Distance Learning in Higher Education during the COVID-19 pandemic: A Systematic Literature Review

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Abstract

The COVID-19 pandemic led to the closing of universities and the forced shift from face-to-face to distance education showcasing the potential and limitations of this form of learning. We used several tools for bibliographic management like Rayyan, VOSViewer and NVIVO and followed the PRISMA protocol. The goal of this systematic literature review was to identify the main keywords, theoretical frameworks and research methodologies used. Our analysis of themes showed the existence of 3 nodes within the literature: students, teachers, and education. After searching in 5 databases, 1915 articles were found. After excluding the duplicates (63 articles), we screened and read the titles and abstracts of 1852 articles. Only 135 articles met the criteria for inclusion. Finally, 122 articles were selected for review and analysis. The most widely used methodology was case study analysis and TAM was the most used theoretical framework.

Keywords: Distance Education, Higher Education, Systematic Literature Review, E-learning, COVID-19

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Introduction

The motivation behind the choice of this topic of research relates to the growing importance of e-learning in a post-pandemic world. Even before the pandemic, a growing number of major universities were beginning to offer courses and degrees through e-learning, which were becoming more recognized. However, the pandemic caused by COVID-19 and the mandatory confinement virtually forced schools and universities to switch all their educational activities to distance learning. This disruptive change posed major challenges for educational institutions, students, and teachers. During this period, the limitations of e-learning became more evident and a growing source of concern. By analyzing the existing literature on emergency remote learning during the Covid-19 pandemic in European Business schools, the objectives of this SLR are the following:

a) Identify the main research themes, keywords and topics;
b) Identify the main theoretical frameworks;
c) Reveal the main research methodologies;
d) Highlight the most relevant authors and journals.

Previous Systematic Literature Reviews (SLR´s) about Distance Education

Several systematic literature reviews following the PRISMA protocol on the topic of e-learning have been written (Table 1). (Valverde-Berrocoso et al., 2020) identified MOOC, Higher Education, Teaching-Learning Strategies, and Interactive Learning Environment as the most widely used keywords in e-learning studies. Higher Education is the level of education on which further research has been carried out. In terms of theoretical frameworks, Community of Inquiry and the Theory Acceptance Model (TAM) were the two most widely used. In terms of modality of e-learning, the MOOC was the most widely studied. Qualitative methodologies particularly case study analysis dominate the field. Structural equation modelling (SEM) was the most used quantitative method and questionnaires the most widely used instruments of data gathering. Finally, design-based research (DBR) and action-research were the most used research methods. (Zare et al., 2016) identified the most significant criteria used to evaluate E-learning initiatives: usability and response-time (35.7% of papers), interactivity (33.3%) and web & course design (30.9%).

Finally, (Sunde et al., 2020) used 5 databases to identify studies that focused on the challenges perspectives on emergency distance education during the COVID-19 pandemic. It enabled the educational process to continue during the pandemic, reduced the risk of the transmission of the virus and allowed for a more dynamic and student-centered learning. However, according to (Sunde et al., 2020), there are

many challenges: digital illiteracy and lack of access to internet, computers, smartphones or tablets make distance education less accessible to teachers and students with low-income levels and exacerbate inequality. Suggestions to address these challenges are made adopting another teaching modality that combines classroom and online learning, training of teachers in using the technologies and providing free internet, mobile phones or computes for students from low-income households.

Methodology

This is a systematic literature review following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework of (Moher et al., 2014). We searched for articles in May of 2021 in five databases (SCOPUS, Jstor, Emerald, Science Direct, IEEE) using the following terms: ("Emergency Remote Learning" OR "Distance Education" OR "B-learning" OR "E-learning") AND ("Higher Education" OR "Tertiary Education") AND ("COVID-19" OR "CORONAVIRUS") AND DOCTYPE (ar) AND PUBYEAR>2019.

Duplicates, thesis, dissertations, monographies, books, and other non-peer reviewed articles were excluded. Likewise, we only included articles published after 2019, written in Portuguese, English, Spanish and French that focus on emergency distance education in higher education. We only included articles that focused on the teaching of accounting, management, economics, translation, marketing, information systems and other subjects taught at ISCAP. Articles that focused on MOOC´s were also excluded. Initially, 1915 articles were found. After excluding the duplicates (63 articles), we screened and read the titles and abstracts of 1852 articles. Only 135 articles met the criteria for inclusion. Finally, 122 articles were selected for review and analysis (see Figure 3).

