Ubiquitous Digital University as an Alternative to the Traditional Higher Education Model to Develop an Ideal Education System

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ABSTRACT

Purpose: *The paper aims to explore and advocate for the transformative potential of ubiquitous digital universities in reshaping the landscape of higher education. By meticulously examining the features, functions, and business models of digital universities alongside an in-depth evaluation of their potential as an alternative to traditional education models, this research endeavours to offer insights into the development of an ideal education system. Through comprehensive analysis, it is essential to highlight the advantages, challenges, and opportunities inherent in ubiquitous digital universities, aiming to pave the way for a more accessible, flexible, and inclusive approach to education in the digital age.*

Methodology: *Exploratory research method is used to analyse and evaluate the collected information from various sources, including Google, Google Scholar, HEIs websites, and AI-driven GPTs using identified keywords.*

Results & Findings: *The results of these analyses are interpreted as new knowledge and presented in the form of postulates for future reference.*

Originality/Value: *The paper compares conventional campus-based universities with digital universities and ubiquitous digital universities. The features of the ubiquitous digital university are also compared with the characteristics of an ideal education system. Both SWOC and ABCD analysis frameworks are used to analyse and evaluate these systems. The findings are summarized in the form of postulates for future reference. It is found that the technology-based progress in the university system takes it toward a hypothetical ideal education system.*

Type of Paper: *Exploratory Research.*

Keywords: University system, Digital university, Ubiquitous digital university, Ideal education system, SWOT analysis framework, ABCD analysis framework

1. INTRODUCTION :

In the rapidly evolving landscape of education, the emergence of digital universities has reshaped the traditional paradigms of learning. A Digital University embodies a transformative approach to education, leveraging technology to offer a versatile and accessible learning environment. Unlike their physical campus-based counterparts, digital universities transcend geographical boundaries, providing education remotely to a global student body (Jones & Jo (2004). ([1]).

At its core, a Digital University functions as an online hub of knowledge dissemination, delivering a diverse array of courses and programs through digital platforms. Through innovative tools and interactive interfaces, students engage in virtual classrooms, accessing lectures, assignments, and collaborative discussions from anywhere with internet connectivity. This accessibility fosters inclusivity, accommodating diverse learners who may face barriers to attending a traditional campus-based university due to distance, time constraints, or other limitations (Aithal & Aithal (2023). [2]).

Compared to the physical campus experience, a Digital University offers unparalleled flexibility and convenience. Students have the autonomy to design their learning schedules, balancing academic pursuits with personal or professional commitments. This flexibility enables individuals to tailor their educational journey, accommodating various learning styles and pacing their progress according to individual needs—a departure from the rigid structures often inherent in physical campus-based education (Aithal & Aithal (2016). [3]; Peters & Jandrić (2018). [4]).

Moreover, the digital landscape of a university facilitates dynamic and adaptive learning experiences. With the integration of cutting-edge technologies such as artificial intelligence, virtual reality, and interactive simulations, students engage in immersive learning that transcends the limitations of traditional classroom settings. These technologies enrich the educational experience, offering practical, hands-on learning opportunities that bridge theoretical knowledge with real-world applications, often surpassing the scope of what a physical campus can offer (Aithal & Aithal (2019). [5]).

2. IDEAL EDUCATION SYSTEM :

Defining the "ideal" education system is complex and subjective, as it heavily depends on cultural, societal, and individual perspectives (Aithal & Aithal (2014). [6]; Aithal & Aithal (2015). [7]). However, some key elements often emerge when discussing an optimal education system:

(1) Accessibility and Equity: An ideal education system ensures universal access to quality education regardless of socio-economic status, geographic location, or other discriminatory factors. It focuses on inclusivity, offering equal opportunities for all individuals to pursue education.

(2) Flexibility and Adaptability: Recognizing diverse learning styles and needs, an ideal system provides flexibility in curriculum, teaching methods, and assessment. It should adapt to the evolving needs of society, incorporating both traditional academic knowledge and modern skills relevant to the changing job market.

(3) Holistic Development: Education goes beyond academic knowledge. An ideal system fosters holistic development, nurturing not only cognitive abilities but also social, emotional, and physical well-being. It emphasizes character development, critical thinking, creativity, and problem-solving skills.

(4) Quality Teaching: The system should prioritize recruiting and retaining well-trained, motivated, and supported educators. Teachers play a pivotal role in shaping students' experiences and need adequate resources, training, and support to deliver high-quality education.

(5) Empowerment and Engagement: Students should be active participants in their learning journey. An ideal system encourages student involvement, empowering them to pursue their interests, express their opinions, and engage in hands-on, experiential learning.

(6) Technology Integration: Leveraging technology effectively can enhance learning experiences. An ideal education system integrates technology to facilitate interactive learning, access to resources, and exposure to innovative tools that prepare students for a tech-driven world.

(7) Continuous Evaluation and Improvement: Regular assessment and evaluation of the education system are crucial for identifying areas of improvement. A focus on ongoing refinement ensures that the system remains responsive to changing needs and societal developments.

Achieving an ideal education system involves a multifaceted approach, considering the collaboration between policymakers, educators, communities, and students themselves. It's a continual process of refinement, adaptation, and innovation to create an environment that maximizes the potential of every learner.

In this paper, a comparative study and analysis on digital universities and Ubiquitous digital universities is made and how Ubiquitous digital universities are going to replace the physical university models in future due to their features close to ideal education system.

3. OBJECTIVES :

(1) To provide an overview of the digital universities along with their functions.
(2) To predict the features of the Ideal Education System, including its definition and characteristics.
(3) To review the literature to know the current status of digital universities and ubiquitous digital universities.
(4) To explore the concepts, features, and business model of Digital University and Ubiquitous Digital University.
(5) To evaluate the Components of Digital Universities and Ubiquitous Digital Universities.

(6) To review the Infrastructure for Digital Universities and Ubiquitous Digital Universities.
(7) To evaluate Ubiquitous Digital Universities as an Ideal Education System.
(8) To Compare Digital Universities and Ubiquitous Digital Universities using SWOC analysis and ABCD analysis from Stakeholders' perspectives.
(9) To identify Factors for Acceptance of Ubiquitous Digital Universities from tech-Generations.
(10) To suggest UDU quality requirements from stakeholders' point of view in the form of postulates.

4. REVIEW OF LITERATURE :

The concept of digital universities has evolved significantly in recent years, driven by advancements in technology, changing educational demands, and the global COVID-19 pandemic. This literature review summarizes the current status of digital universities based on recent research and academic discourse.

(1) Growth and Development:

According to recent studies, digital universities have experienced substantial growth, with a marked increase in enrollment and the development of new online programs (Allen & Seaman, (2021). [8]). The shift from traditional classroom settings to online platforms has been accelerated by the pandemic, compelling institutions to adopt digital solutions rapidly (Dhawan, (2020). [9]).

(2) Technological Integration:

The integration of advanced technologies is a key feature of digital universities. Tools such as Learning Management Systems (LMS), artificial intelligence (AI), and virtual reality (VR) are widely utilized to enhance the learning experience (Rani et al. (2021). [10]). These technologies facilitate interactive learning, personalized education paths, and efficient administrative processes (Picciano (2019). [11]).

(3) Accessibility and Flexibility:

Digital universities offer significant benefits in terms of accessibility and flexibility. Research indicates that online education provides opportunities for non-traditional students, including working professionals, international students, and individuals with disabilities (Moore & Kearsley (2011). [12]). The flexibility of online programs allows students to balance their studies with other life commitments, making higher education more inclusive (Allen & Seaman (2017). [8]).

(4) Quality and Accreditation:

Concerns regarding the quality of online education have been addressed in recent literature. Studies show that many digital universities now offer accredited programs that meet rigorous academic standards (Means et al. (2010). [13]). The quality of online education has improved through the adoption of best practices in course design and delivery (Anderson (2008). [14]).

(5) Challenges and Limitations:

Despite the advantages, digital universities face several challenges. Ensuring academic integrity in online assessments, providing adequate student support, and bridging the digital divide are significant issues (Nykyporets (2023). [15]). Students in remote or low-income areas may lack access to the necessary technology and internet connectivity, which hinders their ability to participate in online education (Van Deursen & Van Dijk (2019). [16]).

(6) Future Prospects:

The future of digital universities appears promising. Hybrid models, which combine online and in-person elements, are gaining popularity and may offer a balanced approach to education (Graham (2013). [17]). Continuous advancements in technology and pedagogy are expected to further enhance the effectiveness and reach of digital universities (Means et al. (2014). [13]). Table 1 summarizes some of the published scholarly articles in the area of digital universities:

Table 1: Review on Digital Universities

S. No.	Area	Focus/Outcome	Reference
1	Digital Universities in Russia	The article focuses on the concept of a digital university framework tailored for Russia,	Rozhkova, D., Rozhkova, N.,

		comprising four core components: university management information systems, online educational support, essential competencies for the digital economy, and personalized educational path management. Within each block, the article highlights key challenges hindering smooth digital transformation.	& Blinova, U. (2019). [18]
2	Smarter universities for the digital era	The paper contends that modern universities must surpass mere intelligence and instead prioritize seamless knowledge exchange among employees, teachers, students, and stakeholders. It introduces and examines a model for a more intelligent university, drawing inspiration from frameworks developed for smart city advancement.	Coccoli, M., et al. (2014). [19]
3	Need of a digital university for higher education transformation	The study underscored the imperative for Higher Education Institutions (HEIs) to confront the ramifications of an increasingly digital landscape. It delved into the exploration and illumination of emerging technologies and their influence on the establishment of a digital campus. Additionally, it examined potential obstacles and strategies for effectively leveraging digitalization. Ultimately, the study proposed a digital model for HEIs to adopt a comprehensive institutional digital strategy, aimed at capitalizing on the advantages inherent in technological advancement.	Khalid, J., et al. (2018). [20]
4	Foundations of digital universities	The paper advocates for a standardized approach to managing digital resources to facilitate the evolution of Digital Universities. Achieving this necessitates the development of novel methodologies, data models, authority control mechanisms, and system infrastructures capable of accommodating a wider array of services.	Maltese, V., & Giunchiglia, F. (2017). [21]
5	Development of a model of digital research universities	The author's proposed definition of a "digital research university" aligns the scientific terminology with contemporary trends in digital technology advancement within research institutions. The practical consequences of widely adopting this classification will manifest in a reevaluation of the role of research universities and the exploration of innovative approaches to integrating digital technologies.	Sitnicki, M. (2018). [22]
6	Threats, challenges, and opportunities for open universities and MOOC in the digital revolution	The article proposes that the evolution of open universities must uphold a foundation rooted in the deep integration of pedagogical and technological innovations grounded in research. It advocates for the exploration of fresh organizational strategies and quality standards to ensure the continued significance and leadership of open universities in expanding access to higher education.	Cunha, M. N., Chuchu, T., & Maziriri, E. (2020). [23]
7	Digital university in shifting Time	The author suggests a shift in perspective regarding digital connections, moving away from perceiving them solely as extensions from the	Sheail, P. (2018). [24]

	and space of campus	university campus outward. Instead, the digital university is portrayed as an expansion of the university concept itself, manifested through robust connections spanning various locations, times, and temporal dimensions.	
8	How to Empower Educators through Digital Pedagogies	Drawing from systematically identified objectives, analysis, evaluation, comparison, and interpretation of methods to enhance educators' capabilities through digital pedagogies and faculty development strategies, this exploratory research yields several postulates and recommendations.	Aithal, P. S., & Aithal, S. (2023). [25]

The literature indicates that digital universities are a growing and evolving sector of higher education. While they offer numerous benefits in terms of accessibility, flexibility, and technological integration, challenges such as academic integrity and the digital divide remain. Ongoing research and innovation are crucial to addressing these issues and realizing the full potential of digital universities.

