Revisiting the Online Learning Concerns during COVID-19: A Systematic Review

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Abstract

The COVID-19 pandemic forcefully shifted the world into a virtual society; consequently, all the brick-mortar businesses moved toward click-mortar businesses. Considerable research has been done to improve the e-learning mode of education before the vigorous situation of COVID-19, which affected the whole world. The current review paper aims to conduct a study on e-learning in COVID-19, published from March 2020 till 2022. This paper analyzed 38 articles concerning the different modes of e-learning, synchronous, asynchronous, and blended e-learning. The digital divide and lack of ICT skills are the main hindrances in successful this virtual process. The current study revealed that these two modes of e-learning are not purely practical if used individually. In contrast, the combination of these two modes is beyond effective and raises students' satisfaction. There is a crucial need to establish a valid infrastructure to promote online learning on a routine basis so that education institutes can immediately switch from brick-mortar to click-mortar learning systems.

Keywords: COVID-19, E-learning, Synchronous learning, Asynchronous learning, Digital divide

Introduction

The insurgence of the COVID-19 pandemic forcefully shifted the world into a virtual society (Reddick, 2020) which changed all the world's activities and businesses. This new change shifted the mode of education from traditional face-to-face education to e-learning in all educational institutes globally (Sahu, 2020). E-learning is a computer-mediated education mode in which the students and educators interact in a flexible setting (Allen & Seaman, 2010; Eygu & Karaman, 2013). ICT devices are used for learning purposes and accessing these technologies and internet devices is foremost in a virtual society. Synchronous e-learning and asynchronous e-learning are the two kinds of virtual communication. Hrastinski (2008) describes synchronous e-learning as digital communication between two or more persons in real time, commonly supported by rich media that is more social and reduces the ambiguity of the complex content with the immediacy of feedback. The term asynchronous e-learning explains different forms of education that facilitate the learners to obtain information at their own pace and time (e.g., e-mail, WhatsApp documents, YouTube recorded videos).

The present study dealt explicitly with comparative computer-mediated studies in the COVID-19 pandemic. Computer-mediated education started in developed countries before this global threat to social interaction, but they still face different issues regarding e-learning. Due to insufficient and limited resources, developing countries face several critical issues concerning e-learning, such as the digital divide, the improvised infrastructure of e-learning, cultural backgrounds, and language issues. Because of the importance of this issue, several studies have been done to explore the different factors that were being a hurdle in practical education and to procure the solution to improve the quality of e-education. Different disciplines gave importance to this issue, such as Education studies based on improving instruction design and psychological research based on how this emergent transition affects the mental health of issue-specific participants. IT studies mentioned how IT skills are substantial during online learning, and Sociology studies disclose the impact of this tectonic shift in education on society. The current study is concluded from the Media perspective because a significant concern during online learning is the selection of accurate media related to the nature of the content. Thus, the current study only focuses on the concerns with two modes of computer-mediated learning, synchronous and asynchronous, via rich media and lean media, respectively.

The current study will analyze 38 articles and conclude the differences and similarities. In this review paper, each study had to be conducted on e-learning synchronous and asynchronous or blended e-learning concerns in COVID-19 and published from 2020 to 2022 in different journals. Pre-COVID-19 literature on e-learning is excluded in the current study because one of the primary purposes of this review report is to examine the previous literature on online learning in the context of COVID-19, in which the social interaction was limited/ restricted, and media was the only means of providing collaborating and communicative experiences for students. This study only focuses on students' perspectives on how they perceived different e-learning approaches during the Covid-19 pandemic and helps to enhance their satisfaction and performance all the other research reports, which are based on instructor and managerial improvement designs, are excluded from the study.

Method

This study has presented reviews of the studies conducted from 2020 to 2022 on institution base e-learning during COVID-19 and which e-learning mode is more satisfactory for the students and enhances their academic performance. Many academic studies have been conducted in this framework before, after, and during COVID-19; rationally, it is difficult to include all studies because of certain limitations (e.g., access and timeframe). Therefore, the current study includes only research articles on this issue from different databases. These articles are considered high-quality papers because most of the articles are published after peer review.

