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Strengths and Weaknesses of Emergency Remote Teaching in Higher Education From the Students' Perspective: The Portuguese Case

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Motivated by the COVID-19 pandemic, most students of higher education institutions (HEIs) in Portugal experienced online learning from March 2020 to July 2020. Based on the answers obtained from students to a set of two open questions included in a questionnaire, this article aims to identify the positive (strengths) and negative (weaknesses) aspects of online learning during this period, which is also known as emergency remote teaching (ERT). A total of 2,107 valid answers were gathered. Issues related to comfort and time management were the topics most frequently mentioned by students as strengths, particularly for those who are simultaneously workers. In contrast, the assessments, interaction, and self-confidence comprised the set of the most frequently mentioned by students as weaknesses. In this latter context, the most evident differences were found by age, type of course, and students' status. The breakdown by gender did not show any relevant difference, regardless of the item under analysis. These findings may be useful for decision-makers to plan their actions, particularly regarding the new challenges for the future of higher education programs. Those actions may include the options regarding the most proper learning model among face-to-face, online, or blended learning by case, as well as the measures to improve the overall quality of the online learning to increase the students' satisfaction.

Keywords: emergency remote teaching, higher education, online learning, strengths, weaknesses, students' perspective

INTRODUCTION

The COVID-19 pandemic led to a general lockdown in several countries which responded in different ways to the challenge of maintaining the continuity of learning (Vincent-Lancrin et al., 2022). In Portugal, the higher education institutions (HEIs) abruptly moved from face-to-face to online classes from March to July of 2020. This period, which has impacted students from all over the world, was also called emergency remote teaching (ERT) since all the actors, including students and teachers, had no alternative or time for preparation (Gillis and Krull, 2020; Sason et al., 2022).

Then, teachers and students had to rapidly adapt to the methods that they were not used to, and for which some of them did not have the proper skills, nor the proper conditions. According to the study by Iglesias-Pradas et al. (2021), for classes and assessments, teachers used the tools and methods that they already knew, with no time to choose the most appropriate for each situation.

For instance, video conferencing platforms and institutional learning management systems (LMS) were commonly used tools during the lockdown (Chaka, 2020).

The literature on the ERT covers several countries, such as the United States (Parker et al., 2021), Hungary (Ismaili, 2021), Switzerland (Cacault et al., 2021), Portugal (Gonçalves et al., 2020; Flores et al., 2021), or China (Huang et al., 2020), including also multi-countries studies (Aristovnik et al., 2020; Marinoni et al., 2020; Ozfidan et al., 2021). Most of them collected data from a questionnaire (Aristovnik et al., 2020; Gillis and Krull, 2020; Gonçalves et al., 2020; Flores et al., 2021; Hensley et al., 2021), although some complemented the survey with interviews (as Parker et al., 2021).

Although being disruptive and unplanned, students rated some positive aspects or strengths of ERT. The main ones are the time and location flexibility, and health security (Gonçalves et al., 2020; Ismaili, 2021; Ozfidan et al., 2021; Parker et al., 2021). The class time flexibility and being able to assist classes everywhere are key features that distinguish online classes from face-to-face ones. For example, being at home was not only convenient but also safer during the COVID-19 pandemic and cheaper (especially for those who lived far from school).

Students also stressed teacher engagement as a strength of the online learning experience (Flores et al., 2021; Parker et al., 2021), as it is an essential element in the learning process. According to the study by Sason et al. (2022), during emergency times, students have significantly higher expectations of the teachers' technical and affective roles. Although recognizing the importance of self-motivation, and the individual learning approach, students valued the interaction and discussions as important attributes of online classes to motivate them to learn (Ozfidan et al., 2021), pointing out the importance of pedagogical practices, such as the teachers' support, the quality of the materials provided, and the quality of interactions (Flores et al., 2021).

Students also highlighted the need for social interaction. Then, the presence of a teacher in synchronous classes provided this element as if students were in the classroom, which was helpful in a period of isolation and social distancing (Dewsbury and Mermin, 2021; Nguyen et al., 2021; Todri et al., 2021). Aligned with this, Gonçalves et al. (2020) found that most of the students stressed that the use of conferences (e.g., video and audio) in synchronous classes facilitates the online learning process. Students also considered synchronous classes more engaging and motivating, allowing an easier interaction (Serhan, 2020; Dewsbury and Mermin, 2021). Therefore, and despite rating asynchronous techniques as very accessible and useful, students do not consider them as enjoyable as synchronous ones (Gillis and Krull, 2020).

