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Integrating Cloud Based Learning Management Systems in Higher Education: Implications for Educational Management

Abstract: - In today's digital age, demands for cloud computing are exponentially rising within practically all sectors globally. The adoption of this novel computing technology is foreseen to cut down on the expenses ICT related solutions, services and infrastructures. Cloud computing has various implications for the educational sector, including teaching and learning practices. It is swiftly becoming an integral part of the global higher educational system, steered by the Education 5.0 demands. Cloud based learning management systems allow for a swifter configuration of ICT infrastructure, intra-institutional connections that are safer as well as quicker deployment of online processes. They facilitate rich and diverse opportunities for knowledge sharing among students and lecturers by means of e-portals and sophisticated learning tools. Besides enhancing the teaching quality, these systems are also capable of drastically reducing the overheads associated with instructive education. It is also anticipated that these systems will enhance the globalization of education or research projects much more efficiently and cost-effectively. Although the potential for cloud based learning systems is increasingly being recognized, it is still in its infancy withing the contexts of Malaysian higher education. There is a pressing need to address various different issues before the successful implementation of this technology within the nation's higher education system. This conceptual paper focuses on the integration of cloud based learning management systems within Malaysian higher education and the implication of this within the contexts of educational management.

Keywords: Cloud computing, Learning Management Systems, Educational Management, Implications, Malaysia, Higher Education, ICT

I. INTRODUCTION

Cloud computing denotes the provision of computing services by cloud service providers based on demand, which pave the way for users to access a diverse range of services like software applications, data storage, etc. The National Institute of Standards and Technology (NIST)'s definition of cloud computing is: "a model for enabling convenience, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interactions" (Mell and Grance, 2011). Cloud computing is capable of doing away with the need for organizations to invest their resources in constructing or maintaining any infrastructure that relates to digital technology. Whenever the need for computing resources arises, the organizations merely need to procure the relevant amenities from a third party firm and effortlessly access the needed services online. Put simply, consumers of cloud based services can greatly cut down on expenses and maintenance processes related to IT resources since they do not have to buy any type of hardware or software applications to operate their businesses (Riahi, 2017).

In today's highly advanced global digital landscape, cloud computing is starting to be extensively utilized to store, manage and process large amounts of information. The higher education sectors across the world too, have been caught up in these latest developments, with many institutions in the developed nations optimizing their utilization of cloud computing systems as well as online teaching and learning processes.

Among the components within the Malaysian Education Blueprint 2013-2025, is for all (HEI) in the country to enhance the capacity and quality of learning by ensuring the necessary internet accessibility and digital learning settings. Also, for the country's (HEI) to integrate online content to share best practices, and to optimize the utilization of ICT for remote, self-paced learning (Bakar, 2023). Along with this, the advancements in technology and digital innovations seen in the current era have led to higher education institutes (HEI) here increasingly focusing on cloud based learning management systems (CBLMS). Among the drivers of this focus on (CBLMS) is the scalability of such virtualized resources (Kumar et al., 2020). The concept of digital classrooms is in tandem

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with the advancements being seen today within educational technology. This allows for the rising demands for digital learning to be addressed properly (Alkhateeb and Abdalla, 2021). By integrating (CBLMS), Malaysian (HEI) could focus more on the enhancement of education quality, teaching activities and research undertakings. As Liu, Chin, and Ma (2024) demonstrated in their study on machine learning-based leadership, the administration of advanced technological systems can unravel significant improvements in organizational efficiency, a finding that could be relevant for the adoption of (CBLMS) in educational settings. Lecturers would no longer have to stumble through and navigate complicated IT systems or software structures (Dhawan, 2020). At its core, (CBLMS) facilitate users in accessing vast amounts of information, regardless of time or geography. These systems consist of streamlined infrastructures that are able to provide educations system with fresh value (Soegoto et al., 2020). They have the potential to brace teaching and learning processes while overcoming the problematic issues and constraints characterizing conventional education systems (Duygu et al., 2018). With the potential for (CBLMS) to become more ubiquitous within the country's higher education system, it becomes extremely important to understand further, the various implications associated with this technology (Hussein & Hilmi, 2020; Kamal et al., 2020).

II. PROBLEM STATEMENT

Despite the growing recognition of the benefits of (CBLMS), their utilization by Malaysian (HEI) is still at its infancy. The adoption of such systems by the (HEI) in the nation have been shown to be delayed and sometimes derailed by various issues. This is further compounded by a scarcity of findings in the available literature concerning the integration of (CBLMS) within Malaysian (HEI).

III. STUDY OBJECTIVES

In today's world, there is a pressing need for the provision and accessibility of quality higher education. This is especially so, in consideration of the UN's 4th Sustainable Development Goal (2015) related to higher education. The objective here is to identify and validate (CBLMS)'s impacts on the Malaysian higher educational sector.