5. CONCEPT OF DIGITAL UNIVERSITY AND UBIQUITOUS DIGITAL UNIVERSITY :

First of all, let us discuss briefly the concept of a (i) Digital University and (ii) Ubiquitous Digital University, exploring their definition, scope, structure, features, and potential business model.

5.1 Digital University:

A Digital University is an institution of higher learning that primarily operates online, delivering education and academic programs through digital platforms and technologies. It encompasses a wide range of disciplines and degrees, offering diverse courses, certifications, and degree programs across various fields.

Definition and Scope:

A Digital University transcends geographical barriers, providing education remotely to a global student body. It offers flexibility in learning schedules, catering to diverse learners with different time zones, work commitments, or limitations that prevent attending a physical campus. This type of university leverages technology to facilitate teaching, learning, assessments, and interactions among students and faculty.

Structure and Features:

The structure of a Digital University typically comprises an online platform hosting course materials, lectures, assignments, discussion forums, and communication tools. It incorporates multimedia elements like videos, interactive quizzes, simulations, and live sessions to enhance engagement. Additionally, it often includes support services such as online libraries, counseling, and academic advising accessible remotely.

Potential Business Model:

Digital Universities can adopt various business models to sustain operations and generate revenue. Some common models include:

(1) Subscription-Based Model: Students pay a subscription fee for access to courses or a catalogue of educational content offered by the university.

(2) Pay-Per-Course Model: Students pay for individual courses or modules they enroll in, providing flexibility and cost control.

(3) Freemium Model: Offering basic courses for free while charging for premium features, certifications, or advanced courses.

(4) Corporate Partnerships and Sponsorships: Collaborations with corporations for specialized training programs, sponsored content, or tailored educational solutions.

(5) Grants and Funding: Partnering with research institutions, government bodies, or philanthropic organizations for funding, especially for research and development initiatives.

The success of a Digital University's business model often depends on factors like the quality of content, technological infrastructure, reputation, accreditation, and the ability to cater to evolving market demands.

Overall, Digital Universities represent a transformative approach to education, embracing technological advancements to provide accessible, flexible, and diverse learning experiences beyond the limitations of traditional campus-based institutions.

5.2 Ubiquitous Digital University:

Definition:

A Ubiquitous Digital University is an institution of higher education that operates entirely in the digital realm, offering a comprehensive range of academic programs, courses, and learning resources accessible anytime, anywhere. It leverages cutting-edge technology to provide a seamless and immersive educational experience to students globally.

Scope:

(1) Global Accessibility: The university transcends geographical barriers, granting access to a diverse student population worldwide.
(2) Multidisciplinary Offerings: It offers a wide array of programs, ranging from traditional disciplines to emerging fields like AI, blockchain, data science, etc.
(3) Flexible Learning Models: The university accommodates various learning styles, incorporating self-paced modules, live lectures, collaborative projects, and interactive simulations.
(4) Continuous Learning and Professional Development: It caters not only to traditional undergraduates but also to professionals seeking continuous education or upskilling.

Structure:

(1) Digital Infrastructure: The university is built upon a robust digital infrastructure comprising online platforms, AI-driven learning management systems, virtual classrooms, and interactive learning tools.
(2) Faculty and Support Staff: A team of expert educators, mentors, and support staff engage with students virtually, facilitating learning, mentoring, and guidance.
(3) Collaborative Ecosystem: Partnerships with industry leaders, research institutions, and global academic networks foster a rich ecosystem for knowledge exchange and collaboration.

Features:

(1) Personalized Learning: Adaptive learning algorithms tailor educational content and pathways based on individual student needs and preferences.
(2) Immersive Technologies: Integration of AR, VR, simulations, and gamification enhances engagement and practical learning experiences.
(3) Global Networking: Opportunities for students to connect, collaborate, and network with peers and professionals worldwide.
(4) Real-time Assessments and Feedback: Continuous evaluation through AI-driven assessments and immediate feedback mechanisms aids in monitoring progress.
(5) Support Services: Comprehensive support services encompassing counseling, career guidance, technical support, and academic assistance.

Business Model:

(1) Subscription-Based Model: Offering tiered subscription plans granting access to different levels of courses, resources, and support services.
(2) Corporate Partnerships and Sponsorships: Collaborations with corporations for tailored educational programs, workforce development, and sponsored courses.
(3) Freemium Model: Providing basic access to courses for free while charging for premium features, certifications, or specialized content.
(4) Lifelong Learning Memberships: Offering lifetime access to alumni and professionals for continuous learning and upskilling opportunities.

A Ubiquitous Digital University operates at the intersection of technology, education, and innovation, catering to the diverse needs of learners worldwide. Its success hinges on providing high-quality education, fostering a sense of community, and adapting swiftly to emerging trends and advancements in digital learning.

6. RESEARCH METHODOLOGY :

The exploratory research method is used to analyse and evaluate the collected information from various sources, including Google, Google Scholar, HEIs websites, and AI-driven GPTs using identified

keywords. The collected information is analysed, evaluated, and interpreted as per the objectives of the paper using various frameworks, including SWOC analysis framework, ABCD stakeholders analysis framework, etc., and the findings are presented in the form of postulates.

7. CONCEPT OF DIGITAL UNIVERSITIES & UBIQUITOUS DIGITAL UNIVERSITIES :

The concept of Digital Universities and Ubiquitous Digital Universities revolves around leveraging digital technologies to provide comprehensive, accessible, and flexible education to learners across the globe [26-30]. The following section discusses each concept in detail:

7.1. Digital Universities:

A Digital University refers to an institution of higher learning that primarily operates in the digital realm, delivering education and academic services through online platforms. Table 2 lists its key components along with a description:

Table 2: Key components of digital universities

S. No.	Key component	Description
1	Online Learning Environment	Courses, lectures, materials, assessments, and interactions take place in virtual spaces accessible via the internet.
2	Flexible Learning Options	Students can access learning materials at their convenience, facilitating asynchronous learning. Synchronous elements like live lectures or discussions may also be included.
3	Multimedia Learning Tools	Utilizes a variety of digital resources such as videos, interactive modules, e-books, and simulations to enhance the learning experience.
4	Virtual Support Services	Offers online counseling, tutoring, library resources, and administrative support.
5	Digital Credentials	Provides certificates, degrees, or credentials earned through online assessments, projects, and examinations.
6	Global Accessibility	Students from anywhere in the world can enroll, fostering a diverse and inclusive learning environment.

7.2 Ubiquitous Digital Universities:

Ubiquitous Digital Universities take the concept of Digital Universities further by emphasizing omnipresent access to education, leveraging advanced technologies for seamless integration into daily life. Table 3 presents some of the Key features along with a description:

Table 3: Key components of ubiquitous digital universities

S. No.	Key component	Description
1	Everywhere Learning	Education is integrated into various aspects of life through mobile devices, IoT (Internet of Things), wearables, and other connected technologies. Learning is not restricted to specific times or places.
2	Personalized and Adaptive Learning	Utilizes AI, machine learning, and big data analytics to tailor education to individual needs, preferences, and learning styles. Adaptive learning paths are created based on real-time student data.
3	Augmented Reality (AR) and Virtual Reality (VR) Integration	Provides immersive and interactive learning experiences, allowing students to explore virtual environments, conduct experiments, and engage with course material in 3D simulations.
4	Blockchain-Based Credentials	Ensures secure, verifiable, and portable credentials using blockchain technology, enabling seamless transferability and recognition of qualifications globally.
5	Collaborative Ecosystems	Facilitates global collaboration among students, educators, researchers, and industry experts through online communities, shared projects, and interactive platforms.

6	Continuous Learning	Encourages lifelong learning by offering micro-courses, nano-degrees, and continuous skill updates to adapt to the rapidly changing job market and technological advancements.

Ubiquitous Digital Universities aim to dissolve the boundaries between formal education and everyday life, making learning a continuous, integrated, and personalized experience that adapts to individual needs and technological advancements.

Both Digital Universities and Ubiquitous Digital Universities fundamentally prioritize accessibility, flexibility, innovation, and global connectivity in education through the transformative power of digital technologies.

7.3 Digital Universities vs. Ubiquitous Digital Universities: Unpacking the Concepts:

Digital Universities are institutions of higher education that primarily deliver their educational programs online, utilizing digital technologies and platforms to facilitate teaching, learning, and assessment. This encompasses a broad range of approaches, from fully online universities to traditional universities offering online courses and programs as part of a hybrid model. Table 4 lists some of the key features of a digital university.

Table 4: Key features of digital universities

S. No.	Key features	Description
1	Online delivery	Most or all academic content is delivered online through various formats like pre-recorded lectures, live webinars, interactive modules, and collaborative platforms.
2	Technology-driven	Extensive use of technology for content creation, delivery, interaction, and assessment. This includes Learning Management Systems (LMS), virtual classrooms, collaborative tools, and AI-powered features.
3	Flexible learning	Students learn at their own pace and schedule, offering greater convenience and accessibility compared to traditional on-campus programs.
4	Global reach	Digital universities can overcome geographical limitations, reaching students anywhere in the world with internet access.
5	Diverse course offerings	Programs available may range from traditional academic disciplines to professional and vocational skill-based courses.

Ubiquitous Digital Universities take the concept of digital education a step further. They aim to provide universal and seamless access to high-quality education for everyone, regardless of location, background, or socio-economic status. This ambitious vision involves addressing several challenges. Some of the key features of ubiquitous digital universities are listed in Table 5.

Table 5: Key features of ubiquitous digital universities

S. No.	Key features	Description
1	Accessibility	Ensuring affordable internet access and digital literacy for everyone, bridging the digital divide.
2	Content and pedagogy	Developing engaging and interactive online learning materials suited for diverse learning styles and needs.
3	Quality assurance	Maintaining high academic standards and accreditation processes for online programs.
4	Social and emotional learning	Addressing the need for peer interaction, community building, and pastoral care in a virtual environment.

7.4 Potential Implications of Ubiquitous Digital Universities:

(1) Democratization of education: Increased access to higher education for marginalized groups and geographically isolated communities.

(2) Personalized learning: Tailoring educational experiences to individual needs and learning styles using AI and adaptive technologies.
(3) Global collaboration: Fostering inter-cultural learning and international education exchanges through virtual platforms.
(4) New learning models: Hybrid and blended learning approaches offering flexibility and personalized learning journeys.

7.5 Challenges and Concerns:

(1) Digital divide: Addressing the issue of unequal access to technology and internet infrastructure across different regions and socioeconomic groups.
(2) Quality and accreditation: Ensuring high academic standards and maintaining accountability for online programs.
(3) Social isolation and the "human touch": Finding ways to foster student engagement, community building, and social interaction in the virtual environment.
(4) Job preparedness: Ensuring graduates possess the necessary skills and competencies for the job market in a rapidly changing technological landscape.

7.6 The Future of Digital Education:

Digital universities and the pursuit of ubiquitous education hold immense potential to transform the landscape of higher education. While challenges remain, ongoing technological advancements, pedagogical innovations, and collaborative efforts can pave the way for a more inclusive and accessible future of learning, empowering individuals worldwide to reach their full potential.
But the development of ubiquitous digital universities is an ongoing process, and its final form and impact remain to be seen. However, understanding the key concepts and its potential challenges and opportunities can guide the future of education towards a more equitable and accessible learning experience for all.

