

FACTORS INFLUENCING EFFECTIVENESS OF E-LEARNING SYSTEMS AMONG UNIVERSITIES DURING THE COVID-19 PANDEMIC: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

The Covid-19 pandemic has spread across the globe affecting various aspects of human life, including education. Higher education is facing an unprecedented crisis all over the world. According to the United Nations, Educational, Scientific and Cultural Organization "UNESCO" more than 1.5 billion students in 165 countries have dropped out of academies and universities due to the Covid-19 outbreak. The pandemic has forced academic bodies to discover new learning and teaching forms, including E-learning. Therefore, this study aims to identify the factors influencing the Effectiveness of the E-learning system during Covid-19 in worldwide universities, including Malaysia. A systematic literature review (SLR) has been conducted as the method. It is started by a mapping process extracted from the current guidelines for classifying and structuring research guides published in the field of E-learning in Malaysian universities and worldwide. A total of 220 papers from three online databases were analyzed and underwent three filtering steps. A total of 24 articles were finally accepted for this study to answer the research question. Seven factors likely influencing E-learning efficacies during the pandemic and post-pandemic period were identified. Twenty-four research papers have been acquired, and through these papers, factors apperceived, which substantiated the results (SLR) of seven factors that can affect the adoption of E-learning systems in universities worldwide during the Covid-19 pandemic: 1) Perceived usefulness 2) Perceived ease of use 3) System Quality 4) Actual use system 5) Behavioral intention 6) Attitude toward using 7) Information Quality. The SLR results will be beneficial for understanding the needs of universities to improve the E-learning systems, especially during the period of the pandemic, post-pandemic, or any crises in the future, by looking at the factors that may be a measure of the environment to adapt. The study's results contribute to forming a clear vision of the Effectiveness of E-learning systems during Covid-19 by considering the factors and their future consequences.

Key words: E-learning during Covid-19, Virtual Learning, Online Learning, Covid-19, Universities, Systematic literature review.

INTRODUCTION

In recent years, the world has witnessed successive and rapid technological and technical developments, which necessitate those in charge of educational institutions to coexist with all global changes, to keep pace with those changes, products, and challenges; and in light of global trends and education development policies that took various forms, including E-learning, distance learning and other methods of development. The COVID-19 pandemic has caused a sudden, simultaneous, and gained attention among people throughout the world. At a critical juncture, the business era has changed in the world (Marinova, 2020). Universities are now using E-learning to provide classroom teaching. Distance class and electronic learning, online education are a form of education often referred to as E-learning. The ongoing COVID-19 crisis has been and will continue to be a significant challenge and learning experience for the global education community. Recently, E-learning in universities has increased dramatically with the development of various E-learning systems known as educational technologies to support traditional teaching and learning. E-learning was not a spur of the moment for the learners. However, COVID-19 is reviving the need to explore and embrace online teaching and learning opportunities (Akbulayev & Aliyev, 2020).

Universities are now using E-learning to provide classroom teaching. Distance class and electronic learning, online education are a form of education often referred to as E-learning. The physical separation between teachers and education students and the use of different techniques to facilitate communication between students and teachers is a key elements in this (Marson, 1984). Universities around the world have adopted E-learning systems. According to (Haas et al., 2011), E-learning refers to the use of ICT to increase and support tertiary school education learning. Furthermore, a range of programs can be emailed to students, from the online course to an entire online class from on-campus. There are many various methods of E-learning. A campus-based university provides classes in any situation, but a particular degree uses E-learning linked to the Internet or other online networks. ICT has shown to be as beneficial as it contributes to the success and Effectiveness of enterprises and individuals and has therefore become an indispensable instrument in modern communities. Despite the possibility of dependency or feelings of need, they greatly amplify our judgment, knowledge, and communication skills. For this cause, a portion of the human-technological relationship takes the form of symbiosis (ADELE & Brangier, 2013). The emergence of the Internet leads to E-learning for g open and distance learning (ODL) programs for students in Malaysia at the beginning of the 1980s. In Malaysia, E-learning is mostly carried out by universities, colleges, and enterprises. Private, public, and university institutions, as well as local and international companies, are the principal players in E-learning (Anuwar, 2004). With the development of various E-learning systems known as educational technologies to support traditional teaching and learning, the use of E-learning in universities has increased dramatically recently. For the students, E-learning was not a spur-of-the-moment decision. On the other hand, Covid-19 is reinvigorating the urge to investigate and embrace online teaching and learning alternatives. (Akbulayev & Aliyev, 2020).

