A Review Study Of Cloud-Based M-Learning Factors In Developing Countries

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Abstract:

A number of technologies have been used to assist and improve the use of e-learning. Recently, research has centered on developing collaborative and interactive cloud-based m-learning platforms. Cloud computing is the most recent initiative to supply computer resources as a service. Using an integrated strategy based on Cloud Computing may be a method to gain agility and rapid access to technology while also saving money at the institutional level. This research provides a review of cloud-based m-learning elements and implementations in developing nations, as well as insights on difficulties and advantages connected with cloud-based m-learning. This study reviews various planned cloud-based m-learning efforts, including their predicted advantages, difficulties, and obstacles. The study used a non-experimental, exploratory research design. This exploratory study includes an important inquiry of secondary data. The findings demonstrate that mobile cloud learning may provide cost-effectiveness, flexibility, and mobility to learning in underdeveloped nations. The usefulness of cloud-based m-learning is not yet obvious, but it deserves further attention. and it shows that the educational institutions in developing countries needs continued attention to get government support, Cloud-based m-learning in developing countries has seen modest development in recent years at various levels of education and mobile services.

Keywords: Mobile Learning; Cloud-Based; M-learning; Cloud Computing; educational institutions Introduction.

1. Introduction

E-learning is one of the most active study areas in applied information technology. Since the beginning of the previous decade, numerous technologies and innovations have been employed in this subject, which leads to its enrichment and popularity, and creates what is being dubbed cloud-based m-learning in education. (Romi, 2023). With all of the rising technology over the last several years, a new type of online education termed m-learning has emerged.

As it is stated in Kumar & Sharma, (2021), M-learning is an extension of e-learning that uses mobile and wireless technology to give learners with more flexible learning tools and materials. M-learning allows learners to learn anywhere and whenever they choose, making the learning environment more comfortable by utilizing numerous mobile devices and technologies.

Mobile phones have had a huge influence on developing countries, opening up new avenues for communication, education, and economic progress. However, there are certain issues associated with the rising usage of mobile phones in these nations. Increased access to information and communication is one of the most significant benefits that mobile phones bring to underdeveloped countries. M-devices allow people in, off or developed areas to connect with loved ones stay informed and engage in commerce. This could bridge the divide and foster social and economic advancement. (Mohammadi et al., 2020).

The global mobile usage trend shows an increase, in user numbers over time. Although the specific data for 2020 is not mentioned it marks the beginning of this trend. As of 2021 the worldwide mobile user count had reached 7.1 billion signifying the adoption of technology. Predictions for 2022 anticipate a rise to 7.26 billion users highlighting the growth and incorporation of mobile devices into everyday life. Looking forward to 2025 estimates indicate a rise to 7.49 billion users signaling momentum in mobile usage. This pattern emphasizes the significance of technology and its pervasive influence, across fields shaping how individuals communicate, work and access information.

