Edu-Tech Learning Platform

Anurag Kumar Jha
BE-Computer Science(Cloud Computing)
Apex Institute of Technology, Chandigarh University
Mohali,India
Email – 21BCS6940@cuchd.in

Priyanshu Srivastava
BE-Computer Science(Cloud Computing)
Apex Institute of Technology, Chandigarh University
Mohali,India
Email – 21BCS6911@cuchd.in

Ramandeep Kasnia
BE-Computer Science(Cloud Computing)
Apex Institute of Technology, Chandigarh University
Mohali,India
Email – 21BCS6844@cuchd.in

Akshat Choudhary
BE-Computer Science(Cloud Computing)
Apex Institute of Technology, Chandigarh University
Mohali,India
Email – 22BCC80003@cuchd.in

Assist. Prof. Sarita Simaiya
BE-Computer Science (Cloud Computing)
Apex Institute of Technology, Chandigarh UniversityMohali, India

I. ABSTRACT

The proposed project aims to develop an E-Learning Website using cloud computing technology. The platform will offer a peer-to-peer learning management system (P2P LMS) for users to access the platform securely. The website will have a clean interface and offer features such as Admin and user dashboards, Reviews, Course Manager, Prerequisites, Payment, and a Control Panel for managing courses and user data. The project will be divided into multiple stages, including problem formulation, research objectives, literature review, methodologies, experimental setup, and conclusion.

Additionally, the website will offer interactive features such as course reviews and announcements, which will help users stay up-to-date on the latest developments in their courses. Overall, the project seeks to create a robust and user-friendly platform that enhances the online learning experience for students and instructors.

Keywords: P2P, LMS, Admin

II. INTRODUCTION

E-learning has become an increasingly popular approach to education in recent years, thanks to advances in digital technologies and the need for flexible and accessible learning opportunities. However, it faces a number of challenges, such as scalability, security, and cost-effectiveness, which can limit its effectiveness and reach. Cloud computing has emerged as a promising solution to these challenges, providing on-demand access to computing resources, storage, and networking, as well as scalability, reliability, and security. Cloud-based e-learning platforms have the potential to revolutionize the way education is delivered and consumed by offering a range of benefits, such as flexibility, accessibility, and personalized learning.

We will be discussing the challenges and opportunities associated with using cloud computing for e-learning and describe the architecture, features, and evaluation of the platform. We would also be analyzing the impact of the platform on student engagement, satisfaction, and learning outcomes, using qualitative and quantitative data collected from student surveys, instructor interviews, and performance metrics.

The contributions of this paper include a practical demonstration of how cloud computing can be used to enhance e-learning in higher education, as well as insights into the factors that influence the adoption and success of cloud-based e-learning platforms. Our findings suggest that cloud-based e-learning platforms can improve student engagement and performance and offer a cost-effective and scalable solution to the challenges of e-learning. We conclude by discussing the implications of our work for the design and implementation of cloud-based e-learning platforms in higher education and beyond.

A. Problem Definition

Access to quality education is a fundamental right, yet millions of people in rural areas around the world lack access to adequate educational resources. The lack of adequate educational resources in rural areas has serious implications for social and economic development, as it limits the ability of individuals and communities to acquire the skills and knowledge necessary to thrive in today's globalized world. To address this problem, there is a need for an e-learning platform that is designed specifically for rural areas and overcomes the limitations of traditional e-learning platforms. The proposed solution is to develop an e-learning platform using cloud computing and P2P networking, which can provide a scalable, cost-effective, and

low-latency solution for delivering education to rural areas. Additionally, the use of cloud computing will enable the platform to be scalable and cost-effective by allowing for on-demand allocation of computing resources and storage.

B. Project Overview

The proposed E-Learning Website will offer an easy-to-use interface with features such as Announcements, Reviews, Course Outlets, Prerequisites, Payment, and a Control Panel for managing courses and user data. The platform will leverage cloud computing technology for scalability, accessibility, and security. The website will have a clean interface for an immersive learning experience.

III. LITERATURE REVIEW

[1] Hou, L., Liu, Q., Nebhen, J., Uddin, M., & Chaudhary, A. (2022). Implementation of Cloud Computing Protocol in E-Learning for Future Wireless Systems.
This research article focuses on developing a prototype for an expert system for E-learning in higher education, particularly in rural areas of developing countries. The article highlights that E-learning is a modern and cost-effective method of education, and it can be used to enhance the literacy rate in rural areas. The article emphasizes the importance of integrating the academic processes of higher education, such as the design of syllabus, courses, and study material, using a centralized cloud-based system to make them easily accessible to all stakeholders. The authors aim to answer the following questions: whether educational institutions are equipped with E-learning tools and technologies or not, whether E-learning technology is feasible for rural areas, and whether the literacy rate in rural areas of developing countries can be enhanced through E-learning mode.