This paper seeks to provide a conceptual understanding of the implications for Malaysian (HEI) with regard to their integration of (CBLMS). This is done by focusing on the benefits and potential problematic issues related to the adoption of (CBLMS) by Malaysian (HEI).

IV. SIGNIFICANCE

This paper will be relevant toward gaining a deeper understanding of the potential for (CBLMS) to enhance Malaysian higher education. The various components that are described in relation to the integration of (CBLMS) by (HEI) should offer some relevant insights for industry players, those responsible for the implementation of this technology and other key stakeholders. It is hoped that this paper catalyzes additional research concerning the various components of (CBLMS) that are focused on here.

V. LITERATURE REVIEW

A large body of work within the existing literature pertaining to cloud computing and higher education in Asia is related to infrastructural considerations. However, studies conducted in developed countries are more focused on attitudinal or behavioral considerations (Sultan, 2016). Studies conducted here also tend to focus on the adoption and acceptance of these technologies, or the opportunities and challenges related to them (Wu, 2023). Several of these studies have underlined the positive effects of integrating (CBLMS) within the higher educational sector, based on the elements of convenience, flexibility, and cost reductions (Al-Ajmi et al., 2021). Some researchers have acknowledged the ability of (CBLMS) to optimize resources but warn against camouflaged risks concerning data confidentiality (Ali, et al., 2018). According to Zhang et al. (2023), breaches in data confidentiality could occur with the utilization of (CBLMS) due to various hardware attacks or software vulnerabilities.

A study done within the Czech Republic found that there were several factors which limited the adoption of (CBLMS) by (HEI) such as data security, IT administration, the lack of services, the overreliance on service providers, etc. (Feuerlicht and Margaris, 2015). The findings of a Bangladeshi study indicate that some of the problems being faced by (HEI) when adopting (CBLMS) are the lack of proper infrastructure, along with unavailable services or limited usage scope within the education field. (Sultana et al., 2017). In Adress et al.'s (2016) study based in Sudan, it was found that privacy and security issues were some of the obstacles to integrating (CBLMS) within the country's higher education system.

According to Nguyen et al. (2018), the adoption of (CBLMS) by (HEI) in Vietnam was impacted by elements like performance expectations or perceived usefulness, other societal influences, hedonic motivations, habitual behaviors, etc. In a similar study, Shana and Abulibdeh (2019) found that when performance expectations are met, for instance concerning their ease of use, it becomes more probable for (HEI) to adopt (CBLMS). In addition, their study points toward user friendly e-learning systems

playing a vital role in the attitudes and behaviors of tertiary students toward such innovations. Security has been a key focus, right from the early introduction of (CBLMS) as highlighted by the findings of Fernández et al.'s (2012) study. Since then, numerous studies have reported about the security concerns associated with (CBLMS).

One study which compared the adoption of (CBLMS) and intercontinental differences among European and Middle Eastern (HEI) found that the former were more inclined to embrace novel educational technology, while the latter were more in favor of conventional teaching methods (Abdulatif, 2020). The findings also indicated that designated centers had been set up in European countries to address any cloud related security issues. Conversely, countries in the Middle East like Oman and Qatar were constantly plagued by security issues relating to data privacy, integrity, security, etc. According to Abdullahi (2018), it was expected for Middle Eastern (HEI) to face various hiccups when integrating (CBLMS) into their educational management processes due to them just being in the initial adoption phase of such technological innovations.

In Shahzad et al.'s (2016) study, they described the benefits and the related drawbacks to the utilization of cloud based technologies within Malaysia's higher education system. As highlighted by them, the adoption of these technologies could be extremely advantageous for the (HEI), especially with regard to their global rankings. Nonetheless, the authors also stressed upon a number of drawbacks, for instance, privacy and security issues, lack of professionalism or slow Internet speeds in particular areas. Other researchers have stated that this technology's various different advantages like its ability to solve problems in a cost efficient manner, easy interactivity and accessibility as well as information management processes underscore its massive potential to be developed further.

VI. FINDINGS

The Implications of Integrating (CBLMS) for Higher Education Management in Malaysia

This section describes the implications of integrating (CBLMS) among Malaysian (HEI) based on two aspects, i.e., benefits and potential issues.

6.1 BENEFITS

1. Minimizing expenses related to technological infrastructure (Arpaci, 2017): With the utilization of (CBLMS), information would become far more accessible, at a much cheaper cost. The (HEI) would not be burdened by the need to spend excessively on hardware, servers, software applications, licensing fees or maintenance costs.