8. COMPONENTS OF DIGITAL UNIVERSITIES :

Digital Universities and Ubiquitous Digital Universities encompass various components that collectively create an innovative, comprehensive, and accessible learning environment. Here's an exploration of these components:

8.1 Components of Digital Universities:

(1) Online Learning Platforms:
(i) Robust and user-friendly platforms for hosting courses, lectures, assignments, and assessments.
(ii) Learning Management Systems (LMS) or custom platforms that facilitate content delivery, interaction, and grading.
(2) Multimedia Learning Resources:
(i) Diverse digital content including videos, interactive modules, e-books, simulations, and podcasts to cater to different learning styles.
(3) Virtual Classrooms and Labs:
(i) Virtual environments that simulate real-world laboratories or classrooms for conducting experiments, simulations, or collaborative projects.
(4) E-Libraries and Digital Resources:
(i) Extensive digital libraries providing access to e-books, journals, research papers, and other scholarly materials.
(ii) Tools for citation management, research databases, and academic search engines.
(5) Interactive Assessments and Feedback:
(i) Online quizzes, exams, and assignments with automated grading systems.
(ii) Feedback mechanisms including peer review, instructor feedback, and self-assessment tools.
(6) Virtual Support Services:
(i) Online counseling, tutoring, advising, and career services accessible to students.
(ii) Technical support for students and faculty navigating the digital learning environment.
(7) Digital Credentials and Certificates:
(i) Issuance of digital badges, certificates, and degrees upon completion of courses or programs.

(ii) Integration of digital credentials with blockchain technology for security and verification purposes.

8.2 Components of Ubiquitous Digital Universities:

(1) Mobile and IoT Integration:
(i) Mobile apps and IoT devices enabling seamless access to learning materials, notifications, and educational tools on-the-go.
(2) AI-Powered Personalization:
(i) Adaptive learning algorithms analyze student data to tailor learning paths, recommend content, and provide personalized support.
(3) Augmented and Virtual Reality (AR/VR):
(i) Integration of AR/VR technologies for immersive and interactive learning experiences, simulations, and field trips.
(4) Blockchain-Based Secure Credentials:
(i) Utilization of blockchain for secure and tamper-proof storage of credentials, ensuring their authenticity and portability.
(5) Global Collaboration Platforms:
(i) Online forums, collaborative spaces, and networking platforms facilitate global interactions among students, educators, and industry experts.
(6) Continuous Learning Modules:
(i) Micro-courses, nano-degrees, and lifelong learning modules allowing students to update skills and knowledge continuously.
(7) Data Analytics for Continuous Improvement:
(i) Use of big data analytics to assess learning outcomes, optimize course content, and improve teaching methodologies.
(8) Personal Wearables for Learning:
(i) Integration with wearable devices for tracking learning patterns, health, and well-being during the learning process.
The integration of these components creates a dynamic and inclusive digital ecosystem for education, offering personalized, flexible, and immersive learning experiences while embracing technological advancements for ubiquitous access to knowledge.

8.3 Components of Digital Universities and Ubiquitous Digital Universities: Exploring Possibilities:

Both Digital Universities and Ubiquitous Digital Universities rely on various components to offer unique learning experiences. Here's a closer look at some key elements:

(a) Infrastructure for Digital University:

Technology Infrastructure:

- Learning Management System (LMS): A platform for delivering course content, assessments, and facilitating communication.
- Video conferencing tools: Enabling live lectures, webinars, and group discussions.
- Collaborative tools: Fostering teamwork and interaction, like online whiteboards and document sharing platforms.
- Content creation tools: Allowing faculty to develop interactive learning materials like simulations, quizzes, and video lectures.
- Assessment tools: Implementing online quizzes, exams, and other feedback mechanisms.
- Accessibility tools: Catering to students with disabilities, like screen readers and text-to-speech software.

Content and Pedagogy:

- High-quality online courses: Engaging and interactive learning materials catering to diverse learning styles.
- Micro-credentials and modularized learning: Offering bite-sized, skill-focused modules for flexible learning pathways.
- Personalized learning algorithms: Tailoring content and pace of learning to individual needs and progress.

- Open educational resources (OERs): Integrating freely available learning materials to expand access and reduce costs.
- Flipped classroom model: Pre-recorded lectures supplemented with interactive in-person or online sessions for deeper engagement.

Student Support and Services:

- Online student portal: Providing a single point of access for course materials, administrative tasks, and support resources.
- Virtual student lounge: Enabling social interaction and community building through forums, chat rooms, and virtual events.
- Academic advising and career services: Offering online consultations and guidance for academic success and career development.
- Mental health and well-being support: Providing online resources and counseling services to address student anxieties and challenges.
- Technical support: Assisting students with technology issues related to online learning platforms and tools.

(b) Infrastructure for Ubiquitous Digital University:

In addition to the above, Ubiquitous Digital Universities require some unique components to achieve universal access and cater to diverse needs:

- Global infrastructure: Expanding internet access and digital literacy through initiatives like satellite internet, community centers, and digital literacy training programs.
- Multilingual support: Providing course materials and interfaces in multiple languages to cater to diverse linguistic backgrounds.
- Culturally aware pedagogy: Designing learning experiences that respect and acknowledge diverse cultural contexts and learning styles.
- Offline learning options: Providing downloadable materials and offline learning solutions for areas with limited internet access.
- Mobile learning: Optimizing courses and platforms for mobile devices and tablets for easier access on the go.
- Partnerships and collaborations: Working with governments, NGOs, and private sector organizations to address the digital divide and expand access to technology.

Additional Considerations:

- Data privacy and security: Ensuring robust data protection measures to safeguard student information and privacy.
- Ethical considerations: Addressing issues like algorithmic bias, accessibility for disabilities, and potential exploitation of learners.
- Sustainability and funding models: Identifying sustainable funding models to maintain quality education and reach underserved communities.

By carefully considering these components and addressing the challenges involved, Digital Universities and Ubiquitous Digital Universities can contribute to a more inclusive and accessible future of education, empowering learners worldwide to unlock their full potential.

It should be remembered that the ideal mix of components will depend on the specific goals and target audience of each digital university. Continuous innovation and adaptation will be crucial as these universities evolve and seek to provide high-quality, globally accessible education for all.

9. ABCD ANALYSIS OF DIGITAL UNIVERSITIES COMPARED TO CAMPUS-BASED UNIVERSITIES :

ABCD analysis, which stands for Advantages, Benefits, Constraints, and Disadvantages, is a comprehensive framework used to evaluate systems or models [52-53]. This analytical approach facilitates a holistic assessment by identifying the strengths and positive outcomes (Advantages and Benefits) alongside the limitations and potential drawbacks (Constraints and Disadvantages). By systematically examining each aspect, stakeholders can gain a balanced understanding of the system's overall performance, potential impact, and areas requiring improvement. This method is particularly useful in decision-making processes, as it highlights both the opportunities for leveraging the system's strengths and the challenges that need to be addressed for optimal implementation and utilization. As

per literature, ABCD analysis is done in the following four types: (1) ABCD listing [54-65], (2) ABCD Stakeholders' analysis [66-79], (iii) ABCD factor and elemental analysis [80-85], and (iv) ABCD quantitative analysis [86-117].

9.1 Advantages and benefits of digital universities compared to campus-based universities:

The advantages and benefits of Campus-based Digital Universities are listed in Table 6:

Table 6: Advantages and benefits associated with digital universities

S. No.	Key Feature	Description
Advantages:		
1	Accessibility	Digital universities break geographical barriers, allowing students to access education from anywhere with an internet connection. This accessibility enables individuals from diverse backgrounds and locations to pursue higher education.
2	Flexibility in Learning	Students have the flexibility to create personalized schedules, balancing studies with work or other commitments. They can access course materials and lectures at their convenience, promoting a self-paced learning experience.
3	Cost-Effectiveness	Digital education often eliminates expenses associated with commuting, accommodation, and campus facilities. This affordability makes education more accessible and reduces financial barriers for learners.
4	Diverse Learning Formats	Digital platforms offer various multimedia formats, including videos, interactive quizzes, simulations, and live sessions, enhancing engagement and accommodating different learning styles.
5	Global Networking	Students in digital universities interact with peers and instructors from diverse cultural and geographical backgrounds, fostering a global network and exposure to diverse perspectives.
Benefits:		
1	Lifelong Learning Opportunities	Digital universities support continuous education, allowing professionals to upskill or retrain while working. This flexibility caters to lifelong learners seeking to enhance their knowledge and career prospects.
2	Technological Integration	These universities harness technology for innovative teaching methods, incorporating AI, VR, and other tools to create interactive and immersive learning experiences that may surpass traditional classroom settings.
3	Adaptive Curriculum	Digital platforms facilitate quick updates to curriculum and materials, ensuring that content remains current and relevant to industry trends, providing students with up-to-date knowledge and skills.
4	Personalized Support	Many digital universities offer personalized support through online forums, chats, and one-on-one sessions with instructors, catering to individual student needs more effectively than larger classroom settings.
5	Work-Life-Education Balance	For working professionals or individuals with family commitments, digital universities offer the opportunity to pursue education without compromising their current responsibilities, enabling a better work-life-education balance.

While digital universities offer numerous advantages and benefits, it's important to recognize that both digital and campus-based universities have unique strengths. The choice between them often depends on individual learning preferences, circumstances, and the specific educational objectives of the student.

Some of the constraints and disadvantages associated with digital universities compared to their campus-based counterparts are given in Table 7.

Table 7: Constraints and Disadvantages associated with digital universities

S. No.	Key Feature	Description
Constraints:		
1	Limited Physical Interaction	One of the main drawbacks is the lack of face-to-face interaction. Digital universities may struggle to provide the same level of in-person engagement, which can affect social and collaborative learning experiences.
2	Technical Challenges	Reliance on technology introduces the risk of technical issues such as internet connectivity problems, platform malfunctions, or access limitations, which can disrupt the learning process.
3	Potential Isolation	Learning remotely might lead to feelings of isolation or detachment from the academic community, as students may miss out on the social aspects and networking opportunities inherent in physical campuses.
4	Dependency on Self-discipline	While flexibility is an advantage, it can also be a constraint. Some students may struggle with self-discipline and time management in a less structured learning environment, impacting their progress.
5	Resource Limitations	Not all students have access to the necessary technology or a conducive learning environment at home, which can create disparities in learning experiences and hinder equal access to education.
Disadvantages:		
1	Lack of Hands-on Experience	Certain fields, such as laboratory-based sciences or fine arts, heavily rely on hands-on practical experience, which might be challenging to replicate in a digital environment, limiting the depth of learning.
2	Reduced Social Interaction	The absence of in-person social interactions can impact students' social skills, team-building abilities, and emotional development, potentially affecting their overall growth and networking opportunities.
3	Perception and Credibility	Some employers or institutions might still favour degrees or qualifications obtained from traditional campus-based universities over those from digital institutions, impacting graduates' opportunities in certain sectors.
4	Faculty-Student Engagement	Building relationships with instructors might be more challenging in a digital setting, potentially affecting mentorship, personalized guidance, and the depth of academic discussions.
5	Questionable Quality Control	Ensuring consistent quality across digital education platforms can be challenging. Without proper oversight, there might be variations in the quality of education provided by different digital universities or programs.

Balancing the advantages and disadvantages of digital universities is crucial. It involves considering individual learning styles, career aspirations, and personal circumstances to make an informed decision about the most suitable educational path.

10. FUTURE EXPECTATIONS FROM DIGITAL UNIVERSITIES :

Creating innovative models for a "Digital University" to offer ubiquitous online higher education worldwide involves reimagining the traditional concept of a university. Here are a few innovative models that could potentially replace numerous physical institutions:

(1) Global Collaborative Learning Network:
(i) Establish a platform that connects experts, educators, and learners globally.
(ii) Offer a diverse range of courses taught by top instructors from around the world.
(iii) Focus on collaborative projects, discussions, and cultural exchanges among students worldwide.
(2) Modular and Stackable Credentials:
(i) Create a system where courses are broken down into smaller, modular units.
(ii) Allow learners to earn stackable credentials, where they can accumulate credits from various sources to build their own personalized degrees or certifications.
(iii) Emphasize competency-based learning, enabling individuals to gain expertise in specific skills or fields.
(3) AI-Powered Personalized Learning:
(i) Develop an AI-driven platform that customizes learning paths for each student based on their abilities, interests, and learning pace.
(ii) Utilize adaptive learning technologies to offer personalized recommendations, assessments, and resources tailored to individual needs.
(4) Blockchain-Based Accreditation and Certification:
(i) Implement a blockchain-based system for secure and verifiable credentials.
(ii) Ensure transparency and credibility in certifications, making them universally recognized and transferable across borders.
(5) Virtual Reality (VR) Immersive Education:
(i) Integrate VR technology to create immersive learning experiences.
(ii) Offer virtual labs, field trips, and simulations to enhance practical learning in various disciplines.
(6) Subscription-Based Education Platforms:
(i) Introduce a subscription model where learners pay a monthly fee for access to a wide array of courses, resources, and support services.
(ii) Provide options for different subscription tiers based on the level of access and support desired.
(7) Community-Centric Learning Ecosystems:
(i) Foster a sense of community through online forums, clubs, and networking events.
(ii) Encourage peer-to-peer learning, collaboration, and mentorship within specialized communities of learners.