The authors discuss the various applications and procedures of E-learning, which include web-based learning, computer-based learning, virtual education opportunities, and digital collaboration. They note that almost at all levels in educational institutions, E-learning will become a vital part of different functions. The literature review section also discusses international benchmarking developments, such as E-excellence, the E-learning Benchmarking Exercise 2009, and the First Dual-Mode Distance Learning Benchmarking Club. The authors state that a comparison of these models reveals a rather high level of correspondence, and a conceptual framework, based on a range of critical success factors, for E-learning has emerged. This model could be used as a foundation for future E-learning and as an inspiration to develop, implement, evaluate, and internalize E-learning.

[2] Dima, A., Bugheanu, A.-M., Boghian, R., & Madsen, D. Ø. (2019). Mapping Knowledge Area Analysis in E-Learning Systems Based on Cloud Computing.
The article aims to evaluate the research on e-learning and cloud technology using quantitative bibliometric analysis. E-learning is considered an important method for modern socioeconomic and business success, and the expansion of educational materials has made it more complex.

The study examines specific literature research and trends and analyzes 637 articles from 2007 and 2022 in WoS using VOSviewer 1.6.18 and bibliometrix R-package to review and assess e-learning and cloud technology research. The most productive country in scientific knowledge and citations is China, and notable researchers are from Romania, Serbia, and Japan. The conceptual structure helps researchers analyze four clusters around Technology, Education, Delivery Systems, and Cloud Services. The study emphasizes cloud-based e-learning technologies and computing and their relationship. The results of this research article illuminate the structure, evolution, trends, and impact of e-learning research and cloud computing systems by evaluating and analyzing the scientific output, key contributions, and future research.

[3] P. Hendradi, M. Khanapi, and S. N. Mahfuzah, "Cloud Computing-Based E-Learning System Architecture in Education 4.0," International Journal of Emerging Technologies in Learning (iJET), vol. 15, no. 17, pp. 137-154, 2020.
The article discusses the development of a cloud computing-based e-learning system architecture in the context of Education 4.0. The paper reviews relevant literature on cloud-based e-learning architecture and Education 4.0 to propose an architecture that can guide the development of cloud-based e-learning systems to meet the needs of Education 4.0. The first part of the paper introduces the background and goals of the study. The second part reviews and presents related works on cloud-based e-learning architecture and Education 4.0.

The paper concludes with a summary of the proposed architecture. The literature review focuses on cloud-based e-learning architecture, which is divided into five layers: Infrastructure, Software Layer, Resource Management Layer, Service Layer, and Application Business Layer. The Business Application Layer is further divided into Content Layer, Application Layer, and Infrastructure Layer. Different papers have proposed different numbers of parts or layers for the Business Application Layer. However, they all share the goal of using cloud computing technology to improve the performance of e-learning systems. The article presents a table summarizing the different parts and layers proposed in the reviewed papers.

[4] Rinkey, Dr. Piyush Gupta, and Dr. Archana Bhatnagar, "Implementation of Cloud based E-learning Architecture," BIT Jaipur, India, 2022.
Rinkey's research paper abstract compares the performance of a self-developed cloud-based website on the proposed architecture to the web-based NPTEL site. Cloud computing affects e-learning, architecture, web test tools, and learning environments, according to the study. The research paper's introduction discusses users' growing use of IT technologies and how cloud computing solves Grid and Cluster's problems with on-demand services. The section discusses e-importance, learning's software and hardware requirements, and how cloud computing enables on-demand learning. The paper states that e-learning has grown in popularity in the 21st century.

E-flexibility, learning's paper and time savings, eco-friendliness, ability to save travel, store multiple topics, and register students anywhere are listed in this section. E-learning challenges include infrastructure, meeting the demand for innovative resources, insufficient, expensive, and unstandardized methods and strategies, expensive hardware and software, and security threats.

The literature review concludes that cloud computing is the only solution to e-learning problems and can boost the computer industry. Cloud computing helps developers, and end-users analyze data, collaborate, and reduce data loss. Cloud computing architecture, features, and deployment models are covered.