Zotero, a bibliographic-management software, was used to compile and manage the databases. For each reference, the abstract, keywords and the full text in PDF were added. Rayyan QCRI, a free web app, was used to screen the titles and abstracts of each citation. Articles that failed to meet the including criteria were excluded and the ones who meet them were included and exported to a RIS. file containing the final sample. Only one reviewer screened the titles and abstracts and then the texts using Rayyan. VOSViewer was used to create maps of the main keywords and authors present in the RIS. file with the final sample that we could visualize and explore. We applied automatic coding to obtain a dendrogram that allows us to identify the most used terms that we can with the results from the co-occurrence map obtained using VOSViewer. In addition, we also analyzed the citations to identify the most relevant authors, journals, and European countries where most research has been carried out.

Results

In this section, we will present the results of the SLR using several graphs to supplement our analysis.

Research Keywords, Themes and Subthemes

The analysis of keywords was carried out using two different tools (n=122). In Figure 1, we can see a co-occurrence analysis made using VOSviewer. Of the 705 keywords detected, only 43 meet the minimum threshold of 5 and all 43 of them were selected. 3 distinct clusters can be identified in red (21 items), green (17 items) and blue (5 items). The 3 nodes with the greatest total link strength were covid-19 (236), learning (155) and student (154). Automatic coding instead of manual coding was used to analyze the texts to reduce the risk of bias and expedite the process.

In Figure 4, the dendrogram shows in the relevance of each of the keywords. By comparison, with over 1000 mentions each, learning, online, teaching and education were revealed to be the most relevant keywords. Given that the shift to online classes in higher education is a controversial subject, we carried out a sentiment analysis. As we can see in Figure 5, overall, most authors maintain a neutral tone (5228 positive references and 4754 negative references).

Theoretical Frameworks

A wide variety of IS models have been used to study distance learning during the pandemic like UTAUT (Nikou & Aavakare, 2021) and "Technology Integration Planning Model"(Yılmaz, 2021). However, the most widely used was the Technology Acceptance Model (TAM) (Lazar et al., 2020; Rizun & Strzelecki, 2020). The model explores how two primary factors influencing an individual's intention to use new technology like e-learning: perceived ease of use and perceived usefulness. The predominance of TAM studies in the field of IS study has been the subject of criticism (McBride, 2018).

Research Methodologies

In qualitative studies, the most frequent methodology is case study analysis (Arcos-Alonso & Alonso, 2021; Assunção Flores & Gago, 2020). For example, many case studies have sought to analyze the level of preparedness of the higher educational system of one or more nation for online learning during the pandemic (Edelhauser & Lupu-Dima, 2020); the process of transition at a certain institution (Assunção Flores & Gago, 2020) or the teaching of a certain subject during the pandemic (Berkova & Nemec, 2020). Participation of the authors as professors or scholars in the process they are studying is frequent. The most studied stakeholders in emergency remote learning students (Agasisti et al., 2020) followed by professors (Almazova et al., 2020). Some studies focus on other stakeholders like the

universities themselves(Appolloni et al., 2021) and academic libraries (Cox, 2021). However, there are a few studies that analyze such complex phenomenon the point of view of multiple stakeholders.

The most frequent method of obtaining data is through online questionnaires. Other methods include Interviews and use of existing databases. In quantitative empirical studies, to analyze the data, researchers used software like SPSS and several quantitative methods. Descriptive statistics (distribution, dispersion, and central tendency) was frequently used to provide basic descriptions of data from a sample. However, many authors use more advance inferential statistics methods (ANOVA, t-square, Chi-Square) to test hypothesis (Akyildiz & Durna, 2021). Another technique used is Structural Equation Modeling (SEM). The most frequent limitation and potential source of bias in quantitative studies relates to the size and representativeness of the sample (especially when samples of convenience and the snowball technique are used).

Authors, Journals and Countries

The three most prominent journals were Sustainability (Switzerland) (19 articles), International Journal of Environmental Research and Public Health (6) and , tied in third place with 5 articles, are Education Sciences, Computers in Human Behavior, Education and Information Technologies. In our selection, we only included studies carried out in European countries (including Russia, Turkey and Azerbaijan) to form a cohort of nations with cultural and geographical proximity to Portugal and that were hit by the pandemic at a similar time. The European countries with the most articles were Spain (28 articles), Romania (12) and Russia (10). Only 5 articles focusing on emergency distance learning in schools of management and accounting in Portugal have been written thus far, which shows there is a gap in the literature. In Figure 2, we can see a co-authorship analysis made using VOSviewer. Of the 383 authors, only 11 met the minimum threshold of 2 articles. F. J. García-Peñalvo of Universidad de Salamanca was the most prolific with 3 articles. We can conclude that there are low levels of clustering which shows that co-authorship between scholars in this field is relatively rare. The largest cluster composed of 4 Italian authors (Capone, v.; Caso, d.; Donizzetti, a.r.; Procentese, f.) who each have published 2 articles and have the highest link total link strength (6). In terms of languages, over 75% of the articles in the final sample were written in English and while the rest was in Spanish. A potential source of bias derives from the software: NVivo software can only analyze texts in English, which means the articles in Spanish were not properly included in the analysis.