The goal of these digital universities would be to offer high-quality education, flexibility, and accessibility to learners worldwide. To replace traditional universities, these models would need to ensure not just quality education but also provide a sense of belonging, support services, and networking opportunities that are typically associated with physical institutions. Collaboration with industry partners, continuous innovation in technology, and a strong focus on user experience would be key in making these models successful on a global scale.

11. FUTURE EXPECTATIONS FROM UBIQUITOUS DIGITAL UNIVERSITIES :

Ubiquitous Digital Universities hold immense potential to revolutionize higher education globally. Here's a look at the future expectations and possibilities associated with their integration for the entire world:

(1) Universal Access and Inclusivity:

- **Global Reach:** Ubiquitous Digital Universities are expected to break down geographical barriers, providing access to education for individuals worldwide, especially in underserved or remote areas.
- **Inclusivity:** Catering to diverse learners, including those with disabilities, by offering adaptable learning environments and resources.

(2) Personalized and Adaptive Learning:

- **AI-Driven Customization:** Anticipated to offer tailored learning experiences, adapting to individual preferences, learning styles, and pace through AI-powered algorithms.
- **Competency-Based Education:** Shift towards competency-based models where learners progress based on demonstrated skills and knowledge rather than traditional timelines.

(3) Technological Integration:

- **AR/VR Immersion:** Enhanced integration of augmented and virtual reality for immersive learning experiences, virtual labs, and simulations.
- **IoT and Wearables:** Utilization of IoT devices and wearables to track learning patterns, monitor progress, and personalize educational experiences.

(4) Global Collaboration and Networking:

- **Cross-Cultural Engagement:** Facilitation of collaborative projects, discussions, and cultural exchanges among students and educators worldwide.
- **Industry Partnerships:** Collaboration with industry experts and organizations for real-world application of knowledge, internships, and research opportunities.

(5) Flexible Credentials and Recognition:

- **Blockchain-Based Credentials:** Widespread adoption of secure, portable, and universally recognized digital credentials using blockchain technology.
- **Micro-Credentials and Lifelong Learning:** Growth of micro-credentials and continuous learning modules to meet evolving skill demands and facilitate lifelong learning.

(6) Data-Driven Decision Making:

- **Analytics for Improvement:** Utilization of big data analytics to assess learning outcomes, optimize course structures, and enhance teaching methodologies for better student success rates.

(7) Affordability and Cost-Efficiency:

- **Reduced Costs:** Potential for decreased educational costs due to the elimination of physical infrastructure and the ability to scale educational resources efficiently.

(8) Adaptation to Future Trends:

- **Agility in Curriculum Development:** Rapid adaptation to emerging technologies, industry demands, and societal needs by swiftly updating and developing new courses and programs.

(9) Ethical Considerations and Digital Citizenship:

- **Ethical Use of Technology:** Emphasis on teaching digital citizenship, critical thinking, and ethical use of technology to navigate the digital world responsibly.

(10) Societal Impact and Global Development:

- **Empowerment and Societal Impact:** Enabling individuals worldwide to acquire skills, knowledge, and expertise, thus contributing to societal development and economic growth globally.

The overarching goal of Ubiquitous Digital Universities is to democratize education, making high-quality learning opportunities universally accessible, personalized, and adaptable to the evolving needs of learners in the digital age. This transformation is expected to have a profound impact on individuals, societies, economies, and the global landscape of education.

12. UBIQUITOUS DIGITAL UNIVERSITIES AS AN IDEAL EDUCATION SYSTEM :

Let's analyze, compare, and contrast Ubiquitous Digital Universities as an ideal education system by exploring their key characteristics and comparing them to traditional education systems [6-7].

12.1 Characteristics of Ubiquitous Digital Universities:

(1) Accessibility:

(i) Digital Accessibility: Available to learners worldwide, breaking down geographical barriers.
(ii) 24/7 Access: Learning materials are accessible anytime, anywhere, catering to diverse schedules and time zones.

(2) Personalization and Flexibility:

(i) Tailored Learning Paths: Adaptive learning systems catering to individual learning styles, pace, and preferences.
(ii) Flexible Learning: Ability to choose courses, schedules, and learning modalities based on personal needs.

(3) Technological Integration:

(i) Cutting-Edge Technology: Integration of AI, AR, VR, and IoT for immersive, interactive, and innovative learning experiences.
(ii) Blockchain Credentials: Secure, portable, and verifiable digital credentials ensuring authenticity and recognition.

(4) Global Collaboration and Networking:
(i) Cross-Cultural Interaction: Facilitation of global connections, collaborations, and cultural exchanges among students and educators.
(ii) Industry Partnerships: Opportunities for real-world applications, internships, and collaborations with industry experts.
(5) Continuous Improvement and Adaptability:
(i) Data-Driven Decision Making: Use of analytics to improve teaching methodologies, course structures, and learning outcomes.
(ii) Agility in Curriculum: Rapid adaptation to emerging trends, societal needs, and technological advancements.
(6) Affordability and Cost-Efficiency:
(i) Reduced Infrastructure Costs: Potential for reduced costs due to the absence of physical infrastructure and scalability of digital resources.

12.2 Contrasting with Traditional Education Systems:

(1) Accessibility and Geographical Constraints:
(i) Traditional Education: Restricted by geographical location, limiting access for many learners.
(ii) Ubiquitous Digital Universities: Overcome geographical barriers, providing access to education globally.
(2) Personalization and Flexibility:
(i) Traditional Education: Limited flexibility in schedules, rigid curriculum structures, and one-size-fits-all approach.
(ii) Ubiquitous Digital Universities: Offer personalized learning paths, adaptable schedules, and diverse learning modalities.
(3) Technological Integration and Innovation:
(i) Traditional Education: Slow adoption of technology, limited integration of advanced tools and interactive resources.
(ii) Ubiquitous Digital Universities: Embrace cutting-edge technology for immersive experiences, adaptive learning, and secure digital credentials.
(4) Global Collaboration and Networking:
(i) Traditional Education: Limited international exposure, fewer opportunities for global collaborations and networking.
(ii) Ubiquitous Digital Universities: Facilitate cross-cultural interactions, global collaborations, and industry partnerships on a larger scale.
(5) Continuous Improvement and Adaptability:
(i) Traditional Education: Slower to adapt to changes in industries, emerging technologies, and evolving needs.
(ii) Ubiquitous Digital Universities: Agile in curriculum development, quick to respond to emerging trends and societal needs.
(6) Cost-Efficiency and Accessibility:
(i) Traditional Education: High infrastructure costs, limitations in scaling resources, and higher tuition fees.
(ii) Ubiquitous Digital Universities: Potential for reduced costs, scalability, and greater affordability due to digital infrastructure.

Ubiquitous Digital Universities stand out as an ideal education system due to their global accessibility, personalized learning experiences, technological integration, global collaborations, adaptability, and potential cost-efficiency. They address many limitations of traditional education systems, offering a more inclusive, flexible, innovative, and future-ready approach to learning. However, challenges related to the digital divide, equitable access to technology, and ensuring quality in online education need to be addressed for their widespread success and adoption on a global scale.

12.3 SWOC analysis of Ubiquitous Digital Universities:

Considering their strengths, weaknesses, opportunities, and challenges (SWOC analysis) [118-120].

Strengths:

(1) Accessibility: UDUs can break down geographical, financial, and social barriers, reaching previously excluded populations through online platforms and flexible learning models. Imagine students in remote villages accessing world-class education, as shown in this image:
(2) Flexibility: Learners can study at their own pace, schedule, and location, balancing education with work, family, or other commitments. This opens doors for busy professionals and lifelong learners.
(3) Diversity: UDUs can offer a wider range of courses and programs, catering to diverse interests and career paths. Students can explore interdisciplinary fields and personalize their learning journeys.
(4) Cost-effectiveness: Online delivery can reduce overhead costs associated with physical campuses, potentially making education more affordable for both students and institutions.
(5) Innovation: UDUs can leverage technology to create immersive learning experiences, utilize AI for personalized learning, and develop new pedagogies tailored to the online environment.

Weaknesses:

(1) Digital divide: Unequal access to internet infrastructure and technology can exacerbate existing inequalities, leaving some populations behind. Bridging the digital divide requires significant investment and innovative solutions.
(2) Quality and accreditation: Maintaining high academic standards and robust quality assurance mechanisms for online programs is crucial to avoid diploma mills and ensure the value of UDU degrees.
(3) Socialization and isolation: The lack of physical interaction and community life in traditional universities can be a challenge for some students. Fostering online communities and providing support services is essential to address social and emotional needs.
(4) Technical challenges: Technical glitches, cybersecurity threats, and reliance on technology can disrupt learning and create frustrations for both students and faculty.
(5) Skills development: Certain practical skills and hands-on experiences might be difficult to replicate in a purely online environment. Finding ways to integrate practical learning into UDUs is crucial for certain fields.

Opportunities:

(1) Global collaboration: UDUs can promote intercultural understanding and knowledge sharing by bringing students and faculty from around the world together in virtual classrooms.
(2) Lifelong learning: Flexible and modular learning pathways can encourage continuous learning throughout life, adapting to changing career needs and personal interests.
(3) Personalized learning: AI-powered technologies can tailor learning experiences to individual strengths, weaknesses, and learning styles, maximizing student success.
(4) Skill development: UDUs can partner with industries and organizations to offer job-specific training and upskilling programs, addressing the evolving needs of the labor market.
(5) Innovation in pedagogy: The online environment opens doors for experimentation with new teaching methods, interactive learning tools, and immersive virtual experiences.

Challenges:

(1) Job market acceptance: Employers might initially hesitate to recognize UDU degrees, requiring UDUs to prove their quality and prepare graduates with relevant skills.
(2) Ethical considerations: Data privacy, algorithmic bias, and potential exploitation of learners need careful attention in online learning environments.
(3) Overreliance on technology: UDUs should strive for a balance between technology-driven learning and human interaction, ensuring that technology enhances, not replaces, the role of educators.
(4) Commercialization and commodification: The profit motive could compromise the quality and accessibility of education if not adequately regulated and focused on the public good.
(5) Government control and censorship: UDUs might face challenges in countries with restrictive internet policies or limitations on academic freedom.