The need for social interaction may also explain why students prefer face-to-face classes to online ones (Elfirdoussi et al., 2020; Lassoued et al., 2020; Cacault et al., 2021; Ismaili, 2021) since students rate the lack of face-to-face interaction and the absence of traditional classroom socialization as negative aspects of online classes (Gonçalves et al., 2020; Muhammad and Kainat, 2020). For instance, when being able to choose, most students at a public Swiss university preferred face-to-face lectures rather than online classes, which were used only occasionally, namely when it was too "costly" to attend the classes in person (e.g., in sickness cases and bad weather days) (Cacault et al., 2021).

Regarding the negative aspects or weaknesses of ERT, students showed concerns about the quality of their online education and the impact of the pandemic on their ability to learn and on their grades (Pettigrew and Howes, 2022). Flores et al. (2021) pointed out that students generally consider assessments as a negative factor in online learning, as they are more difficult, unfair, and more susceptible to fraud. According to the study by Maraqa et al. (2021), the nature and methodology of online assessments influenced the student perception as regards remote learning.

Other common weaknesses stressed by students when facing online classes are their disengagement, lack of concentration, and time management, due to the excessive number of homework (Hensley et al., 2021; Ozfidan et al., 2021; Parker et al., 2021). In addition, the criticism related to the unsuitability of the course contents in an online learning environment, particularly in what concerns laboratory and practical classes (Gonçalves et al., 2020; Parker et al., 2021), is also the reason behind the students' preference for face-to-face learning.

As technical infrastructure is a prerequisite for ensuring adequate distance learning, either from the HEIs or the students, this is a further element stressed by the literature as of the most important to a successful students' adaptation to online education, and commonly appointed as a weakness aspect of the ERT given the lack of basic issues, which directly impacted the classes quality and effectiveness, such as equipment (e.g., computers, laptops, or tablets) and reliable Internet (Coman et al., 2020; Favale et al., 2020; Gonçalves et al., 2020; Huang et al., 2020; Liguori and Winkler, 2020; Marinoni et al., 2020; Flores et al., 2021; Maraqa et al., 2021; Ozfidan et al., 2021; Treve, 2021; Zalat et al., 2021). The World Bank (2020) identified these as infrastructure challenges faced by the HEIs and students in the online learning process. Regarding the necessary conditions to have online classes, the lack of a suitable workspace is also pointed out by students as limiting their learning ability (Gillis and Krull, 2020; Maraqa et al., 2021).

Regarding the influence of sociodemographic characteristics, the literature is not conclusive in what concerns to the gender. According to the studies by Aristovnik et al. (2020) and Warfvinge et al. (2021), male students were more negative toward the online learning experience, whereas female students felt significantly better at coping with the transition. Bisht et al. (2020) also concluded that female students were keener to adopt online education in terms of assignments, study patterns, and comfort. However, Maraqa et al. (2021) found that male students were more inclined to online learning than female students, and Flores et al. (2021) did not find significant differences in gender concerning the adaptation to online learning among Portuguese high students. Concerning other sociodemographic factors, according to the study by Todri et al. (2021), the distance learning experience is more appropriate for those who have a job, and according to the study by Aristovnik et al. (2020), the applied sciences students (being a more practical course) are the ones significantly unsatisfied with ERT.

Given the specificity and atypicality of this ERT, it is relevant to identify the students' perceptions of it. Therefore, this article aims

to identify the positive (strengths) and negative (weaknesses) aspects of the online learning experience in Portuguese HEIs. The findings from this research may be useful for decision-makers to plan their actions, particularly regarding the new challenges for the future of higher education programs. Those actions may include the options regarding the most proper learning model among face-to-face, online, or blended learning by case, as well as the measures to improve the overall quality of the online learning to increase the students' satisfaction.

