other words, peer interaction for learning purposes in the synchronous and asynchronous space does not happen spontaneously with ease and benefits from pedagogical guidance [41,42]. However, as some studies report [43], there might be some connection between students' interaction quality and achievement during ERHE, which underlines the importance of this pedagogical guidance.

Regarding teaching, previous results report the extraordinary demands that the ERHE put on the instructor's need of re-designing teaching and assessment strategies and coping with the loss of immediate students' feedback in classroom interaction, among other issues [44]. With respect to the variety of components of the pedagogical process, many studies coincide in pointing at assessment quality as the most important challenge during ERHE [45–49], which includes a set of challenges from proctoring measures to prevent

students' dishonesty to providing useful feedback and promote meaningful learning from the competence-based perspective of current curricula.

Our study specifically pursues the following goals:

- To describe the ERHE process during 2020 in three Latin American countries (Chile, Mexico, and Ecuador), comparing instructors' and students' perspectives since teaching and learning processes cannot be understood only from a single perspective.
- To identify some variables of ERHE affecting students' and instructors' perceptions of learning. We will particularly look at sex and educational cycle in the case of students as the main personal variables likely to affect subjects' experience.
- To identify improvement needs for future experiences of ERHE, considering the previous analyses.

2. Materials and Methods

A non-experimental quantitative design was employed to analyze the perceptions of students and instructors regarding the remote teaching and learning process. This research is of correlational scope, and the methodological approach used was a cross-sectional survey.

2.1. Participants

Fifteen HE institutions from all over Latin America participated in this project. Altogether, 2742 students and 926 instructors from public and private universities in Chile, Ecuador, and Mexico took part in this study. Instructors and students belonged to careers in the following areas: social sciences (17.5% of students and 18.9% of instructors), biological sciences (10.7% of students and 8.6% of instructors), arts (2.6% of students and 4% of instructors), engineering (19.6% of students and 15.1% of instructors), education (33.5% of students and 33.6% of instructors), and health (16.3% of students and 19.8% of instructors). Regarding the educational level of students, 44.9% of them were in the initial cycle (first and second year), 42.1% in the intermediate cycle (third and fourth year), and 13% in the final cycle (fifth year onwards).

Table 1 shows the demographic distribution of the sample, dividing them by gender, age, and national origin.

Table 1. Demographic distribution of sub-samples.

Countries	Participants	Total	M Age	SD Age	%Women	%Men
Chile	Students	1734	21.8	3.6	67.3%	32.7%
	Instructors	636	44.9	10.6	64.1%	35.9%
Mexico	Students	394	21.8	4.6	75.7%	24.3%
	Instructors	207	44.6	9.8	53.7%	46.3%
Ecuador	Students	614	21.7	4.3	77.6%	22.4%
	Instructors	83	44.9	13.1	54.2%	45.8%

2.2. Instruments

In line with the theoretical framework related to successful virtual education experiences prior to the pandemic, two instruments with similar characteristics were designed for online administration, one targeting students and the other aimed at instructors. Both instruments addressed the same dimensions and aspects in order to fulfill the comparative purpose of our study [50].

Four evaluators with experience in educational psychology and psychometric analysis evaluated the indicators derived from the literature review. The evaluators followed an evaluation guideline that aimed to assess the relationship between each indicator and the theoretical variable associated with effective practices in distance education. The dimensions analyzed were empathy between instructors and students, teaching organization, collaborative work, quality of assessment, and perception of learning. Additionally, they

evaluated the quality of the indicators of each dimension in relation to comprehension, length, and formal aspects. For each indicator, the evaluators provided a score ranging from 1 (low agreement) to 5 (high agreement) to represent its relationship with the theoretical dimension. The four evaluators achieved an intra-class correlation index of 0.89.

The student questionnaire consisted of 65 items, while the instructor questionnaire contained 56 items. Both instruments included Likert-type items, rated on a five-point scale (1 = never to 5 = always). The questionnaires included four open-ended questions for subjective evaluation and reflection on the participants' experience to gather qualitative aspects that could enhance the information.