Rinkey's research paper concludes with a literature review that emphasizes cloud computing's role in e-learning and compares the performance of a self-developed cloud-based website on the proposed architecture to the web-based NPTEL site. The paper examines e-learning, its benefits and drawbacks, and how cloud computing can help. E-learning and cloud computing researchers will find the paper informative.

[5] Kumar, V., & Sharma, D. (2019). E-Learning Theories, Components, and Cloud Computing-Based Learning Platforms.
The article discusses the potential of e-learning and digital platforms to supplement traditional learning methods. The authors identify essential e-learning components and categorize them based on established learning theories, including connectivism and constructivism. The article also reviews the literature on e-learning and its impact on enhancing learning, fostering teacher-student communication, and improving accessibility, content updating, and personalization. The authors argue that e-learning can provide a flexible, personalized, and customized approach to learning that can help students achieve their learning goals. Moreover, e-learning can benefit stakeholders through local standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and ease.

Finally, the authors highlight the importance of integrating learning theories, pedagogies, and technologies to achieve effective outcome-based learning. The article concludes by emphasizing the need to carefully examine e-learning theories to gain detailed knowledge of learning and identify the best practices and tools to support successful e-learning.

KEY REFERENCE

Year	Article Title	Author	Tools/Software	Technique	Source	Evaluation Parameter
2022	Implementation of Cloud Computing Protocol in E-Learning for Future Wireless Systems	Hou, L., Liu, Q., Nebhen, J., Uddin, M., & Chaudhary, A.	Centralized cloud-based system	Expert system for E-learning	Rural areas of developing countries	Feasibility of E-learning in rural areas, Enhancement of literacy rate
2019	Mapping Knowledge Area Analysis in E-Learning Systems Based on Cloud Computing	Dima, A., Bugheanu, A.-M., Boghian, R., & Madsen, D. Ø.	WoS, VOSviewer 1.6.18, bibliometrix R-package	Quantitative bibliometric analysis	Cloud technology and e-learning	Scientific output, key contributions, future research
2020	Cloud Computing-Based E-Learning System Architecture in Education 4.0	P. Hendradi, M. Khanapi, and S. N. Mahfuzah	Cloud computing-based e-learning system architecture	Education 4.0	International Journal of Emerging Technologies in Learning (iJET)	Development of cloud-based e-learning systems
2022	Implementation of Cloud based E-learning Architecture	Rinkey, Dr. Piyush Gupta, and Dr. Archana Bhatnagar	Web test tools, cloud computing	Comparison between self-developed cloud-based website and web-based NPTEL site	BIT Jaipur, India	Performance
2019	E-Learning Theories, Components, and Cloud Computing-Based Learning Platforms	Kumar, V., & Sharma, D.	Cloud-based learning platforms	Literature review, categorization of e-learning components based on established learning theories	N/A	Potential, impact on enhancing learning, fostering teacher-student communication, and improving accessibility, content updating, and personalization
2021	E-Learning Based on Cloud Computing	Wu, W. & Plakhtii, A.	Blackboard Learn LMS	Case study testing of learning management systems for collaborative distance learning	N/A	Improvements in training content and students' academic performance
2019	E-Learning System based on Cloud Computing: A Review Paper	Katiyar, N., & Bhujade, R.	Distributed method platform for e-learning	Literature review, exploration of how cloud computing can address challenges of traditional e-learning networks	N/A	Effectiveness of e-learning

Cloud-based e-learning platforms are hosted on remote servers and accessed over the Internet. Here is a brief overview of some of the existing e-learning platforms in this category: Cloud-Based E-Learning Platforms:

Udemy: A popular online marketplace for self-paced courses on a variety of topics, including programming, business, and personal development.

Coursera: A platform that partners with universities and other organizations to offer massive open online courses (MOOCs) on a wide range of subjects.

edX: Another MOOC platform that offers courses from leading universities and institutions around the world, with a focus on topics such as computer science, engineering, and data science.

Each of these platforms has its own strengths and weaknesses, and the choice of platform will depend on factors such as the needs of the learners, the goals of the course, and the budget and resources available to the instructor or institution. Cloud-based platforms are easier to set up and use but may have limitations in terms of features and flexibility.

METHODOLOGY

A. Proposed System

P2P: Peer-to-peer (P2P) technology has the potential to transform the way e-learning platforms are designed and operated. P2P technology allows for direct sharing of resources among learners without the need for a centralized server or provider. This can lead to more efficient and cost-effective e-learning platforms.