This article is structured into three sections besides this introduction. The "Materials and Methods" section supports the findings. Then, the "Results" section presents the results, and the "Discussion" section provides the limitations and avenues for future research.

MATERIALS AND METHODS

This section is divided into three subsections. The first section provides the information on the sample collection, the second section describes the variables, and, finally, the third section presents the method used for data assessment.

Sample Collection

This study aims to identify the positive (strengths) and negative (weaknesses) aspects of the online learning experience in HEIs in Portugal, which was motivated by the COVID-19 pandemic.

After the first lockdown, most students of HEIs in Portugal experienced online learning from March 2020 to July 2020. Then, the analysis is based on the students' answers to a set of two open questions, included in a questionnaire, covering this period. In the light of the literature review, the questionnaires constitute the main source of data collection for studies in this line of research (Aristovnik et al., 2020; Gillis and Krull, 2020; Gonçalves et al., 2020; Flores et al., 2021; Hensley et al., 2021).

The questionnaire, which was administered online through Google Forms, was distributed in July 2020 among the students of different courses and HEIs in Portugal who took synchronous and asynchronous online classes and online assessments. For this purpose, an invitation was sent by e-mail to several departments of HEIs, asking them to make it available to students. The participation was entirely voluntary and free.

At the end of the process, 2,107 valid answers from those students were gathered. Based on the study by Fávero and Belfiore (2017), and considering the reference population, the sampling error of the study is less than 5% with a confidence level of 95%. Based on the students' answers, 69% are female students, 58% are 25 years or younger, 27% are from practical courses, and 33% are also workers. Finally, most of the students (88%) have their personal computers to attend the online classes. The next subsection provides details on these demographic variables, which will be used for a more detailed analysis of the collected data.

Despite the abovementioned figures, the answers were attributed, in some cases, to more than one of the items of strengths or weaknesses proposed, as the answers indicated different topics. Then, some slight differences concerning those

figures can arise from this double-counting process. In contrast, it should be taken into account that the students' opinion on the strengths and weaknesses was not mandatory, in an effort to obtain a voluntary option on these issues. For this reason, missing values are also possible. Notwithstanding, those cases were also counted (one time) to capture the level of students who had no strong opinion on the positive (strengths) and negative (weaknesses) aspects of the online learning experience in HEIs in Portugal. The next subsection provides further details on the options taken for analysis purposes.

Variable Description

To obtain the students' perspective on the positive (strengths) and negative (weaknesses) aspects of the online learning experience, answers were assessed and classified into different items. Missing answers, as well as answers that indicated "none," "all," and similar were also classified. This classification is provided for both categories of strengths and weaknesses proposed.

The items were created to the extent that the answers pointed out a new element of analysis that could be individually classified for analysis purposes, also considering the similarities of the answers and perspectives regarding a certain aspect. Keywords were then used as an auxiliary process to classify the answers. Notwithstanding, each answer had to be individually read, given that, sometimes, the sense of the answer pointed out a different classification, even when students used similar words. For this reason, some keywords appeared in different items, depending on the overall context.

The objective of the classification proposed was to provide a quantitative analysis from the qualitative aspects mentioned by students on the strengths and weaknesses regarding their online learning experience. At the end of this process, with advances and setbacks to assure that different answers were related to a similar aspect, the following items were gathered as a relevant matter of analysis, as provided in **Table 1**.

To facilitate the comparison, the items proposed to the strengths and weaknesses analysis have the same numbering despite the different perspectives. However, items 8 and 9 were observed as non-applicable to the weaknesses analysis, being exclusively identified to the strengths analysis. In contrast, items 4 and 5 were exclusively identified to the weaknesses analysis.

Furthermore, there is an inherent constraint related to this type of analysis from its subjectivity. For instance, it is difficult to distinguish if a criticism of the classes or professors should be attributable to item 1 or 13, given that the pedagogical method proposed by a given professor could be explained by his/her non-adaptation to online classes. Then, and to avoid a higher level of researcher bias, those cases were classified within item 1 whenever it was not specifically mentioned the issues related to item 13. The same applies to other items, such as the one related to the online assessments (item 11), where the students' criticism could be associated with a low level of professors' adaptation to online learning overall.

