Repositório ISCTE-IUL

LOOKING AT B-LEARNING AND ONLINE EXPERIENCE IN HIGHER EDUCATION DURING COVID-19

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Abstract

COVID-19 caused changes in teaching practices at various levels of education, namely in higher education. This study aims to present an analysis of an experience with higher education students in a b-learning pedagogical model, before and during the current pandemic and in different moments of the confinement measures. The curricular unit analyzed started with a blended-learning approach since 2018, considering the importance of innovative pedagogical models in student learning and became an essential resource during the pandemic period.

This case study was composed of a sample of 269 students from a Portuguese public University who attended the curricular unit Methods and Study Techniques, as optional, in their 1st year of degree, between February 2018 and March 2021.The data were processed using SPSS v.27, seeking to analyze different moments, according to the different confinement measures decreed by the Portuguese Government.

Participants are aged between 17 and 64 years old, 62.5% female and 24.5% worker-students. It was found that regardless of the context of confinement, students showed positive satisfaction with the online course, with its contents, with the platform and with the b-learning pedagogical method, especially during total confinement when classes were in distance learning. The most valued aspects in this modality were the flexibility of teaching the curricular unit and time management. The acquired tools were highly valued by the students, first for the adaptability that gave them, but mainly to face the distance learning challenge in their 1st year of degree, giving them planning and organizing skills for autonomous work. Most students did not point out a disadvantage in this modality, although they expressed the importance of face-to-face classes that were suspended in the context of a pandemic.

Keywords: b-learning, COVID-19, Higher Education, Pedagogical models.

1 INTRODUCTION

The COVID-19 pandemic caused several changes in the lifestyles of societies, thinking about better policies to combat the consequences of this pandemic crisis, it is necessary to understand its most immediate and future impacts [1].

According to the United Nations (UN) [2], school closures around the world, as a protective measure against contagion during the pandemic, touch around 1.5 billion children and young people, affecting their learning, safety, and well-being. The most recent data estimates that in higher education the temporary closure of educational institutions will have overcame 220 million students worldwide [3], and it has been a political and social responsibility to address learning losses, implement distance learning systems and reopen safe teaching spaces to protect mainly the most vulnerable students.

International reports by the Organization for Economic Cooperation and Development (OECD) demonstrate a concern about the disruptive effects on the human and social development of younger people and their more vulnerable position facing the future [4][5].

The loss of social interaction and physical activities in young people is also a concern of the World Health Organization (WHO) [6] which refers to the risk of this generation becoming even more addicted to sedentary behavior's and being prone to mental health problems, being necessary to rethink and prepare a safe return of the school community to face-to-face activities [7].

However, this was also an opportunity to promote and modernize new digital teaching tools that could bring positive innovations to education [8]. It should be highlighted how educational institutions had to adapt to a digital transition that would minimize the impacts of the suspension of classes and closure of schools and universities, particularly in the countries of the European Union [3].

The shift from face-to-face teaching to distance learning methodologies was urgent and unplanned, many higher education institutions needed to adapt quickly [9]. However, it is important to understand that distance education refers to a process of adaptation and development of planning of own strategies and tools, specific teaching and pedagogical materials, the use of virtual environments, as well as an adequate technical support structure for teachers and students and continuous training [10]. According to the European Union, students' study conditions (location, equipment, access and quality of internet), reliance on platforms, loss of family income, and lack of support for socio-emotional well-being were among the main challenges that students faced during the pandemic and that can negatively affect their progress [3]. More than using new technologies, it is also necessary to invest in pedagogical preparation for new teaching models that rely on the use of digital tools [11].

1.1 Impacts of the pandemic evolution in the context of higher education in Portugal

In Portugal, the worsening of the number of patients and mortal victims caused by COVID-19, led the Government to establish exceptional and temporary measures regarding the epidemiological situation of the new coronavirus (Sars-Cov-2) through the Law-Decree No.10-A/2020, of 13 March, even before the first State of Emergency was decreed in the country through the Republic President Decree No.14 -A/2020. This was how a process of suspension of the regular activities of schools and universities, as well as other support services in the area of education began. According to the Law No. 62/2007, higher education institutions, contrary to schools, enjoy scientific, pedagogical, cultural and disciplinary autonomy. Thus, the confinement measures generated fluctuating changes in the Portuguese education system, but the legal regime of higher education institutions safeguarded a greater freedom to adjust the models adopted in higher education, based on the recommendations of the Minister of Science, Technology and Higher Education Office. Thus, we can mark three distinct periods based on the measures adopted by the Portuguese Government.