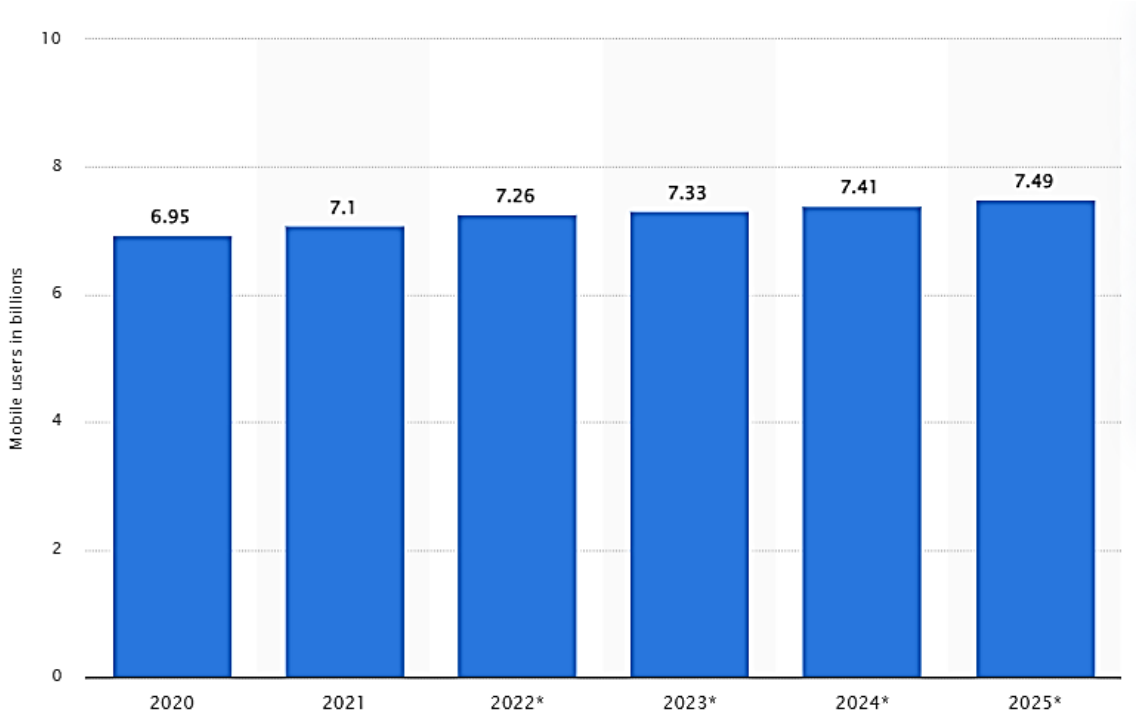

Figure 1: Between 2020 and 2025 the number of users worldwide is expected to increase in billions (Statista, 2024)

The Figure 1 shows the rising in the number of users between 2020 and 2025 will have significant implications for education. As more people gain access to devices educational opportunities become more convenient and adaptable. Mobile technology allows for flexible learning environments enabling students to access resources at any time and from any place regardless of their location. Additionally, mobile devices offer personalized learning experiences through learning platforms and interactive apps that cater to student needs and preferences. Collaboration, among students and teachers is also enhanced as they can easily connect and share materials using platforms fostering a sense of community and knowledge exchange. Moreover, mobile technology promotes digital literacy skills for navigating todays information world. By incorporating electronics into instruction, schools may foster inclusive learning environments and prepare students to succeed in an increasingly digital culture.In developing nations, cell phones play an important role in boosting education accessible. Students in some places can use their smartphones to access learning materials and participate in virtual

classrooms, filling the gap created by limited access to traditional educational institutions. Furthermore, mobile phones are used to transmit information and services in fields such as healthcare, agriculture, and other critical industries. Nonetheless, nations' increasing reliance on phones raises concerns about insufficient infrastructure and communication difficulties. This may make it harder for users to use mobile services, limiting the economic and social benefits that mobile phones may provide (Ahmad et al., 2023). Over the last several years, the majority of research has focused on using Cloud computing to e-learning instruction. Cloud computing is seen as an excellent chance for educational institutions to reap many benefits.

2. Problem Statement

The problem of the current study is to address a lack of awareness about the important factors that might influence educational institutions' willingness to embrace cloud-based m-learning. The purpose of this study is to provide an overview of recent work with cloud-based m-learning in educational settings. Based on the review, recommendations and future research directions are presented.

3. Research Method

The present paper is a review of the research studies pertaining to the subject of cloud-based m-learning, keeping in mind the purpose of offering the discussion and analysis that follows. It will identify any gaps in literary knowledge and work to fill them. The educational infrastructure would be identified and examined, and previous research in this field would be found through a secondary search of pertinent papers.

This study would be confined to an exploratory approach using secondary data. The goal of the literature search is to assess earlier publications on the topic because it is the source of secondary data for this study. The covered literature from a range of information systems, such as journals, books and conference proceedings. Published research articles on m-learning were searched using databases like Emerald Insight, Science Direct, IEEE, Wiley, etc., using many relevant keywords. A focused internet search was conducted utilizing relevant keywords such as “Cloud Computing”, “Mobile Learning”, “Cloud-Based”, “M-learning”, and “educational institutions”.

The paper is arranged as follows: First, the problem statement was identified. Then provides a comprehensive overview of the linked topics, including

cloud-based m-learning education, e-learning problems, and the benefits of cloud-based m-learning. Following that, the section VIII gives a survey of recent research on cloud-based machine learning systems. Section X concludes with a vision for the future of e-learning.