Regarding internal consistency, both questionnaires exhibited satisfactory characteristics. Cronbach's Alpha was calculated for each of the ten questionnaire scales. For students, the reliability of the lowest Cronbach's Alpha score was 0.79, the highest was 0.82, and the average was 0.81. For instructors, the lowest Cronbach's Alpha score was 0.72, the highest was 0.83, and the average was 0.77. Table 2 shows these dimensions and the internal reliability of the questionnaire for each set of participants.

Table 2. Internal reliability dimension of students' and instructors' questionnaire.

Dimensions Students	Cronbach α	Dimensions Instructors	Cronbach α
Instructors' empathy	0.82	Personal empathy	0.83
Teaching organization	0.80	Teaching organization	0.72
Collaborative work	0.82	Collaborative work	0.76
Quality of Assessment	0.79	Quality of Assessment	0.81
Perception of Learning	0.80	Perception of Learning	0.74

2.3. Data Collection

Contact with study participants was established through university authorities in Chile, Argentina, Ecuador, Mexico, and Colombia, with which we had academic links. Participation was obtained from universities in Chile, Ecuador, and Mexico, countries located in Latin America that share various similarities in terms of language, culture, and indigenous heritage. Likewise, they face social and economic challenges like inequality, poverty, and the need to improve their education systems.

The survey was made available online using Google Forms. The questionnaires were distributed during the second semester of lockdown in 2020, a period of emergency teaching and learning. Students and instructors were invited to participate from their respective universities, which centrally sent out the surveys and invitations to participate voluntarily and anonymously via institutional email. Through the institutional email, we were able to obtain almost 95% of the sample for this study.

Additionally, the snowball sampling technique was employed. Participants who completed the survey shared it with their peers in other universities, thereby expanding the survey's reach to the largest possible number of practicing university instructors and students. Through this technique, 100% of the sample presented in this article was completed. In this way, the sample encompassed a wide range of cases within the accessible population from different disciplinary areas, considering both public and private universities within each participating country.

The Ethics Committee of Universidad del Desarrollo approved this research in June 2020. The approval certificate ensures compliance with all ethical safeguards of scientific research, such as confidentiality, anonymity, voluntary participation, the right to withdraw from the study or choose not to answer, the absence of risks associated with participation, and the competence of the research team. This certificate of ethical approval was provided to the universities invited to participate in the study.

The questionnaire used in the study included informed consent, which explained the research objectives and the ethical safeguards involved. The ethical standards and codes of conduct followed included those of the American Psychological Association (APA, 2017), the Code of Ethics of the Chilean College of Psychologists (1999), as well as Chilean

legislation on scientific research (Laws 19.628 and 20.120), and the 1975 Declaration of Helsinki revised in 2000.

2.4. Data Analysis Plan

Analysis of Variance (ANOVA) was used to test for statistically significant differences between groups, and multiple linear regression was conducted to develop explanatory models. The reliability analysis of the scales was carried out using Cronbach's alpha coefficient. All these analyses were performed using R version 4.3.0.

3. Results

This study specifically aims to describe the ERHE process during 2020 in Chile, Mexico, and Ecuador, both from instructors' and students' perspectives, comparing participants' experiences and perceptions of the quality of the teaching and learning process. Tables 3 and 4 show the global results for both the participants' perspectives, students' and instructors'. In the following subsections, we will address the concrete results for each research goal.

Table 3. Student's global perception of ERHE.

Dimensions	M	SD
Instructor's Empathy	3.52	0.75
Didactic organization	3.55	0.74
Collaborative work in online class	3.62	0.73
Quality of Assessment in online class	2.38	1.07
Perception of Learning in online class	3.23	0.84

Table 4. Instructors' global perception of ERHE.

Dimensions	M	SD
Empathy for students	4.09	0.95
Didactic organization	4.56	0.47
Collaborative work	3.16	0.86
Quality of Assessment	2.63	1.13
Perception of Students Learning	3.74	0.98

Students and instructors report that the weakest aspect of education is the quality of the assessment of learning. This difference between assessment and the rest of the studied dimensions is significant for students ($F(4, 10{,}564) = 1365.63$, $p < 0.001$) and instructors ($F(4, 3700) = 853.99$, $p < 0.001$). On the other hand, students' evaluation of remote education is more critical across all domains than instructors' evaluation of their ERHE experience ($p < 0.001$). Students rate all analyzed dimensions significantly lower than instructors.