A first moment was marked by the suspension of face-to-face teaching activities during the 2nd semester of the academic year 2019/2020, in which it was reinforced that all efforts should be promoted to stimulate distance teaching-learning processes, maintaining school activities through digital interaction between students and teachers [12]. Only on the first day of effective suspension of face-to-face classes (16 March 2020) more than 63 thousand participants were registered in about 2700 classes/meetings, and on 27 March 2020, an average of 10,074 meetings per day were already registered, with 221,972 users per day, which led the Government to invest in digital infrastructures to support higher education institutions [13]. Besides the change of face-to-face activities to models that contemplated distance learning, it was also necessary to create and implement contingency plans, non-existent in most organizations, namely in higher education institutions. With the evolution of the setback in the number of contagions, the forecasted reopening of face-to-face activities was pointed to May 2020, the Minister of Science, Technology and Higher Education Office produced recommendations for the phased reactivation of teaching and non-teaching activities with student's presence [14]. These recommendations were partially adopted by higher education institutions, which favour the return only of classes with a more practical or laboratory component and in the final assessment phases (exams).

With the suspension of more restrictive measures, the academic year 2020/2021 presented itself as a second moment, foreseeing the return to face-to-face activities, although combined with technologies that would allow maintaining distance learning. We cannot fail to point out that in Portugal in the academic year 2020/2021, in the middle of the pandemic, 62675 applications to higher education were registered, having been the year of highest demand in the last 25 years [15]. This was considered an unprecedented increase by the General Directorate of Higher Education, which considers it a sign of confidence in training and higher education institutions, especially in the context of the pandemic crisis. In August 2020, the Minister of Science, Technology and Higher Education Office presented new recommendations that had as main objectives to guarantee face-to-face activities, the adoption of realistic procedures and to stimulate pedagogical innovation and modernization [16]. Besides indications for a regular update of contingency plans and operational recommendations for the prevention of contagion, higher education institutions were also alerted that teaching should follow the accreditation modality approved for the operation of courses, which in Portugal is almost exclusively face-to-face. However, the orientation for presential face to face and online simultaneous classes at all levels of higher education, brought what was termed by the 'hybrid model', which in many cases only guaranteed the presence of teachers in the classroom, but not of all the students and it was not a blended-learning model (b-learning). The designation of a hybrid teaching model to represent teaching in classrooms with devices and computer programs had suffer criticism regarding its denomination, as it does not reflect a

pedagogical model that refers to an integrated learning experience between online and face-to-face [17].

The third moment is relative to the second semester of the 2020-2021, which started in the period of the second general confinement. On January 22, 2021, the regulation of the state of emergency in force by Decree No. 3-A/2021 is amended by Decree No. 3-C/2021, indicating again the suspension of face-to-face teaching and non-teaching activities in higher education institutions, without prejudice to the assessment (exams) seasons in progress [17]. Although the measures were enacted, still at the end of the first semester, their effects had a greater weight in the second semester, which was taught in an exclusively online format. In March 2021, with the forecast of the return to face-to-face teaching, the Minister of Science, Technology and Higher Education Office again made recommendations for the progressive lifting from 19 April, of the measures to suspend face-to-face activities in scientific and higher education institutions, considering the potential risk still existing [18]

1.2 Innovation and adaptation of teaching modalities in a Portuguese university during the pandemic: the case of LCT-Iscte

The Soft Skills Lab (in portuguese Laboratório de Competências Transversais - LCT-Iscte) was created in 2009 at Iscte - University Institute of Lisbon, offering students of all degrees a soft skills and languages curricular units, as a complement for the specific study plans of each graduation [19]. Since 2015, LCT-Iscte assumes the management and coordination of the production of online courses through the Online Learning (OL) project, initially through a wordpress-based platform. OL encompasses all the activities in the scope of the production, implementation and evaluation of online courses of Iscte - University Institute of Lisbon. When in 2017 the project gains greater visibility, the online courses platform becomes internal and managed by the Information Systems Development Office under the technical and pedagogical coordination of the Soft Skills Lab. The use of online courses has as principle a contribution to the implementation of a blended-learning model, which is not to be confused with in-class lessons transmitted simultaneously at a distance [17]. Within the various models of hybrid education or bl-learning, the model adopted by LCT-Iscte is close to the flipped classroom [20].

