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Distance Learning during the COVID-19 Pandemic: Resources, Obstacles, and Emotional Implications for Italian Students in Higher Education

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ABSTRACT

The study examined how 807 undergraduate Italian students coped with synchronous, asynchronous, and blended learning environments during the COVID-19 pandemic. Strengths and weaknesses of online learning were collected via an electronic platform (SurveyMonkey) and then categorized by grounded theory analysis using ATLAS.ti 8.0 software. The results showed technical, practical, relational, organizational, and transformative features of online learning emerged, differentiated in synchronous, asynchronous, and blended modes. Emotional aspects also affected the evaluation of distance learning because depression and fear were more frequent among the students who found distance learning to be an obstacle rather than a resource or felt ambivalent about it.

KEYWORDS

Distance learning; higher education; online teaching; perception and emotional response to COVID-19; resources and obstacles of e-learning

Distance Learning during the COVID-19 Pandemic

In response to the COVID-19 pandemic, universities worldwide have adopted educational applications, platforms, and virtual resources for the shift to online teaching. In many countries, including Italy, the reorganization of academic education has been consistent, with lessons delivered exclusively online since the onset of the pandemic. Building online learning management systems on a large-scale has been a relatively novel undertaking in which the virtual learning environment is organized in synchronous, asynchronous, and blended learning sessions. Virtual universities are not new and many deliver fully online programs (Stricker et al., 2011). Synchronous online classes produce teacher-student interactions very similar to face-to-face sessions but delivered online via a virtual platform that allows video/audio conferencing, instant messaging, and interactive applications. Usually, live interactions with the teacher and immediate feedback facilitate the learning climate and effective teaching (Lawson et al., 2010).

Asynchronous online classes do not require the simultaneous presence of teachers and students in a virtual classroom. Teachers assign homework or materials for study and reflection and plan the learning process of their students in video-recorded lessons, emails, and feedback on written assignments. This kind of learning promotes learner autonomy and critical thinking since students can self-pace their interaction with the content and process the information (Hrastinski, 2008; Robert & Dennis, 2005). Both synchronous and asynchronous learning require expertise, time, experience, and familiarity with course development and design.

Blended learning combines the advantages of traditional learning methods and e-learning, as it alternates synchronous with asynchronous learning according to the learning objectives and the skills to be transferred within a preset timeframe (Singh, 2003). In this way, it can ensure teacher guidance and develop student initiatives (Graham, 2006).

“In general, blended learning refers to a pedagogical approach that combines multiple learning delivery means with traditional classroom teaching to perfect teaching efficiency and effectiveness” (Wu & Liu, 2013, p. 177). Mulla et al. (2020) stress the importance of training, aimed at teachers and students alike, to complete the transition to e-learning. While e-learning implies a distance between trainees, it is also a connectivity tool that allows the world to remain close to students educationally and emotionally.

In a moment of global crisis, innovation may be achieved by collectively taking up the task of teaching “how to think and how to approach a problem” (EAIE, 2020), while reserving virtual room meetings for the exchange of ideas, the manifestation of human warmth, and the sharing of emotions

(Bloom et al., 2020). In the work by Chiu-Lan and Ming (2020) at the University of Studies and International Trade in Fuzhou, China, are reported the factors influencing the effectiveness of online education: autonomous learning skills and students' active participation, teachers' attitudes and inputs, platform functionalities, and didactic strategies selected by teachers. Numbering among the biggest challenges are the need to change teaching strategies and methods, the need to reset the boundaries of time and space (online and offline), to reskill teachers, and to reduce the psychological pressure from the unfamiliarity of ongoing change. Consequently, it does not underestimate the level of didactic and existential stress that students experience in this transition. For example, in India, following the closure of university facilities, Dwivedi et al. (2020) conducted a study involving 1000 medical students from which it appears that stress levels were far lower in those who engaged in e-learning than those who did not. Clinical training exposed them to a greater risk of contracting the virus; nevertheless, these results were very eloquent.