3.1. Remote Education Process during 2020, Both from Instructors' and Students' Perspectives in Chile, Mexico, and Ecuador

The results of the three Latin American countries studied in relation to the dimensions of Empathy, Didactic organization, Collaborative work, Quality of Assessment, and Perception of Students' Learning are presented in the following subsections. We will also analyze whether there are differences in these dimensions according to the gender of the participants and the disciplinary areas. In the case of the students, we will also report whether there are differences according to the level of education they are studying (initial, intermediate, or final).

It is important to note that there are significant differences between Chile, Mexico, and Ecuador in relation to the technological and physical resources present at the beginning of ERHE ($F(2, 2639) = 18.27$, $p < 0.001$). When making comparisons between student groups through the Tukey-HSD test, results show that students from Ecuador report having fewer physical and technological resources for remote education ($p < 0.001$), while Mexican students are the ones who have the best conditions ($p < 0.001$).

On the other hand, students studying degrees related to the area of education (M = 3.89) and biological sciences (M = 3.88) report having the least physical and technological resources for ERHE compared to the rest of the degrees ($F(5, 2562) = 18.68$, $p < 0.001$). There are no significant differences for students by gender ($t(2623) = 0.71$, $p = 0.50$) or the cycle they are studying ($F(2, 2635) = 0.03$, $p = 0.97$). Regarding instructors, there are no significant differences.

3.1.1. About Empathy in ERHE

Table 5 presents results concerning the first dimension: Instructor empathy versus students' perceived empathy. We found significant differences in the perception of empathy between Chilean students and those from Mexico and Ecuador ($F(2, 2639) = 117.80$, $p < 0.001$). Also, when making comparisons between groups through the Tukey-HSD test, Chilean students report perceiving lower empathy from their instructors during the pandemic ($p < 0.001$).

Table 5. Perception of Instructor Empathy by Students and Instructors in Chile, Mexico, and Ecuador.

Country	Participants' Perspective on Empathy	M	SD
Chile	Students	3.28	0.89
	Instructors	4.12	0.92
Mexico	Students	3.87	0.83
	Instructors	3.99	1.01
Ecuador	Students	3.73	0.91
	Instructors	4.14	0.93

Moreover, there are significant differences by gender ($t(2623) = 6.86$, $p < 0.001$); female students perceive greater empathy from their instructors. Significant differences also exist by cycle, with intermediate-level students (third and fourth year) reporting lower perception of empathy from their instructors ($F(2, 2635) = 13.58$, $p < 0.001$). Intermediate-level students differ from both initial-cycle students ($p < 0.001$) and final-cycle students ($p = 0.03$).

Furthermore, there are significant differences between disciplines ($F(5, 2562) = 38.41$, $p < 0.001$); students in the education ($p < 0.001$) and social sciences ($p < 0.001$) fields perceive greater empathy from their instructors, while students in engineering ($p < 0.001$) and biological sciences ($p < 0.001$) perceive less empathy from their instructors.

Interestingly, in all three countries, students in the education and social sciences fields are the ones who report having the most empathetic instructors (Chile: $F(5, 1728) = 16.64$, $p < 0.001$; Ecuador: $F(5, 583) = 5.71$, $p < 0.001$; Mexico: $F(4, 240) = 4.94$, $p < 0.001$).

Regarding the instructors, there are no significant differences between countries ($F(2, 923) = 1.60$, $p = 0.20$). However, there are significant differences by gender ($t(921) = 3.04$, $p = 0.002$). Female instructors perceive themselves as more empathetic than males. On the other hand, there are significant differences between disciplines ($F(5, 657) = 5.09$, $p < 0.001$). Instructors in education majors perceive themselves as significantly more empathetic than instructors in the field of biological sciences ($p < 0.001$).

3.1.2. About Didactic Organization in ERHE

Table 6 presents results regarding the second dimension of the questionnaires: Didactic organization. Significant differences are observed in the experience of students from the three countries ($F(2, 2639) = 72.28$, $p < 0.001$). When making comparisons between groups through the Tukey-HSD test, it is observed that Chilean students report the remote educational process with lower didactic organization ($p < 0.001$), while Ecuadorian students report a better perception of this variable ($p < 0.001$).