Students have a first moment of face-to-face classes, in which they have direct contact with teachers and peers, moving on to a second phase of online course completion. The online course allows students to have more flexible access to more theoretical content and to carry out exercises, giving space for the next classes to be reserved for more participatory activities rather than lectures. All online contents made available are elaborated by the course authors themselves, who teach in the Soft Skills Lab. Those courses were record in a professional studio, the FCCN (FCCN is the Scientific Computing Unit of the FCT - Foundation for Science and Technology), to record the teaching support videos [21]. The information, as well as the support materials used, are based on the procedures and instruments used in the experience and good practices of the project and on the contributions of the authors of videos and online courses. All the videos recorded as support to the online courses are based on the principle of microlearning [22], so that the contents have an adequate duration and allow maintaining the interest and motivation of the students. It also enables the videos to be reviewed whenever necessary, facilitating permanent access to the information. Whether in class or during the course remotely, teachers are always available to clarify questions or monitor the activities carried out by students. When they return to the classroom, students spend most of the class time solving problems, debating or working on projects.

In the specific case of the curricular unit Methods and Study Techniques, due to its forceful innovative component in supporting the achievement of academic success and promotion of social well-being, even before the pandemic, a b-learning model was already established since 2018. The online course designed to support the classes of this curricular unit integrates the main contents of it in 14 modules through videos and quizzes that allow its participants to improve skills in this domain. Activity forms are also made available through the university's e-learning blackboard. The objective of the curricular unit is to stimulate students' self-knowledge and autonomy in their learning, so that they can apply this knowledge in different contexts through the acquisition of competences of study methods and techniques [23]. Still when taught in face-to-face teaching, it combined expository, interrogative and active learning methodologies, using several pedagogical techniques to support teaching such as role play, exercises and group activities. With the transition to the b-learning modality the online course allowed students to have a combination of more interactive teaching methods that concede them to dedicate more time to practical activities in the classroom.

Table 1 - Distribution of synchronous and asynchronous contact activities

	1st moment	2nd moment	3rd moment
	Face-to-face (presentation of the class, explanation of the model and introduction to the curricular unit)	Realization of the online course (videos, quizzes and activity forms)	Return to face-to-face classes (group activities, debates and project work)
Before pandemic	In the classroom	Through the OL and Blackboard e-Learning platform and e-mail	In the classroom
During pandemic	In the classroom or via zoom	Through the OL and Blackboard e-Learning platform and e-mail	In the classroom or via zoom

Source: Author's elaboration

During the pandemic, there was an adaptation with the restriction of face-to-face classes to zoom classes (Table 1). The online courses and the LCT-Iscte lecturers' experience as teachers in the field of soft skills and with practice in articulating distance learning modalities, interpersonal communication skills and multimedia course production contributed to minimizing the impact of these constant transformations, adapting to the different teaching moments. Considering that LCT-Iscte was already prepared for online teaching, we wanted to understand: (1) how the b-learning learning process took place throughout the different moments of influence of the pandemic on the teaching-learning model; (2) the students' satisfaction with the b-learning platform and course (3) the advantages and disadvantages of the b-learning teaching model.

2   METHODOLOGY

The study was based on a sample of 269 students who took the online course on Study Methods and Techniques on the online platform between February 2018 and March 2021 at a Portuguese public university. The participants voluntarily completed a questionnaire, in which they were asked a set of questions about their perception with online experience, immediately after finishing the online course. The questionnaire was automatically generated by the platform without recording the student's name or number, thus ensuring the anonymity of participation. Statistical data were analyzed using the SPSS v.27 software.

Considering the different variables available for analysis, it was considered fundamental to analyse their satisfaction with the online course, with its contents, with the platform and with the b-learning pedagogical method. In order to be able to analyze the variations between the periods before and during the pandemic and the effects of the measures to suspend face-to-face activities with the closure of the universities, we chose to divide the sample into four groups according to the contextual framework presented: (1) before the pandemic; (2) at the beginning of the pandemic - transition to lockdown; (3) during the pandemic – without lockdown; (4) during the pandemic - in total lockdown (Table 2).