This study explores the crucial factors influencing the Effectiveness of an E-learning system among worldwide universities during Covid-19.

Background Problem

The Covid-19 pandemic has put new pressures on various areas of life, most notably the field of education. Therefore, resorting to distance education was the quickest emergency solution to preserve education and searching for the available means according to the available capabilities for the students to continue receiving education. Due to this, universities forced themselves to switch to E-learning, employing means of communication they had not been using before. Their faculty members communicate with students in different ways, and some problems appeared in the application of E-learning. It raises doubts about the adoption of E-learning. In addition, some problems occurred in the application of E-learning because some of the universities did not follow E-learning or distance learning beforehand, in addition to the weakness of the E-learning infrastructure that requires the adoption of specific software and the provision of internet networks, smartphones, and computers for each student. Therefore, an urgent need has emerged to know and evaluate the Effectiveness of E-learning, the extent to which it achieves education goals, its ability to meet students' needs and create an interactive environment that replaces face-to-face learning.

E-learning technology has become a fundamental role in the success of the educational process in light of the tremendous technological development and the spread of modern means of communication. However, due to the conditions that the whole world suffers from at present, represented by the space of Covid-19, educational institutions have suddenly found themselves forced to switch to distance learning to ensure the continuity of the teaching and learning process and use the Internet, smartphones, and computers to communicate remotely with students (Yulia, 2020). The government of Malaysia has taken several measures to close all academies with the Ministry of Education and the E-learning program to highlight the rapid shift from traditional face-to-face learning classes to virtual learning lessons. The government working with the ministry of education (ME), has thus implemented several steps to close all universities and shift to the E-learning program to highlight the rapid transition from standard face-to-face to virtual learning (Lukas & Yunus, 2021). The main challenges to effective E-learning include lack of training, student infrastructure preparation, and learning instruments. There must thus be appropriate facilities for the efficient success of E-learning. Students must be self-disciplinary in time management, as the lecturers do not engage face-to-face. Instructors also must be trained to produce appropriate learning materials for their pupils (Mseleku, 2020). According to (Ismail et al., 2020), the main challenges for successful online learning are lack of training, facilities and infrastructure, students' preparation, and learning tools. Thus, adequate facilities must be provided for E-learning to be effectively successful. Students must have strong self-discipline in time management since there is no face-to-face interaction with instructors. Instructors must also undergo adequate training to develop suitable learning materials for the students.

However, the need for E-learning has risen due to its remarkable characteristics. E-learning is an additional means not only to enhance traditional teaching. In addition, it introduces the concept of lifelong E-learning and helps effectively in times of crisis (Mseleku, 2020). The lack of positive models is one of the main reasons for this problem with adopting E-learning in Malaysian universities. Since the model is the core of any technology to face the main challenges and become successful, there is a need to develop appropriate models for E-learning. The SLR has been chosen as a method to fulfill the paper's objective. We performed a broad, automated search to find SLRs published in 2020-2021. The following section describes our systematic mapping method in this study.

LITERATURE REVIEW

According to (Obeidat et al., 2020), E-learning means using electronic technology to offer learners educational material, allowing them to engage with content, teachers, and peers actively. One of the benefits of E-learning is that students can access educational material anywhere and at any time to save effort, time, and expense. Also, he performed an E-learning survey with 399 students. In general, the overall assessment of students' E-learning experiences was positive. Students, however, have identified problems with their E-learning experiences which are mainly linked to technical problems (for example, lack of a viable internet, lack of laptops). E-learning is that it delivers powerful new tools to improve skills and ability, speed, and performance, regardless of whether a company is operating in one or many locations. Just as the growth of ICT profoundly transformed work and communication, the introduction of electronic learning technology substantially alters the nature of learning (Sharma, 2017).