Table 6. Perception of Didactic Organization from Students and Instructors in Chile, Mexico, and Ecuador.

Country	Participants' Perspective on Didactic Organization	M	SD
Chile	Students	3.43	0.73
	Instructors	4.53	0.47
Mexico	Students	3.82	0.70
	Instructors	4.63	0.44
Ecuador	Students	3.68	0.76
	Instructors	4.67	0.45

There are significant differences by gender (t(2623) = 6.16, $p < 0.001$). Female students perceive the didactic organization of their virtual classes more positively (M = 3.61, $p < 0.001$). Additionally, there are significant differences by cycle (F(2, 2635) = 19.90, $p < 0.001$): intermediate-level students (third and fourth year) report a more negative perception in this area. There are also significant differences by disciplinary area (F(5, 2562) = 11.17, $p < 0.001$), with students in education majors reporting a better experience in this variable (M = 3.62, $p < 0.001$) and students in engineering fields reporting the lowest (M = 3.36, $p < 0.001$).

Regarding teaching strategies, students report that the most frequently used ones in ERHE are technological expository (using video capsules or YouTube), written response (such as work guides), dialogic, and traditional expository (presentation through online PowerPoint). The least used strategies were collaborative and gamification approaches.

There are significant differences in the perception of students from Chile, Mexico, and Ecuador regarding students' participation (F(2, 2639) = 47.30, $p < 0.001$). When making comparisons between groups through the Tukey-HSD test, Chilean students have the most negative perception ($p < 0.001$).

Regarding the instructors, we found significant differences between Chile and the other two countries (F(2, 923) = 6.49, $p < 0.01$). Chile has a lower mean ($p < 0.01$). There are no significant differences by gender, nor are there significant differences by discipline area.

Furthermore, through a Chi-squared test of independence, teaching strategies reported by the instructors were compared. It was found that Chilean instructors report significantly fewer dialogical activities than other instructors ($Chi^2(2) = 6.00$, $p = 0.04$) and fewer written response activities ($Chi^2(2) = 22.25$, $p < 0.001$). Ecuadorian instructors report the most technological expository activities ($Chi^2(2) = 1.75$, $p = 0.42$) and traditional expository activities ($Chi^2(2) = 3.93$, $p = 0.14$). Finally, Mexican instructors report the most significant collaborative activities ($Chi^2(2) = 9.96$, $p < 0.01$).

3.1.3. Collaborative Work in ERHE

Table 7 presents the results of the third dimension: Collaborative work. We found significant differences between Ecuadorian students and the rest of the countries (F(2, 2639) = 115.00, $p < 0.001$). When making comparisons between groups through the Tukey-HSD test, results show that Ecuadorian students report a higher presence of collaborative work than the others ($p < 0.001$).

Also, there were differences by gender (t(2623) = 5.73, $p < 0.001$), with women reporting a higher experience of collaborative work. Additionally, there are significant differences between academic cycles (F(2, 2635) = 16.89, $p < 0.001$). Intermediate cycle students express a significantly lower level of collaborative work. On the other hand, there are also differences among students from different disciplines (F(5, 2562) = 21.28, $p < 0.001$). Students in the field of education significantly differ from other areas, reporting higher levels of collaborative work.

Table 7. Perception of Collaborative Work by Students and Instructors in Chile, Mexico, and Ecuador.

Country	Participants' Perspective on Collaborative Work	M	SD
Chile	Students	3.23	0.89
	Instructors	3.61	1.03
Mexico	Students	3.83	0.73
	Instructors	3.94	0.80
Ecuador	Students	3.30	0.86
	Instructors	4.15	0.81

Regarding the instructors, there were significant differences between Chile and the other two countries ($F(2, 923) = 17.53$, $p < 0.001$). The Chilean sample has the lowest scores. There are also gender differences ($t(921) = 3.90$, $p < 0.001$), with female instructors having a higher perception of the implemented group work. There are no significant differences between disciplines ($F(5, 657) = 0.18$, $p = 0.97$).