Table 2 – Distribution of the sample by school period and period of the COVID-19 pandemic

	Semester - academic years	COVID-19 pandemic period	N	%
1	2nd semester - 2018/2019 1st semester - 2019/2020	Before pandemic	60	22,3
2	2nd semester - 2019/2020	Pandemic - 1st lockdown	54	20,1
3	1st semester - 2020/2021	Pandemic - without lockdown	112	41,6
4	2nd semester - 2020/2021	Pandemic - 2nd lockdown	43	16
			269	100

The analysis regarding the perception of the course contents was performed using a 5-point scale of Likert ranging from 1 (strongly disagree) to 5 (strongly agree) on the following variables: the online course contents are presented in a clear and understandable way; the exercises suggested in the online course modules are adequate; the pedagogical material available on the online platform is adequate to the pedagogical objectives of the training modality; the questionnaires/tests, carried out online, contribute to the self-assessment of learning; the pedagogical strategy adopted is adequate to the pedagogical objectives of the b-learning modality. The same scale was used to analyze the accessibility of the platform, its availability and the degree of difficulty of the pedagogical model used, and aspects related to the perceptions of the learning processes. Regarding the overall satisfaction about the course, the general contents of the online course, the platform and the b-learning pedagogical method were rated by the students on a score from 0 to 10, where 0 represents total dissatisfaction, 5 represents moderate satisfaction and 10 represents total satisfaction.

The questionnaire ended with two open questions regarding the advantages and disadvantage of the b-learning modality, whose answers were systematized through a categorical content analysis for these dimensions. We also considered relevant to analyze the students' discourse during the different moments identified, given that in the curricular unit of Study Methods and Techniques, a report on the impact of the curricular unit and the teaching modality in their self-learning is individually elaborated by the students.

3   RESULTS

During the COVID-19 pandemic, the restricted access to face-to-face classes forced teachers, students, researchers and staff to find new modalities and resources that would allow them to adapt to the imposition of distance learning [24]. Most of the synchronous classes were taught using the Zoom platform, where the face-to-face classes became synchronous distance classes. In order to try to maintain the working model between synchronous and asynchronous classes, even in the periods in which face-to-face contact was suspended, all the activities and group dynamics were maintained, using the option of simultaneous rooms (breakout rooms) of the Zoom platform. In this case, the technologies allowed to gather students in groups, something that would not be possible in face-to-face teaching, considering the rules of physical distance. In this sense, it is considered relevant to understand if the b-learning strategies used before and during the pandemic were perceived differently by the students, i.e., if their satisfaction with the use of digital resources changed. Among the students, the participants are aged between 17 and 64 years, with the average age of 22 and 62.5% being female. There were 24.5% of working students and 65.8% had never taken an online training course. It was also verified that 91.4% of the students attended the classes at home and that 95.5% used the computer as the preferred equipment for the online course.

3.1   Perception and satisfaction about the online course contents

Although the differences between the different periods of the pandemic were not very significants, we found that, in the period during the first and second confinement, participants showed a higher level of positive agreement with the different aspects related to the course contents (Figure 1). The answer "I agree a lot" was the one that showed the highest expression in all moments, being more representative in the variable "clarity of the contents" in which 80% of the students strongly agree that the contents of the online course are presented in a clear and understandable way. As for the duration of the course modules, 91.8% of the participants consider that they have an adequate duration. 93.3% of the participants agree with the importance of the existence of activities and exercises in the course for learning and 88.1% state that the amount of activities that are requested in this online course is adequate in relation to the time available. Regarding the support throughout the learning process (face-to-face and remote), and also 88.1% of the participants state that the teachers are always available to provide support throughout the process.

An analysis of the different variables regarding the course contents allowed us to understand that the course has had a very positive appreciation globally in all the different moments. In the second confinement, students showed a higher level of agreement regarding the clarity of the contents, the appropriateness of the suggested exercises and the appropriateness of the materials to the pedagogical objectives of the training modality. As for the adequacy of the b-learning pedagogical strategy to the pedagogical objectives of the b-learning modality, students were more likely to agree with its adequacy in the first confinement.