2 Storage costs, space and backup (Al-Malah, et, al. 2021): Due to their scalability, (CBLMS) enable the capability of (HEI) to greatly increase the amount of data they can store, at a much cheaper cost. Also, the cloud offers a viable avenue to safely store data and prevent their irretrievable losses which could happen using conventional technology. This would ensure the operational continuity of the (HEI) and also their easy recovery from any technical catastrophes.

3. Cost effective internationalization of education (Zainuddin, 2023): (CBLMS) have an immense potential to facilitate global collaborations, the acquisition of vital skills and the development of cultural sensitivity amongst students. Also, they provide lecturers with valuable insights that are data-driven and opportunities for continuous professional development. They also smoothen the sharing of research and other academic undertakings amongst the (HEI) located across the world.

4. Decluttering organizational processes (Asadi et al., 2020): By utilizing various deployment models that are in alignment with the needs of the (HEI) and its ICT strategies, organizational tasks can be simplified and performed without much manpower. (CBLMS) can enhance the delivery of e-services and flexible lessons, along with better and faster performances of computers due to the latter's memory not being burdened with as many programs. This is in addition to the reduced amount of personal training that results from the utilization of (CBLMS) since more work can be done by fewer employees. Also, because, the learning curve concerning the hardware or software components related to (CBLMS) is not a steep one.

5. Bridging the gap between (HEI) (Al-Malah et al., 2021): (CBLMS) have a great potential to generate information bridges and enhance networks between various (HEI). This would allow the involved institutions to perpetually access the necessary collaborative information from any location and at any time. In addition, a country wide library system involving the collaborating (HEI) could be designed along with portals for learning, research activities, etc.

6.2 CHALLENGING ISSUES

Although, cloud computing is being utilized extensively today, and has been shown to potentially provide various benefits to the Malaysian higher education system, several pressing issues need to be considered. These issues are related to the management processes, technical aspects, security, and actual services. Being a developing nation, the internet accessibility, speed and reliability is still lacking here, particularly within the more rural locations. These persistent systemic shortcomings make it difficult for the wider integration of (CBLMS) within the management of the country's higher education (Kamal et al., 2020). Cloud computing necessitates a high speed internet connection which is extremely reliable, without which it would not

be possible to quickly access or store data. Another issue is the country's lack of experts in the field of cloud computing, which has further delayed the introduction of (CBLMS) (Goh et al., 2019).

Other challenges are related to the more generic threats which could potentially arise with the utilization of (CBLMS) by (HEI). This includes breaches of data security, unsolicited promotions, cloud services failure, etc. (Munjal, 2015). According to Y. F. Chin et al. (2024) in their study on the financial industry, the impacts on data security can cause disruption or annihilation depending on the circumstances, a shared threat for higher education systems. The most concerning fact is that it is 'the breach or leakage of any confidential data relating to those affiliated with the [HEI], such as students, academics, other employees, etc.'. The threats to confidentiality may be both internal and external. The most worrying issue here is the breach or leak of any confidential data involving those associated with the (HEI) for instance, students, academics, other employees, etc. Threats to confidentiality could arise internally or externally. The former could involve users of the (CBLMS) who have malicious intentions, dodgy third-party vendors, etc. This type of threat could be more dangerous due to every new delivery model potentially necessitating the involvement of large numbers of internal users (Tchernykh, et. al, 2019). External threats are related to cyberattacks that are done remotely involving cloud infrastructures or applications, which generally target the users' software and hardware. Such attacks are difficult to prevent or tackle and they usually happen within cloud systems that are more public.

Needless to say, (HEI) process large amounts of sensitive data and personal information involving students. The key challenge here is to keep these data secure and confidential, but unfortunately it is not possible of the (HEI) to control or know the whereabouts of data storage locations (Saleh, 2013).

VII. CONCLUSION

There is an immense potential for (CBLMS) to provide Malaysian (HEI) that are seeking to enhance their global rankings with various tangible benefits. Some of the challenging implications for Malaysian (HEI) seeking to integrate (CBLMD) into their operations are lacking expertise, threats to security and privacy as well as the low accessibility, speed and reliability of internet services in some parts of the country. Nevertheless, over the long run, this innovative education solution is foreseen to become more safe, practical and financially viable for Malaysian (HEI). Among their many anticipated benefits are saved expenses, easy accessibility, shared information, abundant storage spaces, and enhanced operations of (HEI) management systems. The rapidly evolving (CBLMS) have the potential to replace the (HEI)' s existent data centers, storage spaces, applications, etc., with a cloud presence. Thus, doing away with various elements of the conventional physical campus infrastructures. It is hoped that future studies are undertaken, which place a more empirical focus on the various components highlighted in the 'findings' section of this conceptual paper.

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