3.1.4. Quality of Assessment in ERHE

Table 8 shows the results of the fourth dimension of the questionnaire: Quality of Assessment perceived by students and instructors. We found significant differences between Chilean students and students from Ecuador and Mexico regarding the assessment of learning ($F(2, 2639) = 184.90$, $p < 0.001$). Using the Tukey-HSD test, it is observed that Chilean students have the lowest score, indicating the most negative opinion regarding the quality of education ($p < 0.001$). On the other hand, Mexican students are the ones who show the best appraisal ($p < 0.001$).

Table 8. Perception of Quality of Assessment from Students and Instructors in Chile, Mexico, and Ecuador.

Country	Participants' Perspective on Quality of Assessment	M	SD
Chile	Students	2.12	0.97
	Instructors	2.44	1.11
Mexico	Students	2.99	1.06
	Instructors	3.00	1.04
Ecuador	Students	2.65	1.07
	Instructors	3.18	1.09

We found significant differences between men and women ($t(2623) = 6.14$, $p < 0.001$), with female students having a more positive perception of the quality of assessment of learning. Also, there are significant differences between academic cycles ($F(2, 2635) = 12.29$, $p < 0.001$). Students in the initial cycle presented a more positive opinion than the other two cycles. Finally, there were differences between students from different disciplines ($F(5, 2562) = 56.54$, $p < 0.001$). Students in the fields of engineering and biological sciences have a significantly more negative opinion of the quality of assessment compared to students in the Education field.

Through the ANOVA test, significant differences are observed between Chile and the other two countries in the case of instructors ($F(2, 923) = 31.79$, $p < 0.001$). When making comparisons between groups using the Tukey-HSD test, we noticed that Chilean instructors have the lowest mean ($p < 0.001$). In other words, they have the most negative opinion about assessment in ERHE.

There were also significant differences by the gender of the instructor ($t(921) = 2.71$, $p = 0.007$), with female instructors having a generally better opinion of the quality of assessment. Additionally, there are significant differences by disciplinary area ($F(5, 657) = 3.39$,

$p = 0.005$), with instructors from education-related fields reporting a better experience in this variable and those from engineering areas reporting the lowest.

Using the Chi-squared test of independence, we observed that Chilean instructors report higher use of open-ended items than the rest ($Chi^2(2) = 4.81$, $p = 0.09$), and Ecuadorian instructors significantly use more closed-ended items ($Chi^2(2) = 65.62$, $p < 0.001$). There are no significant differences in the use of performance-based tasks among instructors from different countries ($Chi^2(2) = 1.79$, $p = 0.41$).

On the other hand, female instructors report fewer closed-ended responses and more open-ended responses and performance-based tasks. Instructors from the education area significantly use more open-ended items and performance-based tasks, while instructors from biological sciences use more closed-ended items.

3.1.5. Perception of Students' Learning in ERHE

Table 9 presents results concerning the fifth and last dimension of the questionnaire: Perception of learning during ERHE. We found significant differences between Chilean students and students from Mexico and Ecuador ($F(2, 2639) = 190.30$, $p < 0.001$). Chilean students show a significantly lower score in their perception of learning. Additionally, there are differences between Mexico and Ecuador and in favor of Ecuador.

Table 9. Perception of Student Learning from Students and Instructors in Chile, Mexico, and Ecuador.

Country	Participants' Perspective on Student Learning	M	SD
Chile	Students	3.01	0.81
	Instructors	3.01	0.85
Mexico	Students	3.69	0.69
	Instructors	3.54	0.79
Ecuador	Students	3.49	0.78
	Instructors	3.44	0.78

There were also significant differences between men and women ($t(2623) = 6.68$, $p < 0.001$); women had a higher perception of learning. There were also significant differences between cycles ($F(2, 2635) = 28.58$, $p < 0.001$). Intermediate cycle students perceive significantly lower learning. Finally, there are significant differences between discipline areas ($F(5, 2562) = 13.54$, $p < 0.001$). The perception of learning differs among students in education and health-related careers, on the one hand, and students in engineering and biological science fields, on the other. The former group perceived achieving higher learning outcomes.