The first part of the questionnaire included demographic variables relating to gender ($V1$), age ($V2$), course ($V3$), the students' status ($V4$), and students' condition (devices available) ($V5$).

TABLE 1 | Strengths and weaknesses items gathered.

Item	Some related keywords
0—Missing	Not applicable
1—Pedagogical quality	Availability; capacity; classes; feedback; learning; organization; pedagogy; professors; quality; support; teachers; teaching
2—Asynchronous online classes	Asynchronous; classes; record
3—Moodle, files, and other resources	Documents; contents; files; Moodle; materials; means; resources; tools
4—Internet issues	Internet; break; access; connection; fail; speed
5—Other infrastructures	Computers; devices; softwares
6—Comfort and timing management	Access; convenience; comfort; home; management; timing; transport
7—Autonomy, self-motivation, and learning process	Autonomy; independence; self-motivation; self-responsibility; organization; learning; management
8—Saving	Costs; home; money; rent; resources; transportations; savings
9—Health security	COVID-19; health; pandemic; safety; SARS-Cov-2; security; virus
10—Attention and concentration	Attention; noise; concentration; conversation; silence; disturbance
11—Assessments	Assessments; exams; grades; Moodle; quizzes; tests
12—Adaptation to online learning	Adaptation; efforts; innovation; resilience; technology
13—Interaction and self-confidence	Interaction; intervention; mutual help; participation; relationships; support; self-confidence
14—Others (general issues), as a residual category	
15—None/I don't know/I have no opinion	
16—All	

The objective behind the $V3$, despite the subjectivity of the classification proposed, is to find a different pattern of perspective concerning the need for more practical classes, which is attributed to courses, such as engineering, medicines and laboratory practices, information systems and similar, and arts (e.g., dance, music, cinema, and theater) in comparison with courses, such as management, accounting, finance, marketing, international trading, public relations, history, and other social sciences in general. Furthermore, the V5 has the objective to compare possible differences in students' perspectives concerning the existence, or not, of a proper condition to attend the online classes.

Analysis Method

As this article addresses two open questions, exploratory analysis is proposed (based on Hensley et al., 2021). Despite that, a significant effort was developed for converting the qualitative information into quantitative data, as explained in the previous subsection. Through this process, frequency analysis (in absolute and in relative terms) enables the development of a more comprehensive perspective.

Then, and in addition to the answers computed for the total, the results will be assessed through comparisons between two main subgroups identified within each of the demographic variables described earlier, as follows:

- gender ($V1$): men (codified as "M") vs. women (codified as "F");
- age ($V2$): 25 years or younger (codified as "$\leq$ 25") vs. older than 25 years (codified as "$>$ 25");
- course ($V3$): more theoretical courses (codified as "T") vs. more practical courses (codified as "P");
- students' status ($V4$): worker (codified as "W") vs. non-worker (codified as "NW");

TABLE 2 | Demographic variables.

Variable	Classifications proposed
Gender (**V1**)	Female (F)
	Male (M)
Age (**V2**)	Older than 25 years old ($>$ 25)
	25 years old or younger ($\leq$ 25)
Course (**V3**)	More practical courses (P)
	More theoretical courses (T)
Students' status (**V4**)	Non-worker (NW)
	Worker (W)
Students' condition (devices available) (**V5**)	Shared computer or non-proper devices, such as mobile phones (SC)
	Non-shared computer (NSC)

- students' condition (devices available) ($V5$): non-shared computer (codified as "NSC") vs. shared computer or non-proper devices, such as mobile phones (codified as "SC").

Table 2 presents the demographic variables studied and the classifications proposed.

The next section is dedicated to present the results considering the methodology proposed in this study.

RESULTS

This section presents the findings from the analysis of the strengths and weaknesses mentioned by the students in the questionnaire. **Figure 1** summarizes the relative frequencies of each item proposed.