4. Cloud Computing

The availability of mobile technology greatly simplifies consumers' lives. It guarantees an uninterrupted rapid communication system. The technology of smartphones is advancing quickly, as are other devices like tablets and Android phones. These days, "cloud computing" is the most often mentioned subject in the information technology industry. Developers and IT workers utilize this word, especially in the online sector (Anuradha et al., 2021, Wang et al., 2022). These days, employing cloud computing has numerous advantages because of globalization. Typically, a cloud computing technology supplier offers services that include applications relevant to everyday business (Vinoth et al., 2022). But these programs may also be accessed using software that is referred to as a web browser, and the server stores the data (Gupta et al., 2023).

In the modern day, cloud computing is a well-known service in the information technology industry, founded on two domains: virtualization and distributed computing. Cloud computing allows for the removal of traditional or outdated application silos and provides information technology businesses with unprecedented scalability (Shukur et al., 2020). "Cloud computing" is one of the most well-known and alluring information technology innovations. Both the software and the services infrastructure are supported by it. That is the reason it is drawing a lot of IT professionals to it. The need for users has altered due to current developments in internet and information technology trends. New technologies appear every day and are developing daily. In essence, cloud computing is the usage of computer resources made available over the internet (Haji et al., 2020).

4.1 Models for Delivering Cloud Services

Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are the three layers of the cloud computing architecture that are represented by the many cloud service models, which are categorized according to the customers' computing requirements. The abstraction level of the capacity offered and the providers' service models serve as the foundation

for this classification. These various distribution methods are recognized from the viewpoint of the end-user in various businesses. Cloud computing might potentially address the needs of huge segments of the industry since it offers platform as a service (PaaS) and infrastructure as a service (IaaS) in addition to software as a service (SaaS). (Parast et al., 2022). The following is a discussion of this classification:

1. **Software as a Service (SaaS):** With this computing approach, users may access word processing and spreadsheets—two common desktop applications—as a web service. Because it operates on the cloud, users may use the program on-demand from any location at any time without having to install and execute it on their computers. In order to optimize speed, security, availability, disaster recovery, and maintenance as well as to achieve economies of scale, the SaaS model groups customers' applications into a single logical environment on the SaaS cloud. Personal apps like Gmail, TurboTax Online, Facebook, and Twitter, as well as enterprise-level apps like Salesforce, NetSuite, and Google, are a few examples of Software as a Service (SaaS).
2. **Platform as a Service (PaaS):** When deploying consumer-made or purchased apps onto cloud infrastructure, cloud providers offer a greater degree of abstraction. These apps can be produced utilizing programming languages, operating systems, web servers, libraries, services, and tools for programming languages. With this distribution approach, cloud customers may utilize a development platform to create apps directly (SaaS, for example). Amazon's Relational Database Services, Google's AppEngine, Microsoft's Azure Services Platform, and Rackspace Cloud Sites are a few examples of PaaS.
3. **Infrastructure as a Service (IaaS):** Infrastructure as a service refers to the virtualized resources (computer, storage, and communication) that are made available to the user on demand. In order to demonstrate the comprehensive approach for all hardware to run an IT infrastructure as a service, the idea was first introduced under the name Hardware-as-a-Service (HaaS) and then changed to Infrastructure-as-a-Service (IaaS).

4.2 Cloud Deployment Models

Depending on their requirements and services, cloud computing provides services to individuals and corporations. According to Patel & Kansara, (2021) , there are now four deployment models available. These include:

1. **Public Cloud:** Any subscriber having access to the cloud space and an internet connection can use a public cloud. Service providers deliver applications, storage, and other resources to the broader population. These services are provided on a pay-per-use or complimentary basis.
2. **Private Cloud:** A private cloud is created for a particular group or organization and restricts access to that group or cloud infrastructure that is maintained and hosted either internally or externally by a third party and exclusively for that organization.
3. **Community Cloud:** When two or more enterprises share comparable cloud requirements, they share a community cloud. shares infrastructure, whether managed in-house or by a third party and hosted in-house or externally, across several enterprises within a certain community who have similar concerns (security, compliance, jurisdiction, etc.). Less users are affected by the expenses than in a public cloud, but more than in a private cloud.
4. **Hybrid Cloud:** is a combination of two or more clouds (public, private, or community) that offer the advantages of various deployment patterns while remaining separate and distinct entities. In essence, a hybrid cloud consists of a minimum of two clouds that may be public, private, or community clouds.