Figure 1 – Course contents - comparison per period
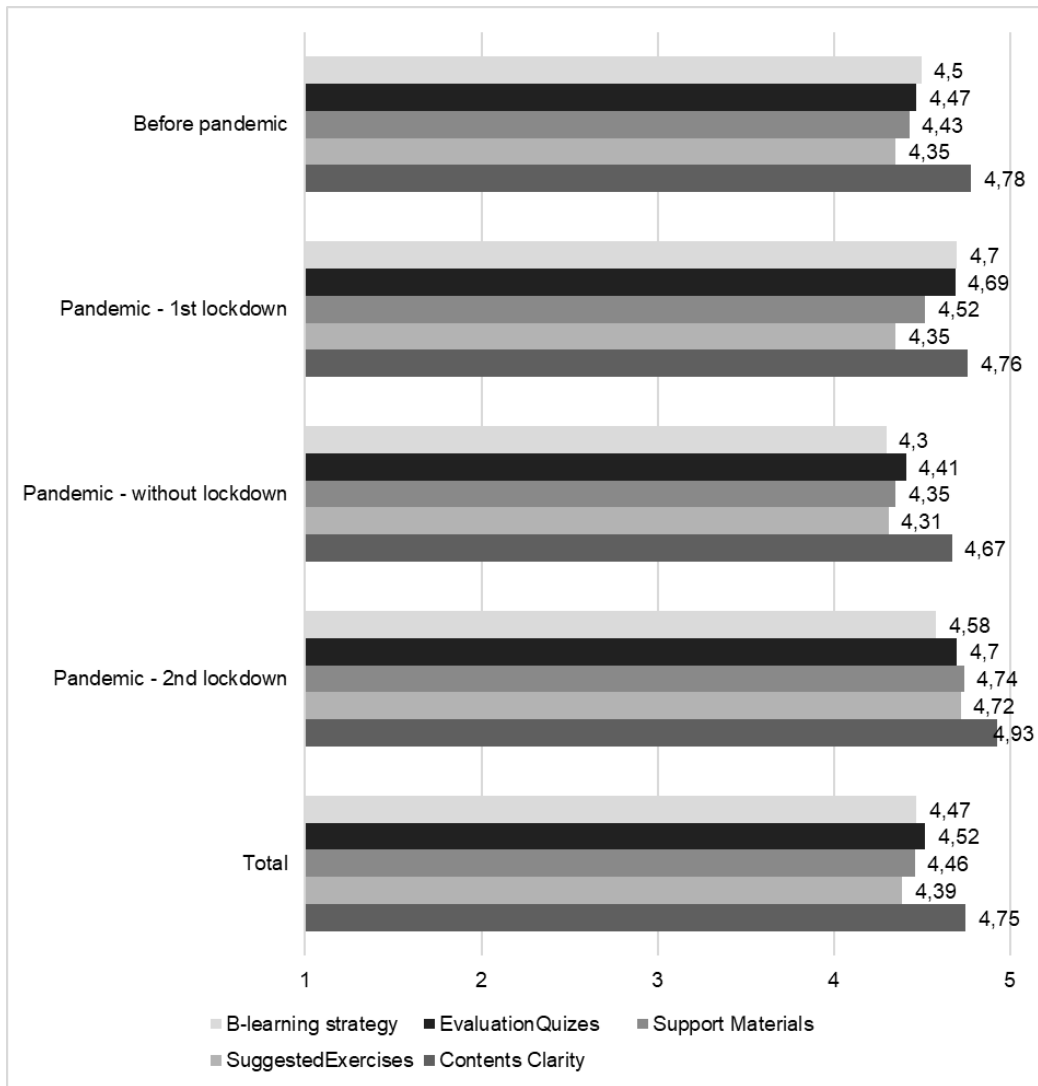
Source: Author's elaboration