Conclusion

The goal of this systematic review was to analyze the existing literature on emergency distance learning during the Covid-19 pandemic in European business schools. Although a great number of articles

have been published since the 2020, the literature on remains scarce with several gaps that need to be explored. This complex nature of this phenomenon warrants an interdisciplinary approach. Hence, as our reviews shows, scholars from a wide variety of subjects (Medicine, Psychology, Education sciences, Economics and Information Systems) have made significant contributions to this field. Although several studies have been carried out in Portuguese business schools, the literature on our country still lags other European nations. The improvised shift to non-face-to-face education in higher education during the pandemic is arguably the greatest pedagogical experiment in history. Distance education has pros and cons for both students and professors, but it has been essential to ensure the continuity of teaching and researching activities of the universities during an unforeseen public health crisis. Universities must adapt their strategies to leverage existing technologies to create new and sustainable ways of creating value, demonstrate leadership in times of crises, promote a sense of belonging within the academic community and pay close attention to the mental well-being of its members.

Finally, it is imperative that we highlight the limitations of this study. Firstly, the number of databases and studies analyzed is limited. Secondly, the topic of research relates to an ongoing and very recent phenomenon that began in late 2019. Thirdly, because we only included studies conducted in European universities, caution needs to be taken before generalizing the findings to other geographical and educational contexts. Due to time constraints, the review protocol was not registered. Further research is needed to stay up to date with the latest developments of the pandemic.

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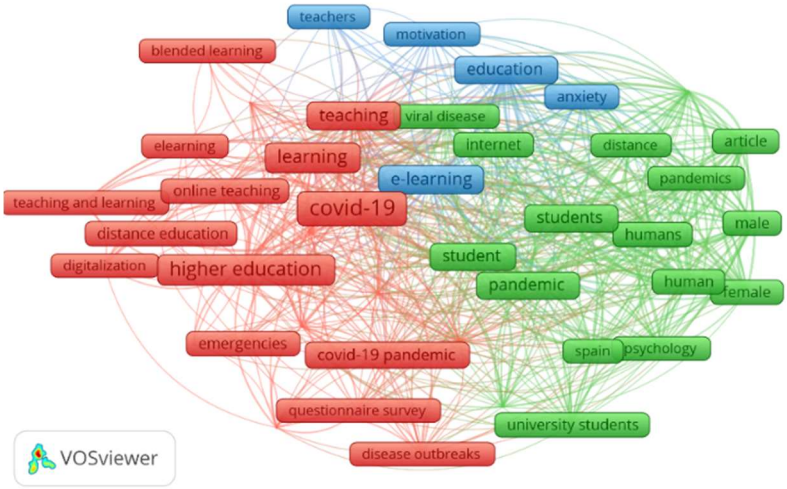
Table 1

Previous Systematic Literature Reviews about e-learning based on PRISMA

Study	Search Term	Databases	Number of papers
(Sunde et al., 2020)	("Distance Learning AND COVID-19 AND Challenges AND Perspectives"; "Distance Learning AND COVID-19 OR Coronavirus AND Challenges AND Perspectives" e "Remote Teaching AND COVID-19 OR Coronavirus")	Science Direct; PsycInfo; BVS; SciElo e LILACS	5
(Valverde-Berrocoso et al., 2020)	(ISSN (10,967,516, 0360-1315, 0007-1013) AND KEY (e-learning)) AND DOCTYPE (ar) AND PUBYEAR > 2008 AND PUBYEAR < 2019	SCOPUS	248
(Zare et al., 2016)	"MCDM, MCDA, AHP, ANP, TOPSIS, DEMATEL, ELECTRE, LP, E-learning, web-based learning, online learning, virtual learning, network learning" and their combinations.	ScienceDirect, Taylor and Francis, IEEE, Springer and Emerald Publishers	42