Following the initial Covid-19 detection in December 2019, the WHO proclaimed Covid-19 a global pandemic in March 2020 and warned of its highly contaminated natural environment Covid-19 (WHO, 2019). Around the world, the countries implemented many rules like full or partial lock-outs, social distancing regulations, and curfews to prevent their spread. To minimize the risk of humans becoming infected with Covid-19, locations in which people, notably education institutions, interact closely have been locked down. As a result of global measures, almost 1.5 billion registered students of all ages suffered educational interruptions, representing around 90% of the world's student population (UNESCO, 2020). E-learning has been the proposed solution to the situation pandemic; the University of Liberia adopted E-learning intending to promote medical education that provides relevant learning opportunities for students, develops the competencies of faculty members, helps them to cope with this situation, and is considered the best practice And an ideal way to teach during the lockdown (Mohebi et al., 2018). Italy is permitted to leave the house only for critical necessities, as it has been the most stringent lockdown in its history. Everyday retail, university, restaurant, and catering enterprises shall not operate. Public gatherings are not allowed. All activities not considered critical to the Italian manufacturing chain are close. Limitations have restricted the mobility of people while platforms for distance work, learning, and online cooperation, such as video and gaming, have begun to develop (Reiss, 2000). Yulia investigated the impact of the Covid-19 pandemic on reshaping education in Indonesia. Where the types and strategies of learning used by teachers in the world were explained via the Internet due to the closure of educational institutions to limit the spread of the pandemic. The descriptive survey

method was used, and to achieve the study's objective, the study used a questionnaire. The results of the study showed a high-speed impact of the Covid-19 pandemic on the education system. The results encourage education in higher education in general and during emergency periods (Yulia, 2020).

According to (Syauqi et al., 2020), the impact of the Covid-19 pandemic has spread almost across the globe, causing all educational institutions in Indonesia to close. As a result, teachers had to switch to online teaching methods and use E-learning systems, while students had to adapt to the online learning environment quickly. He emphasized that vocational education is not only knowledge mastery but also skills. The results of this study indicate that teachers in the Online Learning Administration do not align with students' expectations but can provide them with motivation and ease of learning. Some students mentioned that they have easy access to E-learning resources, but students are still reluctant to use them sustainably in the future.

Method

A literature systematic review method was used in this paper. The following section covers details of audit preparation and implementation.

A SYSTEMATIC LITERATURE REVIEW (SLRs)

SLR is described as a process of defining, evaluating, and analyzing all available research evidence to address specific research questions (Bakar et al., 2015). A systematic review of the literature prevents duplication of work already done in the center and produces documented results (Group & Extraction, 2011). It also aims to create a summary to collect results on a specific topic. In contrast to the traditional review (Basbar & Zhang, 2009). Compared to an expert review that uses ad hoc literature compilation, SLR is a methodologically systematic review of research findings. An SLR is intended to promote the creation of evidence-based recommendations for all available evidence on a research topic (Kitchenham et al., 2009).

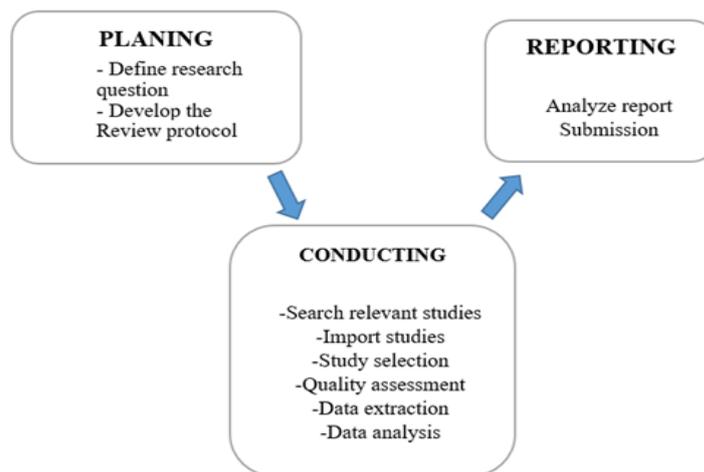


Figure 1: Mapping study presses

1. PLANNING PHASE

In the Plan review process, the mapping research protocol is specified, a robust protocol is established during this phase, and the systems for information collection are outlined. It specifically specifies analysis questions, searches for the collection of relevant reports, requirements for inclusion and exclusion for primary research, and screening paper processes (Vale et al., 2017). The research question is formulated and presented in the review protocol

Research Questions: What are the factors influencing the effectiveness of an E-learning system among worldwide universities during Covid-19?