From **Figure 1**, it can be observed a higher level of missing values (item 0) for the strengths (39%, which may be compared with 33% for the weakness), which indicates that the student's voluntary participation had a 61% level. From this

FIGURE 1 | Strengths (S) and weaknesses (W) from the students' perspective, in percentage.
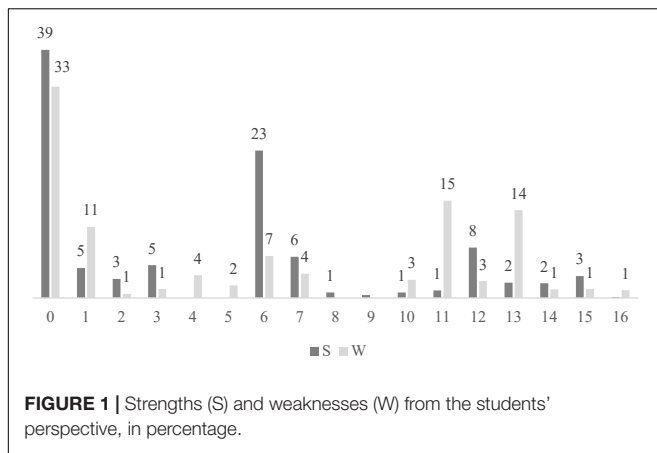
perspective, the level of students' participation (non-missing values) is two-third (67%) in the context of the weakness items, which means that students pointed out weaknesses more frequently than strengths.

It can also be seen for the strengths, as the most frequently mentioned item, the item "6. Comfort and timing management," with 23% of all cases (only 7% for the weaknesses). With percentages between 5 and 8%, the following items arise in the context of the strengths: "1. Pedagogical quality" and "3. Moodle, files, and other resources," with 5% in both cases, "7. Autonomy, self-motivation, and learning process" (6%), and "12. Adaptation to online learning" (8%). Therefore, it may be stressed a relevant difference (15 percentage points) between the most frequent and all other aspects mentioned by students concerning the strengths regarding their online learning experience.

In contrast, the highest level of a given weakness item is 15%, which can be found for item "11. Assessments," which is close to the 14% level found for item "13. Interaction and self-confidence." It is worthwhile to mention that these two aspects had low frequencies in the context of the strengths (1 and 2%, respectively). Following, it arises the item "1. Pedagogical quality" (11%) and, finally, the "6. Comfort and timing management" (7%). This latter case is pointed out, in the context of the weaknesses, from the students' feeling of overwhelming as regards the academic homework and other activities during the lockdown. It is relevant to stress that some of those latter cases might also be associated with assessments issues. This is explained by the fact that students did not specify, in some cases, if the abovementioned feeling was specifically related to assessments or other academic activities in general.

Some examples of the abovementioned items as the most frequently mentioned by students are provided below:

- **Item 1—Strengths**: "The dedication of professors to fulfill all the objectives of the curricular unit." and "The commitment and attention showed by the professors who gave us online classes."; **Item 1—Weaknesses**: "It is difficult to understand the topics taught." and "The classes did not significantly contribute to the knowledge of the topics."

- **Item 3—Strengths:** "Possibility of having different tools, such as videos and files for our study." and "The availability of complementary means of study."
- **Item 6—Strengths:** "I don't waste time on transport to college." "It is more comfortable and there is less time wasted." "The speed of access that does not imply the mobility of the student on long journeys by public transport." "The fact that I could study at home, where I felt most comfortable. It was easier to manage my time and not lose contact with my family"; **Item 6—Weaknesses:** "A lot of physical and psychological fatigue from being all day in front of the computer for study and work purposes." and "The significant number of academic homework and other activities that professors required just because we are at home."
- **Item 7—Strengths:** "Encouraging autonomy in learning." and "It requires to students have greater organizational skills."
- **Item 11—Weaknesses:** "Multiple-choice tests are not adequate, as the rationale cannot be assessed." and "More assessments when compared to face-to-face classes."
- **Item 12—Strengths:** "It allowed us to acquire new knowledge and different teaching methods, which may be advantageous or applied at certain times in the future." and "The agility and flexibility required by teachers and students."
- **Item 13—Weaknesses:** "Drastic decrease of contact with colleagues and teachers." and "Lack of interaction among colleagues."

Following, **Table 3** shows the aspects mentioned by students on the strengths regarding their online learning experience, with a breakdown by groups of analysis. Differences in absolute value higher or equal to 3 percentage points between the relative frequencies obtained for any subgroups, in relation to total, are highlighted in bold.

