

SECTION 19. PEDAGOGY AND EDUCATION

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CAPABILITIES OF CLOUD COMPUTING TEACHING IN APPLICATION OF INTERDISCIPLINARY APPROACH IN TERTIARY LEVEL

Modern tertiary education is highly influenced by the general trends in the social, technological and economical spheres of life. It also becomes one of the key factors to provide and develop these transformations. The major skills students need in order to be successful in their career and to be able to bring positive change into their professional field are as follows: critical thinking, problem solving, communication and collaboration skills. Teachers and methodologists are constantly working on providing the necessary tools to help students obtain these essential skills. For instance, Cloud Computing Teaching is aimed to facilitate teachers and students within the educational process. It has both the advantages like accessibility, collaboration, organization and cost; and disadvantages such as privacy issues, access to the internet and reliability [13]. Though the capabilities of using Cloud Computing Learning to facilitate the interdisciplinary approach in higher education have not been studied yet.

The **aim** of this article is to research the opportunities and obstacles in using Cloud computing teaching to support the application of interdisciplinary approach in the tertiary level. To achieve the aim were determined the following **tasks**: 1) to investigate the specific features of interdisciplinary approach in education; 2) to study the notion of Cloud Computing Teaching and examples of its application; 3) to research the advantages and disadvantages of using Cloud Computing Teaching to facilitate the interdisciplinary approach in higher education.

Research **methodology** is grounded in the fundamental theoretical methods and universal analytical methods of deduction and induction, abstraction and generalization.

Interdisciplinary teaching predetermines teaching across different academic subjects or fields of knowledge by connecting them within common themes, issues, or problems. This teaching method integrates various educational disciplines in order to provide a more comprehensive and holistic approach to learning [6].

Interdisciplinary education emphasizes the importance of critical thinking skills, empowering students to deal with complicated issues and problems from various perspectives. It enhances critical and creative thinking in students, providing them with necessary analytical skills that predetermine success in the modern world [7; 12].

Interdisciplinary education frequently involves a variety of methods and tools (like hands-on learning, experimental learning, simulations, etc.) to investigate complex problems. Inventive teaching methods, techniques and technologies, enable students to approach complex problems in novel and stimulating ways as interdisciplinary education combines knowledge from various academic fields to provide a more relevant understanding of a specific topic or problem breaking the borders between different fields of study [1].

Interdisciplinary education encourages cooperation and teamwork among students, teachers, and professionals from various fields to facilitate the exchange of knowledge and proficiency through communication, teamwork, collaboration and problem-solving.

Enabling students to look at the problem from different perspectives while working on genuine problems and actual societal concerns, interdisciplinary education fosters the creation of a conscientious, equitable, and open-minded society [11; 5].

Cloud computing revolutionized education, provided students and teachers with the access to shared information and resources. Cloud computing is viewed as a network of interconnected computers, servers, software, and storage devices that enable users to operate applications and access resources from any other device connected to the Internet. In education, it is represented by the use of cloud-based technology to access and store learning resources and course materials, enabling modern and interactive learning experience. Most of the educational institutions have become highly dependent users of information technology. They provide educational services for students and teachers to have control and convenient access to their information utilizing the Internet-empowered. [14]

Primary users of higher institution cloud resources include teachers, students, faculty members, parents, admission and examination councils. Lecturers can upload their lecture guides, quizzes and assignments on a cloud storage server using their mobile android, laptops and any other enabled devices anywhere and anytime. There are many aspects where cloud computing can be applied in the tertiary level. Among them are the following ones: academic activities using Networks, application of SaaS (Software as a Service) in Educational Material, development of electronic teaching and learning Database. [8]

To the popular cloud-based programs that are actively used in education belong Google classroom, Blackboard, Knowledge Matters, Coursera, Microsoft Education Center, Classflow and Moodle [4]. They provide a wide range of tools and features to support online learning, including forums, quizzes, assignments, multimedia resources, courses, tools for communication, etc.

The worldwide lockdown due to the coronavirus pandemic and war made us oversee the concept of e-learning. Cloud computing technologies make education a simple and engaging experience for both teachers and learners. Students, professors, and teachers are now able to appreciate the accessibility and ease of cloud-based education, its impact on scaffolding, accelerating methods of providing collaboration-based learning.

Cloud computing offers significant advantages in facilitating an interdisciplinary approach in higher education. Here's a quick rundown of the five main **benefits** of cloud computing in education regarding interdisciplinary approach:

Accessibility. Cloud computing facilitates creation of the virtual interdisciplinary classroom environment that can involve as many students as would wish to participate in the lesson. It provides easy access to educational resources and the opportunity to submit assignments and coursework online. Moreover, all the above can be done with the wide range of technical devices like PC, laptop, tablet or smartphone.

Scalability. Cloud resources outstretch in order to meet the increased requirements of interdisciplinary learning. Once this frantic period is over, the Cloud resources scale down so as not to waste them. This also helps to regulate the cost of services.

Improved Collaboration. Real-time collaboration makes a significant part of cloud computing in interdisciplinary higher education settings. Cloud software serves to encourage student communication across different scientific fields, support remote learning through virtual classrooms, and develop management portals which facilitate teachers collaboration. It's one of the most effective approaches to establish an interdisciplinary environment, where teachers and students can come to total agreement.

High speed. Cloud Computing enables us to open the service in a few clicks. This quick deployment lets us get access to the required interdisciplinary resources within several minutes.

Simplifying teaching. It provides teachers with the means to analyze student progress easily, effectively communicate with them and efficiently give feedback. [2; 3]

Several basic **challenges** threaten the quality of cloud computing implementation in education, limiting its effectiveness in interdisciplinary learning. They include:

Lack of Control. One of the biggest challenges of cloud computing is lack of control. University districts have limited control over the cloud computing environment. They must rely on the cloud provider to ensure their data is secure and the system is reliable.

Service Disruptions. If the cloud provider has technical problems, it can become an obstacle for higher education institutions to re-access their data, resulting in potential disruptions to classes.

Usage Limits. Most cloud service providers limit bandwidth and memory usage. Higher education can be overwhelmed with unexpected charges for exceeding set limits. This can turn out to be disruptive and inconvenient.

Security and Privacy Concerns. Cloud computing users can deal with risks of data breaches, data loss, and data manipulation. To protect the participants of the educational process, higher education institutions should activate two-factor authentication for their users and consider using encryption. [2; 9; 10]

Conclusions. Interdisciplinary learning approach fosters the growth of analytical and critical thinking, problem-solving, teamwork, and collaboration skills through integration of information and techniques from different academic fields and providing a broader perspective of genuine and more clear comprehension of complex issues. Cloud computing in education is represented by the use of cloud-based technology to access and store learning resources and course materials to support the process of learning, make it more effective and engaging. Popular cloud-based programs used in education are Google classroom, Blackboard, Knowledge Matters, Coursera, Microsoft Education Center, Classflow, Moodle, etc. They facilitate online learning providing necessary tools for creation of forums, quizzes, assignments, multimedia resources, courses, discussions, etc. Cloud computing is beneficial for interdisciplinary learning, though it also provides some challenges. Among the benefits we find its accessibility, scalability, improved collaboration tools, high speed, means to simplify teaching. Challenges of using cloud computing in interdisciplinary education are represented by lack of control, service disruptions, usage limits, security and privacy concerns.

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