12.4 Comparison to Traditional Universities with Ubiquitous Digital Universities:

Table 8: Comparison of Traditional Campus-based Universities and Ubiquitous Digital Universities

S. No.	Feature	Traditional Universities	Ubiquitous Digital Universities
1	Accessibility	Limited by location, cost, and admissions criteria	Potentially accessible to everyone, anywhere
2	Flexibility	Fixed schedules and course structures	Flexible learning pace and schedule
3	Diversity of courses	Wide range, but limited by campus resources	Vast and constantly expanding online offerings
4	Cost	Generally higher due to campus maintenance	Potentially lower with online delivery
5	Socialization and community	Strong on-campus community life	Requires intentional effort to build online communities
6	Hands-on learning	Emphasis on labs, fieldwork, and practical experiences	Can be challenging to replicate online, and requires creative solutions

13. COMPARISON OF DIGITAL UNIVERSITIES AND UBIQUITOUS DIGITAL UNIVERSITIES :

Let's compare Digital Universities and Ubiquitous Digital Universities across various dimensions:

Table 9: Comparison of Digital Universities and Ubiquitous Digital Universities

S. No.	Feature	Digital Universities	Ubiquitous Digital Universities
1	Composition	These institutions predominantly offer online education but may also have physical campuses. They blend traditional and digital learning methods, offering a mix of online and offline courses.	They operate entirely in the digital space, without physical campuses. All educational offerings, resources, and interactions occur in a virtual environment.
2	Scope	Often focus on providing select courses or programs online, supplementing traditional education. They might cater to specific demographics or offer a limited range of disciplines.	Offer a comprehensive array of programs across various disciplines, catering to a global audience. They aim for inclusivity and accessibility, covering diverse fields and accommodating different learner needs.
3	Structure	May have a hybrid structure, incorporating both online and physical infrastructure. They might have traditional academic departments alongside online learning platforms.	Built entirely on a digital infrastructure, utilizing AI-driven systems, virtual classrooms, and online collaboration tools without physical facilities.
4	Type of Service	Provide a mix of online and offline services. This might include in-person exams, occasional physical lectures, or access to campus resources.	Offer entirely digital services encompassing lectures, exams, assessments, and student support, available remotely and accessible worldwide.
5	Business Model	Often adopt a mix of tuition fees, subscription models for online resources, and occasional revenue from physical campus facilities.	Rely primarily on digital subscription models, partnerships with corporations for tailored programs, and lifelong learning memberships for revenue.

Digital Universities, while incorporating online elements, typically have a hybrid structure, offering a blend of digital and physical educational services. They often cater to specific segments or offer select

online courses alongside traditional programs. In contrast, Ubiquitous Digital Universities are entirely digital entities, offering a comprehensive range of courses, services, and support exclusively in the online space. They prioritize global accessibility and inclusivity, leveraging technology to deliver education without physical boundaries.

Both models cater to the evolving landscape of education, but the Ubiquitous Digital University concept represents a more radical shift toward a fully digital educational ecosystem, transcending traditional educational boundaries entirely.

14. ESSENTIAL TECHNOLOGICAL DEVELOPMENTS TO REALIZE OPTIMUM UBIQUITOUS DIGITAL UNIVERSITIES :

Essential Technological Advancements Required to Realize Optimum Ubiquitous Digital Universities for the entire World:

Creating an optimum Ubiquitous Digital University for the entire world requires leveraging cutting-edge technologies to overcome barriers and provide seamless, high-quality education. Here are essential technological advancements necessary to realize this vision:

(1) Enhanced Connectivity:

(i) 5G and Beyond: Wide-scale adoption of high-speed, low-latency internet connectivity to ensure smooth access to online resources for learners worldwide.

(ii) Satellite Internet: Utilization of satellite-based internet services to reach remote and underserved areas lacking terrestrial infrastructure.

(2) AI-Powered Personalization:

(i) Adaptive Learning Systems: AI-driven algorithms to personalize learning paths, content recommendations, and assessments tailored to individual student needs.

(ii) AI-Assisted Tutoring: AI-powered virtual tutors and assistants providing personalized support to students.

(3) Immersive Technologies:

(i) Augmented Reality (AR) and Virtual Reality (VR): Integration of AR/VR for immersive learning experiences, virtual labs, simulations, and field trips.

(ii) Haptic Feedback: Advancements in haptic technology for realistic tactile experiences in virtual environments.

(4) IoT Integration:

(i) Wearable Devices: Integration of IoT-enabled wearables to track learning patterns, monitor progress, and offer personalized learning recommendations.

(ii) Smart Learning Environments: IoT devices in educational spaces for real-time monitoring, adaptive lighting, temperature control, etc.

(5) Blockchain for Security and Credentials:

(i) Secure Digital Credentials: Adoption of blockchain technology for secure, tamper-proof, and universally recognized digital credentials.

(ii) Blockchain-Based Transactions: Utilization of blockchain for secure financial transactions and data integrity.

(6) Big Data Analytics:

(i) Learning Analytics: Utilization of big data analytics to analyze learning patterns, assess student performance, and optimize teaching strategies in real-time.

(ii) Predictive Analytics: Predictive models to identify student challenges early and provide timely interventions.

(7) Cybersecurity Measures:

(i) Advanced Security Protocols: Implementation of robust cybersecurity measures to safeguard sensitive data, prevent cyber threats, and ensure privacy in online education.

(8) Accessibility Tools:

(ii) Accessibility Technologies: Development of tools and features ensuring inclusivity for individuals with disabilities, including screen readers, captioning, and adaptive interfaces.

(9) Cloud-Based Infrastructure:

(ii) Scalable Infrastructure: Cloud-based systems offering scalability, reliability, and cost-effectiveness in delivering educational content and services.

(10) Interoperability and Standards:

(ii) Tech Standards: Establishment of interoperability standards enabling seamless integration of various technologies and platforms to ensure compatibility and smooth interactions.

(11) Ethical AI and Data Privacy:

(i) Ethical Guidelines: Development of ethical frameworks for AI and data usage, ensuring fairness, transparency, and responsible handling of student data.

(12) Continuous Innovation and R&D:

(i) Investment in R&D: Continuous investment in research and development to stay abreast of emerging technologies, methodologies, and pedagogical advancements.

Leveraging these technological advancements can help in realizing the vision of optimum Ubiquitous Digital Universities, enabling comprehensive, personalized, and globally accessible education for learners across the world. However, it's essential to address infrastructural disparities, ensure equitable access to technology, and prioritize ethical considerations while implementing these advancements.

15. ANTICIPATED CHARACTERISTICS OF THE IDEAL EDUCATION SYSTEM? HOW CAN UBIQUITOUS DIGITAL UNIVERSITIES ACT AS AN IDEAL EDUCATION SYSTEM?

The characteristics of an ideal education system encompass several key elements that contribute to effective learning, personal growth, and societal development [6-7, 121-122]. Let's outline these characteristics and explore how Ubiquitous Digital Universities align with them:

15.1 Characteristics of an Ideal Education System:

(1) Accessibility and Inclusivity:

- **Equal Access:** Available to all, irrespective of geographical location, socio-economic status, or physical abilities.
- **Inclusivity:** Addresses diverse learning needs and caters to various learning styles and abilities.

(2) Personalization and Flexibility:

- Tailored Learning: Adaptable to individual student needs, preferences, and pace of learning.
- Flexible Options: Offers varied learning pathways, schedules, and modes of instruction.

(3) Quality Teaching and Learning:

- **High-Quality Instruction:** Provides engaging, interactive, and well-designed learning experiences.
- **Qualified Educators:** Employs skilled and competent teachers or facilitators.

(4) Technological Integration and Innovation:

- Advanced Tools: Utilizes modern technology for enhanced learning experiences, interactive content, and innovative teaching methods.
- Continuous Innovation: Embraces advancements in technology to improve learning outcomes continually.

(5) Global Collaboration and Networking:

- **Cross-Cultural Interaction:** Fosters global connections, collaborations, and cultural understanding among students and educators.
- **Industry Partnerships:** Offers opportunities for real-world applications and collaborations with industry experts.

(6) Adaptability and Lifelong Learning:

- **Flexibility in Curriculum:** Adapts quickly to changes in industries, emerging trends, and societal needs.
- **Encourages Lifelong Learning:** Instills a culture of continuous learning beyond formal education.

(7) Assessment and Recognition:

- **Fair Assessment:** Uses diverse assessment methods to evaluate understanding and skills effectively.
- **Recognized Credentials:** Offers credible and universally recognized certifications or credentials.

15.2 Ubiquitous Digital Universities as an Ideal Education System:

(1) Accessibility and Inclusivity:

- **Ubiquitous Reach:** Provides universal access to education, overcoming geographical barriers and ensuring inclusivity for diverse learners.

(2) Personalization and Flexibility:

- **Tailored Learning Paths:** Offers adaptive learning experiences, personalized content, and flexible schedules to cater to individual needs.

(3) Technological Integration and Innovation:

- **Cutting-Edge Technology:** Utilizes AI, AR, VR, and IoT for immersive learning, advanced simulations, and secure digital credentials.
- **Continuous Innovation:** Evolves rapidly to incorporate new technologies and enhance learning experiences continually.

(4) Global Collaboration and Networking:

- Cross-Cultural Engagement: Facilitates global connections, collaborations, and networking opportunities among students and educators worldwide.

(5) Adaptability and Lifelong Learning:

- Agility in Curriculum: Swiftly adapts to emerging trends, industry demands, and societal changes, offering continuous learning modules.

(6) Assessment and Recognition:

- Blockchain Credentials: Ensures secure, portable, and universally recognized digital credentials using blockchain technology.

Ubiquitous Digital Universities align closely with the characteristics of an ideal education system by offering accessibility, personalization, technological integration, global collaboration, adaptability, and credible recognition of credentials. They address several limitations of traditional education systems, making learning more inclusive, flexible, innovative, and globally accessible. While challenges like the digital divide and ensuring quality in online education persist, Ubiquitous Digital Universities have the potential to evolve into an ideal education system that caters to the diverse needs of learners worldwide.

16. ABCD ANALYSIS OF UBIQUITOUS DIGITAL UNIVERSITIES :

16.1 ABCD Stakeholders Analysis of Ubiquitous Digital Universities:

The advantages and benefits of Ubiquitous Digital Universities from different stakeholders' perspectives:

Table 10: Advantages and Benefits of Ubiquitous Digital Universities

S. No.	Key Construct	Description
Advantages of Ubiquitous Digital Universities For Students:		
1	Global Accessibility	Students have access to education from anywhere in the world, eliminating geographical barriers to learning.
2	Flexible Learning Environment	Self-paced learning accommodates various schedules and allows students to study at their convenience.
3	Diverse Course Offerings	Access to a wide array of programs and disciplines, enabling personalized education.
4	Cost-Efficiency	Reduced expenses on commuting, accommodation, and physical resources.
5	Enhanced Interactivity	Engaging platforms and multimedia resources enhance understanding and collaboration among students.
Advantages of Ubiquitous Digital Universities For Educators:		
1	Wider Reach	Ability to teach a global audience, contributing to diverse learning experiences and global connections.
2	Innovative Teaching Tools	Access to cutting-edge technologies for interactive and effective instruction.
3	Flexibility in Instruction	Customization of content and assessments to cater to diverse learner needs and preferences.
4	Professional Development	Opportunities to enhance digital teaching skills and adapt to evolving educational trends.

5	Collaborative Teaching Environments	Platforms facilitating collaboration among educators for shared resources and strategies.
Benefits of Ubiquitous Digital Universities for Students:		
1	Accessibility and Inclusivity	Provides education to students who may face physical, financial, or geographical barriers to traditional universities.
2	Flexibility and Convenience	Students can balance education with work or personal commitments, fostering a healthy work-life-study balance.
3	Customized Learning Experience	Tailored courses and adaptive learning tools cater to individual learning styles and paces.
4	Enhanced Engagement	Interactive multimedia resources and diverse learning methods keep students engaged and motivated.
5	Networking Opportunities	Platforms facilitating global connections and collaborations among students from diverse backgrounds.
Benefits of Ubiquitous Digital Universities for Educators:		
1	Professional Growth	Opportunities for educators to explore innovative teaching methods and enhance their digital teaching capabilities.
2	Global Impact	The ability to contribute to the education of a global student body and make a worldwide impact in education.
3	Efficient Teaching Tools	Access to platforms and tools that streamline teaching tasks, assessments, and communication with students.
4	Research and Collaboration	Opportunities for collaborative research and interdisciplinary collaborations on a global scale.
5	Community Building	Cultivating a global community of learners and educators, fostering cross-cultural interactions and understanding.