1.2 Develop The Review Protocol

The PICOC criteria were applied to define the research question once it had been developed for the SLR. The words were separated using commas by the researcher using Population, Intervention, Comparison, Outcomes, and Study (PICOC). It will enable us to preserve them independently as keywords, which will aid in creating our search string.

Table 1: Summary of PICOC

Population	Universities
Intervention	N/A
Comparison	Universities in Malaysia
Outcome	Factors
Context	E-learning during Covid-19

Table 2: Keywords and Synonyms

Keyword	Synonyms	Related to
E-learning during Covid-19	<ul style="list-style-type: none"> • Electronic Learning during Covid-19 • MOOC • coronavirus • Covid-19 • E-learning during Covid-19 • online learning during Covid-19 • synchronous learning • virtual learning 	Context
Factors	<ul style="list-style-type: none"> • aspects • components • elements • issues • variables 	Outcome
Universities	<ul style="list-style-type: none"> • Higher education students • Postgraduate student • Undergraduate student • university students 	Population
Universities in Malaysia	<ul style="list-style-type: none"> • Higher education in Malaysia • Malaysian higher institution • Malaysian private universities • Malaysian public universities 	Comparison

The Process Used To Derive Search Terms:

The method for search terms: is the following: Record the topic of analysis for this PICOC study

- List keywords that can help you build your search string based on the research query.
- Identify alternate terms and synonyms.
- To enter the synonyms, use Boolean "OR".
- To connect keywords, use the Boolean "AND".

2. CONDUCTING PHASE

2.1 Searching for Relevant Studies

To obtain the necessary prior studies related to the topic, the research process must be accurate, in-depth, and comprehensive to address the RQ questions in SLR (Kitchenham et al., 2009). This section describes the research techniques intended to retrieve the above-related studies. This research employs the following search string with appropriate search terms for the automated procedure:

("Universities" OR "university students" OR "Higher education students" OR "Postgraduate student" OR "Undergraduate student" OR "university students") AND ("E-learning during Covid-19" OR "Electronic Learning" OR "MOOC" OR "coronavirus" OR "Covid-19" OR "E-learning during Covid-19" OR "online learning during Covid-19" OR "online teaching" OR "synchronous learning" OR "virtual learning") AND ("Universities in Malaysia" OR "Higher education in Malaysia" OR "Malaysian higher

institution" OR "Malaysian private universities" OR "Malaysian public universities" OR "Malaysian university student") AND ("Factors" OR "aspects" OR "components" OR "elements" OR "issues" OR "variables").

Table 3: Imported studies

Database	Number of Imported studies
Google Scholar	47
Science@Direct	69
Scopus	104

Three digital libraries are used in this analysis to find similar studies in the areas of research and to produce and check for specific conjunctions of keywords using well-known databases such as Google scholar, Science@Direct, and Scopus. We have chosen these four online databases as they are well-known multidisciplinary research sites with a wide range of publications that have been reviewed and updated. Table 3 shows imported studies.

2.2 STUDY SELECTION

To answer this study's research question and to identify relevant primary studies in the existing E-learning and Covid-19 pandemic papers. This identification process is performed with study selection criteria, including both the inclusion and exclusion criteria. This criterion is based on the research question.

The researcher defined the following selection criteria:

A. Inclusion criteria:

- Studies related to E-learning at worldwide universities.
- Both qualitative and quantitative methods.
- Studies were published between 2020 and 2022.
- Studies related to education and computers.

B. Exclusion criteria:

- Studies are not written in English.
- Studies that do not relate to E-learning.