5. E-Learning Challenges and Cloud-based systems

With today's cloud computing, apps, and capabilities, e-learning might become a very profitable sector (Malhi et al., 2020). One powerful tool for addressing the drawbacks of traditional local physical laboratories and computer platforms is a cloud-based e-learning system. However, before the cloud is extensively utilized and embraced to support and encourage e-learning, there are several basic issues and obstacles that need to be resolved. To effectively employ cloud computing for e-learning and teaching, academic institutions must provide IT assistance, and instructors and students must go through a process of learning (Karmakar et al., 2022).

Utilize existing public or commercial cloud resources or services, or third-party solutions, as you see fit. In addition to receiving training, the instructor should be knowledgeable about cloud capabilities and work with the IT

department of the institution to determine which cloud model will work best for the needs of the class. It is necessary to train the instructor on how to allocate, set up, and maintain student accounts on cloud services. Additionally, guidance and instruction on how to access and utilize the cloud-based course resources must be given to students. The learning curve for teachers and students may be steep or low, depending on the requirements and design of the course. Compared to teachers in other subjects, those teaching computer science and related courses could find it easier to learn about and use the cloud (Kumar and Sharma, 2021).

Table 1: The Revolution of learning

Learning Type	Key Features
Traditional Learning	Printed Books, Physical Classrooms
Digital Learning	Digital Media, Virtual Teaching
E-Learning	Internet Platform, Non-centralized Teaching
Smart Learning	Unlimited Platform, Virtual Physical Model

The above table categorizes different learning approaches based on their environment.

- Traditional Learning: This is the most familiar setting, with physical classrooms and learning materials like printed books.
- Digital Learning: This approach uses digital media like videos and online resources, and teaching can be virtual through platforms like video conferencing.
- E-Learning: This involves online platforms for learning, but unlike digital learning, it doesn't necessarily require live instruction. E-learning courses can be self-paced and accessed anytime.
- Smart Learning: This is the most flexible option, offering a combination of online platforms and potentially even virtual reality simulations alongside traditional physical materials.

Installing the operating system, middleware, and server and client modules are only a few of the tasks involved in converting an e-learning program.

User demands, the availability of the current IT infrastructure, and a cost/benefit analysis are all required in a migration feasibility study (Ahmad et al., 2023). Virtualization may be used to minimize resource under-utilization and optimize the mapping of current resources to the cloud tiered architecture, hence lowering the financial cost of the system. A poor internet connection can seriously restrict cloud-based education and e-learning, even if connectivity and speed have substantially improved over the last ten years to an acceptable level worldwide. When data and services are accessible from non-regional cloud datacenters, the problem gets much worse. Users and students using cloud-based e-learning systems may experience prolonged delays as a result of this issue. If students require the usage of specialized software, hardware, and resources in physical laboratories, the cloud might not be the best platform for teaching certain subjects and disciplines (Yusof and Sadiq, 2024). If they need a hardware dongle, robots, mainboards, physical network devices, and digital forensics can all be classified as equipment (Romi, 2023).

6. The Benefits of Cloud-Based M-Learning

Possible Reasons and Advantages of Using Cloud-Based M-Learning (Riahi, 2015) states that using cloud computing technologies to implement e-learning has the following advantages:

- **Lower costs:** Users may operate all connected programs with the least amount of internet connection settings by using the cloud environment that their PCs, smartphones, and tablets provide.
- **Improved performance:** Since many of the necessary programs and processes of cloud-based e-learning applications are already reserved in the cloud; client computers operate without experiencing any performance-related problems.
- **Instant software updates:** Updates are always sent to e-learners right away. This is because cloud-based e-learning apps using cloud power cause all software to be updated immediately in the cloud source.
- **Improved compatibility with document formats:** Cloud-based e-learning programs are considerably more compatible with a wider range of file formats and typefaces, which may not display well on some desktops or mobile devices.