Articles solely in the English language were reviewed in the current study. Google Scholar database was used to search these articles. Therefore, the current review study has adopted a scientific standard for selecting studies based on the PRISMA statement. Several previous media review studies use the PRISMA model and other social sciences research to systematically select studies for a purpose (Domaradzki, 2021; Pilar et al., 2019). PRISMA comprises the filtration of studies through four stages of identification, screening, eligibility evaluation, and final selection, as reflected in the figure-1 below:
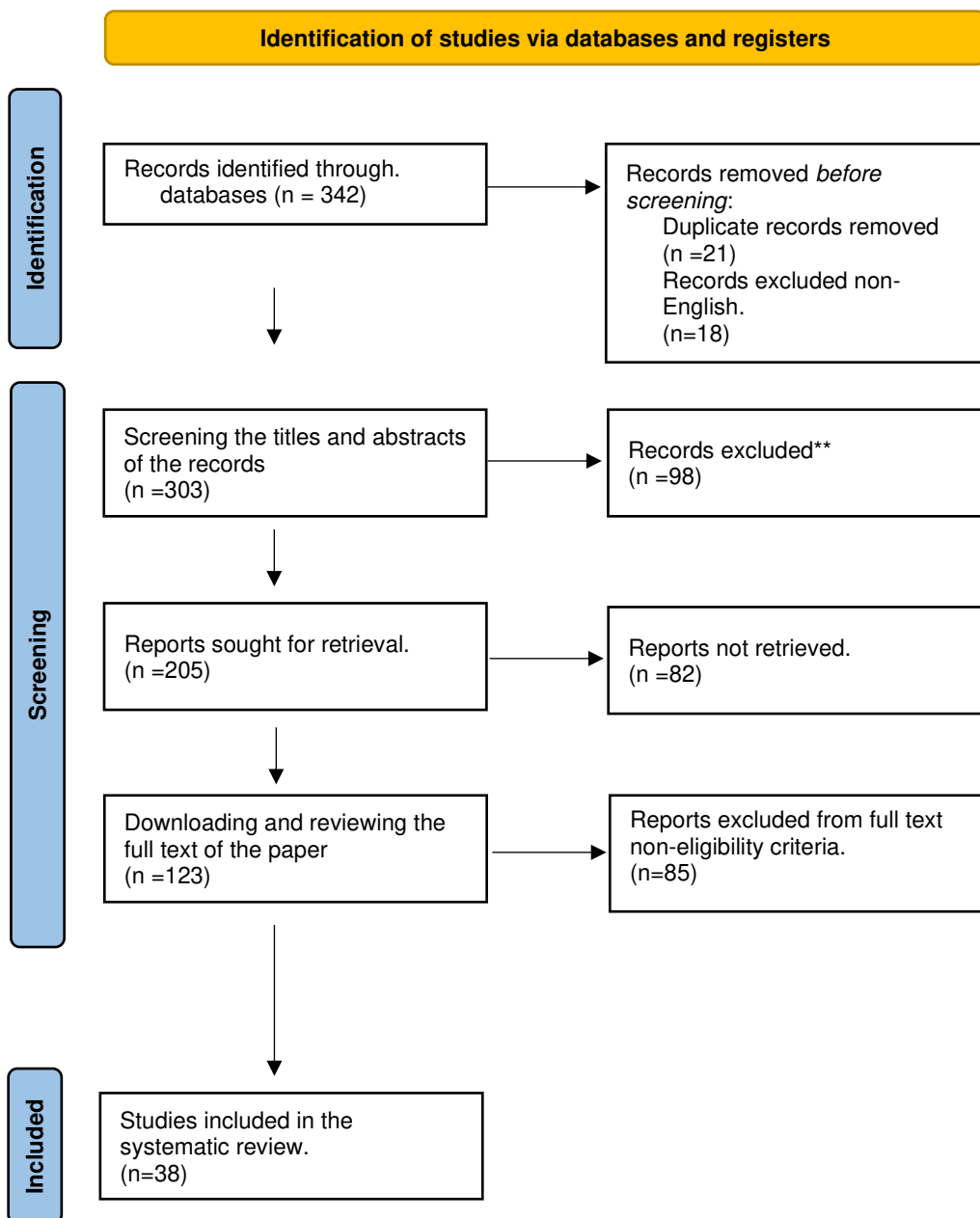
Identification of studies via databases and registers