Cloud Infrastructure: The e-learning platform would be hosted on cloud infrastructure, such as Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform. This would provide scalability, availability, and security features that are essential for hosting an online platform.

Learning Management System (LMS): An LMS would be used to manage the course content, assignments, quizzes, and discussions. The LMS could be an open-source platform like Moodle or a commercial platform like Canvas or Blackboard.

Collaborative Tools: The platform would offer tools for collaboration and communication among learners and instructors, such as discussion forums, group projects, and video conferencing. These tools could be integrated with the LMS or provided through third-party services like Zoom or Microsoft Teams.

IV. RESULT

The P2P Learning Platform project aims to develop a cloud-based E-Learning website that utilizes a peer-to-peer learning management system (P2P LMS) for secure access to the platform. The platform successfully accomplishes the desired objectives.

As a result, we get a P2P community-focused e-learning application that is designed to facilitate online education. Many general objectives were set for the project, which were achieved properly. As of now application offer – an admin panel which is used to control the application and can only be accessed by administrators, and a User panel which is where users log in and are able to create their own courses for the public or can consume content and courses provided by other instructors on the platform.

The Admin Panel provides various features such as – Category creation, edit, manipulate & delete the already existing category.
Course Viewing panel – to perform various operations on courses like approve, edit, filter, etc.
Student panel – To view students on the platform, which courses they are enrolled in, etc.
Enrollment panel – To view the enrollment history.
Message panel – This can be used to send messages to any user of the platform.
System Settings – This area handles Application settings which can be used by the admin to alter the application setting and to enable and disable features.
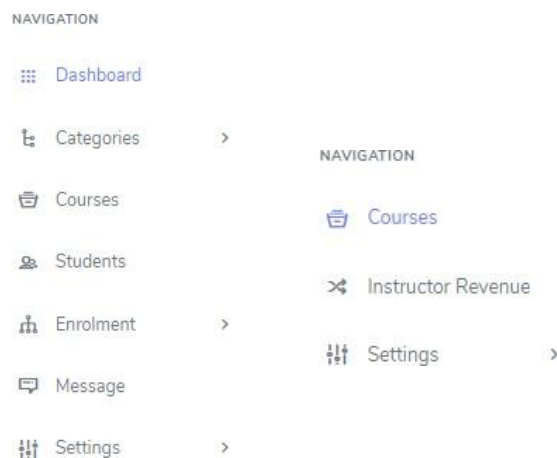
ADMIN   USER

Similarly, User Panel provides various features such as –

My course panel – This section can be used by users to view the courses they have purchased and enrolled in and to view course details and their progress.
User profiles can be edited in the user panel; other things like a wish list, message, and purchase history are also available.

Instructor Revenue – This feature can be used by the user to

keep track of his / her revenue gained by monetization of courses.

friendly environment.

Setting - At last, a setting section helps the user to set payment settings.

Courses involve a variety of supported multimedia like – video format, text format, pdf, document format, etc.

Videos can be added to the platform using three integrations, namely – YouTube, Vimeo, and HTML5.
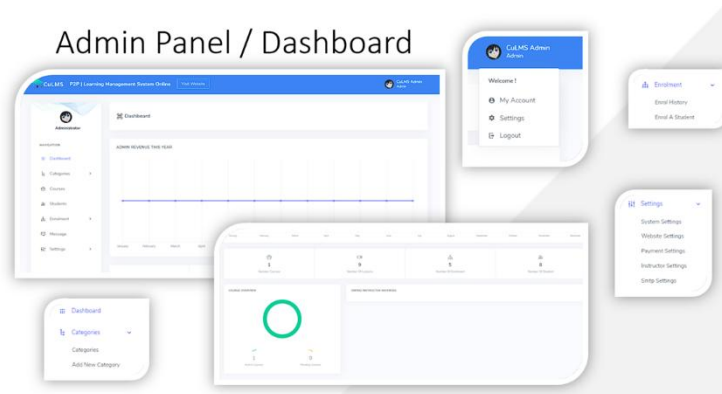

The course can also contain quizzes for practice sessions for learners on the platform.

The P2P Learning Platform project has the potential to offer an effective and scalable platform for online learning, enabling students and instructors to engage in collaborative learning and knowledge sharing in a secure and user-

V. CONCLUSION

1)   The e-learning website using cloud computing is an effective way to deliver educational content and can be used to supplement or even replace traditional learning methods.