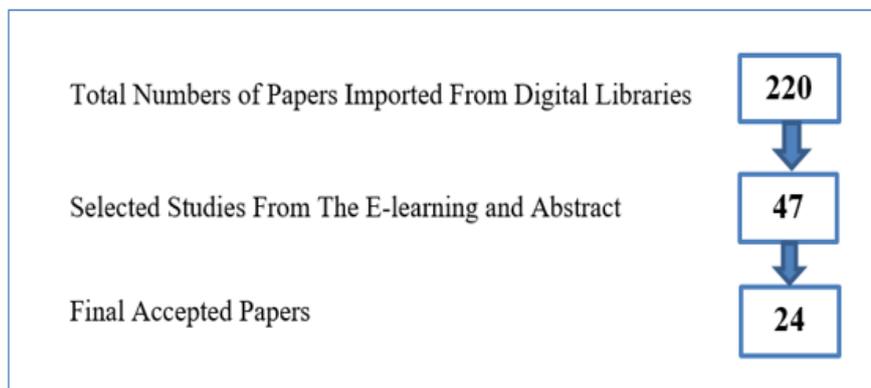


Figure 2: Paper Selection Process

Figure 2 illustrates the paper selection process. The number of papers imported from digital libraries reached 220. After applying the inclusion and exclusion criteria at the title and abstract level, only 47 sheets of paper remained. The following filtering was applied at the content level using inclusion /exclusion criteria to remove papers not written in English and papers not related to E-learning in universities. With these exceptions, only 24 final papers were considered.

Quality Assessment and Data Extraction

To make the data extraction process simple, a form was developed to compile evidence on the question of study and to measure the quality of primary studies. The evaluation checklist consisted of four general questions to determine the consistency of quantitative and qualitative studies in a ratio of the following: Yes=1 point, No=0 points, and partially=0.5 points. The resulting

total quality score for each study ranged between 0 (very poor) and 4 (very good). Table 4 below illustrates the studies quality assessment checklist.

Table 4: Studies Quality Assessment Checklist

Item	Answer
Were the findings trustworthy?	Yes/No/Partial
Were the data analysis and study findings reported clearly?	Yes/No/Partial
Were data collection procedures followed correctly?	Yes/No/Partial
Were the study's goal(s) mentioned clearly? (Kitchenham et al., 2009).	Yes/No/Partial

C. Studies Quality Assessment Checklist

We listed the following information for each paper: the author's name, the year of publication, the kind of paper (journal/conference), the source (Scopus/ScienceDirect/Google Scholar), and the overall quality score. These 24 papers were released during the years 2020 and 2022. twenty-three papers were published in journals, and the last paper was published in conference proceedings. 3.35 out of 4 is the overall paper's mean quality score.

D. Reporting Phase

Table 5: Factors

NO	Factors	Studies (S)	Total Studies
F1	Perceived Usefulness	S1,S3,S5,S6,S9,S11,S12,S13,S15,16,S19,S20,S21,S22,S23,S24	16
F2	Perceived Ease Of Use	S1,S5,S6,S9,S11,S12,S13,S15,S16,S19,S21,S20,S22,S23,S24	15
F3	Information Quality	S4,S8,S15,S22	4
F4	System Quality	S8,S10,S13,S15,S17,S21,S22	7
F5	Actual use system	S7,S12,S13,S23,S24	5
F6	Behavioral Intention to use	S2,S3,S6,S7,S8,S9,S13,S14,S16,S18,S19, S20, S24	13
F7	Attitude toward using	S1,S6,S11,S16,S17,S18, S20,S21	8

The study found that most of the authors agreed that "Perceived Usefulness" is the most studied factor that is believed to influence E-learning adoption during Covid-19, which is covered by (16 papers), and also (15 papers) for "perceived ease of use". Moreover, "System Quality" was covered with (7 papers) and also "Behavioral Intention to use" was covered with (13 papers) and "Information Quality" was covered with four papers. In addition, "Attitude toward using" was covered with eight papers, and "Actual use system", the least studied, was covered with five papers.

Table 2: Factors Definitions

NO	Factors	Definition
F1	Perceived usefulness	According to (Davis, 1989), Perceived usefulness (PU) is described as "the extent to which an individual believes a system will improve their performance in the workplace". The perceived usefulness of the E-learning system is a powerful indicator of a technological system.
F2	Perceived ease of use	Perceived ease of use (PEOU) is classified as the degree to which an individual believes that using a specific system will be not stressful" (Davis, 1989). (Chen & Tseng, 2012) Proposed that the perceived ease of use influences E-learning acceptance and adoption. According to some research, perceived ease of use has a greater effect than perceived utility, and both positively impact behavioral Intention to embrace the technical structure.
F3	System Quality	According to (Gorla et al., 2010), System quality is the quality of the information system processing itself, which comprises software and data components, and measures the technical soundness of the system. (Seddon, 1997) Stated that "The quality of the system is concerned with whether system problems exist, user interface consistency, the convenience of use, document quality and, occasionally, program code quality and maintenance.
F4	Actual use system`	Actual system use is described as "a favorable or unfavorable emotion of an individual regarding the conduct of the target (e.g., using a system) (Fathema et al., 2015). Potential users form motivational tendencies reasonably quickly after exposure to a new regime and are well informed about the observable behavioral consequences of such tendencies.
F5	Behavioral Intention	(Bundot et al., 2017) they pointed out that Behavioral Intention is an attempt to use the demeanor to assess the intensity of the Intention of individuals to conduct a particular action or use information and communication technology.
F6	Attitude toward using (ATU)	ATU as defined by (Davis, 1989) referred to a physical propensity that expresses some degree of favor or disadvantage by assessing a particular entity. Attitude toward using has a direct impact on technological intention.
F7	Information Quality	Information Quality refers to measuring, currency, accuracy, speed of production, completion, formatting, relevance & dependability linked to the quality of information (Bailey & Pearson, 1983).