Identification

Records identified through. databases (n = 342)

→ Records removed *before screening*:
Duplicate records removed (n =21)
Records excluded non-English.
(n=18)

Screening

Screening the titles and abstracts of the records (n =303)

→ Records excluded** (n =98)

Reports sought for retrieval. (n =205)

→ Reports not retrieved. (n =82)

Downloading and reviewing the full text of the paper (n =123)

→ Reports excluded from full text non-eligibility criteria. (n=85)

Included

Studies included in the systematic review. (n=38)

Figure 1: PRISMA flow chart for review protocol

At the initial stage of the filtration process, the researcher confined the blocks of keywords to confine and obtain specific search results. Specific keywords include Synchronous learning, Synchronous e-learning during COVID-19, Asynchronous e-learning, Synchronous learning, and Asynchronous learning settings during COVID-19, Emergency remote learning settings during COVID-19, Synchronous learning advantages and disadvantages, Asynchronous learning advantages, disadvantages, and blended learning are used to collect research results manually. Keywords facilitate extracting all the studies conducted on the specific area with their similarities either with the abstract, keywords, or title of the publication. Three hundred and forty-two publications were collected in the identification stage. Through manual evaluation, twenty-one duplications and eighteen non-English publications were excluded from the collected studies, leaving three hundred and three publications in screening. In the second stage, ninety-eight studies were excluded as they did not fulfill the eligibility criteria in the title and abstract according to the topic's relevance. After screening the articles, the researcher downloaded the full text of the two hundred and five remaining articles, whereas only one hundred and twenty-three articles were

retrieved. After reading the full text of retrieved articles, the researcher decided to exclude material articles eighty-five that did not match the current study objectives. Thirty-eight articles were left for final selection, which were reviewed for synthesis according to the objectives of the present study. The researcher only found articles on the titles mentioned above during the 2020 to 2021 time frame through Google Scholar. The current study summarizes the concerning information and synthesizes those results**.**

Results

Emergency Remote Learning, Digital Divide, and IT Infrastructure in E-Learning

Winarto et al. (2020) explained that if media aims to transmit information for learning purposes, it is called learning media. ICT devices are being used for learning purposes in the current virtual society. Inadequate training of teachers raised many questions about their capabilities to deal with the technology in this transition to the online mode of learning. Moreover, the perceived usefulness and ease of use of digital devices significantly impact online education acceptance in higher education institutes (Almajali et al., 2021). Student performance is affected by using different appropriate teaching tools to ensure the relevance of assessing students' knowledge and skills (Jacques et al., 2021). In addition, digital devices are now in high demand by parents and children. Due to low-appropriate e-learning infrastructure and fewer resources to facilitate, teachers, universities, and students with no access to digital devices and internet facilities face challenges (Subedi et al., 2020).

An emergency transition of e-learning during COVID-19 has emphasized the inequalities in developing societies generally and in higher education (Preez & Grange, 2020). These inequalities between high and low socioeconomic status and geographical disparities raise the digital gap. Furthermore, this digital gap hinders continuing education with online education (Reddick, 2020). MOODLE (Modular Object-Oriented Dynamic Learning Setting) usage, which demands robust network connectivity and signals, is negatively affected by network failure and weak bandwidth (Maphosa et al., 2020). Financial status and connectivity concerns are critical issues during the e-learning process for students (Pearson, 2020). Most higher education students were prepared for the online education system because they have laptops and access to the internet (Budi et al., 2020). In contradiction to the previous study, Gay (2020) identified that the digital divide is still occurring, and only one-third were ready for e-learning. Students with financial and access challenges suffered more in education during the lockdown. Several target groups (from urban and rural areas) never had access to the internet, and some have never used ICTs tools before. Socioeconomic status is a critical determinant in evaluating online education system success that primarily benefits those students with higher socioeconomic status and widens the cognitive gap between high and low socioeconomic status (Kuika et al., 2020, Payton & Auriols, 2021).