A study by Nariman at the Ritsumeikan Asia Pacific University in Japan (2021) reported a high degree of satisfaction with the e-learning educational system by more than 70% of the students interviewed. Distance learning (DL) can overcome the barriers of time and space; however, it can exacerbate inequalities, especially for students from remote and marginalized areas and for which specific educational interventions may be necessary (Demuyakor, 2020).

An underestimated aspect in the multitude of published studies is the link between delivery strategies for DL and students' emotions during the COVID-19 2020 lockdown, which is the main topic of the present study, as illustrated below.

Emotions and Learning in Pandemic Emergency

In emergency situations emotions are the driving force of action, influencing personal and interpersonal well-being. Emotions arise from affective and subjective experience, the cognitive evaluation of internal and external factors, and a motivational component that transforms impulse into action (Scherer, 1987). Emotions synthesize a complex experience that triggers a multicomponent response and disposes us to act in one or a completely different direction (Arnold, 1960).

Human beings possess a certain amount of control over events and the control mechanisms themselves are part of our emotional experience. This defines the motivational component of emotion that may induce students to accept or not some kind of learning experience (Izard, 1994). Furthermore, given the theoretical and empirical underpinnings of the interdependence between emotions and learning, we can say that positive

emotions have a positive effect on learning content that learners perceive as relevant to them (Bower, 1981; Schwarz, 1990), and on the readiness to undertake major changes (Fullan, 2013; Lillejord et al., 2018). Positive emotions broaden the way of thinking and the ability to deal with stress and adversities, ultimately increasing personal resilience (Fredrickson et al., 2003). Finally, emotions leave a trace on learning; recalling the gratifying emotion of having mastered something new. In contrast, negative emotions are managed by trying to control or eliminate them. Strongly negative emotions can distract a student's attention to a task (Hascher, 2010), impeding the learning process.

The abrupt shift to online learning coincided with the onset and rapid spread of the COVID-19 pandemic. Students suddenly had to deal with the anxiety of facing technological challenges, lifestyle changes, and health risks for themselves, their families, and entire populations (Bao, 2020). Many people experienced strong emotions, including worry, stress, fear, anxiety, and depression (Di Napoli et al., 2021; Marzana et al., 2022; Migliorini et al., 2021). Studies in various geographical contexts with different educational systems have provided empirical evidence for this emotional spectrum, also among students in higher education (Aristovnik et al., 2020; Aylie et al., 2020; Keckojevic et al., 2020; Pragholapati, 2020; Son et al., 2020; Villani et al., 2020).

Most studies to date have analyzed students' emotional responses during the stay-at-home restriction in relation to family variables (e.g., cohabitation with parents), social aspects (availability of social support), or clinical issues (COVID-19 contracted by people close to them). One study involving students from two Indian cities analyzed the emotions of university students, the fear of academic failure, and the online environment during the pandemic. The findings underlined the role of emotional intelligence in mediating depressive states and in coping with the crisis in a constructive and adaptive way (Chandra, 2020). The authors of the present study went on to state how the spectrum of emotions (anxiety, anger, depression, fear) observed during DL may help explain students' evaluations of distance learning as a resource or obstacle, and the emotions associated with COVID-19 experience.

Methods

Research Aims

The study had three objectives: (1) understand the strengths and weaknesses of DL from the students' viewpoint; (2) analyze the relationship between DL perceived as a resource or an obstacle and the learning environment (synchronous, asynchronous, blended); (3) analyze the relationship

between DL perceived as a resource or an obstacle and students' emotional experience during the pandemic.

Participants

The study population was 807 undergraduate Italian students (128 males and 679 females, average age 22.12 years \pm 4.68) enrolled at seven public and private universities (North, Central, and Southern Italy), attending courses in psychology and education sciences. The majority were females, which is in line with the proportion of women studying psychology in Italian universities (78%; Censis, 2019), and reflects the common female majority in response degrees in an online survey during the Covid Pandemic (Smith, 2008). They benefited in different ways from the distance learning environments provided by their universities. [Table 1](#) presents the characteristics of the study population and the distance learning environment they experienced.