Regarding instructors' appraisal, there were significant differences between Chile and the other two countries ($F(2, 923) = 37.25$, $p < 0.001$). When comparing the groups using the Tukey-HSD test, it is observed that Chilean instructors reported a lower mean. In other words, they perceive that their students learned significantly less than the students from other countries, comparing the other instructors' perspectives. There are no differences by gender.

3.2. Predictive Model to Explain Perception of Student Learning from the Perspective of Both the Instructor and the Student

Multiple linear regression was performed to create explanatory models of student learning perception as viewed by both instructors and students themselves. Table 10 displays the outcomes from the teacher's standpoint, while the student's perspective is presented in Table 11.

Table 10. Perception of Student Learning from Instructors' Perspective.

	B	SE
Women	0.005	0.070
Social Sciences	0.091	0.149
Health	−0.357 *	0.151
Engineering	−0.292 *	0.144
Education	0.152	0.156
Biological Sciences	−0.281	0.242
Intermediate Cycle	−0.153 *	0.070
Terminal Cycle	−0.103	0.104
Empathy for students	0.046	0.039
Didactic organization	0.254 ***	0.073
Collaborative work	0.058	0.036
Quality of Assessment	0.068 *	0.033
Intercept	1.541 ***	0.345

* = $p < 0.05$; *** = $p < 0.001$.

Table 11. Perception of Student Learning from Students' Perspective.

	B	SE
Women	0.074 **	0.028
Social Sciences	0.023	0.080
Health	−0.103	0.089
Engineering	0.067	0.077
Education	0.088	0.081
Biological Sciences	−0.040	0.120
Intermediate Cycle	−0.091 ***	0.027
Terminal Cycle	0.069	0.036
Empathy for students	0.119 ***	0.018
Didactic organization	0.493 ***	0.023
Collaborative work	0.190 ***	0.016
Quality of Assessment	0.021	0.013
Intercept	0.289 **	0.101

** = $p < 0.01$; *** = $p < 0.001$.

Table 10 shows that the participating instructors perceived that their students learned more in the ERHE education when the instructional organization of their synchronous classes was effective, the evaluation methodologies employed were reliable, the students were not in the intermediate cycle, and they did not belong to Engineering or Biological Sciences undergraduate areas.

Table 11 exposes that the participating students perceived more learning in the ERHE when the instructional organization of their synchronous classes was felt effective, instructors displayed empathy towards their students, and peer collaborative work exercises were conducted. Additionally, this trend was observed among female students who were not in the intermediate cycle.

Noteworthy, for instructors, pedagogical variables explain their students' learning (both instructional and evaluative aspects); however, for students, in addition to instructional aspects, the instructor's empathy and collaborative work carried out in classes are relevant. These variables encompass undeniable socioemotional components.

4. Discussion

Due to the pandemic, the implementation of remote education in 2020 was developed in an emergency. In this study, we intended to describe Chilean, Ecuadorian, and Mexican students' and instructors' evaluations on several aspects of the teaching and learning process, paying attention to sex and educational cycle (that is, 'study-expertise') in the case of students, in order to be able to identify needs of improvements for future cases.

Initially, educational institutions were concerned with internet access, providing equipment to enable connections, and creating physical spaces to facilitate the distance learning process. However, these basic conditions were not assured. Many students faced challenges due to the lack of access to electronic devices and a stable internet connection, as evidenced by the previous studies [13,16].

In these three national contexts participating in our study, many instructors had to learn on the fly how to use technologies for an online teaching and learning process. Initially, this remote education was a transfer, adaptation, or exact copy of face-to-face education. There was no time for special preparation. As instructors gained experience, nevertheless, it became increasingly clear that a different approach was needed [30,33,36].

The first point of discussion of our results is that students' and instructors' perceptions differ regarding the same aspects, and this pattern is consistent across the three studied countries. In general, instructors tend to have a more favorable perception than students in the five dimensions examined: empathy, didactics, collaborative work, assessment, and learning. Students, as recipients, revealed themselves as more critical than instructors and showed more disagreement with ERHE. These findings align with those of [15], who demonstrated that many students reported a loss of quality in online education compared to face-to-face education. This also corresponds with the findings of [6], who highlighted that students faced challenges in staying focused on online assignments and exams due to distractions. Additionally, they missed the face-to-face interactions with instructors and classmates, which impacted their ability to ask questions and receive real-time feedback, which reminds us of the need to carefully design even the smallest details of inter-peer interaction to facilitate a successful learning experience [37].