2)   The use of cloud computing can provide scalability, accessibility, cost-effectiveness, flexibility, security, and collaboration benefits to e-learning platforms.

3)   User feedback can help identify areas for improvement in the e-learning website, such as enhancing the user interface, improving content quality, or providing more interactive features.

4) The e-learning website may have specific advantages or limitations depending on the subject matter or intended audience, which should be taken into account when designing future e-learning projects.

5) The proposed system for e-learning using cloud computing and P2P networking is expected to address the limitations of existing e-learning platforms and provide a more efficient and effective way of delivering education.

VI. FUTURE WORK

1) **Personalization and Adaptive Learning**: Cloud computing provides the infrastructure for implementing personalized learning experiences. By leveraging data analytics and machine

learning algorithms, e-learning platforms can analyze user behavior, preferences, and performance to offer tailored content, recommendations, and adaptive learning paths. This individualized approach can significantly improve learning outcomes and engagement.

2) **Collaboration and Interactivity**: Cloud-based e-learning platforms can facilitate collaborative learning experiences. With cloud storage and computing power, students and instructors can easily share files, collaborate on projects, and engage in real-time discussions. Cloud-based tools can also enable interactive features such as virtual classrooms, simulations, and gamification to enhance engagement and learning outcomes.

3) **Mobile Learning**: Cloud computing plays a crucial role in supporting mobile learning initiatives. With cloud-based e-learning platforms, students can access their courses and learning materials from any device with an internet connection. Mobile apps, coupled with cloud services, enable learners to ngage in bite-sized learning, microlearning, and mobile-friendly content delivery, catering to the increasing demand for on-the-go learning experiences.

VII. REFERENCES

[1] Hou, L., Liu, Q., Nebhen, J., Uddin, M., & Chaudhary, A. (2022). Implementation of Cloud Computing Protocol in E-Learning for Future Wireless Systems.

[2] Dima, A., Bugheanu, A.-M., Boghian, R., & Madsen, D. Ø. (2019). Mapping Knowledge Area Analysis in E-Learning Systems Based on Cloud Computing.

[3] P. Hendradi, M. Khanapi, and S. N. Mahfuzah, "Cloud Computing-Based E-Learning System Architecture in Education 4.0," International Journal of Emerging Technologies in Learning (iJET), vol. 15, no. 17, pp. 137-154, 2020.

[4] Rinkey, Dr. Piyush Gupta, and Dr. Archana Bhatnagar, "Implementation of Cloud based E-learning Architecture," BIT Jaipur, India, 2022.

[5] Kumar, V., & Sharma, D. (2019). E-Learning Theories, Components, and Cloud Computing-Based Learning Platforms.

[6] Wu, W. & Plakhtii, A. (2021). E-Learning Based on Cloud Computing.

[7] Katiyar, N., & Bhujade, R. (2019). E-Learning System based on Cloud Computing: A Review Paper.

[8] "E-learning platform using cloud computing: A systematic literature review" by Amany Saleh, Ayman Ezzat, and Mohammad Alshayeb, published in Education and Information Technologies (2019).

[9] "Cloud Computing in E-Learning: A Review of Literature" by Sheikh Shuja Ahmed, Mohammad Tariq Banday, and Ghulam Mohiuddin Wani, published in the International Journal of Engineering Science and Computing (2018). [10]"Design and Implementation of Cloud-Based E-Learning Platform" by Qing Li and Jianbin Hu, published in the International Journal of Emerging Technologies in Learning (2016).

[11]"Cloud Computing for E-Learning: A Review of the Literature" by Gulsah Koc and Goksel Yalcinkaya, published in the International Journal of Advanced Computer Science and Applications (2014).

[12]"A Study on Cloud Computing-Based E-Learning System" by Shu-Chen Hsu, Chun-Wei Huang, and Chien- Hung Liu, published in the Journal of Educational Technology & Society (2014).

[13]"A Model for Cloud Computing Based E-Learning System" by Siti Nurmaini, Siti Zaiton Mohd Hashim, and Aziz Deraman, published in the Journal of Theoretical and Applied Information Technology (2015).

[14]"Cloud Computing-Based E-Learning Platform Using Open Source Software" by Fazal-e-Amin, Muhammad Hamad Alizai, and Irfan Ullah, published in the Journal of Cloud Computing: Advances, Systems, and Applications (2019).

[15]"Cloud-Based E-Learning Platform for Higher Education Institutions" by Harikrishnan M and M. V. Rajesh, published in the International Journal of Emerging Technologies in Learning (2018)