Procedure

The present study is part of broader national research investigating the impact of COVID-19 on the personal and social life of university students (Di Napoli et al., 2021; Migliorini et al., 2021). Students were asked to express their emotions and describe meaningful events they experienced during the first lockdown in the spring of 2020 (March 2020) by writing their responses in a textbox on the Survey Monkey platform; responses could range from a few words to a total of 10,000 characters. For the present study, we analyzed only the texts in which the students described their experience of DL and their emotions related to the pandemic. The project was reviewed by the Ethical Committee of Psychological Research, Department of Humanities, University of Naples Federico II and was approved before the data mining (protocol 10/2020).

Table 1. Sample characteristics.

Variable	Mean/%	SD/N
Sex		
Male	15.9	128
Female	84.1	679
Learning environment		
Blended	48.9	395
Synchronous	36.2	292
Asynchronous	14.9	120
Geographical origin		
North Italy (NI)	50.3	406
Central Italy (CI)	6.9	56
South Italy (SI)	42.8	345

Data Analysis

A mixed, quali-quantitative, sequential-step methodology was used.

First, the textual material was analyzed by researchers to explore from the bottom the meanings that the students attributed to their online learning experience. Researchers coded significant words and sentences, according to a bottom-up approach. The data disclose an emerging reality from the interactive process with a specific structural, social, and temporal context (Mills et al., 2006). In this theoretical framework and with the use of Atlas.ti (version 8.0) software, the texts were encoded, and portions were assigned labels that synthesized the meanings (open coding). The codes were then assembled into semantic categories of a higher level of abstraction, in which codes with homogeneous semantics were grouped together (axial and selective coding). Several online meetings, involving researchers from seven Italian public and private universities, were held to share with the national research team the meanings attributed to the written materials.

The present study describes the perception of DL and the emotions experienced in the early phase of the pandemic. The literature on emotions is enormous and the language can be ambiguous when we refer to mixed emotions, rendering it difficult to classify into predetermined categories (Plutchik, 2001). For this reason, the students were asked to describe their personal emotional experiences; the texts were subsequently codified according to the bottom-up approach described above. To ensure coding reliability, the research team discussed and solved step-by-step any inconsistencies in code taxonomy to reach an agreement between researchers.

The coded distance learning experience and emotions were then transformed into matrix data to obtain an exact match between single respondent and assigned code. The second step of quantitative analysis was evaluating the association between the perception of DL (as a resource or an obstacle) and both the learning environment (synchronous, asynchronous, blended), and the emotional experience reported by the students.

We performed χ^2 statistics to assess the statistical impact of the teaching methods and the operative observables, as well as between the observables. During the first phase, the dataset was cleaned and prepared for analysis; the preconditions for inferential statistics were then assessed (i.e., subsample balancing, minimal numerosity, skewness, and kurtosis for continuous variables). Descriptive statistics were computed for the sociodemographic and the operative variables.

Results

Qualitative Analysis

Based on the codes from text analysis we described the aspects of DL according to the students' experience: technical/practical, relational, cognitive, organizational, and transformative aspects. These dimensions were then grouped into two semantic categories (resource and obstacle) which connote the students' experience.

DL as Obstacle

The obstacle category was the most frequent in the students' texts (46.2% of codes). It refers to aspects that in some way limited or impeded the learning process and personal and professional growth. The category was characterized by expressions referring to the distance learning experience in clearly negative terms because it limited the positive aspects of face-to-face teaching. Analyzing the students' responses, we found that the obstacle was mainly "relational" (35.1%). Students referred to the absence of contact with their teachers and peers and to the lack of visual feedback and paraverbal communication; analysis of the qualitative data also suggested a degree of embarrassment by the webcam prying into the privacy of students' homes and living situations with other family members due to stay-at-home restrictions; finally, the relational aspects also heavily affected students who found it difficult to participate in online discussion due to the one-way communication in frontal lessons, to accept being filmed with a webcam and see their own image projected on the computer or smartphone screen. The following responses exemplify this kind of obstacle:¹

The lack of direct contact with the teacher and classmates, with the university community, diminishes the sense of belonging (NI, F21).