LIST OF SELECTED PAPERS

The total number of papers imported into the digital library was 220, and the total number of papers included in the data extraction stage was 47. Accepted final papers are 24 studies following inclusion/exclusion criteria. Papers not written in English have been removed, and papers not related to E-learning. Table 3 shows the list of papers.

Table 3: List of Papers

code	Papers Title	Factors
S1	Understanding student acceptance of online learning systems in higher education: Application of social psychology theories with consideration of user innovativeness.	F1,F2,F7
S2	Factors impacting the behavioral intention to use E-learning in higher education amid the Covid-19 pandemic: UTAUT2 model.	F6
S3	FACTORS AFFECTING THE ADOPTION OF E-LEARNING IN INDONESIA: LESSON FROM Covid-19.	F1,F6
S4	Investigating Technostress as Moderating Information Quality and E-learning Effectiveness on Students in Jakarta During the Covid- 19 Pandemic.	F3
S5	Factors That Affect E-learning Platforms after the Spread of Covid-19: Post Acceptance Study.	F1,F2
S6	Using an extended Technology Acceptance Model to understand students' use of E-learning during Covid-19: Indonesian sports science education context.	F1,F2,F6, F7

S7	Determining factors affecting the acceptance of medical education E-learning platforms during the Covid-19 pandemic in the Philippines: Utaut2 approach.	F5,F6
S8	Examining the Moderating Effect of Perceived Benefits of Maintaining Social Distance on E-learning Quality During Covid-19 Pandemic	F3,F4,F6
S9	Modeling the acceptance of E-learning during the pandemic of Covid-19 A study of South Korea.	F1,F2,F6
S10	Learner-content interaction in E-learning- the moderating role of perceived harm of Covid-19 in assessing the satisfaction of learners.	F4
S11	Students' adoption of E-learning in an emergency: the case of a Vietnamese university during.	F1,F2, F7
S12	The Impact of Covid-19 Crisis upon the Effectiveness of E-learning in Higher Education Institution.	F1,F2,F5
S13	Determining factors affecting acceptance of E-learning platforms during the Covid-19 pandemic: Integrating the extended technology acceptance model and Delone & McLean is a success model.	F1,F2,F3, F4,F5,F6
S14	Exploring the Students' Behavior Intentions to Adopt E-learning Technology: A Survey Study Based on Covid-19 Crisis.	F6
S15	Driving Factors Analysis of E-learning Use in Primary Schools During the Covid-19 Pandemic Era: An Exploratory ISSM Model.	F1,F2,F3, F4
S16	Investigating university academics' behavioral intention in the adoption of E-learning in a time of COVID-19	F1,F2, F6,F7
S17	Factors influencing students' satisfaction with continuous use of learning management systems during the Covid-19 pandemic: An empirical study	F4,F7
S18	Adoption of E-learning During the Covid-19 Pandemic.	F7
S19	Students' Acceptance of Technology-Mediated Teaching – How It Was Influenced During the Covid-19 Pandemic in 2020: A Study From Germany	F2,F6
S20	The Acceptance of E-learning Among ESL Primary School Students During Covid-19	F1,F2,F6, F7
S21	Exploring Factors Influencing Online Learning and Ways To Develop Online Learning After Covid 19 Pandemic	F1,F2,F4, F7
S22	E-learning services to achieve sustainable learning and academic performance: An empirical study	F1,F2,F3, F4
S23	Measuring E-learning systems success: Data from students of higher education institutions in Morocco	F1,F2,F5
S24	Factors affecting the adoption of E-learning at the university level	F1,F2 F5,F6