- **Benefits for learners:** Students can benefit from a multitude of advantages offered by cloud-based e-learning. Nearly all of their coursework, for example, can be completed online, including taking classes, participating in exams, getting feedback from lecturers, and submitting and receiving assignments and projects from teachers.
- **Helpful for teachers:** Teachers may benefit from cloud-based e-learning in a number of ways. Many of their responsibilities may be completed online, including creating test papers, managing content to create learning materials with more complex material for students, grading assignments, exams, and projects, providing comments to students, and interacting with them in online forums.

7. Cloud-Based M-Learning in Education

Electronic learning, or e-learning, and mobility are the foundations of mobile learning design. However, the poor network transmission rate, expensive device and network costs, and scarcity of educational materials are some of the drawbacks of traditional mobile learning applications (Thavi et al., 2024). Applications for cloud-based m-learning are presented to address these issues. The apps provide learners enhanced services in terms of data size, processing speed, and battery life, for instance, by using a cloud with substantial storage space and processing power.

Teachers may conduct lectures, assignments, and a host of other activities over the cloud for m-learning that is cloud-based. The data would be stored in the cloud, from which Cloud Computing Technology would access it as needed. With the notion of private, public, and hybrid clouds, the data may be shared or safeguarded. Private clouds, however, would offer a superior platform to prevent a number of problems related to data sharing (Li et al., 2020). Additionally, this would guarantee strict control on data accessibility. Teachers would then have access to student data so they could see the lectures and turn in assignments. As a result, the dynamic educational system will move from a physical location to an online virtual environment.

Moreover, several tasks can be carried out simultaneously over the cloud. Thus, the cloud facilitates the extension of the availability of several courses on a single platform. This ingenuity may be quite beneficial, particularly for developing nations when the populace faces major hurdles related to location or education. Furthermore, cloud computing improves accessibility.

Additionally, it guarantees a platform or program with the least amount of internet dependence, anytime and wherever. Additionally, it lessens the distance that kids from rural regions must go in order to receive an education (Shamsudin et al., 2023).

Multiple people may edit and manage the same document or job at the same time thanks to cloud computing. This shortens operating time and enhances the platform for group-based initiatives (Bello et al., 2021). Moreover, it enables speedy data transmission and reception (via the internet). As a result, students are able to communicate effectively and lead group discussions for learning. Personal cloud computing has many applications since it can be tailored to the educational philosophy. By using cloud computing, the organization might set up a "user type priority." As a result, a teacher who upholds the educational concept and protects both themselves and the kids' data may be granted certain precedence and benefits. Students are able to structure and customize their projects, assignments, and papers. Cybersecurity is ensured by the private cloud. Every teacher's and student's records and activities are safeguarded by a security system. Prior to gaining access to their data, users are often required to go through a series of security checks. This lowers the potential for danger and guarantees authenticity (Oladoyinbo et al., 2023).

The cloud significantly lessens the worry of data loss because it is an online platform. Teachers are able to evaluate each student's work individually and identify both their areas of strength and weakness. Moreover, computers offers a vast foundation for storing various data forms (Haji et al., 2020).

Furthermore, saving this data is incredibly simple and doesn't call for any extra steps or expertise. As a result, less physical space is required. This also lessens the need to carry books and paperwork about. Thus, cloud computing would have an inconceivably large positive impact on the educational system in poor nations. The task platforms, documents, and software must all work with the cloud software, though. Additionally, there is a risk that this will alter, introduce, grow, or improve the cloud. Systems are so frequently compelled to avoid using other platforms. Furthermore, cloud computing needs infrastructure, the internet, and a number of other components that come together to build a platform. Small errors in one of these have a significant impact on how well the system functions.

8. Artificial Intelligence (AI) and M-Learning

Another name for machine intelligence is artificial intelligence, which spans a number of fields including robots, computers, genetic algorithms, and philosophy (Mariyanti, 2023). AI is defined differently in academic research, although it is generally understood to mean imbuing a machine with human intellect. It operates on expert systems, knowledge data, and natural language processing. It also finds patterns for a given job by examining a large amount of data. AI has an influence on higher education by utilizing robotics and fiction (Manhiça et al., 2022); it uses clever algorithms and builds an interactive learning environment using deep learning and machine learning. These days, artificial intelligence (AI) transforms learning, becoming a vital tool for academics and educators, and adds intelligence to learning apps and learning management systems (LMSs). Intelligent tutoring systems (ITS) are becoming more and more well-liked due to their customized and unique approach for each student (St-Hilaire et al., 2022). Depending on the ability of the students, these ITS use a variety of teaching styles, including as dialogic, linear, or more exploratory.