Figure 2 – Overall satisfaction with course contents – per period
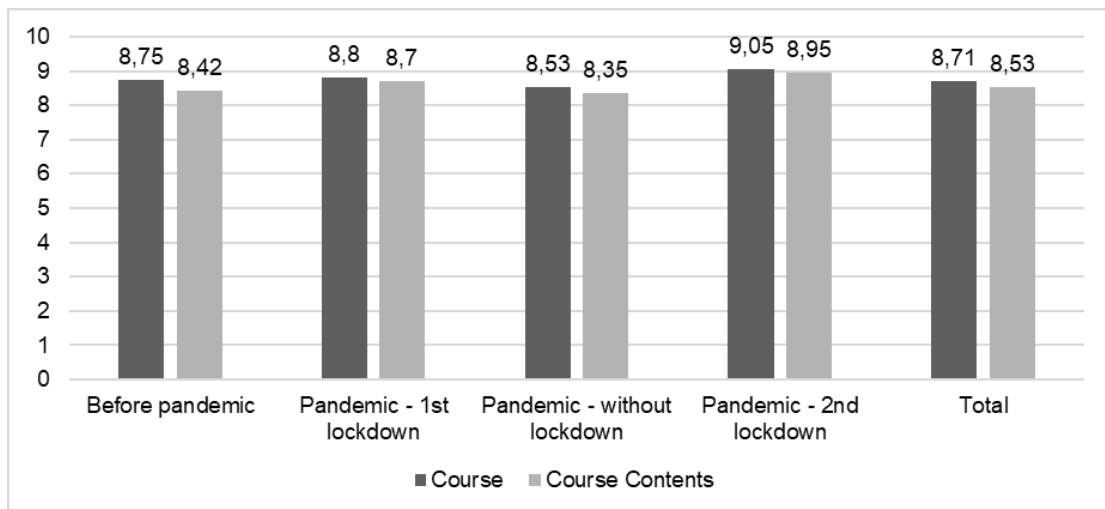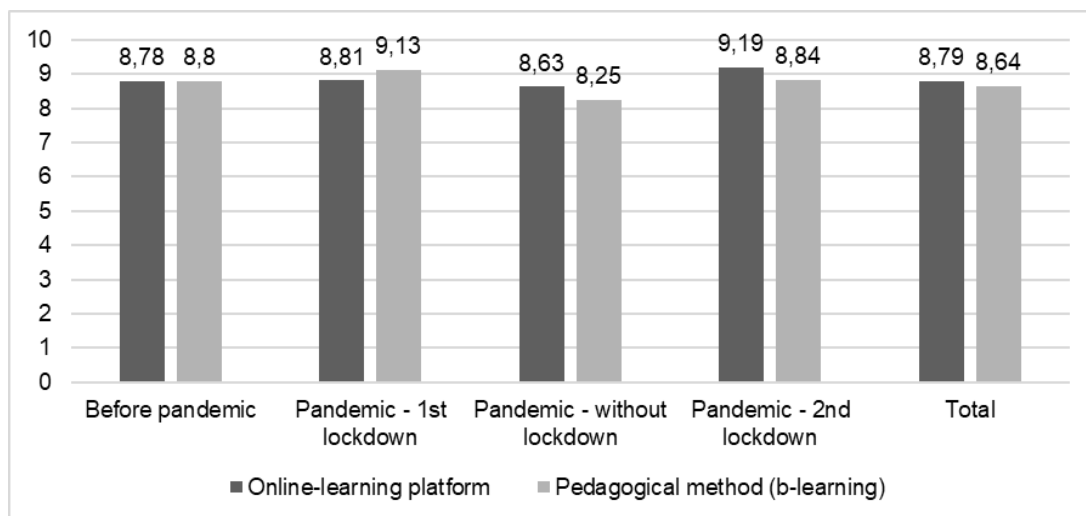

Source: Author's elaboration

The overall satisfaction with the course obtained a median of 9 at all periods and during second confinement, that is in the current semester, is when greater satisfaction is revealed (Figure 2). The students' comments revealed that this preference was also positive when compared to the obligatory curricular units in their graduation study plans. It was one of the few that had a structured with b-learning model, which give us the perception that higher education institutions should invest more in this model.

The insecurity felt by the possibility of contagion through contact in face-to-face classroom, ended up being referred by many students as a concern during the beginning of the academic year 2020/2021, even with all the contingency plan measures in place. Students who attended classes in the semi-presence model commented that they would have liked to go to face-to-face classes more often, but many of them did not did it for fear of contracting the virus or because of the way they were allocated in shift schedules with other curricular units.

3.2 Satisfaction with the Online-Learning (OL) platform and the pedagogical model

Regarding the access to the OL platform, 94.8% agree or strongly agree that the access to the platform is simple, 88.5% agree or strongly agree that the platform was always available and 83.3% disagree or strongly disagree that the learning process by the online-learning platform is complex or difficult. The data reveal that the system of access to videos and exercises, made available, was well received by the students, demonstrating to be a tool of easy access. Some students with difficulties to access reported that these occurred mainly because they were trying to login with their personal e-mails and the platform restricts access to students' institutional accounts. The comparison between the different moments is in line with the appreciation of the online course, being once again in the confinement period that the platform and the b-learning pedagogical method has a higher appreciation (Figure 3).

Figure 3 – Overall satisfaction with the platform and pedagogical method - per period

Source: Author's elaboration

However, there is no significant difference between the different moments, and it can be concluded that there is a positive satisfaction with the pedagogical method adopted in this curricular unit before and during the pandemic, as well as with the OL platform, observing that the online strategy promoted has achieved good results. In addition, 78.4% of the participants indicated that the b-learning model should be extended to other curricular units, specially while this situation prevails.