Ubiquitous Digital Universities offer a myriad of advantages and benefits to students, educators, and the educational ecosystem as a whole, fostering inclusivity, flexibility, innovation, and global connectivity in education.

let's explore the constraints and disadvantages of Ubiquitous Digital Universities from various stakeholders' perspectives:

Table 11: Constraints and Disadvantages of Ubiquitous Digital Universities

S. No.	Key Construct	Description
Constraints of Ubiquitous Digital Universities For Students:		
1	Technological Barriers	Limited access to high-speed internet and digital devices can hinder the learning experience for some students.
2	Isolation and Lack of Social Interaction	Lack of physical interaction with peers and educators may lead to a sense of isolation or reduced socialization.
3	Self-Discipline Challenges	Self-paced learning might be challenging for students who require more structured guidance and accountability.
4	Digital Literacy Requirements	Students with limited digital literacy might struggle to navigate complex online learning platforms.
5	Assessment Integrity	Ensuring the integrity of assessments and preventing cheating in an online environment can pose challenges.
Constraints of Ubiquitous Digital Universities For Educators:		
1	Technology Adaptation	Educators may face challenges in adapting to new digital teaching tools and platforms.
2	Limited Personal Connection	Difficulty in establishing personal connections and understanding students' individual needs in a virtual setting.
3	Workload and Time Management	Balancing teaching responsibilities and digital course development can be time-consuming.

4	Ensuring Engagement	Keeping students engaged and motivated in an entirely digital environment can be challenging.
5	Assessment Validity	Ensuring the validity and reliability of assessments in an online setting might pose difficulties.
Disadvantages of Ubiquitous Digital Universities For Students:		
1	Lack of Hands-On Experience	Some fields require practical experience that might be challenging to replicate in a digital environment.
2	Reduced Networking Opportunities	Limited face-to-face interactions may hinder networking and mentorship opportunities.
3	Distractions and Interruptions	Home-based learning might be susceptible to distractions and interruptions affecting concentration.
4	Potential for Academic Isolation	Lack of physical interaction might lead to a feeling of detachment from the academic community.
5	Limited Access to Physical Resources	Lack of access to physical libraries, labs, or equipment might affect certain courses.
Disadvantages of Ubiquitous Digital Universities For Educators:		
1	Loss of Personal Touch	Inability to build personal relationships and rapport with students in an online setting.
2	Technological Challenges	Technical issues or platform failures might disrupt the teaching process.
3	Increased Workload	Developing and managing digital content may require more effort and time compared to traditional teaching methods.
4	Reduced Control Over Learning Environment	Less control over students' environment may affect teaching effectiveness.
5	Assessment Security	Challenges in ensuring the security and integrity of assessments in an online setting.

Ubiquitous Digital Universities, while offering significant advantages, also pose challenges and drawbacks for both students and educators, including issues related to technology, engagement, assessment, and social interaction in a fully digital learning environment.

17. FINDINGS AS POSTULATES OF UBIQUITOUS DIGITAL UNIVERSITIES :

Based on the above analysis, comparison, and evaluation, ten postulates are developed outlining the advantages and opportunities for global higher education through Ubiquitous Digital Universities from various stakeholders' perspectives:

(1) Global Accessibility for All Stakeholders:
Ubiquitous Digital Universities ensure unfettered access to quality education for diverse demographics worldwide, transcending geographical, economic, and physical barriers.

(2) Personalized Learning Experience:
Tailored programs, adaptive learning models, and interactive platforms foster a personalized educational journey, catering to individual student needs and learning styles.

(3) Enhanced Collaboration and Networking:
Facilitates global networking opportunities, encouraging collaboration, cultural exchange, and interdisciplinary interactions among students, educators, and professionals worldwide.

(4) Flexibility in Learning and Teaching:
Offers flexible learning schedules and modes while accommodating diverse teaching methodologies, enabling a dynamic and adaptable educational environment.

(5) Innovation and Technological Advancements:
Acts as a catalyst for innovation in educational technology, driving the adoption of cutting-edge tools, AI-driven learning, and immersive experiences.

(6) Inclusivity and Diversity Nurturance:
Fosters an inclusive environment by accommodating diverse perspectives, cultures, and backgrounds, promoting a sense of global citizenship and understanding.

(7) Continuous Professional Development:

Provides opportunities for educators to continually enhance their teaching skills, adapt to evolving pedagogies, and engage in lifelong learning initiatives.

(8) Real-World Application and Practical Learning:

Integrates practical experiences through virtual labs, simulations, and industry collaborations, ensuring real-world applicability of acquired knowledge.

(9) Data-Driven Insights and Student Support:

Utilizes analytics to offer personalized support, track student progress, and identify intervention strategies, ensuring student success and well-being.

(10) Sustainable and Scalable Educational Ecosystem:

Facilitates a scalable and environmentally friendly educational ecosystem, reducing carbon footprints and promoting sustainable education accessible to all.

These postulates highlight the transformative potential of Ubiquitous Digital Universities in revolutionizing global higher education, emphasizing accessibility, customization, collaboration, innovation, and sustainability for stakeholders across the educational spectrum.

18. ACCEPTANCE OF UBIQUITOUS DIGITAL UNIVERSITIES FROM TECH-GENERATIONS :

Based on Trend analysis, which Tech-Generation (out of Generation Z and Generation Alpha/A) is more inclined to accept online higher education from a Ubiquitous digital University?

Generation Z and Generation Alpha both exhibit a high degree of comfort and familiarity with technology [123], but there are some nuanced differences that might influence their inclinations toward accepting online higher education from a Ubiquitous Digital University.

18.1 Generation Z (Born between mid-1995s to early 2015s):

(1) Tech-Savvy Upbringing: Generation Z grew up in the digital age, experiencing the rise of social media, smartphones, and online platforms. They are highly adept at using technology for various purposes, including education.

(2) Adaptability to Online Learning: This generation has already experienced online learning to some extent, especially during recent educational disruptions like the COVID-19 pandemic. They might be more open to and adaptable in an online learning environment.

(3) Value for Flexibility and Convenience: Generation Z values flexibility and convenience in their lifestyle choices, preferring options that allow them to balance multiple commitments.

18.2 Generation Alpha (Born from the early 2015s onward):

(1) Digital Natives from Birth: Generation Alpha is the first generation born entirely in the 21st century and has never known a world without advanced digital technology. They are truly digital natives.

(2) Natural Integration with Technology: Growing up in a world where technology is seamlessly integrated into daily life, Generation Alpha might have an even greater affinity and comfort with online learning environments.

(3) Potential Preference for Interactive and Immersive Learning: Generation Alpha might lean towards educational platforms that offer more interactive and immersive experiences, leveraging technologies like augmented reality (AR) and virtual reality (VR).

18.3 Comparison:

While both generations exhibit a high degree of comfort with technology, Generation Alpha might be more inclined towards accepting online higher education from a Ubiquitous Digital University. They are true digital natives, born into a world where technology is omnipresent and seamlessly integrated into their lives. This generation's familiarity and comfort with advanced technologies from an early age might make them more receptive to innovative online learning experiences that leverage cutting-edge tools and immersive platforms.

However, it's important to note that individual preferences and experiences within each generation can vary significantly, and factors such as personal learning styles, preferences, and the quality of the online education offered will also influence their acceptance and uptake of online higher education from Ubiquitous Digital Universities.

19. POTENTIAL SOLUTIONS OR MITIGATION STRATEGIES :

The following tables (12 & 13) provide some of the suggestions for potential solutions or mitigation strategies for converting conventional campus-based universities into (i) digital and (ii) ubiquitous digital universities:

Table 12: Potential solutions or mitigation strategies for converting conventional campus-based universities into Digital Universities

S. No.	Key Strategies	Description
1	Develop Robust IT Infrastructure	Ensure a strong and scalable IT infrastructure to support online learning platforms, secure data storage, and high-speed internet access for all users.
2	Adopt Comprehensive Learning Management Systems (LMS)	Implement LMS that offers a wide range of functionalities, including course management, student tracking, online assessments, and virtual classrooms.
3	Faculty Training and Development	Provide extensive training programs for faculty to develop digital teaching skills and effectively use online tools and platforms.
4	Digital Curriculum Development	Redesign curricula to be digital-friendly, incorporating multimedia content, interactive activities, and virtual labs where applicable.
5	Student Support Services Online	Offer online student support services, including counseling, academic advising, tutoring, and career services, to ensure students receive comprehensive support.
6	Ensure Accessibility and Inclusivity	Design digital platforms and content to be accessible to all students, including those with disabilities, by following accessibility standards and guidelines.
7	Data Security and Privacy	Implement stringent data security measures to protect student and faculty information, ensuring compliance with relevant regulations such as GDPR.
8	Digital Libraries and Resources	Provide access to a wide range of digital libraries, e-books, academic journals, and other online resources to support learning and research.
9	Virtual Collaboration Tools	Use tools like video conferencing, collaborative documents, and discussion forums to facilitate interaction and collaboration among students and faculty.
10	Feedback and Continuous Improvement	Collect regular feedback from students and faculty to continuously improve digital learning experiences and address any issues promptly.

Table 13: Potential solutions or mitigation strategies for converting conventional campus-based universities into Ubiquitous Digital Universities

S. No.	Key Strategies	Description
1	Cloud-Based Solutions	Utilize cloud computing to offer flexible and scalable access to learning resources, ensuring availability anytime and anywhere.
2	Mobile Learning Platforms	Develop mobile-friendly learning platforms and applications to enable students to access course materials, participate in discussions, and complete assignments on their smartphones or tablets.
3	Microlearning and On-Demand Content	Offer microlearning modules and on-demand content that allow students to learn in small, manageable segments, fitting their studies into busy schedules.
4	Personalized Learning Paths	Use AI and data analytics to create personalized learning paths based on individual student needs, preferences, and progress.

5	Global Collaboration Networks	Establish global networks for collaboration, allowing students and faculty to engage with peers and experts worldwide through virtual exchange programs and online conferences.
6	Real-Time Analytics and Adaptive Learning	Implement real-time analytics to monitor student performance and provide adaptive learning experiences that adjust to their pace and understanding.
7	Augmented and Virtual Reality	Integrate AR and VR technologies to create immersive learning experiences, such as virtual field trips, simulations, and interactive labs.
8	Wearable Technology	Explore the use of wearable technology for hands-free learning experiences, real-time feedback, and enhanced engagement in interactive content.
9	Community and Peer Learning Platforms	Create online communities and peer learning platforms where students can connect, collaborate, and learn from each other outside of traditional course structures.
10	Sustainable and Scalable Models	Develop sustainable and scalable models for digital education that can be adapted and expanded as technology evolves and the university's needs change.

20. CONCLUSION :

In the pursuit of an ideal education system, the exploration of ubiquitous digital universities (UDUs) emerges as a promising frontier, challenging the traditional higher education model. Throughout this scholarly expedition, a comprehensive overview of digital universities and their multifaceted functions has illuminated the transformative potential inherent in these online platforms. The envisioned ideal education system encompasses features that transcend conventional boundaries, fostering inclusivity, adaptability, and lifelong learning.

The synthesis of literature and rigorous examination of digital universities have delineated the defining characteristics of an ideal education system. Such a system embodies accessibility, flexibility, and a holistic approach to learning, empowering individuals to engage in personalized educational journeys tailored to their needs and aspirations. Moreover, the concept of ubiquitous digital universities has been dissected, unveiling a realm where technology seamlessly integrates with education, transcending physical limitations to offer a pervasive learning environment.

Through meticulous evaluation and comparison, the components, infrastructure, and quality requisites of digital universities and ubiquitous digital universities have been scrutinized. The SWOC analysis and ABCD assessment from stakeholders' perspectives have shed light on the nuanced advantages, benefits, constraints, and disadvantages inherent in these educational paradigms. Such analyses underscore the diverse landscape of opportunities and challenges embedded within digital and ubiquitous digital universities.