The mobile media, learner-friendly access mechanisms, sophisticated teaching techniques, and intelligent learning environment are all features of the AI-based m-learning apps. A platform where students have learning possibilities based on their knowledge, aptitudes, and tailored adaptive teaching is made possible, for example, by mobile intelligent teaching expert systems. For example, Google has created Socratic, an app that allows users to set up a platform for students to ask questions. The program recognizes the voices of the pupils and provides the most relevant replies based on the teaching materials it finds online. The software also employs the most powerful intelligent algorithms to answer step-by-step arithmetic problems. It is a strong AI resource finder for students in any academic topic (St-Hilaire et al., 2022).

9. Literature Review and Related Works

The literature review explores the evolution and utilization of cloud based mobile learning systems discussing advancements, foundations, ongoing efficacy assessments of the systems identified challenges and proposed solutions. By examining industry sources, the study aims to address any hindrances that may impede the effective implementation of cloud based

mobile learning. The review offers perspectives on the realm of these systems by highlighting existing trends and initiatives, at both national and international levels leveraging insights, from prior research studies.

According to Thavi et al. , (2024) the work was based on a comprehensive review of literature on cloud computing in education, focusing on cloud computing in education, remote/distance learning, and cloud-based decision making . Following the TAK principle, the works included 829 research items, of which 72 were selected. The results consisted in a selection of studies using cloud computing in the learning process, organized thematically, conceptually, and from a theoretical point of view. To conclude, the study finds that while cloud computing is clouded with promises for educational institutions, a myriad of challenges such cost, security and expert provision have restrained its full potentiality. Cloud computing is an emerging trend with vast potentialities to enhance the educational system, especially in developing countries such as India. The study emphasizes the significance of raising awareness, exploring, and researching the potential benefits of cloud computing, as well as making cloud computing knowledge available in educational institutions worldwide.

Harfoushi (2017) investigated the increasing use of smartphones and their expanding capabilities, emphasizing their role in boosting demand for mobile learning. This trend demonstrates how mobile learning is changing the educational environment by making it more accessible and cost-effective than traditional techniques. Integration with cloud storage solutions like Google Drive expands mobile computing's potential by providing users with numerous storage options and allowing them to access learning resources at any time, from anywhere. The study emphasizes the simplicity of storing and retrieving important documents and presentations using mobile cloud computing (MCC), which benefits both professionals and students. However, it also emphasizes the need for more investigation into MCC's security weaknesses, since the occurrence of data breaches needs a complete evaluation of MCC security processes.

Naveed and colleagues (2023) emphasized the relevance of internet and mobile technologies in supporting the long-term acceptance and use of Cloud-Based Mobile Learning (CBML) in education. They foresee a transition away from traditional classroom instruction and toward a more

user-friendly setting with CBML, which will eventually improve educational quality. The COVID-19 epidemic has highlighted the importance of embracing E-Learning and M-Learning choices, stressing the significance of CBML. Higher education administrators should carefully consider using these techniques, especially given the fast improvements in technology. By using Multi-Criteria Decision Making (MCDM) to analyze the primary and secondary components of sustainable CBML, this study provides useful insights for strategic planning and decision-making processes to address all stakeholders' changing educational demands. CBML, with its emphasis on strategic planning and the use of modern educational technology, is set to usher in a new era of accessible learning.

Okai Ugbaje et al. (2020), did research in a Nigerian university to investigate the practical benefits of combining cloud computing with mobile learning (m-learning), which goes beyond simply theoretical discourse. The study demonstrates how wireless mobile technology, which is popular among college students in countries such as Nigeria, may overcome challenges associated with wired access. It claims that a mobile learning environment based on cloud technology might address issues such as overcrowded lecture rooms and slow distribution of educational resources, while also providing a cost-effective method of knowledge transmission. It demonstrates the potential of cloud-based m-learning to increase accessibility and efficacy in resource-constrained environments such as Nigeria by facilitating access to course content and enriching teaching and learning experiences.