We can't talk face-to-face with our teachers and classmates if we want to ask for explanations (CI, F21).

I can't be myself; I feel inhibited by the computer screen. I can't participate as I'd like to (SI, M27).

I like having direct contact, eye contact with the teachers, all kinds of human contact, so the downside of remote learning is that you're not close to anyone. I fear that this kind of learning environment creates distance between people, which would not have happened in other circumstances (SI, F20).

Other experiences that negatively affected DL were the technical (18.6%) and the cognitive (17.2%) aspects. The reference to technical obstacles reveals the inequality in obtaining devices (webcam, microphone, etc.), technological infrastructure inadequacy with frequent

connection problems, and academic platform overload, as emerged in the following responses:

The connection is often down, making it difficult to follow the lessons (NI, F22)

It's become very difficult to follow lessons online because of connectivity problems with the teacher and classmates (CI, M22)

One problem is that I don't have a webcam and so I can't take exams (SI, F25).

The code “cognitive obstacle” refers to distractions in the home environment, the difficulty to stay engaged during the lesson, and the psycho-physical fatigue of entire days spent in front of a computer screen:

Students and teachers are easily distracted; it's difficult for us to remain engaged and for them to remember what they're talking about (NI F22)

Troubles with everything; remote learning is arduous and online sessions are often more difficult than normal class lessons (CI, F23)

The home can be a lot noisier than the classroom, making it difficult to pay attention (SI, M20)

The code “organizational obstacle” was less frequent (14.5%); the “transformative” code was even rarer. The code “organizational obstacle” referred to the inability of universities to ensure the provision of services or to problems the students had in continuing courses, taking online exams, and participating in degree ceremonies; these problems affect both the symbolic meaning of these events (for example, degree ceremonies) and the organizational communication at different levels: secretariat, bureaucratic procedures, etc.

My experience with remote learning has shown me that not everything is a ready-to-use plug-in, that the technology often is of no help, and that it's difficult to keep up and motivated to keep going (NI, F27)

There's no time to keep up with the recorded sessions (CI, F21)

Especially situations in which nonverbal gestures like a handshake no longer occur, and there are no visual cues that help you understand what's happening (SI, F22).

Finally, the “transformative obstacle” code referred to a kind of resistance to change. DL was perceived as a sort of challenge. Teachers were not sufficiently trained in the use of remote technologies, and some students missed what they had before the pandemic, pointing to what was lost rather than what could be gained by adaptation to the new environment.

Students and teachers seem to have lost their way (NI, M19)

What's missing is the community life of the university and the chances for discovery and growth (CI, M21)

Some teachers, despite their efforts, fail to create interest and the lessons just drag on as usual (SI, F20)

DL as a Resource

The “resource” category (18.8%) comprised the aspects that students felt supported their learning process, personal and professional growth. This category involved expressions with a positive connotation; DL generated new possibilities in the personal domain and for peers and teachers. No verbalization has been recorded for DL as a cognitive resource.

DL was perceived as a “technical and practical resource” when it allowed access to new platforms, new technological tools, and when it helped organize the day because it reduced commuting time for off-campus students or working students; it reduced self-study time since students could review recorded lessons whenever they wanted. For example:

I used the chance to explore new platforms for alternative learning (SI, M29)

Remote learning for a commuter like me is very convenient and saves me time and money (train fare, food) (CI, F23).

I think it could be a good tool in the future [...] so that students who want to study but don't have the money can follow lessons (recorded and uploaded on Moodle) and still go to work (NI, F22).