Figure 1

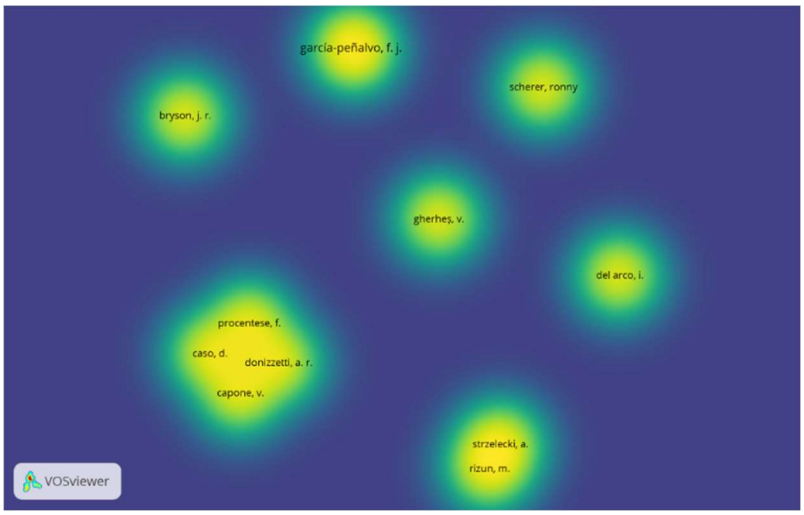
Network visualization of main keywords using VOSViewer



Note. Analysis conducted based on bibliographic data from a RIS file with the selected references for analysis (n=122). We used full counting and set a minimum threshold of 5 occurrences per keyword.

Figure 2

Co-authorship analysis using VOSViewer



Note. Analysis conducted based on bibliographic data from a RIS file with the selected references for analysis (n=122). We used full counting as our counting method and set a minimum threshold of 2 documents per author and selected all the authors.

Figure 3

PRISMA Flow diagram

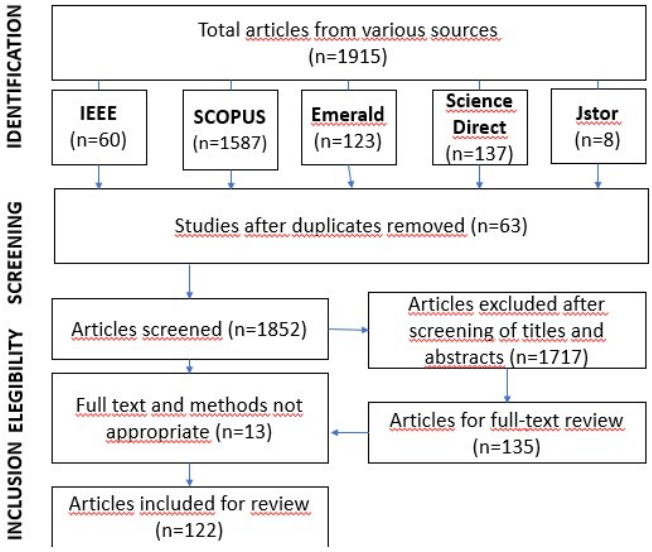


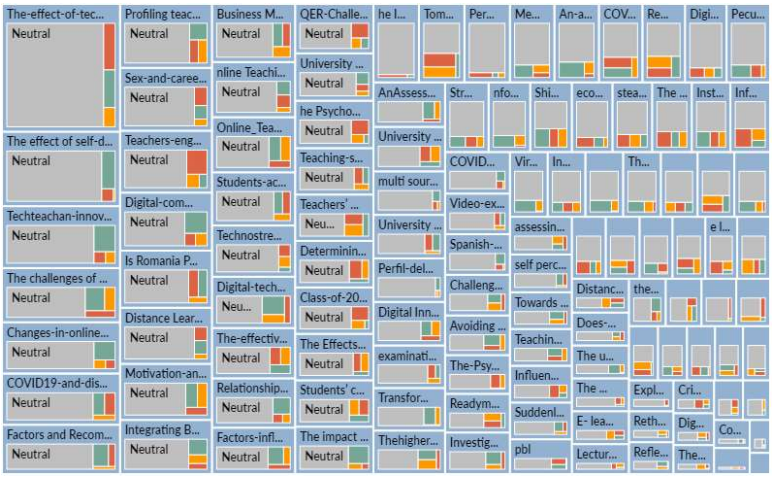
Figure 4

Hierarchy chart of keywords using NVivo12

Note. Analysis conducted based on the full texts of the final sample. NVivo screened every paragraph of all texts, and no term was excluded.

Figure 5

Sentiment Analysis using NVivo12



Note. Analysis conducted based on the full texts of the final sample. NVivo screened every paragraph of all texts.