3.3 Advantages and disadvantages of the b-learning model

Among the most valued aspects in this modality, the flexibility of teaching assumed a greater expression in the answers. Students mentioned in several comments that the freedom of schedule and autonomy to choose their own study space was the main advantage of the b-learning learning model. With regard to the flexibility of time to take the online courses 92.2% stated that being able to attend online classes

whenever they want is an advantage and 91.1% said that the choice of space also presents itself as an added value. The time management issue was heavily addressed in the student's comments and the very nature of the course unit also contributed to the promotion of study methods and techniques during the pandemic period. The tools and strategies promoted in class led some students to state that this curricular unit was transversal not only to the various degrees, but also to the different domains of their personal, academic and professional lives.

With regard to the main disadvantages, most students did not indicate any disadvantages in the pedagogical model adopted in this curricular unit. However, it was mentioned in the students' answers that during the all the pandemic periods, the face-to-face classes were a disadvantageous aspect. But for 86,3% of the students' face-to-face sessions are important for learning, with this percentage being higher during all of confinement (92,6% - 1st lockdown and 93% - 2nd lockdown). As for the usefulness of the face-to-face sessions for consolidating the learning of the curricular unit's contents, 83,3% of the students consider them useful and again during the period of confinement this answer assumes greater expression (94,5% - 1st lockdown). In other words, although students did not express significant disadvantages in the b-learning modality adopted in the curricular unit, they mostly mentioned that face-to-face teaching is important and useful for their learning.

4   CONCLUSIONS

The data analysis allowed us to perceive that the preparation of higher education institutions for hybrid models can be considered as an advantage in the teaching-learning process. The satisfaction with the availability of the online course contents maintained and increased its positive appreciation by the students during the pandemic. One of the reasons we consider to have contributed to these results was the previous preparation of a b-learning model and that teachers were prepared to adapt to the online context rapidly. The students also found easy to use the platform, which aims to be simple and intuitive. This model stood out by allowing a use of the face-to-face contact time more focused on the exchange of ideas, debates and collaborative activities. Among the advantages of the model adopted, we highlight the following aspects to be considered after the pandemic:

- Stimulate the profitability of higher education institutions investment in digital technologies during the pandemic for the development of b-learning initiatives and teaching programs.

- Update and increase the technological and digital resources available to students, teachers and researchers, investing in interactive and appealing platforms.

- Enable courses from different cycles, registered/approved at the Agency for Assessment and Accreditation of Higher Education (A3ES) with face-to-face study plans, to make their contact hours more flexible with physical and virtual learning activities.

It should be noted that face-to-face classes were one of the points mentioned by students as a disadvantage during the period of closure of higher education institutions. There was no manifest preference for an exclusively online regime which reaffirms the importance of the face-to-face contact to integrate moments of the teaching-learning process. Therefore, we consider that this will be an incentive to create opportunities to diversify the traditional teaching models, bringing a greater interactivity and flexibility to the teaching-learning process.

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REFERENCES

[1]   OECD, "COVID-19: Protecting people and societies", OECD Policy Responses to Coronavirus (COVID-19)", OECD Publishing, 2020. [cited 2021 May 3]. Retrieved from https://doi.org/10.1787/e5c9de1a-en.

[2]   UN, "Policy Brief: The Impact of COVID-19 on children", 2020. [cited 2021 May 3]. Retrieved from https://unsdg.un.org/resources/policy-brief-impact-covid-19-children

[3]   T. Farnell, A. Skledar Matijević and N. Šćukanec Schmidt, "The impact of COVID-19 on higher education: a review of emerging evidence: analytical report", LU: Publications Office, 2021 Retrieved from: https://data.europa.eu/doi/10.2766/069216

[4]   OECD, "Youth and COVID-19: Response, recovery and resilience", OECD Policy Responses to Coronavirus (COVID-19), 2020 Jun [cited 2021 May 3]. Retrieved from: https://doi.org/10.1787/c40e61c6-en.

[5]   OECD, "How schools can help protect young people in a recession", OECD Education Policy Perspectives, No. 30, OECD Publishing, 2021.

[6]   World Health Organization, "Manutenção de serviços essenciais de saúde: orientação operacional para o contexto da COVID-19. Orientação provisória", 1 June 2020, [cited 2021 May 2]; Retrieved from: https://iris.paho.org/handle/10665.2/52363

[7]   World Health Organization, "Checklist to support schools re-opening and preparation for COVID-19 resurgences or similar public health crises" Geneva: World Health Organization; 2020. Retrieved from: https://www.who.int/publications/i/item/9789240017467

[8]   OECD, "Education responses to COVID-19: Embracing digital learning and online collaboration", OECD Policy Responses to Coronavirus (COVID-19), OECD Publishing, Paris, 2020. https://doi.org/10.1787/d75eb0e8-en.