Some responded that DL can be viewed as an “organizational resource” (9.5%), underlining the importance of feeling part of an academic community and the reassuring impact this has on personal life (e.g., ensuring a stable routine, strengthening the sense of being part of a greater whole, etc.), as can be seen from these responses:

Remote learning provides for maintaining a basic routine (NI, F25).

I believe that my university, or better, my teachers, did an excellent job in managing the situation and that it was not that complicated to follow online lessons (CI, F21).

I've learned that studying and the university are an important part of my life. Remote learning has taught the teachers that their students are important, as is the direct contact with us (SI, F21).

Some felt that DL can provide a “transformative resource” (4.8%): a challenge to the reluctance of academic organizations to renew themselves by adopting positive changes (being stronger, more resilient, more creative, more avant-garde, etc.)

A future area of focus could be to develop and refine online learning, an opportunity that was missed in 2020 (NI, F21).

We're lucky that we can go beyond opening a book and taking notes: we study what we are and there's no better time than the present to accept this (CI, F22).

Remote learning has taught us to overcome the present circumstances and to continue studying even if it's become more difficult (SI, F21).

DL was also viewed as a “relational resource” (4.1%) when it concerned the discovery of a new way of relating (between students and between students and teachers). For example, a sort of affective closeness emerged in the sharing of personal life, captured by the webcam; it turned out that speaking while watching oneself on a computer screen can help overcome the shyness and the embarrassment of speaking in public and enhance the relationship and empathy with teachers, as some students wrote:

Remote learning gives voice to the shy who'd never dare speak up in class (NI, F22).

I can find only positive aspects to remote learning, like greater teacher accessibility (CI, F22).

I'm very happy with the work the teachers and the university did; their effort to assure us gives me emotional satisfaction (SI, F25).

Inferential Statistics

We analyzed whether the perception of DL as an obstacle or a resource was randomly distributed by teaching method (synchronous, asynchronous, or blended). At this level of description, obstacles were less perceived in the courses that used blended learning, while resources were more perceived in synchronous learning, and ambivalent (both as obstacle and resource) in blended learning [$\chi^2_{(4)} = 13.89, p < 0.001$].

To detect any other differences, we compared the four domains that showed both resources and obstacles (relational, organizational, transformative, and technical) with the teaching method (synchronous, asynchronous, or blended) (Table 2) and the evaluation of DL (resource, obstacle or ambivalent) with the emotions mentioned above (Table 3). Analysis of the differences between students' evaluation of the domains within each teaching modality showed that (Table 2):

- the technical domain was perceived as an obstacle mainly in blended and asynchronous learning, while it was perceived as a resource in synchronous learning
- the relational domain was perceived more as an obstacle than a resource in all three learning environments

Table 2. Differences between the students' evaluation of the domains within each teaching modality (χ^2 statistics).

Domain	Modality	Resource	Obstacle	Ambivalent	$\chi^2(df=4)$
Technical	Blended	71 (19.5%)	78 (21.4%)	33 (9%)	16.17**
	Synchronous	62 (22.9%)	48 (17.7%)	11 (4.1%)	
	Asynchronous	21 (18.6%)	24 (21.2%)	1 (0.9%)	
Relational	Blended	18 (4.9%)	158 (43.3%)	8 (2.2%)	17.65**
	Synchronous	14 (5.2%)	88 (32.5%)	6 (2.2%)	
	Asynchronous	1 (0.9%)	37 (32.7%)	1 (0.9%)	
Organizational	Blended	38 (10.4%)	49 (13.4%)	7 (1.9%)	21.15***
	Synchronous	20 (7.4%)	45 (16.6%)	1 (0.4%)	
	Asynchronous	19 (16.8%)	23 (20.4%)	5 (4.4%)	
Transformative	Blended	21 (5.8%)	1 (0.3%)	1 (0.3%)	37.21***
	Synchronous	11 (4.1%)	19 (7%)	1 (0.5%)	
	Asynchronous	7 (6.2%)	12 (10.6%)	1 (0.9%)	

NB: For the sake of clarity, only responses related to obstacles, resources, and ambivalent are reported. Percentages refer to the original codes including missing responses (** $p < 0.01$; *** $p < 0.001$). *df* denotes degrees of freedom.