Synchronous E-Learning Advantages and Disadvantages

The most widely used e-learning mode is synchronous e-learning during COVID-19. Most educational institutes use Google Hangout, Zoom, and Google classroom for their content delivery (Nikmah & Azimah, 2020). However, choosing the correct method and media to deliver specific content is crucial. Content delivery via synchronous learning mode raises the student's motivational level because of the access characteristics of a geographically dispersed audience (Hernandez & Florez, 2020, Jacques et al., 2021). Synchronous learning is a method where task discussion, assignments planning, opinions, and feedback can be quickly done. Moreover, students could enhance their critical thinking and writing skills and get social support, but misinterpreting the task became an issue for students (Rinekso & Muslim, 2020).

The most critical challenges during e-learning are connectivity issues in rural areas, proficiency in using e-learning devices, student's attitude acceptance of e-learning system, insufficiency of digital devices, and the scientific mode of e-learning along with appropriate ICT tools regarding different content materials (Desai et al., 2021). Different strategies to improve the effectiveness of online education should be used by educators. Educators should deliver the content through media as in a traditional classroom, interactive sessions with students (discussion and feedback), and use mixed learning tools, synchronous and asynchronous (Yulia, 2020). The practical solution to successful learning is pre-session preparation for strategic delivery and formative assessment after the session (feedback) (Kiernan, 2020). Fulton (2020) chose a mediated variable, 'e-guest,' to examine the effectiveness of synchronous e-learning. He proposed that specialists from different regions as an e-guest easily approach the students far away, which would be difficult in a traditional classroom.

After analyzing 20 articles on pre-COVID-19 regarding e-learning effectiveness, Prestiadi (2020) found that operative integration of e-learning into the educational design can enhance the performance of students through using different modes of media (rich media and lean media) and the instructor's way of teaching in which they provide additional learning flexibility of time and pace and get their instant feedback may increase the learner's cognitive skills (Evans et al., 2021). Effective integration and receptivity to e-learning are more crucial than the quality of technology. The most striking factors towards e-learning are IT cognizance, university assistance, and the high quality of ICT requisite from the learner, instructor, and residential institutes (Alqahtani & Rajkhan, 2020).

Asynchronous E-Learning Advantages and Disadvantages

Hariadi & Simanjuntak (2020) conducted qualitative research to explore the student issues related to asynchronous e-learning mode during COVID-19 and explicit the different issue-specific factors, i.e, lack of technical support, lower connectivity (signal issues), and the digital divide. However, it is helpful to enhance the student's self-access learning and the opportunity to download different supporting apps for e-learning (Basri et al., 2021). Khalil (2020) conducted qualitative research to explore the proficiency of online learning during COVID-19. He revealed that an imperative e-learning design must integrate with the e-education system. The opportunity to record a lecture benefits student in the learning process. However, the most wigged-out factors are the increased time allocated sessions, connectivity issues, negative attitude towards computer-mediated education, and unsuitability for functional subjects. The reason behind these factors is the lack of non-verbal communication, which is crucial for the desirous logical link between students and teachers. However, nevertheless overall, e-learning has been discovered effectively.

Alquadah et al. (2020) examined e-learning as an effective and practical learning mode through a cross-sectional survey study because of the flexibility of time and place. To overcome the main obstacle in this process, the lack of ICT skills, and to obtain higher satisfaction from learners and instructors, the training of ICT skills is crucial (Soub et al.,2021, Dao & Duong, 2021). Abogye et al. (2021) conducted a study on students' perspectives to determine the challenges during online learning and revealed that learners were not ready for e-learning as a sole source. Social issues (makes learners isolated), Lecturer issues (insufficient training for delivering content), and Accessibility issues (digital divide) negatively influenced the student's intentions to learn online. Kapila (2021) seconded the previous study that asynchronous e-learning obstructed the development of a favorable association between learner and instructor/ educator. Participants from remote areas faced a digital divide (economic and geographical issues towards devices and connectivity) and unawareness of using ICT tools for learning; consequently, it became the initial reason to reduce learner performance and satisfaction. Bugreeva (2021) introduced a different angle of improvising e-learning that to fortify the efficient e-learning, some instruments of edutainment and infotainment should be intenerated by the educational institutions through new instructional

designs for synchronous e-learning (video conferences, video lectures, video seminars, and webinars) and asynchronous e-learning (visualizations recorded videos with some attractive themes and appeals). Due to multimedia, the opportunity to merge audio-visualization and graphics in virtual learning instructional design is possible.