As shown in Table 3, through the results of the SLR, we obtained twenty-four essential research papers, and then each of the essential factors was identified, and the number of papers that referred to each factor. (Studies S) are a set of studies that refer to a certain factor and a total of studies that refer to the number of papers that are mentioned in the (Factors F). The study found that most of the authors agreed that "Perceived Usefulness" is the most studied factor that is believed to influence E-learning adoption during Covid-19, which was covered by (16 papers), likewise (15 papers) for "perceived ease of use". Moreover, "System Quality" was covered with (7 papers) and also "Behavioral Intention to use" was covered with (13 papers) and "Information Quality" was covered with four papers. In addition, "Attitude toward using" was covered with eight papers, and "Actual use system", which is the least studied, was covered with five papers.

DISCUSSION

In this paper, we perform a systematic review of the literature to investigate the factors influencing E-learning adoption during the pandemic and post-epidemic periods. The automatic search result is integrated. A total of 220 papers from three online databases were analyzed and underwent three filtering steps. A total of 24 articles were finally accepted for this study to answer the research question; seven factors likely to influence E-learning efficacies during the pandemic and post-pandemic period were identified. Our SLR results show that E-learning adoption is affected in universities. Perceived usefulness, ease of use, System Quality, Actual use system, Behavioral Intention, System Quality, and Information Quality.

About 14 study results reported that university E-learning is affected by its Perceived usefulness. Perceived usefulness has been discussed in various studies as one of the factors influencing the adoption of the E-learning system. This study also found that a Perceived Ease of Use significantly impacts the adoption of an E-learning system during Covid-19. The third factor is System Quality. Systems quality measures Adaptability, Availability, Reliability, Response Time, and Usability. Also evaluation of the Web site's usability and the relevance for decisions of the information provided. The fourth factor is the Actual use system Studies have found that it impacts the adoption of E-learning, which is the endpoint where students use the E-learning system. The fifth

factor: 13 studies indicated that the Behavioral Intention to use strongly affects the education system's adoption during the epidemic. The Behavioral Intention to continue using the E-learning system relates to the student's desire. Furthermore, Attitudes toward using and university students' attitudes towards learning show a greater probability that learners will accept the new learning system, which has a high effect on adopting the E-learning system during Covid-19. Finally, Information quality is an essential aspect for measuring the Effectiveness of information and E-learning systems due to its crucial role in achieving learning objectives and the significant problems caused by the poor quality of information.

CONCLUSION

Universities can use the results of this study, specifically Malaysian universities, to be aware of these factors that influence the adoption of E-learning during the Covid-19 pandemic and post-pandemic periods. For future work, it was suggested to develop a model for the factors that influence the adoption of E-learning during the Covid-19 pandemic and post-pandemic period and to test the model by looking at the relationship between factors and the adoption of the E-learning system.

These factors can help improve the current E-learning system by increasing the knowledge of E-learning as it relates to its use and Effectiveness during the pandemic and post-pandemic period. E-learning systems can facilitate learning and teaching as a method that can implement anywhere and anytime, as long as the place or location is online. Steps can be taken accordingly. In addition, this study encourages students and universities to use E-learning to help improve their teaching process.