On the other hand, one issue on which instructors and students agree is that the area of assessment of learning is the least successful. Assessment remains the Achilles' heel, even more so in online education contexts, as pointed out by [26]. The assessment system generates mistrust among all participants. On the one hand, there were concerns about the possibility of dishonest practices (copying and plagiarism), which raises doubts about the academic integrity of students. Indeed, there were doubts about whether the grades obtained by students truly reflect what they have learned. This is associated with the research findings of [9], where they identified several problems in assessing online learning.

One of the main issues they found was the lack of adequate tools and methods for assessing online learning. Instructors also pointed out that it is challenging to assess student participation and engagement online, as well as the authenticity of work submitted electronically. Additionally, instructors mentioned that the absence of face-to-face interaction with students hinders effective feedback and assessment of learning. Pre-pandemic literature already warned about the need to take specific measures for assuring learning assessment in the online context [35], thus guaranteeing that the online space goes beyond a medium of delivery of students' solved assignments or a means of test-taking but evolves into a safe space for effective feedback. In this regard, studies have shown [48] the importance of moving towards more authentic, contextualized, and challenging assessments, where students are required to apply knowledge, make decisions, and demonstrate performance. This entails incorporating more frequent performance-based tasks and the use of open-ended items. Instructor feedback plays a key role in remote education, as it allows for monitoring of learning and encourages student self-regulation. Unfortunately, the main preoccupation of instructors during ERHE was in proctoring measures.

The good news is that remote education has allowed some progress to be made. A systematic review by [49] analyzed how the COVID-19 pandemic affected assessment in HE. The study found that traditional methods, such as paper-and-pencil examinations, have become less common while project-based assessments have become more popular. Additionally, it showed that online assessment methods can be more efficient and effective than traditional methods.

The cross-country comparison also reveals certain trends. In general, both Chilean instructors and students tend to be more critical of their experience in emergency remote

education compared to Ecuadorian and Mexican participants. Chilean students, in particular, perceive less empathy from their instructors and have a more negative perception of remote education's didactics and assessment. Moreover, Chilean instructors are the ones who perceive most that their students learn less, and they also consider themselves less dialogical in their teaching compared to their peers in Ecuador and Mexico. In contrast, in the Ecuadorian sample, students, despite having the least technological conditions for remote education, perceive greater empathy on the part of their instructors. Instructors stand out for engaging in more tutoring activities. Finally, Mexican students are the ones who have the most technology for ERHE and are most likely to engage in performance-based tasks for assessment. Instructors stand out for engaging in more collaborative work activities.

It is important to mention that in Chile, the pandemic occurred immediately after the social upheaval experienced since October 2019. This meant that many university students had their first experience of remote education during (and on top of) a time of social unrest without the necessary conditions, and the results were not very positive. Therefore, the ERHE pandemic possibly started with a negative predisposition due to previous experiences and also because of the emotional impacts caused by the political and social polarization during those times.

Our second goal pointed at differences between participants' views considering sex differences and study experience in the case of students. Regarding sex, we found noteworthy results. In most of the dimensions assessed, females, both students and instructors, tended to make more positive evaluations of ERHE than their male counterparts. We found no previous study that could help us interpret these results; we would want to underline them. The previous worldwide study of Aristovnik and colleagues [15] did not throw significant differences between students by sex, which might indicate that differences could be linked to Latin-American cultural particularities in addition to sex. Regarding study experience, there is a negative trend in the evaluations of ERHE by students in the intermediate cycle (third and fourth year of studies) compared to students in the initial or terminal cycle. This could be interpreted based on the experience and comparison that third- and fourth-year students make between face-to-face and remote education during crucial years of their professional training. Such a comparison cannot be fully made by students in the initial cycle since they lack enough university experience and can hardly compare to other kinds of study practices at HE, and students in the final cycle take it less seriously as they are close to graduating from their degree course.