Based on **Table 3**, the level of missing values is higher (lower) from the students' answers who are younger (older) or non-workers (workers). The item "6. Comfort and timing management" is an aspect more noticeable for the group of students who are also workers, reaching 29%. Finally, the older or worker students were also the ones who pointed out more frequently the item "12. Adaptation to online learning" (11 and 12%, respectively).

Table 4, in turn, shows the aspects mentioned by students on the weakness regarding their online learning experience, with a breakdown by groups of analysis. The cases were highlighted in bold in a similar way, as proposed for **Table 3**.

In the context of the weakness items, older or worker students were, again, more participative than the opposite group in each case (74 and 75%, respectively). Furthermore, there was a higher level of participation by students who shared their computers or used a non-proper device (i.e., mobile phones) to attend the online classes (72%). In comparison with the opposite subgroup, students from more practical courses more significantly identified the item "13. Interaction and self-confidence" as a weakness (20%), conversely to the items

TABLE 3 | Results for the strengths from the students' perspective by groups, in number and percentage.

	In number (in percentage)										
	Gender		Age		Course		Students' status		Students' condition		Total
Item	F	M	> 25	≤ 25	P	T	NW	W	SC	NSC	
0	586	248	259	575	224	610	653	181	100	734	834
	(40%)	(37%)	**(28%)**	**(46%)**	**(41%)**	**(38%)**	**(45%)**	**(26%)**	(37%)	(39%)	**(39%)**
1	81	20	45	56	22	79	60	41	10	91	101
	(5%)	(3%)	(5%)	(4%)	(4%)	(5%)	(4%)	(6%)	(4%)	(5%)	**(5%)**
2	35	29	29	35	25	39	41	23	7	57	64
	(2%)	(4%)	(3%)	(3%)	(5%)	(2%)	(3%)	(3%)	(3%)	(3%)	(3%)
3	73	37	59	51	18	92	66	44	17	93	110
	(5%)	(5%)	(6%)	(4%)	(3%)	(6%)	(5%)	(6%)	(6%)	(5%)	**(5%)**
6	344	152	231	265	132	364	297	199	54	442	496
	(23%)	(22%)	**(25%)**	**(21%)**	(24%)	(23%)	**(20%)**	**(29%)**	(20%)	(23%)	**(23%)**
7	94	44	46	92	31	107	103	35	16	122	138
	(6%)	(6%)	(5%)	(7%)	(6%)	(7%)	(7%)	(5%)	(6%)	(6%)	**(6%)**
8	9	9	16	2	2	16	4	14	3	15	18
	(1%)	(1%)	(2%)	(0%)	(0%)	(1%)	(0%)	(2%)	(1%)	(1%)	(1%)
9	7	3	5	5	4	6	6	4	3	7	10
	(0%)	(0%)	(1%)	(0%)	(1%)	(0%)	(0%)	(1%)	(1%)	(0%)	(0%)
10	14	4	12	6	3	15	11	7	1	17	18
	(1%)	(1%)	(1%)	(0%)	(1%)	(1%)	(1%)	(1%)	(0%)	(1%)	(1%)
11	17	8	9	16	1	24	20	5	1	24	25
	(1%)	(1%)	(1%)	(1%)	(0%)	(1%)	(1%)	(1%)	(0%)	(1%)	(1%)
12	114	55	104	65	35	134	88	81	24	145	169
	(8%)	(8%)	**(11%)**	**(5%)**	(6%)	(8%)	**(6%)**	**(12%)**	(9%)	(8%)	**(8%)**
13	35	16	27	24	20	31	36	15	6	45	51
	(2%)	(2%)	(3%)	(2%)	(4%)	(2%)	(2%)	(2%)	(2%)	(2%)	(2%)
14	29	20	31	18	12	37	28	21	4	45	49
	(2%)	(3%)	(3%)	(1%)	(2%)	(2%)	(2%)	(3%)	(1%)	(2%)	(2%)
15	43	31	34	40	21	53	50	24	21	53	74
	(3%)	(5%)	(4%)	(3%)	(4%)	(3%)	(3%)	(3%)	**(8%)**	**(3%)**	(3%)
16	2	1	2	1	1	2	2	1	1	2	3
	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0%)
Total	1,483	677	909	1,251	551	1,609	1,465	695	268	1,892	2,160
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)

"11. Assessments" (10%) and, although with a less significant difference, the item "1. Pedagogical quality" (8%). Finally, the item "13. Interaction and self-confidence" was also more expressively felt as a weakness by older or worker students (17 and 19%, respectively), which can be potentially explained by the greater willingness to accept new technologies by the younger ones.