Table 3. Relationship between emotional activation and DL evaluation (resource or obstacle).

Emotion	Level	Resource	Obstacle	Ambivalence	χ^2
Depression	Absent	97 (22.4%)	223 (51.5%)	113 (26.1%)	7.83*
	Present	55 (17.4%)	150 (47.5%)	111 (35.1%)	
Fear	Absent	86 (18.8%)	251 (54.9%)	120 (26.3%)	12.65***
	Present	66 (22.6%)	122 (41.8%)	104 (35.6%)	
Anxiety	Absent	68 (20.6%)	176 (53.3%)	86 (26.1%)	4.42 ^{ns}
	Present	84 (20.0%)	197 (47.0%)	138 (32.9%)	
Rage	Absent	124 (20.5%)	309 (51.1%)	172 (28.4%)	3.38 ^{ns}
	Present	28 (19.4%)	64 (44.4%)	52 (36.1%)	

* $p < 0.05$; *** $p < 0.001$; ^{ns}Not significant.

- the organizational domain was perceived as an obstacle and as a resource in blended and asynchronous learning; the percentage of responses referring to obstacles was slightly higher; it was viewed more as an obstacle than a resource in asynchronous learning
- the transformative aspect was perceived more as a resource than an obstacle in blended learning, while the opposite was noted for synchronous and asynchronous learning.

The general effect of the sex variable on emotions was also evaluated. We found a statistically significant effect only for anxiety and depression: female students reported a higher level of these emotions than their male counterparts [$\chi^2_{(1)} = 7.07$, $p < 0.001$ and $\chi^2_{(1)} = 8.31$, $p < 0.001$, respectively].

Finally, the results of the analysis of relationships between distance learning evaluation (resource, obstacle, or ambivalent) and emotions (depression and fear) are presented in Table 3. As indicated in the methodology section, emotions, both absent and present, for each respondent

were noted. In a previous study analyzing responses during the first Italian lockdown, the emotions category included codes related to fear, anxiety, depression, and anger, self-referred or to family and friends (Di Napoli et al., 2021).

The fear category included codes that referred to fear and terror. Fear, one of the most widespread initial emotions among respondents, concerned the health and the social sphere.

The anxiety category included the codes that described situations of anxiety, distress, worry, and tension. This category pervaded all aspects of daily life and referred to the loss of control over one's life and problems like falling asleep, studying, and maintaining other routines. Depressive emotions comprised sadness, despondency, loneliness, and helplessness. Loneliness and sadness were also noted among the most common depressive emotions. Anger was motivated by insecurity, tension, nervousness, and aggression. The anger that the respondents reported feeling was directed toward people who behaved inappropriately because they did not follow the rules for protecting collective health, and toward institutions, which were perceived as indifferent toward citizens' difficulties.

Analysis of the association between emotional activation and the evaluation of DL showed that depression and fear were more frequent in the responses from students who viewed DL learning as ambivalent than as a resource [$\chi^2_{(2)} = 7.83$, $p < 0.05$; $\chi^2_{(2)} = 12.65$, $p < 0.001$, respectively].

Discussion and Conclusion

One of the main aims of the present study was to understand the criticalities that need to be improved in DL. To do this, the study analyzed the students' perception of DL during the COVID-19 pandemic as universities had to massively shift to creating online learning environments and students had to rapidly adapt themselves to new situations and methods of learning.

Student evaluation of the DL experience was categorized into four domains through which we analyzed resources and obstacles of the online learning experience. This is an interesting contribution to the literature on DL as experienced by the students themselves, as such, it provides insight not into learning quantity but rather into the quality of activated learning.

