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WHAT MADE IMPLEMENTING EFFECTIVE ELEARNING HARD?: A SYSTEMATIC LITERATURE REVIEW

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Abstract— Covid-19 pandemic change a lot of industries in the world, including education. Education industries have become the third most affected by the pandemic and force educational institutions to change how they deliver their education services. eLearning became one of the solutions to these problems. But the implementation of eLearning proved to be hard and faced many obstacles or barriers. This paper is a Systematic Literature Review paper using Kitchenham. The systematic review results show four categories of barriers in eLearning: human factors, technological factors, financial factors, and organizational factors. To tackle this problem, educational institutions need to change the way they deliver the material; gamification is one way to change it. The organization also has a vital contribution to tackle these barriers as the policymakers and supporters, both financially and as training providers.

Keywords: Covid-19, eLearning, Barrier

Abstrak—Pandemi covid 19 mengubah banyak sekali industri di dunia, termasuk dalam sektor Pendidikan. Dengan adanya pandemic ini, banyak institusi pendidikan yang terpaksa mengubah cara mereka dalam memberikan layanan Pendidikan bagi masyarakat. Salah satu cara yang berubah adalah berubahnya penyampaian dari luring menjadi daring menggunakan berbagai platform. Dengan diterapkannya eLearning ini, muncul masalah-masalah baru yang mengakibatkan kegiatan eLearning ini menjadi tidak efektif. Paper ini adalah paper Systematic Literature Review menggunakan pendekatan kitchenham sebagai protokol review. Dari hasil review yang dilakukan, ditemukan empat kategori pengahalang yang ditemukan, yaitu; Faktor Manusia, Faktor Teknologi, Faktor Finansial dan Faktor Organisasi. Untuk menghadapi hal ini, institusi Pendidikan perlu mengubah cara dalam menyajikan materi daring. Salah satu cara yang bisa digunakan adalah dengan menggunakan gamifikasi. Organisasi disini juga mempunya peran penting terutama dalam pembuatan kebijakan paying dan dukungan dakam pelaksanaan pembelajaran daring.

Kata Kunci: *Covid-19, eLearning, Penghalang.*

INTRODUCTION

The covid-19 pandemic changed a lot of ways people worked and disrupted a lot of sectors. Statista in 2020 [1] published some data which show that in 2020, education and health industries were significantly affected by the pandemic. Figure 1 Sectors Affected by pandemics show the affected sectors.

We know from Figure 1 that the most affected sectors are Leisure and hospitality, wholesale and retail, and education, respectively. The education sector became one of the most affected sectors because almost all activities were conducted offline in class. In their paper, Ghulam et al. [2]explained that this covid 19 pandemic pushed many educational institutions to change their way of delivering education to ensure the continuity of learning activity. This change of methodology caused by this condition made some universities, schools, and other educational institutions can't run their activities. This condition became harsher because we don't know when this pandemic will end, as mentioned by Roman et al. in their paper [3]. Many academic institutions changed their learning methods into online platforms such as LMS, social media, or other platforms to tackle this obstacle. This kind of method is usually called eLearning. eLearning itself can be described as delivering educational materials through the internet [3]. eLearning itself is not a new thing on the internet. In the early stage of the internet, the internet is mainly used for exchanging information. The first documented formal eLearning media is CBT. CBT was born in the late eighties [4] and used as a training platform.

eLearning implementations faced many challenges, which hindered the effectiveness of the learning activities, as mentioned in [5]. This research tried to summarize and analyze how academic institutions

such as universities could implement eLearning more effectively and what features can be added to the eLearning platforms to aid this goal.

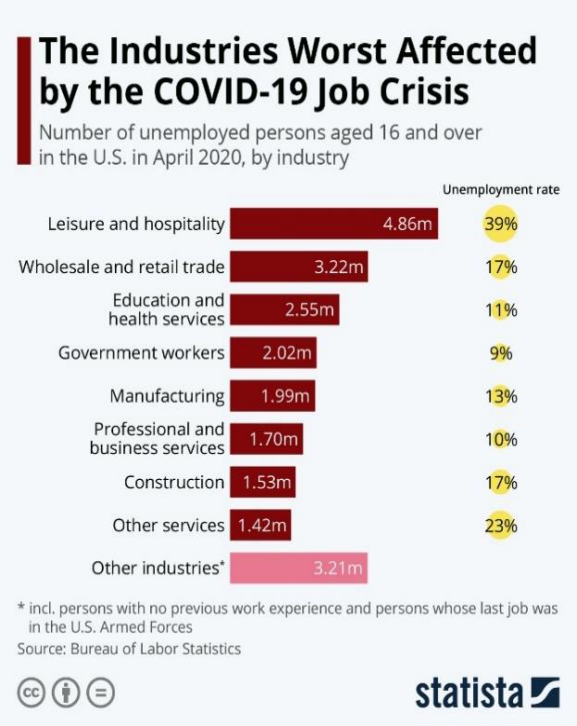

Figure 1 Sectors affected by pandemic [1]

MATERIALS AND METHODS

This paper is a systematic literature review paper. To gain the barrier of eLearning, we used Kitchenham's systematic literature methodology [6][7]. Kitchenham's Systematic Literature Review procedure can be seen in Figure 2 Search Protocols. The first step of the review is deciding the research questions. The research questions used in this research is:

1. Q1: What hinders or the barrier of eLearning?
2. Q2: how to improve the effectiveness of the eLearning activity?

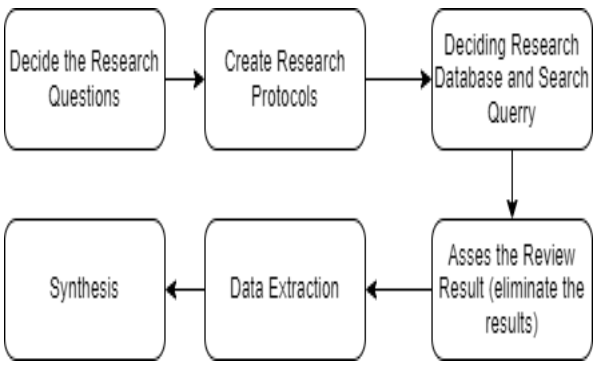

Figure 2. Search Protocols.

The next step is creating the protocols. The goal of creating a search protocol is to ensure that the excellent quality of the review can be achieved. As mentioned, the Protocols we used are using Kitchenham's Systematic Literature Review Protocols. After deciding the research protocols, we determine the search query and the research database we will use. In this research, we use four research databases: Science Direct, IEEExplore, Emerald, and Proquest. The search query implemented is: (eLearning OR e-Learning OR Distance Learning OR Asynchronous Learning) And (Barrier OR Hindrance OR Obstacles). This search query was then implemented and modified accordingly based on the research database requirements. After deciding the database and search query, the next step is determining the elimination criteria. The elimination criteria are:

1. The research paper wrote in a non-English language.
2. The Research paper does not mention eLearning, Distance Learning, or Asynchronous learning in the search query results.
3. The paper stated the research clearly in the abstract

After deciding the elimination criteria, the next step is conducting the data extraction. In this step, we read the papers, find the eLearning implementation barriers, and write it into the synthesis tables.

RESULTS AND DISCUSSION

Table 1 Search and Elimination Results

No	Research Databases	Search Result	Eligible papers
1	Science Direct	12	3
2	IEEExplore	14	6
3	Proquest	2	-
4	Emerald	3	1
5	Total	31	10

Table 1 search and elimination results show that the search results were not that big. Because of the search results in the research, many research papers were not mentioned the search query clearly, so we eliminated it. From thirty papers we collected and read, only ten papers wrote the barriers of eLearning in their paper.

Table 2 Synthesis Results show the result of the Synthesis Process. The synthesis results are classified based on the HOT models [8] developed by Yusof et. Al. We added financial factors into the classification model because finances became one of the main factors we found and can be seen from organizational and Personal factors.

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Table 2 Human Factor

Barrier of eLearning	Source
Human Factor	
Lack of Interaction	[9], [10]
Harder to Assimilate Material	[9]
Resistance	[9], [11], [12], [13]
Lack of ICT Skill	[13], [14], [10], [15]
Lack of Digital Literacy	[14], [15]
Lack of English Proficiency	[14], [11], [12], [13]
Weak Motivation	[12]–[14], [16]
Lack of Pedagogical Skill	[13], [15][10][3]
Education Method	[10], [12]
Lack of Compensation and Time	[12], [13], [15]
Distrust	[12], [16]
Boredom	[12]
Frustration	[3], [12]
Exhaustion	[16]
lack of student preparation	[10]
Inability to meet student's need	[10]

From Table 2 till Table 4, we can see that the most mentioned factors mentioned in these papers were human factors. Many psychological factors come when we fully implement eLearning, such as exhaustion, frustration, and boredom. Humans as a social entity need social interaction and partners either in teaching or studying. Human factors also became the most identified by researchers because the nature of people is the same even though they come from a different geographic area.

The lack of English skills, Pedagogical skills, and ICT Skills also became the highlight of the results. Students and teachers lack this skill, which hinders the effectiveness of the learning process. Many LMS used, such as Teams, google classroom, and Moodle using English as the user interface language. On the other hand, the English of the researcher's research subject has low English literacy. For example, based on EF research data, Indonesia has low English proficiency and got position eighty from one hundred and twelve countries in Asia [17]. This lack of ability made many learning features unused and can be utilized by the user.

The other problem that occurred when institutions changed their learning method from offline to online learning is the lack of online pedagogical or online teaching proficiency from the teacher or the lecturer. Naveed et al. mentioned that the inability of the teacher to create online teaching materials became a roadblock to eLearning success. Therefore universities or any educational institutions need to give their teachers training to develop effective learning materials, as mentioned in Montazer's research [12], which also became the main barrier factors in the organization side.

Another weakness from the educator side is the teaching methods. Many educators use educational practices that aren't suitable for eLearning methods, resulting in boredom and exhaustion for both the educator and the students [12]. This factor also has a close relationship with the lack of training from the organization. Therefore, educators, in this case, teachers, lecturers, and the ministry of education, need to find new ways to teach.

Teachers and lecturers can implement gamification to tackle this boredom and lack of motivation in learning. Gamification can be described as implementing gaming mechanics into other forms of activity, such as in education. Medal's functionality is one form of gamification usually used in forums and other communities [18].

Many learning websites use this kind of gamification to keep the learner's attention during the learning session. For example, Duolingo, an English learning platform, uses this kind of gamification to achieve learning. This achievement can be seen by other users who made the competitive situation between learners to continue their study.

This competitive nature itself can enhance the students learning phase. Another factor from Duolingo which can be adapted into formal eLearning is the concept of self-learning and "do it your own-phase." Many online learning websites such as Duolingo, Udemy, and other learning websites use this concept to less the learning burden of the students. Hypothetically Using students' own-phase in learning could enhance their learning curve.

Figure 2 Example of Gamification in eLearning, Duolingo

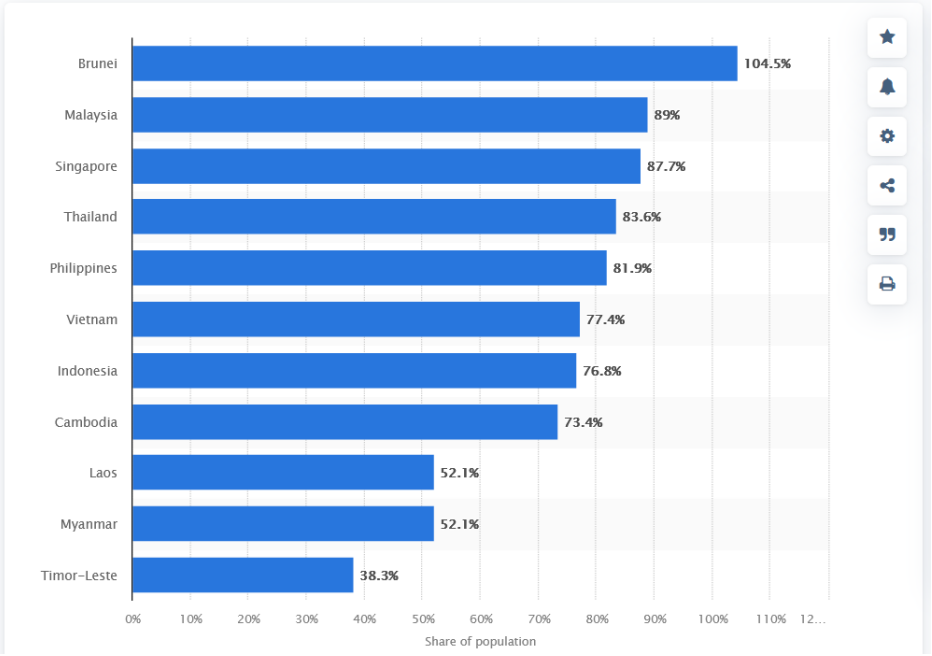

Figure 3 Internet Penetration Data [19]

For example, in the Udemy business process, the students learn the skill they want at their own phase with a predetermined time to clear the course. The educators with good enrollment numbers could get bonuses, which made the ecosystem live [20]. Moodle also has the same kind of gamification that educators can utilize. The gamification comes in the form of a badge that the educators can give to the learner as a learning achievement.

But, to ensure this learning method can be implemented, the technology factors became the next problem because this kind of education method needs good technological infrastructure and devices [21].

Table 3 Technological Factor

Barrier of eLearning	Source
Accessibility	[9], [12]
Difficulty in Online Exam	[9]
Inappropriate Infrastructure	[3], [13], [14], [22]
Technical Problems	[10], [11], [16]
Lack of Technological devices like computer	[12], [22]
Internet problems	[12], [3], [16], [22], [10]
Power Problems	[12], [22]

From the technological factor, the main issue is the internet, which started from accessibility, reliability, and availability. Lack of technology such as the device and infrastructure became the main factors that made the internet inaccessible. Figure 3 Internet Penetration shows that Indonesian are still left behind in the availability of internet connection in Southeast Asia. Indonesia ranked seventh among eleven countries in Southeast Asia. This data shows that Indonesia does not have good internet to support eLearning.

For example, in Indonesia, as reported by Kompas. Many students need to climb mountains and risk their lives to get internet access [23]. This news is supported by the data gained by the World Bank in 2021 [24]. This lack of internet access made the students can not study effectively. Lack of internet access not only became the problem these students need to face. The lack of digital devices also made the learning process ineffective because they needed to use the devices together and alternately.

Another problem faced by both students and educators is the power problem. Many places do not have adequate electricity to ensure the learning process can be run effectively. Aminu et al. found in their research in Nigeria that one of the problems educators and students alike face is the power problem [22]. Without adequate electrical power, the device used in eLearning can not operate well. Indonesia also met this problem amidst the covid-19, As written by Okezone.com [25]. In this news article, Bogor, one of Indonesia's big cities, has problems in conducting online learning assessments because of unreliable electrical power. As mentioned before, the lack of devices also became the main problem in eLearning effectiveness. Many students do not have adequate eLearning devices or use the devices alternately between siblings or friends [23]. This problem is connected to the next category of issues which are financial problems.

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Table 4. Financial Factor

Barrier of eLearning	Source
Financial Condition	[12], [22]
Lack of Investment	[10]
Expensive device	[10], [22]
Expensive internet	[10]

Figure 1 shows that many industries are affected by covid-19, and table 3 shows what would happen when such sectors closed. Many parents of the students depend on these industries to fund their child's education, but many people lose their job and can not afford the devices or technologies needed for eLearning. Lack of Financial Investment or budget made the students can not afford to buy the devices. Therefore they can not attend the class.

Table 5 Organizational Factor

Barrier of eLearning	Source
Lack of Technical Support	[14][13]
Lack of Financial Support	[14]
Lack of Inadequate Policy	[14]
Lack of Training in eLearning	[14], [11], [12], [22]
Lack of Instructional Design	[14]
Privacy and Security	[11]
Shortage of Technical Staff	[10]
Cultural	[12]
lack government support	[12]
Lack of quantity and quality Content	[12]

The last category we identified is the Organization factors as shown is Table 5. In this category, we also include government as the regulator. The main problem of the organization is the lack of preparation due to sudden changes situation amidst the pandemic. Therefore a lot of organizations employed the hit and run strategy. Lack of policies from organizations made some educators and students lose motivation [14]. As mentioned before, organizations need to give adequate training to the educator, and the organization as the education provider also needs to ensure the eLearning participants' privacy and security. Therefore, organizations need to create policies as the umbrella for said activity. Another factors organization need to focus at is the availability of the ICT staff. Without adequate ICT Staff as the eLearning support center, the eLearning activity does not have enough support.

CONCLUSION

Covid-19 pandemics change many things in the world, including education. Education became the third most affected industry amidst the pandemic situation. This pandemic forces many educational institutions to change their way of teaching from direct learning in classrooms into eLearning. But, in this shifting process, many problems occur, which makes the learning process ineffective. The issues found can be categorized into four factors: human, Technological, financial, and Organizational factors. Human factors became the most studied and observed factors that hindered learning. Educators and organizations need to find other ways to serve the learning activities to change this condition. One of the ways is using gamification, which proved to be effective in enhancing learning effectiveness. Government and organizations also need to make policies to support eLearning.

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