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REFERENCES

- Akbulaev, N., & Aliyev, V. (2020). The effect of coronavirus sars-cov-2 in the tourism industry in Africa. *Journal of Environmental Management and Tourism*, 11(8), 1938–1947. [https://doi.org/10.14505/jemt.v11.8\(48\).06](https://doi.org/10.14505/jemt.v11.8(48).06)
- Babar, M. A., & Zhang, H. (2009). Systematic literature reviews in software engineering: Preliminary results from interviews with researchers. *2009 3rd International Symposium on Empirical Software Engineering and Measurement, ESEM 2009, October*, 346–355. <https://doi.org/10.1109/ESEM.2009.5314235>
- Bailey, J. E., & Pearson, S. W. (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction Author (s): James E. Bailey and Sammy W. Pearson Published by: INFORMS Stable URL : <http://www.jstor.org/stable/2631354> REFERENCES Linked references are available on JSTOR f. *Institute for Operations Research and the Management Sciences*, 29(5), 530–545.
- Bao, W. (2020). COVID -19 and online teaching in higher education: A case study of Peking University . *Human Behavior and Emerging Technologies*, 2(2), 113–115. <https://doi.org/10.1002/hbe2.191>
- Bundot, G. Y., Yunus, J. M., & ... (2017). Technology Acceptance Model Of Intention To Use ICT By Academics In Nigerian Higher Education. *Online Journal for TVET* <https://publisher.uthm.edu.my/ojs/index.php/oj-tp/article/view/4771>
- Chen, H. R., & Tseng, H. F. (2012). Factors that influence acceptance of web-based E-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, 35(3), 398–406. <https://doi.org/10.1016/j.evalprogplan.2011.11.007>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- Fathema, N., Shannon, D., & Ross, M. (2015). Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions. *MERLOT Journal of Online Learning and Teaching*, 11(2), 210–232.
- Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *Journal of Strategic Information Systems*, 19(3), 207–228. <https://doi.org/10.1016/j.jsis.2010.05.001>
- Group, C. P., & Extraction, D. (2011). *Arthritis Research UK Primary Care Centre Systematic Review Protocol & Support Template*. March, 1–8.
- Ismail, N. S., Bakar, N. M. A., & Wafa, S. W. W. S. S. T. (2020). Online Learning Challenges during Pandemic COVID-19 in Malaysian Higher Learning Institution. *Universal Journal of Educational Research*, 8(12), 7151–7159. <https://doi.org/10.13189/ujer.2020.081282>
- Kitchenham, B., Pearl Brereton, O., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2009). Systematic literature reviews in software engineering - A systematic literature review. *Information and Software Technology*, 51(1), 7–15. <https://doi.org/10.1016/j.infsof.2008.09.009>
- Lukas, B. A., & Yunus, M. M. (2021). ESL teachers' challenges in implementing E-learning during COVID-19. *International Journal of Learning, Teaching and Educational Research*, 20(2), 330–348. <https://doi.org/10.26803/IJLTER.20.2.18>
- Marinova, S. T. (2020). COVID-19 and International Business. In *COVID-19 and International Business* (Issue March 2021). <https://doi.org/10.4324/9781003108924>
- Marson, S. (1984). Distance learning. *Nurse Education Today*, 4(5), 98. [https://doi.org/10.1016/S0260-6917\(84\)80010-6](https://doi.org/10.1016/S0260-6917(84)80010-6)
- Mseleku, Z. (2020). A Literature Review of E-learning and E-Teaching in the Era of Covid-19 Pandemic. *International Journal of Innovative Science and Research Technology*, 5(10), 588–597.
- UNESCO. (2020). Education: From disruption to recovery - COVID-19 impact on education. Unesco, 19, 1–4. <https://en.unesco.org/covid19/educationresponse>

- Obeidat, A., Obeidat, R., & Al-Shalabi, M. (2020). The Effectiveness of Adopting E-learning during COVID-19 at Hashemite University. *International Journal of Advanced Computer Science and Applications*, 11(12), 96–104. <https://doi.org/10.14569/IJACSA.2020.0111213>
- Sharma, P. (2017). The impact of. *Dental Nursing*, 13(5), 232–233. <https://doi.org/10.12968/denn.2017.13.5.232>
- Seddon, P. B. (1997). A Respecification and Extension of the DeLone and McLean Model of IS Success. In *Information Systems Research* (Vol. 8, Issue 3, pp. 240–253). <https://doi.org/10.1287/isre.8.3.240>
- Siron, Y., Wibowo, A., & Narmaditya, B. S. (2020). *FACTORS AFFECTING THE ADOPTION OF E-LEARNING IN INDONESIA: LESSON FROM COVID-19*. 10(2), 282–295.
- Vale, T., de Almeida, E. S., Alves, V., Kulesza, U., Niu, N., & de Lima, R. (2017). Software product lines traceability: A systematic mapping study. *Information and Software Technology*, 84, 1–18. <https://doi.org/10.1016/j.infsof.2016.12.004>
- WHO. (2019). Coronavirus disease (COVID-19) pandemic. 1–11.
- Yulia, H. (2020). Online Learning to Prevent the Spread of Pandemic Corona Virus in Indonesia. *ETERNAL (English Teaching Journal)*, 11(1), 48–56. <https://doi.org/10.26877/eternal.v11i1.6068>

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