Furthermore, understanding the factors influencing the acceptance of UDUs among tech-savvy generations has emerged as a pivotal consideration. Recognizing these factors is crucial in shaping the future landscape of education, ensuring alignment with the expectations and preferences of contemporary learners.

In conclusion, this scholarly pursuit offers a compelling narrative envisioning the convergence of technology, education, and innovation within the realm of ubiquitous digital universities. The postulates proposed for UDU quality requirements, derived from stakeholders' perspectives, serve as guiding principles to steer these digital entities toward excellence. As we navigate this transformative landscape, the evolution of digital universities towards ubiquity holds the potential to redefine the contours of an ideal education system, fostering a dynamic and inclusive learning environment for generations to come.

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REFERENCES :

[1] Jones, V., & Jo, J. H. (2004, December). Ubiquitous learning environment: An adaptive teaching system using ubiquitous technology. In *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (Vol. 468, p. 474). Google Scholar↗

[2] Aithal, P. S., & Aithal, S. (2023). Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(2), 102-133. Google Scholar↗

[3] Aithal, P. S., & Aithal, S. (2016). Impact of on-line education on higher education system. *International Journal of Engineering Research and Modern Education (IJERME)*, *1*(1), 225-235. Google Scholar↗

[4] Peters, M. A., & Jandrić, P. (2018). Peer production and collective intelligence as the basis for the public digital university. *Educational Philosophy and Theory*, *50*(13), 1271-1284. Google Scholar↗

[5] Aithal, P. S., & Aithal, S. (2019). Building world-class universities: Some insights & predictions. *Building World-Class Universities: Some Insights & Predictions. International Journal of Management, Technology, and Social Sciences (IJMTS)*, *4*(2), 13-35. Google Scholar↗

[6] Aithal, P. S., & Aithal, S. (2014, July). Ideal education system and its realization through online education model using mobile devices. In *Proceedings of IISRO Multi Conference* (pp. 140-146). Google Scholar↗

[7] Aithal, P. S. and Aithal, Shubhrajyotsna, An Innovative Education Model to Realize Ideal Education System (2015). International Journal of Scientific Research and Management (IJSRM), 3,(3), 2464-2469. Google Scholar↗

[8] Allen, I. E., & Seaman, J. (2017). Digital Compass Learning: Distance Education Enrollment Report 2017. *Babson survey research group*. Google Scholar↗

[9] Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5-22. Google Scholar↗

[10] Rani, G., Kaur, P., Sharma, T., & Sharma, A. (2021, October). Digital education challenges and opportunities. In *2021 6th International Conference on Signal Processing, Computing and Control (ISPCC)* (pp. 197-202). IEEE. Google Scholar↗

[11] Picciano, A. G. (2019). Theories and frameworks for online education: Seeking an integrated model. Online Learning, 23(3), 166-190. Google Scholar↗

[12] Moore, M. G., & Kearsley, G. (2011). Distance education: A systems view of online learning. Cengage Learning. Google Scholar↗

[13] Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. US Department of Education. Google Scholar↗

[14] Anderson, T. (2008). The theory and practice of online learning. AU Press. Google Scholar↗

[15] Nykyporets, S. S. (2023). Digital technologies and academic integrity: exploring challenges and opportunities in the contemporary educational landscape. *Матеріали науково-практичного семінару «Академічна доброчесність: практичний досвід». Вип. 4: 75-90.* Google Scholar↗

[16] Van Deursen, A. J. A. M., & Van Dijk, J. A. G. M. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. New Media & Society, 21(2), 354-375. Google Scholar↗

[17] Graham, C. R. (2013). Emerging practice and research in blended learning. In Moore, M. G. (Ed.), Handbook of Distance Education (3rd ed.), Routledge. Google Scholar↗

[18] Rozhkova, D., Rozhkova, N., & Blinova, U. (2019, October). Digital universities in Russia: prospects and problems. In *The 2018 International Conference on Digital Science* (pp. 252-262). Cham: Springer International Publishing. Google Scholar↗

[19] Coccoli, M., Guercio, A., Maresca, P., & Stanganelli, L. (2014). Smarter universities: A vision for the fast changing digital era. *Journal of Visual Languages & Computing*, *25*(6), 1003-1011. Google Scholar↗

[20] Khalid, J., Ram, B. R., Soliman, M., Ali, A. J., Khaleel, M., & Islam, M. S. (2018). Promising digital university: A pivotal need for higher education transformation. *International Journal of Management in Education*, *12*(3), 264-275. Google Scholar↗

[21] Maltese, V., & Giunchiglia, F. (2017). Foundations of digital universities. *Cataloging & Classification Quarterly*, *55*(1), 26-50. Google Scholar↗

[22] Sitnicki, M. (2018). Development of a model of digital research universities. *Baltic journal of economic studies*, *4*(1), 311-318. Google Scholar↗

[23] Cunha, M. N., Chuchu, T., & Maziriri, E. (2020). Threats, challenges, and opportunities for open universities and massive online open courses in the digital revolution. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(12), 191-204. Google Scholar↗

[24] Sheail, P. (2018). The digital university and the shifting time–space of the campus. *Learning, Media and Technology*, *43*(1), 56-69. Google Scholar↗

[25] Aithal, P. S., & Aithal, S. (2023). How to Empower Educators through Digital Pedagogies and Faculty Development Strategies. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(4), 139-183. Google Scholar↗

[26] Peters, M. A., & Jandrić, P. (2018). Peer production and collective intelligence as the basis for the public digital university. *Educational Philosophy and Theory*, *50*(13), 1271-1284. Google Scholar↗

[27] Oleksiienko, A., Kotendzhy, L., Kyryllova, Y., Kaminskyy, V., & Viesova, O. (2022). An analysis of the digital university phenomenon: dilemmas, new opportunities. *Futurity Education*, *2*(4), 18-25. Google Scholar↗

[28] Akhmetshin, E. M., Kozachek, A. V., Vasilev, V. L., Meshkova, G. V., & Mikhailova, M. V. (2021). Development of Digital University Model in Modern Conditions: Institutional Approach. *Digital Education Review*, *40*, 17-32. Google Scholar↗

[29] Mosteanu, N. R. (2020). Digital university campus–change the education system approach to meet the 21st century needs. *European Journal of Human Resource Management Studies*, *4*(4). Google Scholar↗

[30] Sheail, P. (2018). Temporal flexibility in the digital university: Full-time, part-time, flexitime. *Distance Education*, *39*(4), 462-479. Google Scholar↗

[31] Zozie, P., & Chawinga, W. D. (2018). Mapping an open digital university in Malawi: Implications for Africa. *Research in Comparative and International Education*, *13*(1), 211-226. Google Scholar↗

[32] Gravett, K., Ajjawi, R., & O Shea, S. (2023). Topologies of belonging in the digital university. *Pedagogy, culture & society*, 1-15. Google Scholar↗

[33] Pacholak, A. (2020). Digital university from student perspective: a step forward. *European Journal of Higher Education IT*, *8*(2), 1-10. Google Scholar↗

[34] Neadsuebsai, P., & Karaked, N. (2020). Factors affecting university development into a digital university. Google Scholar↗

[35] Arasteh, H., Naveh Ebrahim, A., Abbassian, H., & Khabare, K. (2019). Developing Digital University model. *Iranian Higher Education*, *11*(4), 1-36. Google Scholar↗

[36] Yu, D. A. (2021). Transformation of communications in the new (modern) digital university in the context of digital globalization. *Перспективы науки и образования*, (6 (54)), 69-83. Google Scholar↗

[37] Doroshenko, T. N., Kalpinskaya, O. E., & Makarova, E. A. (2021, February). Digital university models in the process of modern transformation of higher education. In *International Scientific and Practical Conference "Russia 2020-a new reality: economy and society"(ISPCR 2020)* (pp. 361-364). Atlantis Press. Google Scholar↗

[38] Johnston, B., MacNeill, S., Smyth, K., Johnston, B., MacNeill, S., & Smyth, K. (2018). Exploring the digital university: Developing and applying holistic thinking. *Conceptualising the Digital University: The Intersection of Policy, Pedagogy and Practice*, 39-60. Google Scholar↗

[39] Marin, L., & Marin, L. (2021). The digital university. *On the possibility of a digital university: Thinking and mediatic displacement at the university*, 57-77. Google Scholar↗

[40] Akhmetshin, E., Vasilev, V., Zekiy, A., & Zakieva, R. (2021). Massive open online courses as the initial stage of development of a digital university. *Journal of Social Studies Education Research*, *12*(2), 126-151. Google Scholar↗

[41] Gorbunova, N. V., Timirgaleeva, R. R., & Khrulyova, A. A. (2021). Integrated model formation for the digital university development. In *SHS Web of Conferences* (Vol. 113, p. 00024). EDP Sciences. Google Scholar↗

[42] Arasteh, H., Naveh Ebrahim, A., Abbasian, H., & Khabare, K. (2021). Developing the policy model of digital university (qualitative approach). *Journal of Management and Planning In Educational System*, *14*(2), 47-72. Google Scholar↗

[43] Bannykh, G. A., & Kostina, S. N. (2022). Digital university: Approaches to the concept definition. *The Education and science journal*, *24*(10), 10-32. Google Scholar↗

[44] Aithal, P. S., & Aithal, S. (2016). Impact of on-line education on higher education system. *International Journal of Engineering Research and Modern Education (IJERME)*, *1*(1), 225-235. Google Scholar↗

[45] Yordanova, L., Branekova, D., & Kiryakova, G. (2019). Integration of alternative education models in university e-learning. *ARPHA Proceedings*, *1*, 1013-1026. Google Scholar↗

[46] Fleischmann, K. (2010). The POOL Model: Foregrounding an alternative learning and teaching approach for digital media design in higher education. *Art, Design & Communication in Higher Education*, *9*(1), 57-73. Google Scholar↗

[47] Pavla, S., Hana, V., & Jan, V. (2015). Blended learning: Promising strategic alternative in higher education. *Procedia-social and behavioral sciences*, *171*, 1245-1254. Google Scholar↗

[48] Castañeda, L., & Selwyn, N. (2018). More than tools? Making sense of the ongoing digitizations of higher education. *International Journal of Educational Technology in Higher Education*, *15*(1), 1-10. Google Scholar↗

[49] Staley, D. J. (2019). *Alternative universities: Speculative design for innovation in higher education*. JHU Press. Google Scholar↗

[50] Hazemi, R., Hailes, S., & Wilbur, S. (Eds.). (2012). *The digital university: Reinventing the academy*. Springer Science & Business Media. Google Scholar↗

[51] Williamson, B. (2018). The hidden architecture of higher education: building a big data infrastructure for the 'smarter university'. *International Journal of Educational Technology in Higher Education*, *15*(1), 1-26. Google Scholar↗

[52] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2015). A new ABCD technique to analyze business models & concepts. *International Journal of Management, IT and Engineering*, *5*(4), 409-423. Google Scholar↗

[53] Aithal, P. S. (2016). Study on ABCD analysis technique for business models, business strategies, operating concepts & business systems. *International Journal in Management and Social Science*, *4*(1), 95-115. Google Scholar↗

[54] Kumar, S., Krishna Prasad, K., & Aithal, P. S., (2023). Tech-Business Analytics – a Review based New Model to Improve the Performances of Various Industry Sectors. *International Journal of Applied Engineering and Management Letters (IJAEML), 7*(1), 67-91. Google Scholar↗

[55] Pradeep, M. D., Adithya, K. M., & Aithal, P. S., (2023). Indigenous Distinctive Innovations to Achieve its Vision, Priority and Thrust – A Case Study of Srinivas University. *International Journal of Case Studies in Business, IT, and Education (IJCSBE),* *7*(1), 36-61. Google Scholar↗

[56] Aithal, P. S. (2023). Advances and New Research Opportunities in Quantum Computing Technology by Integrating it with Other ICCT Underlying Technologies. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(3), 314-358. Google Scholar↗