Zeng and Cleesuntorn (2024), investigated how several factors influence undergraduate art and design students' perceptions of learning (PL) and continuous intention (CI) to engage in mobile learning (M-learning) at a private institution in Chengdu, China. these looked at elements such as self-efficacy (SE), enjoyment (EN), perceived utility (PU), perceived ease of use (PEOU), and social acceptability (SA) to see how these affected PL and CI. The study found that EN has a direct effect on PL, emphasizing the relevance of students' familiarity and comfort with mobile technology. Furthermore, SE indirectly promotes PL by emphasizing its importance in pushing pupils to persevere in their studies. Furthermore, PU and SA have a considerable impact on CI, indicating that students' judgments of the utility and social acceptance of M-learning play an important part in their readiness to continue

using it in the future. Overall, the study emphasizes the role of EN, SE, PU, and SA in molding students' perceptions and intentions to use M-learning, particularly in art and design education.

Alkhaldi et al., (2024) carried out a study exploring the intricacies of e learning results. The study focused on Kuwaiti universities and colleges and highlighted the necessity of having a resilient learning system that can easily switch between conventional and online teaching techniques. It emphasizes how crucial student participation and teamwork are to improving e-learning results, and it implies that teachers are less important in the process possibly because e-learning platforms are self-sustaining. The student, instructor, course, technology, and environment dimensions are the main areas of emphasis for the recommendations made to university and college administrative bodies in order to improve the results of online education. Future research avenues suggested by the study include qualitative investigations incorporating management bodies, inclusion of teacher views, comparative analysis between public and private schools, longitudinal studies, and expansion to high school settings. These recommended approaches aim to improve comprehension and efficacy of online learning possibilities for students of various educational levels.

Madni et al. (2022) investigated the critical role of the Internet of Things (IoT) in boosting education, particularly in developing countries, despite global challenges such as the COVID-19 epidemic. IoT technology is critical in maintaining ongoing education since it enables remote learning and provides students with a variety of tools to study well from home. The study's goal is to identify the important elements that influence IoT uptake in e-learning programs at developing-country higher education institutions (HEIs). Individual, organizational, environmental, and technological problems are among those considered. Using a comparative methodology, the study ranks these criteria in terms of their importance to the proper integration of IoT-based e-learning in HEIs. The research findings will help officials at universities and government entities make informed judgments about adding IoT into e-learning. By solving these issues, governments may assist schools and students adopt IoT technology, resulting in better educational outcomes.

Sultana (2020) explored the variables influencing Mobile Collaborative Learning (MCL) by including mobility and self-management learning components into the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The study's empirical findings show that performance expectation, effort expectancy, and self-management learning all have a substantial impact on the use of the Blackboard platform for MCL. However, characteristics such as the enabling context, social influence, and mobility were shown to have no significant effect on behavioral intention or actual usage of the MCL platform. These findings emphasize the significance of understanding the underlying variables that drive the adoption and usage of MCL platforms in organizations that deliver interactive education, contribute to future MCL research, and give insights for Blackboard platform providers and users.

The variables impacting Ningxian university students' happiness and desire to continue utilizing cloud-based e-learning, with a particular emphasis on English literature majors at three institutions. Twelve hypotheses were established to test the impact of various features on perceived usefulness, satisfaction, and continuous intent to use. The study emphasizes the importance of boosting students' happiness in order to increase their motivation to continue studying by finding that it is the strongest predictor of future usage intention using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling. Furthermore, a variety of independent factors influence perceived usefulness; yet, the study finds no relationship between perceived usefulness and satisfaction. The research indicates that to enhance satisfaction and promote ongoing usage of cloud-based e-learning platforms, it's crucial to maintain high-quality courses and foster interaction among users. This study underlines the significance of more research to completely comprehend how perceived utility and enjoyment are interwoven in cloud-based e-learning settings, as well as the critical impact of course quality, interaction, and design in determining student satisfaction (Chen, 2024).

10. Contribution of the Study

The findings of this study are likely to contribute to the current body of literature on cloud-based mobile learning (m-learning) in poor nations. By identifying flaws in these areas, the study provides as a foundation for future research efforts. Furthermore, educational institutions may use these findings

to improve their cloud-based services and discover elements that may impact the outcomes of cloud-based m-learning projects, facilitating decision-making processes. The findings offer insight on the problem's institutions face when using cloud-based m-learning technology. Additionally, the findings can inform the development of effective strategies to reach all clients without mobile cloud-based solutions.