Blended Learning

A blended learning system comprises offline and online learning systems. Before Covid-19, blended learning systems consisted of offline (traditional face-to-face classroom) and online (virtual classroom) settings. However, during Covid-19, a blended learning system is managed through a Web-based (asynchronous) and instructor-based (synchronous) e-learning system (Singh, 2021). Although students' perception of online learning participation is declined and enfeeble, engagement and retention levels are decreased. However, overall, students displayed that there is a possibility to decrease burnout and increase engagement and retention levels using synchronous and asynchronous learning modes. (Chen et al., 2020). Amiti (2020) concluded, after reviewing 50 articles on which mode of e-learning is more effective than others, that a blend of synchronous and asynchronous methods is substantially demanded from the students to foster e-learning outcomes and satisfaction. The most significant predictors of e-learning quality are learners' satisfaction and acceptance of technology and the apps used during e-education. Moreover, a blended learning system helps the students complete their tasks on time and enhance the outcome of their results due to the direct interaction with their instructors virtually as well as face to face (Falfushynskan et al., 2021). Hence, during the Covid-19 pandemic, students favored receiving information and lectures through blended learning rather than a single mode of content delivery (Alquadah et al., 2020, Megahed & Hassan, 2021).

Discussion and Conclusion

After analyzing the 38 articles about the different concerns towards synchronous, asynchronous, and blended e-learning, the current study shows the pros and cons of both modes of e-learning. Moreover, it demonstrates the strength of blended e-learning during Covid-19 according to student perspective. Current investigation identifies that a purely single mode of e-learning is insufficient to execute satisfaction and improve the student's performance. However, the digital divide and ICT skills are the initial issues during e-learning in COVID-19 in developing and developed countries. During synchronous e-learning mode, video and audio connections in real-time are crucial to understand the informational material thoroughly. However, cause of geographical disparities, students, and instructors face connectivity (signal) issues, and the low socioeconomic status segment of the society faces economic/financial issues to afford internet access for connecting to live classes. Synchronous e-learning uses rich media to deliver its content. Interactive learning sessions and the immediacy of feedback are the superior advantages/ quality of this learning mode.

During asynchronous e-learning, cognitive skills for individual learning are more important for learners to understand content material better. Less cognitive skill escalates the cognitive divide among learners during COVID-19. Lean media is used for asynchronous e-learning (YouTube channels, WhatsApp recorded voice messages and documents, E-mails, LMS). Learners can read or listen to this content at their own pace of time, but late feedback from both sides is its limitation. However, most issue-specific participants proposed blended learning integration, a combination of e-learning and traditional face-to-face learning, in future educational infrastructure.

After analyzing the previous literature on online learning, this study reveals that these studies underpin the different theoretical frameworks: Knowledge Gap Hypothesis (Digital divide), Learning theories (behaviorism, constructivism), Rich Media Theory, and Technology Acceptance Model. Pre-covid research has been done when social interaction was not restricted. During

COVID-19, the crucial need to explore the learning process is amenable to media access. Computer-mediated learning is called virtual learning, and a virtual process is a process in which physical interaction between people and objects has been removed. The virtual terminal is used when there is no physical presence during interaction (Fiol and O'connor, 2005). To determine the significant efficiency of the virtual learning process, it is inevitable that upcoming researchers conduct research underpinning the 'Process of Virtualizibility' theory and pursue whether e-learning has all the initial compulsory components related to the virtual process. Process virtualizibility describes "How amenable a process is to be conducted without physical interaction between people or people and objects" (Overby, 2012). Several researchers used Media Richness Theory to determine which media is best for what type of content. Media Richness Theory and its extensions' quest to elucidate media selection for different communication processes only require person-to-person interaction. Process virtualization theory applies to both person-to-person and person-to-object interaction.

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