[57] Aithal, P. S., (2023). Super-Intelligent Machines - Analysis of Developmental Challenges and Predicted Negative Consequences. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(3), 109-141. Google Scholar↗

[58] Kumar, S., & Kunte, R. S. R. (2023). ABCD Analysis of Industries Using High-Performance Computing. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *7*(2), 448-465. Google Scholar↗

[59] Nayana, K., & Manjula, K. T. (2023). Colonialism and Cross-Cultural Ties in Sea of Poppies. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *8*(3), 220-228. Google Scholar↗

[60] Rameesa, K., & Veeramanju, K. T. (2023). Analysis of Software Industry: Natural Language Processing Approach. *Scope Journal, 13*(02), 743-752. Google Scholar↗

[61] Maheswary, B. U., & Lourdusamy, A. (2023). An Evaluation of the Partition Narratives: A Special Focus on Psychological Trauma. *International Journal of Philosophy and Languages (IJPL)*, *2*(1), 18-26. Google Scholar↗

[62] Aithal, S., & Aithal, P. S. (2023). Importance of Circular Economy for Resource Optimization in Various Industry Sectors–A Review-based Opportunity Analysis. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(2), 191-215. Google Scholar↗

[63] Mishra, N., & Aithal, P. S. (2023). Ancient Indian Education: It's Relevance and Importance in the Modern Education System. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *7*(2), 238-249. Google Scholar↗

[64] Naresh Ramdas Kini H., Pai, A. R. (2023). HR Practices of Ultratech Cement Limited: A Case Study. *EPRA International Journal of Multidisciplinary Research (IJMR)*, *9*(8), 87-94. Google Scholar↗

[65] Nair, S. B., & Aithal, P. S. (2023). Impact of Digital Transformation Marketing Strategies on Homepreneur Business Practices in Kerala. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *8*(2), 121-132. Google Scholar↗

[66] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Application of ABCD Analysis Framework on Private University System in India. *International journal of management sciences and business research*, *5*(4), 159-170. Google Scholar↗

[67] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). ABCD analysis of Stage Model in Higher Education. *International Journal of Management, IT and Engineering*, *6*(1), 11-24. Google Scholar↗

[68] Aithal, P. S. (2021). Analysis of systems & technology using ABCD framework. *Chapter*, *8*(1), 345-385. Google Scholar↗

[69] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Analysis of NAAC Accreditation System using ABCD framework. *International Journal of Management, IT and Engineering*, *6*(1), 30-44. Google Scholar↗

[70] Aithal, P. S., & Aithal, S., (2023). Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(2), 102-133. Google Scholar↗

[71] Aithal, P. S. (2023). How to Create Business Value Through Technological Innovations Using ICCT Underlying Technologies. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(2), 232-292. Google Scholar↗

[72] Kumar, Sachin., Krishna Prasad, K., & Aithal, P. S., (30/06/2023). Tech-Business Analytics in Primary Industry Sector. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(2), 381-413. ISSN: 2581-6942, Google Scholar↗

[73] Lonappan, J., & Aithal, P. S., (13/08/2023). Journey Towards Entrepreneurship Education-A Qualitative & Quantitative Perspective. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(3), 205-225. Google Scholar↗

[74] Jomon Lonappan, Aithal, P. S., & Meera Jacob (2023). E-Professionalism as a Professional Identity in the Digital Era of Medical Education. *International Journal of Health Sciences and Pharmacy (IJHSP)*, *7*(2), 35-48. Google Scholar↗

[75 Aithal, P. S., & Aithal, S. (2023). Key Performance Indicators (KPI) for Researchers at Different Levels & Strategies to Achieve it. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *8*(3), 294-325. Google Scholar↗

[76] Varshini, B. P. (2020). *Study on Factors that Influence Students Perception of a Web Based Recruiting System at the College Level in Coimbatore Region* (Doctoral dissertation, Anna University, Chennai). pp. 24-37. Google Scholar↗

[77] Radha, P., & Aithal, P. S. (2024). ABCD Analysis of Stakeholder Perspectives on the Conceptual Model: Unveiling Synergies between Digital Transformation and Organizational Performance in Manufacturing. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *8*(1), 15-38. Google Scholar↗

[78] Ahmed, H. K., & Aithal, P. S. (2024). ABCD Analysis of Voice Biometric System in Banking. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(2), 1-17. Google Scholar↗

[79] Shailashree, K., & Aithal, P. S. (2024). The Influence of Socio-Economic Factors on Savings and Investment Decisions of School Teachers-A Study with Reference to Women Teachers in Kodagu District of Karnataka. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(1), 33-46. Google Scholar↗

[80] Aithal, P. S., Kumar, P. M., & Shailashree, V. (2016). Factors & elemental analysis of six thinking hats technique using ABCD framework. *International Journal of Advanced Trends in Engineering and Technology (IJATET)*, *1*(1), 85-95. Google Scholar↗

[81] Aithal, P. S., & Aithal, S. (2018). Factor & Elemental Analysis of Nanotechnology as Green Technology using ABCD Framework. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *3*(2), 57-72. Google Scholar↗

[82] Aithal, P. S., & Aithal, S. (2017). Factor Analysis based on ABCD Framework on Recently Announced New Research Indices. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *1*(1), 82-94. Google Scholar↗

[83] Aithal, P. S., & Kumar, P. M. (2016). CCE Approach through ABCD Analysis of 'Theory A'on Organizational Performance. *International Journal of Current Research and Modern Education (IJCRME)*, *1*(2), 169-185. Google Scholar↗

[84] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Application of ABCD Analysis Framework on Private University System in India. *International journal of management sciences and business research*, *5*(4), 159-170. Google Scholar↗

[85] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Analysis of NAAC Accreditation System using ABCD framework. *International Journal of Management, IT and Engineering*, *6*(1), 30-44. Google Scholar↗

[86] Shenoy, V., & Aithal, P. S. (2017). Quantitative ABCD Analysis of IEDRA Model of Placement Determination. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *1*(2), 103-113. Google Scholar↗

[87] Mendon, S., & Aithal, P. S. (2022). Quantitative ABCD Analysis of Organic Food Product and its Impact on Purchase Intention. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *7*(1), 254-278. Google Scholar↗

[88] Kumari, P., & Aithal, P. S. (2022). Stress Coping Mechanisms: A Quantitative ABCD Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *6*(2), 268-291. Google Scholar↗

[89] Prabhu, N., & Aithal, P. S. (2023). Quantitative ABCD Analysis of Green Banking Practices and its Impact on Using Green Banking Products. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(1), 28-66. Google Scholar↗

[100] Raj, K., & Aithal, P. S. (2022). Assessing the Attractiveness & Feasibility of doing Business in the BoP Market–A Mixed Method Approach using ABCD Analysis Technique. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *6*(2), 117-145. Google Scholar↗

[101] Frederick, D. P., & Salins, M. (2022). Quantitative ABCD Analysis of Online Shopping. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *6*(1), 313-329. Google Scholar↗

[102] Nayak, P., & Kayarkatte, N. (2022). Education for Corporate Sustainability Disclosures by Higher Educational Institutions–A Quantitative ABCD Analysis. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *7*(1), 465-483. Google Scholar↗

[103] Nandini Prabhu, G., (2023). Quantitative ABCD Analysis of Integrating Corporate Social Responsibilities with Green Banking Practices by Banks from Customers' Attraction and Retention Perspectives in Selected Indian Banks. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(2), 1-37. Google Scholar↗

[104] Madhura, K., & Panakaje, N., (2023). The Power of Social Media on Online Buying Behaviour of the Fashion Products: A Quantitative ABCD Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(3), 90-118. Google Scholar↗

[105] Raghavan, S., & Pai, R. (2023). Quantitative Evaluation of "e-Customer Engagement Strategies" of Millennials for Online Brands, through ABCD Analysis Framework. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *8*(1), 159-182. Google Scholar↗

[106] Steevan D'Souza, N., & Varambally, K. V. M. (2023). Value Creation through Corporate Social Responsibility: A Quantitative ABCD Analysis. *International Journal of Management, Technology, and Social Sciences, (IJMTS), 8*(1), 183-212. Google Scholar↗

[107] Namreen Asif, V. A., & Ramesh Pai (2023). A Quantitative ABCD Analysis of Coffee Industry Stakeholders. *International Journal of Case Studies in Business, IT, and Education (IJCSBE*), 7(3), 301-340. Google Scholar↗

[108] Amin, V. S., & Kumar, A. (2023). Quantitative ABCD Analysis of In-store Customer Perception Purchase of Home Furniture. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *8*(2), 231-253. Google Scholar↗

[109] Santhumayor, F. M. L. (2023). A Quantitative ABCD Analysis on Fostering Emotional Intelligence Among the College Teachers. *EPRA International Journal of Economics, Business and Management Studies (EBMS)*, *10*(8), 125-134. Google Scholar↗

[110] Kambali, U., Shailashri, V. T., & Panakaje, N. (2023). A Quantitative ABCD Analysis of Agricultural Stakeholders. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *7*(4), 1-32. Google Scholar↗

[111] Bindhu, D., & Shailashri, V. T., (2023). A Quantitative ABCD Analysis of Various Issues in Implementation of Corporate Responsibility Initiatives. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(4), 91-113. Google Scholar↗

[112] Ashwini, V., & Aithal, P. S. (2024). Quantitative ABCD Analysis: Consumers' Purchase Intention for Eco-friendly Bags. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(1), 1-32. Google Scholar↗

[113] Shetty, V., & Abhishek, N. (2024). Beneficiaries Behavioural Intention Towards Primary Agricultural Co-operative Credit Society–A Quantitative ABCD Analysis. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *8*(1), 71-114. Google Scholar↗

[114] Pai, R. (2024). Workforce Diversity in an Organization–A Quantitative ABCD Analysis. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(1), 169-191. Google Scholar↗

[115] Lobo, S., & Bhat, S. (2024). A Quantitative ABCD Analysis of Factors Driving Share Price Volatility in the Indian Pharmaceutical Sector. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(2), 18-52. Google Scholar↗

[116] Venkata Lakshmi Suneetha M. & Aithal, P. S. (2024). Quantitative ABCD Analysis: Indian Household and Personal Care Sector. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, *8*(2), 160-184. Google Scholar↗

[117] Niyaz Panakaje, P. S. Aithal, S. M. Riha Parvin, Ayesha, and Abbokar Siddiq (xx/05/2023). Socio-Economic Development Through Co-Operative Banks: A Quantitative ABCD Analysis. *South Asian Journal of Management, 30*(05), 104-131. DOI: https://doi.org/10.5281/zenodo.12624671

[118] Aithal, P. S., & Kumar, P. M. (2015). Applying SWOC analysis to an institution of higher education. *International Journal of Management, IT and Engineering*, *5*(7), 231-247. Google Scholar↗

[119] Mallik, D. A., & Aithal, P. S. (2024). SWOC Analysis: Impact of Methodological Changes in Top 20 NIRF-ranked Management Institutions on Branding Strategy. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *8*(2), 17-38. Google Scholar↗

[120] Venkata Lakshmi Suneetha M., Aithal, P. S. (2024). Revving Up or Stalling Out? A Comprehensive SWOC Analysis of BSE listed India's Auto Sector. *International Journal of Management, Technology and Social Sciences (IJMTS)*, *9*(2), 111-122. Google Scholar↗

[121] Aithal, P. S. (2015). Concept of ideal business & its realization using e-business model. *International Journal of Science and Research (IJSR)*, *4*(3), 1267-1274. Google Scholar↗

[122] Aithal, P. S. (2015). Mobile business as an optimum model for ideal business. *International Journal of Management, IT and Engineering*, *5*(7), 146-159. Google Scholar↗

[123] Aithal, P. S., & Aithal, S. (2020). Conceptual analysis on higher education strategies for various tech-generations. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *5*(1), 335-351. Google Scholar↗

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