Academically, the study adds valuable knowledge for educational institutions considering the adoption of cloud-based m-learning and serves as a reference for future research endeavors. Furthermore, the outcomes of this research have practical implications for both educational institutions and students, potentially improving profitability, performance, and service quality. It emphasizes the importance of considering environmental factors for long-term sustainability.

11. Conclusions:

In this study, the existing of cloud-based m-learning frameworks for educational institutions in developing countries along with some other countries in middle east has been briefly explored. A review of these studies revealed that in order to receive government support, the educational sector needs to continue receiving attention. Services have not improved much in recent years in terms of measuring the viability of the current approach and offering cloud-based services at the primary, secondary, and even tertiary levels. The results show that since practice level decision making happens there, initiatives and programs aimed at increasing the uptake of cloud-based m-learning must prioritize it. The primary relevance and timeliness of these results may be found in relation to decision makers who are currently confronted with the challenge of cloud-based mobile learning environments.

The study mentioned above is constrained by its focus on papers published solely within the past decade, but there is potential for expansion to include earlier years as well as forthcoming publications. A bibliometric survey could be undertaken to analyze thousands of papers, broadening the scope beyond those mentioned. Furthermore, the research could be broadened beyond the educational sector to encompass various industries such as healthcare, finance, and others. These papers could be examined in greater depth to identify the drivers and barriers of cloud computing in each sector, potentially establishing rankings to aid organizations in adopting cloud

computing more effectively. Additionally, the review was limited in its inclusion of journal articles published only in certain languages, suggesting opportunities for further research considering geographical boundaries, development statuses of countries, and other relevant factors.

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المؤتمر العلمي السنوي الثالث والعشرون الموسوم
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والمنعقد تحت شعار (بالبحث العلمي الرصين نرتقي ونتعلم ونتقدم)
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دراسة مراجعة لعوامل التعلم عبر الأجهزة المحمولة المستندة إلى السحابة في الدول النامية

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مستخلص البحث:
تم تطبيق عدد من التقنيات لمساعدة وتحسين استخدام التعلم الإلكتروني. لذا تمحور البحث حول تطوير منصات التعلم السحابية المتنقلة التعاونية والتفاعلية. الحوسبة السحابية هي أحدث مبادرة لتوفير موارد الحاسوب كخدمة. باستخدام استراتيجية متكاملة تعتمد على الحوسبة السحابية يمكن تحقيق الحصول على السهولة والوصول السريع إلى التكنولوجيا بينما يتم توفير الأموال على المستوى المؤسساتي. توفر هذه الدراسة استعراضًا لعناصر التعلم السحابي المتنقل والتطبيقات في الدول النامية، بالإضافة إلى رؤى حول الصعوبات والمزايا المتصلة بها. يراجع هذا البحث جهود التعلم السحابي المتنقل المخطط لها، بما في ذلك المزايا المتوقعة والصعوبات والعقبات. استخدمت الدراسة تصميم بحث استكشافي غير تجريبي. تشمل هذه الدراسة الاستكشافية استفسارا هاماً للبيانات الثانوية. تظهر النتائج أن التعلم السحابي المتنقل قد يوفر كفاءة تكلفة ومرونة وقابلية للتنقل للتعلم في الدول النامية. لم يتضح بعد مدى فعالية التعلم السحابي المتنقل لكنه يستحق مزيدًا من الاهتمام. وتظهر الدراسة أن المؤسسات التعليمية في الدول النامية تحتاج إلى اهتمام مستمر للحصول على دعم الحكومة. شهد التعلم السحابي المتنقل في الدول النامية تطوراً متواضعاً في السنوات الأخيرة على مستويات استخدام الجوال في مجالات التعليم المختلفة.

الكلمات المفتاحية:الحوسبة السحابية، التعلم المتنقل القائم على السحابة، التعليم الالكتروني، لمؤسسات التعليمية، الدول النامية

ملاحظة : هل البحث مستل من رسالة ماجستير او اطروحة دكتوراه ؟ كلا