The next section is dedicated to the discussion, limitations, and avenues for future research.

DISCUSSION

This article summarizes, from the answers provided by HEIs students to two open questions, the positive (strengths) and negative (weaknesses) aspects of their online experience, motivated by the first lockdown. For this purpose, the aspects pointed out by the 2,107 students were classified. These aspects were particularly in line with similar studies on this period of ERT (e.g., Gonçalves et al., 2020; Cacault et al., 2021; Flores et al., 2021; Ismaili, 2021; Ozfidan et al., 2021; Parker et al., 2021).

More specifically, and regarding the main strength stressed by students, comfort and timing management was the one most rated, standing out from the rest. This corroborates the literature, as being able to attend classes anywhere, namely at home or work, saving time and money on long journeys are seen as the most positive aspect of the ERT experience by students (Gonçalves et al., 2020; Ismaili, 2021; Ozfidan et al., 2021; Parker et al., 2021).

The pedagogical quality, including teacher availability, pedagogical methods, and support, was also stressed as positive, as well as the item Moodle, files, and other resources (regarding the diversity and quality of the materials provided), which is aligned with previous studies (Flores et al., 2021; Parker et al., 2021). The adaptation to online learning, including the use

TABLE 4 | Results for the weaknesses from the students' perspective by groups, in number and percentage.

	In number (in percentage)										
	Gender		Age		Course		Students' status		Students' condition		Total
Item	F	M	> 25	≤ 25	P	T	NW	W	SC	NSC	
0	524	215	240	499	193	546	566	173	79	660	739
	(34%)	(31%)	**(26%)**	**(38%)**	(33%)	(33%)	**(37%)**	**(25%)**	**(28%)**	**(34%)**	**(33%)**
1	164	85	106	143	48	201	160	89	38	211	249
	(11%)	(12%)	(11%)	(11%)	**(8%)**	**(12%)**	(10%)	(13%)	(13%)	(11%)	**(11%)**
2	8	6	11	3	4	10	7	7	2	12	14
	(1%)	(1%)	(1%)	(0%)	(1%)	(1%)	(0%)	(1%)	(1%)	(1%)	(1%)
3	22	9	22	9	2	29	15	16	6	25	31
	(1%)	(1%)	(2%)	(1%)	(0%)	(2%)	(1%)	(2%)	(2%)	(1%)	(1%)
4	59	21	42	38	21	59	52	28	19	61	80
	(4%)	(3%)	(5%)	(3%)	(4%)	(4%)	(3%)	(4%)	**(7%)**	**(3%)**	(4%)
5	33	11	29	15	15	29	22	22	11	33	44
	(2%)	(2%)	(3%)	(1%)	(3%)	(2%)	(1%)	(3%)	(4%)	(2%)	(2%)
6	111	36	52	95	44	103	121	26	15	132	147
	(7%)	(5%)	(6%)	(7%)	(8%)	(6%)	**(8%)**	**(4%)**	(5%)	(7%)	**(7%)**
7	49	36	19	66	21	64	71	14	11	74	85
	(3%)	(5%)	(2%)	(5%)	(4%)	(4%)	(5%)	(2%)	(4%)	(4%)	(4%)
10	46	17	26	37	22	41	44	19	7	56	63
	(3%)	(2%)	(3%)	(3%)	(4%)	(2%)	(3%)	(3%)	(2%)	(3%)	(3%)
11	241	99	134	206	57	283	236	104	41	299	340
	(16%)	(14%)	(14%)	(16%)	**(10%)**	**(17%)**	(15%)	(15%)	(14%)	(15%)	**(15%)**
12	29	30	36	23	17	42	29	30	6	53	59
	(2%)	(4%)	(4%)	(2%)	(3%)	(3%)	(2%)	(4%)	(2%)	(3%)	(3%)
13	213	94	155	152	114	193	174	133	34	273	307
	(14%)	(13%)	**(17%)**	**(12%)**	**(20%)**	**(12%)**	**(11%)**	**(19%)**	(12%)	(14%)	**(14%)**
14	17	13	19	11	9	21	16	14	5	25	30
	(1%)	(2%)	(2%)	(1%)	(2%)	(1%)	(1%)	(2%)	(2%)	(1%)	(1%)
15	19	12	24	7	8	23	10	21	3	28	31
	(1%)	(2%)	(3%)	(1%)	(1%)	(1%)	(1%)	(3%)	(1%)	(1%)	(1%)
16	13	14	11	16	9	18	17	10	6	21	27
	(1%)	(2%)	(1%)	(1%)	(2%)	(1%)	(1%)	(1%)	(2%)	(1%)	(1%)
Total	1,548	698	926	1,320	584	1,662	1,540	706	283	1,963	2,246
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	100%