[9]   C. Carvalho and A. S. Pontes, "Algumas reflexões sobre o impacto da crise pandémica no ensino superior, Instituto Superior Técnico, 2020, [cited 2021 May 2]; Retrieved from https://catalogobib.parlamento.pt:82/images/winlibimg.aspx?skey=&doc=133971&img=21022&save=true

[10]   H.L. Gusso, A.B. Archer, F.B. Luiz, F.T. Sahão, G.G. Luca, M.H.O. Henklain, et al. Ensino superior em tempos de pandemia: diretrizes à gestão universitária. *Educação & Sociedade*, 41, 2020. https://dx.doi.org/10.1590/es.238957

[11]   W. Ali, "Online and Remote Learning in Higher Education Institutes: A Necessity in Light of COVID-19 Pandemic". *Higher Education Studies*. 10(3), pp. 16–25, 2020.

[12]   Minister of Science, Technology and Higher Education Office, "Nota de esclarecimento" 13 de março de 2020, [cited 2021 April 29]; Retrieved from https://www.dges.gov.pt/pt/pagina/covid-19-avisos

[13]   Minister of Science, Technology and Higher Education Office, "A ciência, o ensino superior e o conhecimento no Combate ao COVID19", 27 de março de 2020, [cited 2021 April 29]; Retrieved from https://www.dges.gov.pt/pt/pagina/covid-19-avisos

[14]   Minister of Science, Technology and Higher Education Office, "Recomendação e esclarecimento às instituições científicas e de ensino superior: Elaboração de planos para levantamento progressivo das medidas de contenção motivadas pela pandemia COVID-19", 17 de abril de 2020, [cited 2021 April 29]; Retrieved from https://www.dges.gov.pt/pt/pagina/covid-19-avisos

[15]   DGES, "Candidatos ao ensino superior público atingem 62675, registando o maior número de candidatos nos últimos 25 anos", 24 de Agosto de 2020, [cited 2021 April 29]; Retrieved from https://wwwcdn.dges.gov.pt/sites/default/files/nota_cna2020_candidatos_1.fase_1o_comunicado_24ags.pdf

[16] Minister of Science, Technology and Higher Education Office, "Recomendação às instituições científicas e de ensino superior para a preparação do ano letivo 2020/2021", 4 de agosto de 2020, [cited 2021 April 29]; Retrieved from https://www.dges.gov.pt/pt/pagina/covid-19-avisos

[17] M.B. Horn and H. Staker, *Blended: Usando a Inovação Disruptiva para Aprimorar a Educação.* Porto Alegre: Penso Editora, 2015.

[18] Minister of Science, Technology and Higher Education Office, "Recomendação às instituições científicas e de ensino superior no contexto das medidas de desconfinamento controlado definidas pelo Governo" 11 de março de 2021 [cited 2021 April 29]; Retrieved from https://www.dges.gov.pt/en/node/1908

[19] H. Belchior-Rocha, F. Almeida, I. Casquilho and J. Ferreira, "Preparing students to apply transversal skills - a case study in higher education*", Edulearn17 Proceedings*, pp. 4156-4163, 2017.

[20] H. Belchior-Rocha, R. Mauritti, J. Paiva Monteiro and L. Carneiro, "Is this Blended-learning, or another thing?", *Edulearn20 Proceedings*, pp. 5428-5434, 2020.

[21] FCCN, "Estúdio - Serviço de Colaboração da Unidade FCCN". [cited 2021 May 7]. Retrieved from: https://www.fccn.pt/colaboracao/estudio/

[22] K. Leong, A. Sung, D. Au and C. Blanchard, "A review of the trend of microlearning". Journal of Work-Applied Management, 13, pp.88–102, 2021.

[23] I. Casquilho-Martins, H. Belchior-Rocha, F. Almeida and A. Picornell-Lucas, "Methods and techniques of study as a complement to lifelong learning and professional life". *WCLTA 2018 9th World Conference on Learning, Teaching and Educational Leadership*, 2018.

[24] C. Hodges, S. Moore, B. Lockee, T. Trust, and A. Bond. *The Difference Between Emergency Remote Teaching and Online Learning*. Educause Review. 2020. Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning