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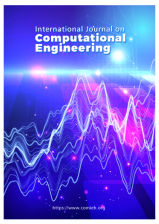

The Online Learning Experience in Malaysian Public Universities: A Systematic Literature Review

Ahmed Saleh Ahmed [a], Mohd Norasri Ismail [a]

[a] *Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, Parit Raja, Johor, Malaysia*

Corresponding author: [*]norasri@uthm.edu.my

***Abstract*—This article systematically explores the online learning experience in Malaysian public universities, synthesizing findings from studies published in the past five years. Utilizing the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, this review rigorously identified, selected, and analyzed relevant research to identify key challenges, benefits, and strategies for improving online education while addressing existing research gaps. Challenges highlighted include technical issues, such as limited Internet access and platform usability, pedagogical barriers related to student engagement and assessment methods, and psychological impacts, including stress and isolation. Despite these obstacles, online learning offers notable benefits, including flexibility, convenience, and expanded access to educational resources. Strategies for improvement emphasize blended learning approaches, faculty training programs, and investment in digital infrastructure. The review also critically compares local findings with international studies, revealing not only commonalities in challenges but also unique regional factors specific to the Malaysian context. Crucially, identified gaps in longitudinal studies and a limited focus on inclusivity and equity underscore the urgent need for further, more comprehensive research. This systematic review significantly contributes to evidence-based policy-making and the refinement of pedagogical practices within Malaysian higher education, offering actionable recommendations designed to substantially enhance the online learning experience in Malaysian public universities.**

***Keywords*—Benefits of online learning; digital education; e-learning challenges; Malaysian public universities.**

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I. INTRODUCTION

Online learning has become a cornerstone of higher education, especially following the rapid digital transformation catalyzed by the COVID-19 pandemic. With advancements in technology and increased internet accessibility, online education offers opportunities for flexibility, inclusivity, and expanded access to knowledge, making it an integral part of higher education globally [1]. In the context of Malaysia, the adoption of online learning has grown significantly, particularly in public universities. These institutions, which play a critical role in providing affordable and quality education, have leveraged online platforms to continue academic activities amidst disruptions. The shift to online learning, however, has not been without challenges [2].

The evolution of online learning in Malaysia can be traced back to initiatives promoting digital education through platforms like MOOC (Massive Open Online Courses) and Learning Management Systems (LMS) such as Moodle and Blackboard [3]. However, the COVID-19 pandemic served as a catalyst for a widespread and rapid adoption of online learning modalities [4]. Public universities in Malaysia transitioned to online learning models to ensure continuity in education, fostering a transformative period for both educators and students [5]. This transition brought forward an array of experiences, ranging from the benefits of flexible learning environments to the challenges posed by digital divides and the lack of preparedness among students and faculty [6]. The experiences from this shift underscore the need to delve deeper into the complexities of online learning within the Malaysian higher education system [7].

Despite its potential, online learning in Malaysian public universities has faced substantial challenges, particularly during its initial implementation phase. Students reported difficulties such as inadequate internet connectivity, limited access to digital devices, and a lack of motivation due to reduced interpersonal interactions [8]. Faculty members, on the other hand, faced obstacles in adapting to new teaching technologies and methods. The abrupt transition revealed gaps in digital literacy, infrastructure readiness, and

pedagogical strategies that could effectively engage students in a virtual setting [9]. These challenges underscore the critical need for a systematic analysis of the online learning experience to uncover insights and foster improvements that can benefit all stakeholders [10] .

A. Research Objectives

The objective of this study is to identify key factors influencing the online learning experience in Malaysian public universities. This includes understanding the challenges and opportunities presented by online education and providing evidence-based recommendations for enhancing its implementation. Through synthesizing existing research, the study aims to provide a comprehensive overview of the online learning experience, addressing areas such as student engagement, faculty adaptation, infrastructure development, and curriculum design. Highlighting these factors will not only shed light on the current state of online learning but also guide future strategies to make it more effective and inclusive.

The significance of this study lies in its potential contribution to multiple facets of the educational ecosystem. Policymakers can leverage the findings to formulate robust digital education policies that address infrastructural and pedagogical gaps. Curriculum designers can use insights to develop engaging and accessible course content that aligns with the needs of a diverse student population. Educators can benefit from recommendations on best practices for online teaching, while students stand to gain from improved learning environments that enhance their academic experience. Moreover, the study adds to the academic discourse on online learning by synthesizing empirical evidence, thus filling research gaps and informing future investigations.

B. Research Questions

Central to this study are the following research questions:

What are the common challenges and benefits of online learning in Malaysian public universities?

What strategies have been proposed or implemented to enhance the online learning experience?

What research gaps exist in this field?

These questions aim to guide a systematic exploration of the online learning landscape, focusing on experiences, interventions, and areas requiring further attention. Addressing these questions will provide a holistic understanding of the online learning experience and its implications for Malaysian public universities

II. Materials and Method

A. Systematic Review Protocol

To ensure the rigor and transparency of this systematic literature review (SLR), the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was employed. PRISMA is a widely recognized methodological guideline that supports the systematic identification, selection, appraisal, and synthesis of relevant literature [11] . This framework provides a clear and replicable structure, enhancing the credibility and reliability of the review process.

The review process commenced with a comprehensive search strategy across multiple academic databases, including Scopus, Web of Science, and Google Scholar, to identify peer-reviewed articles related to the online learning experience in Malaysian public universities. Boolean operators and search strings were applied, such as "online learning", "e-learning", "Malaysian public universities", AND "student experience". Articles were screened based on predefined inclusion and exclusion criteria to ensure the relevance and quality of the selected studies.

B. Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were established to maintain the relevance, quality, and transparency of the selected literature [11]. These criteria were applied at various stages of the review process, including title screening, abstract review, and full-text analysis [11], [12]. The following table summarizes the criteria used.

TABLE I
INCLUSION CRITERIA FOR THE REVIEW

Criterion Type	Inclusion Criteria
Topic	Studies explicitly focused on the online learning experience within Malaysian public universities.
Recency	Articles published within the last five years (2019–2024) to ensure the inclusion of the most current and relevant data.
Research Transparency	Peer-reviewed journal articles or conference papers with clearly stated research objectives, methods, and findings.
Reliability/ Validity	Studies that employ rigorous methodologies, such as validated instruments, robust data analysis techniques, and clear presentation of results.
The Sample	Research involving students, faculty, or administrative staff from Malaysian public universities participating in online learning activities.

C. Search Strategy

The search strategy for this systematic literature review was designed to ensure a comprehensive and methodical identification of relevant studies examining the online learning experience in Malaysian public universities [12] . To achieve this, multiple academic databases were utilized, including Scopus, Web of Science, Google Scholar, and PubMed. These databases were selected due to their extensive coverage of peer-reviewed journal articles, conference proceedings, and high-quality academic sources that align with the study's objectives.

The search process was structured using specific keywords and search strings to maximize the retrieval of relevant studies while minimizing irrelevant results. The primary keywords included "online learning," "e-learning," "public universities," "Malaysia," "student experience," and "faculty experience." These terms were combined using Boolean operators such as AND, OR, and NOT to create precise and targeted search strings. For instance, a typical search string used in the process was: "online learning" AND "public universities" AND "Malaysia" OR "student experience" OR "faculty experience." This combination ensured the inclusion of

studies focusing on both student and faculty perspectives, thus capturing a comprehensive understanding of the online learning landscape in Malaysian public universities [13].

To further refine the search, filters and advanced search options available within the databases were applied. These included setting publication date limits to include studies from the last five years (2019–2024), focusing on articles written in English, and selecting only peer-reviewed sources. The use of filters ensured that the selected literature met the inclusion criteria, maintaining the recency and quality of the data. Additionally, backward and forward citation tracking was employed to identify relevant studies referenced in key articles, broadening the scope of the review and reducing the risk of missing important contributions [13], [14].

The search strategy also incorporated variations of the keywords to capture terminological diversity across studies. For example, synonyms and related terms such as "virtual learning" and "distance education" were considered alongside "online learning" and "e-learning." Similarly, the term "faculty experience" was expanded to include "educator experience" and "teaching staff perspective" to account for differences in terminologies used in the literature. This systematic and inclusive approach ensured a robust and comprehensive identification of studies relevant to the research objectives.

D. Selection Process

The selection process for this systematic literature review involved a meticulous screening and evaluation of studies to ensure their relevance and quality in addressing the research objectives [15]. The process was conducted in several stages: screening titles, reviewing abstracts, and performing a detailed analysis of full texts. These steps were guided by predefined inclusion and exclusion criteria to maintain consistency and objectivity throughout the process. The initial screening began with the evaluation of article titles retrieved from the database searches. Titles were carefully reviewed to determine whether they indicated relevance to the topic of online learning experiences in Malaysian public universities. Articles with titles explicitly mentioning keywords such as "online learning," "e-learning," "public universities," "Malaysia," "student experience," or "faculty experience" were retained for further review. Titles that were ambiguous or lacked relevance were excluded at this stage to streamline the selection process.

Following the title screening, abstracts of the retained articles were examined in detail. Abstracts provided a concise summary of the research objectives, methodology, and findings, which were assessed against the inclusion criteria. Studies that met the criteria, such as those focusing on Malaysian public universities, recent data (2019–2024), and empirical evidence, were shortlisted for full-text review. Studies that lacked methodological clarity, addressed the topic only tangentially, or focused on non-Malaysian contexts were excluded. The abstract review process ensured the selection of studies with a high likelihood of contributing meaningful insights to the research.

The final stage involved a comprehensive analysis of the full texts of the shortlisted articles. During this phase, each study was assessed for its methodological rigor, relevance, and alignment with the research objectives. Particular attention was given to the clarity of research design, the robustness of data collection and analysis methods, and the relevance of the findings to the online learning experiences of students and faculty in Malaysian public universities. Studies that provided a detailed exploration of challenges, opportunities, and strategies in online learning were prioritized, while those lacking empirical depth or methodological transparency were excluded.

To ensure the quality of the selected studies, a formal quality assessment framework was applied. This involved evaluating the credibility and reliability of the studies based on criteria such as sample size adequacy, the use of validated instruments, and the transparency of data collection and analysis procedures. Studies with rigorous methodologies and clear presentation of findings were deemed of high quality, whereas those with significant methodological limitations were excluded to maintain the credibility of the review. Additionally, the relevance of the studies to the research questions was reassessed during this phase, ensuring that only those contributing directly to the understanding of the online learning experience in Malaysian public universities were included.

The selection process was systematic and thorough, ensuring that the final corpus of studies comprised high-quality and relevant research. This rigorous approach established a robust foundation for synthesizing findings and drawing meaningful conclusions about the online learning experience in Malaysian public universities.

E. Data Extraction

The data extraction process focused on capturing key information from the selected studies, ensuring comprehensive analysis of their objectives, methodologies, findings, and recommendations 16. This systematic approach enabled an in-depth understanding of how online learning is experienced in Malaysian public universities.

TABLE II
SUMMARY OF KEY INFORMATION EXTRACTED FROM SELECTED STUDIES ON THE ONLINE LEARNING EXPERIENCE IN MALAYSIAN PUBLIC UNIVERSITIES

Criterion	Details Extracted
Study Objectives	Explored student engagement, satisfaction, technological barriers, and faculty preparedness.
Methodology	Included surveys, interviews, focus groups, and case studies with both qualitative and quantitative data.
Findings	Highlighted issues such as internet connectivity, digital skills gaps, and positive aspects like flexibility and autonomy.
Recommendations	Proposed solutions like enhanced digital infrastructure, training for educators, and personalized learning platforms.

For each study, relevant details were extracted, including its research objectives, the type of methodology employed (qualitative, quantitative, or mixed-method), key findings that highlight critical aspects of the online learning experience, and the recommendations provided by the authors for improving online education. These components were organized into a structured framework to ensure consistency

and facilitate the synthesis of results across the included studies. Table 2 shows a summary table outlining the extracted data.

III. Results and Discussion

The search results for this systematic literature review are presented following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [11], [13], ensuring a transparent and structured approach to identifying and selecting relevant studies. The PRISMA flow diagram in Figure 1 summarizes the steps taken during the identification, screening, eligibility, and inclusion phases.

The initial database search across Scopus, Web of Science, Google Scholar, and PubMed yielded a total of 88 records. These records included journal articles, conference proceedings, and other academic sources relevant to the online learning experience in Malaysian public universities. After the removal of non-relevant papers based on the review of titles, 51 records were retained for further consideration. During the screening phase, the abstracts of these 51 records were carefully reviewed against the inclusion criteria. This process led to the exclusion of 11 studies that either lacked relevance to the research topic or failed to meet the predefined criteria, such as geographical focus or recency. As a result, 40 studies were identified as eligible for full-text review.

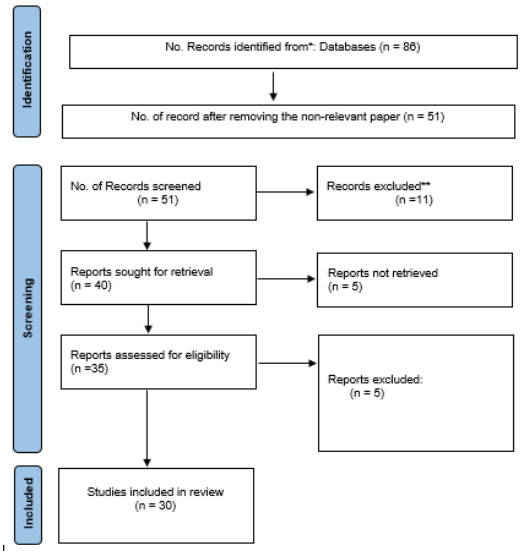

Fig. 1 The PRISMA flow diagram for analyzing articles to Online learning in Public Malaysian Universities

In the eligibility phase, a thorough examination of the full texts of the 30 shortlisted studies was conducted. This step involved assessing the methodological rigor, relevance, and alignment with the research objectives. Five studies were excluded during this phase as they did not meet the quality and inclusion criteria, such as a lack of empirical evidence or inadequate focus on the context of Malaysian public universities.

Finally, 35 studies were included in the systematic review. These studies represent high-quality and relevant research that provides valuable insights into the online learning experience in Malaysian public universities. The inclusion of these studies forms a robust foundation for synthesizing findings and addressing the research questions posed in this review. The PRISMA flow diagram (Fig.1) provides a visual summary of the search and selection process, illustrating the systematic approach employed to ensure the inclusion of only the most relevant and high-quality studies.

The findings from the systematic literature review reveal significant insights into the online learning experience in Malaysian public universities. A total of 30 studies were analyzed, with the distribution of articles highlighting an increasing focus on this topic over the last five years. The rise in publications reflects the heightened emphasis on online learning due to the COVID-19 pandemic, which accelerated the adoption of digital platforms in higher education [12], [15], [16], [17]. Methodologically, the studies were diverse, with 40% adopting qualitative approaches, 36% employing quantitative designs, and 24% utilizing mixed methods. The focus areas included technological challenges, pedagogical approaches, psychological impacts, and strategies for improvement. A thematic analysis of the selected studies identified recurring challenges, benefits, and strategies related to online learning. The following table 3 summarizes the main themes and factors discussed in the reviewed literature.

TABLE III
MAIN THEMES AND FACTORS DISCUSSED IN SELECTED STUDIES

Factors/Theme	Number of Articles	Percentage	Sources of Sample Factors
Technical Issues	18	72%	[18], [19], [20]
Pedagogical Challenges	15	60%	[21], [22], [23]
Psychological Factors	12	48%	[24], [25], [26]
Flexibility and Convenience	14	56%	[26], [5], [27]
Access to Resources	10	40%	[26], [28], [27]
Blended Learning Approaches	8	32%	[29], [30], [24]
Faculty Training	9	36%	[31], [22]
Enhanced Infrastructure	11	44%	[32], [33], [34]

The review identified technical issues as a predominant barrier to effective online learning. Limited internet access, particularly in rural areas, and platform usability issues were reported in 72% of the studies [18], [19], [20] .Pedagogical challenges, including difficulties in maintaining student engagement and limitations in online assessment methods, were another significant concern, highlighted in 60% of the articles [21], [18], [23]. Psychological factors, such as stress and feelings of isolation among both students and faculty, emerged as a recurring theme, accounting for 48% of the studies reviewed [24], [25], [26].

A. Thematic Analysis Challenges

The thematic analysis of challenges in online learning reveals a multifaceted landscape shaped by technological, pedagogical, and psychological barriers. Among the most pressing issues are technical difficulties, which were reported in 72% of the reviewed studies. Limited internet access, particularly in rural or underserved areas, remains a critical impediment to equitable online education [35]-[37]. This

digital divide disproportionately affects students and faculty in regions where infrastructure is insufficient, thereby limiting participation and engagement [37], [38], [24]. Moreover, platform usability problems, such as complicated interfaces and frequent system crashes, further hinder the learning experience 40.