of the available technologies, resilience, as well as autonomy, self-motivation, and learning process were also considered strengths to point out.

In what concerns the main weakness rated by students, there was not a single one that stands out. Instead, different aspects, such as assessments, interaction and self-confidence, and pedagogical quality, arose.

Regarding the assessments, in particular, students set out their disapproval of the online assessments and the impact on their grades, particularly with multiple-choice tests, which were seen as more difficult and unfair. These corroborate the literature in what concerns the influence of the online assessments methodology on the students' perception of ERT (Flores et al., 2021; Maraqa et al., 2021; Pettigrew and Howes, 2022). In addition, time management difficulties, with students' feeling overwhelmed with the academic homework, were another weakness of this experience, aligned with previous research

(Hensley et al., 2021; Ozfidan et al., 2021; Parker et al., 2021).

Regarding the item interaction and self-confidence, the lack of interaction, close relationships, and support (not only by teachers) were also seen as a weakness of ERT, which may be explained by the need for social interaction during the lockdown according to the literature (Elfirdoussi et al., 2020; Gonçalves et al., 2020; Lassoued et al., 2020; Muhammad and Kainat, 2020; Cacault et al., 2021; Ismaili, 2021). This is also a fundamental aspect to keep in mind when deciding about future higher education programs (e.g., face-to-face, online, or blended learning), which can be affected by some specific characteristics of either students or courses.

Although the pedagogical quality was pointed out as a positive aspect, only 5% of the students highlighted it. Conversely, 11% of them stressed this as a weakness of the ERT that stresses the importance of the teacher in the learning process and for the

students' satisfaction (Flores et al., 2021; Ozfidan et al., 2021; Parker et al., 2021). Given that students had higher expectations regarding teachers' technical and affective roles (Sason et al., 2022), they may have felt that many teachers were not prepared for the online learning challenges.

About the influence of sociodemographic characteristics in the student's perceptions, age, and students' status showed the most relative differences concerning the comfort and timing management, and adaptation to online learning items within the strengths.

In contrast, the age, type of course, and students' status had the most relevant differences in assessments and interaction and self-confidence items regarding the weaknesses.

These findings corroborate those of Todri et al. (2021), who pointed out that distance learning may be more appropriate for those who work, as well as Aristovnik et al. (2020), Gonçalves et al. (2020), and Parker et al. (2021), in what concerns the easier adaptation of theoretical courses to online learning.

Regarding gender, it was not found significant differences concerning the students' perception of ERT, which is aligned with the findings by Flores et al. (2021). However, it can be seen as a controversial aspect, as other researchers have reached different conclusions (e.g., Aristovnik et al., 2020; Bisht et al., 2020; Maraqa et al., 2021; Warfvinge et al., 2021).

Finally, as the main limitation of this article, it can be stressed the subjectivity related to the classification and analysis proposed, given the underlying constraints inherent in the clear identification of the strengths and weaknesses from the students' answers.

Further research may also explore the items and demographic variables proposed in this study through more robust analyses, such as regression, cluster analysis, and other quantitative methods.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article can be made available by the authors under request, without undue reservation.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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