Regarding comparisons between disciplines, there is also a trend that has been previously discussed by [25]. Students studying education-related careers tend to share a more positive evaluation of the various dimensions of ERHE. The opposite occurs with engineering-related careers, which tend to have a more negative view. The additional difficulty of communicating mathematically in the online context could help understand these results [31].

It would be interesting to delve into what factors contribute to women in general, and students studying education-related careers in particular, having a more positive impression of the implementation of ERHE. Similarly, understanding why engineering students, male students, and those in their third and fourth year of studies have a more negative evaluation of this process. Future studies could be carried out to further investigate these aspects.

The results of this research enable us to identify areas for improvement in future experiences of ERHE, as was our third goal, particularly generalizable to the Latin American context. For instance, the instructional design should be modified to be more dynamic, more dialogic, and to give greater prominence to students. Attention should also be focused on the instructor-student bond, including aspects like containment, visibility, and dyadic relationship, as it has a significant impact on learning, particularly during emergencies. Additionally, it is crucial to ensure clarity in instructions and to consider the needs of the learner, as discussed in the article by [14].

There is a need to enhance dialogic, collaborative, gamified, and technology-based teaching activities, especially considering that didactics and dialogic interaction are two variables that significantly predict remote learning, according to [43]. Additionally, it is known that communication between students and instructors was negatively affected during ERHE, which had an impact on the quality of learning, as stated by Senanayake and colleagues [13].

Technology-based remote education is here to stay, offering many opportunities and positive aspects in terms of learning and outreach. Prior to the pandemic, ref. [40] explored students' perceptions of learning regardless of the course delivery method and online environment. The results indicated that perceptions of face-to-face learning were higher than those of online learning in terms of social presence [37], social interaction, and satisfaction. However, there is always a place for contrasting views. In previous studies, some students even felt very comfortable with online learning, as it gave them the opportunity to be innovative through the use of computer technology.

On the other hand, Bustamante and colleagues [18] identified benefits of ERHE, such as the flexibility and accessibility of online learning. Students reported greater ease in accessing learning materials and organizing their study time, enabling them to learn at their own pace and on their own schedule. Additionally, some students mentioned that online education allowed them to save time and money by avoiding daily commuting to the university. Instructors also reported greater flexibility in lesson planning and the possibility of reaching a wider audience.

It is, therefore, necessary to gain a deeper understanding of how students perceive and react to ERHE, as the perception and attitude of students and instructors are critical to motivation and learning. The pandemic has had a significant impact on the lives of HE students and instructors around the world. Students reported higher levels of anxiety, stress, and depression during the pandemic, negatively affecting their emotional well-being, learning, and quality of life [15]. Future research on remote education should consider these aspects.

5. Conclusions and Practical Ideas

Remote education can have significant benefits and opportunities for both students and instructors if we learn from the experience of ERHE during the pandemic. The possibility of saving time on transportation, having greater flexibility in the educational process, studying at one's own schedule and pace, and promoting a more sustainable education are certainly benefits in today's world and for the future.

However, technology-based HE cannot be reduced to these logistic aspects. We know that the instructional design of ERHE should be different from face-to-face education. Logistically, it becomes necessary to consider, for instance, shorter synchronous classes and ensure students have the minimum and basic conditions for internet access and technological devices for distance learning.

Emotional aspects are also crucial. There is a focus on the importance of stronger connections between instructors and students, as well as among students themselves, as face-to-face interaction and social relationships are missed. Additionally, showing empathy towards students in their new learning process is essential.

Pedagogical aspects cannot be overlooked. Instructors must strive for increased student participation and dialogue, prioritize the curriculum, and clarify what is essential. Undoubtedly, implementing assessment is a priority. Students need meaningful and realistic assessments that allow them to apply their knowledge. It is equally important to provide opportunities for feedback from instructors to clarify doubts, learn from mistakes, and reinforce their successes. Both students and instructors perceive instructional organization as a crucial variable for explaining learning.

In this sense, technology should be at the service of learning and the user, transforming (and facilitating) learning. Not just transferring the face-to-face classroom PowerPoint to the online environment. To achieve this, we must pay attention to the protagonists of the

teaching and learning process, students and instructors, in order to respond to instructors' need for professional development and to the learner's perspective and learning needs.

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