Concerning the results of the qualitative analysis, the students recognized numerous obstacles to DL and their personal growth that we can reassume in a "devoiced vision" of opportunity which highlights the lack/loss of resources experienced in the transition to DL. Where DL is recognized as a resource it responds to pragmatic needs, not immediately related to any advantages for learning. This observation is shared by a

previous study that reported that online learning can place stressful and challenging demands on students to keep up with academic requirements (Fawaz et al., 2021). In particular, from results raise that DL poses relational difficulties in the relationship with peers and with oneself.

In addition, technical obstacles enhance the problem of inequalities as described elsewhere (Demuyakor, 2020). However, students also recognize that DL has the advantage that on an organizational level it allows for a deliberate routine, besides maintaining emotional closeness with peers and encouraging participation by shy students. This underscores the important function of DL as a connectivity tool (Mulla et al., 2020), especially in the current situation of social distancing. Also, students valued interaction with their teacher as an essential relational resource in DL. This result is in line with the inferential analysis from which it emerged that the technical domain is perceived as a resource in the synchronous mode, that is, in the learning environment that allows students to relate to the teacher.

DL was not seen as a cognitive resource and only partially as a transformative resource; this refers to the role that teachers can play in facilitating learning and giving meaning to the learning experience. Teachers should design online activities that help students engage in course content and in connecting with each other (Dixson, 2012). Encouraging critical thinking and helping students to make sense of the experience occur through guided discussion and tasks (Al-Husban, 2020).

Three further considerations emerged from the inferential analysis. The relational domain is perceived negatively, therefore as an obstacle, in all three learning environments considered, and in fact, as demonstrated in other studies (Villani et al., 2020) the relational sphere is undoubtedly the one most sacrificed by DL. Consistently, the organizational domain is an obstacle in the asynchronous mode since in this way students are deprived of community life and peer socialization that feeds the sense of academic community (Procentese et al., 2020). Finally, the transformative qualities of DL are perceived as a resource in the blended environment that offers the possibility to access both educational content and relationships with teachers and colleagues in an innovative way.

Similar to a previous study (Unger & Meiran, 2020), our study analyzed student response to the COVID-19 pandemic and found a range of emotions that included fear, anxiety, depression, anger, self-referred or referred to family and friends. We explored the relationship between the emotional experience of students during the COVID-19 pandemic and the perception of DL as a resource or an obstacle.

As we have said, students who experience emotions of depression and fear in relation to the pandemic situation are more inclined to evaluate ambivalent aspects of DL, while they are less able to identify the

resources. This result confirms the functions that the different qualities of emotions might have on the learning process and motivation (Hascher, 2010). In an emergency, students with emotional frailties may change their perception of learning environments, increasing the feeling of bewilderment. Supporting previous studies (Besser et al., 2022) our work suggests the need for universities to organize learning keeping in mind the feelings of their students, to promote positive emotions and increase resilience (Fredrickson et al., 2003).

The limitations of this study are referred first to an imbalance of the sample with respect to sex, being predominantly made up of females. Furthermore, in our study, we do not consider demographic background or academic outcomes that could have an impact on students' perception of DL. Future studies could take into consideration the difference between the degree programs students are enrolled in since some scholars have highlighted that university students who study nursing and medicine are inclined to be exposed to highly stressful circumstances during such outbreaks (Husky et al., 2020). These limitations notwithstanding, many of the lessons learned from student perception can be helpful for universities to develop innovative e-learning environments that might consider the resources or obstacles recognized by students in relation to different aspects of the DL. In particular, the study highlights the role that students' emotions, in this case associated with the emergency, have in the perception of DL as a potential tool for support and social sharing or, on the contrary, as a tiring experience, full of obstacles to face.

The research contributes to improve the field of teaching strategy and the possibility that Universities became an opportunity for innovation and care, creating a protective space in which both teachers and students may accomplish the educational challenge in a resilient way, taking into count both technical and emotional aspects.

Note

1. All quotations are followed by geographical area, sex, and age of the respondent.

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