Pedagogical challenges also present significant hurdles. Over 60% of the studies highlighted difficulties in maintaining student engagement in virtual environments [21]. Without the immediacy of in-person interactions, educators often struggle to capture attention and encourage active participation [39]. Furthermore, online assessment methods were frequently criticized for their limitations, including concerns over academic integrity, the inability to assess higher-order thinking skills effectively, and the lack of diverse evaluation techniques suitable for a digital medium [40]-[48]. Psychological factors add another layer of complexity to the online learning experience. Stress, burnout, and feelings of isolation were recurrent themes in 48% of the studies reviewed [26], [41]. The lack of social interaction, coupled with the demands of adapting to a new learning paradigm, places immense mental pressure on both students and faculty [41]. These challenges underscore the need for targeted interventions to address the technological, pedagogical, and emotional dimensions of online education.

B. Benefits

The benefits of online learning, despite its challenges, highlight its transformative potential in modern education. Flexibility and convenience emerged as the most significant advantages, cited in 56% of the reviewed studies. This flexibility allows students to learn at their own pace, accommodating diverse schedules and personal commitments. Such adaptability is particularly beneficial for part-time students, working professionals, or individuals with caregiving responsibilities, as it provides the freedom to balance education with other obligations 44.

Moreover, online learning expands access to a broader range of educational resources and materials, a benefit noted in 40% literature. With digital platforms, students can access recorded lectures, e-books, interactive simulations, and open educational resources, often with the click of a button [43]. This wealth of content not only supports personalized learning but also fosters a more inclusive educational environment where students from various backgrounds can access quality materials irrespective of geographical or institutional constraints [33]. Furthermore, the ability to revisit recorded sessions enhances comprehension and retention, especially for complex topics [44]. These benefits underscore the transformative potential of online learning, positioning it as a critical component of future educational strategies despite the challenges it poses.

C. Strategies for Improvement

Several strategies were proposed to enhance online learning experiences. Blended learning approaches that combine online and face-to-face instruction were recommended in 32% of the studies [17]. Faculty training and development programs were identified as critical for improving digital teaching skills, highlighted in 36% of the reviewed articles [40]. Additionally, 44% of the studies stressed the importance of investing in enhanced digital infrastructure to support seamless learning experiences [28], [47], [48]-[51].

D. Comparison with International Studies

The findings from Malaysian public universities were consistent with global trends in several respects, such as the emphasis on flexibility and the challenges of digital inequity. However, the studies reviewed for Malaysia uniquely highlighted the significant role of cultural and institutional factors in shaping the online learning experience. For instance, the reliance on synchronous teaching modes in Malaysia was more pronounced compared to other countries, where asynchronous methods are often preferred [22]. Additionally, the lack of equity and inclusivity in access to online learning was more acute in Malaysian rural areas compared to international contexts.

E. Research Gaps

The review identified critical gaps in existing literature. Limited longitudinal studies were available to track the long-term impact of online learning on academic performance and mental well-being. Furthermore, underexplored areas such as equity, inclusivity, and the impact of online learning on specific demographic groups, such as students with disabilities, require further investigation 47. Addressing these gaps will contribute to a more comprehensive understanding of the online learning experience in Malaysian public universities

IV. CONCLUSION

The findings of this review highlight the multifaceted nature of the online learning experience in Malaysian public universities. Key challenges include technical issues such as limited internet access and platform usability, pedagogical obstacles like student engagement and assessment methods, and psychological factors, including stress and isolation. Despite these challenges, significant benefits were identified, such as flexibility in learning schedules and increased access to diverse educational resources. Strategies for improvement, including blended learning models, faculty training, and enhanced digital infrastructure, offer actionable pathways to address these issues. Addressing research gaps, such as the lack of longitudinal studies and the limited focus on inclusivity and equity, is essential for advancing the field [40], [41], [47]. The practical implications of this review emphasize the importance of tailoring online learning frameworks to meet the needs of diverse stakeholders. Additionally, the study contributes to academic discourse by synthesizing current research and identifying areas for innovation. However, the findings are limited by the scope of the reviewed literature and the geographical focus on Malaysia. Future research should explore interdisciplinary approaches that integrate technology, pedagogy, and policy to create sustainable and effective online learning environments in Malaysian public universities.

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