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Digital Transformation in the Algerian Higher Education Sector: Challenges and Opportunities

Dr. Safraoui Fatima*

Pr. Ammari Brahim

Faculty of La and Political Sciences, Faculty of La and Political Sciences,

CHLEF University

CHLEF University

f.safraoui@univ-chlef.dz

b.ammari@univ-chlef.dz

Abstract:

The higher education sector globally is undergoing major changes driven by technological advancements, making digital transformation essential for improving educational and administrative performance. In Algeria, institutions have started adopting digital solutions, especially after the COVID-19 pandemic, but these efforts remain limited and fragmented. This research explores the current state of digital transformation in Algerian higher education, focusing on key challenges such as infrastructure, human resources, and legislation. It also identifies opportunities to strengthen this transformation and proposes a framework for a national digital strategy aligned with global standards. The study concludes that Algeria's higher education system must adopt a unified and well-resourced digital strategy to overcome fragmentation and align with global digital transformation standards.

Keywords: *Digital transformation, Algerian higher education, digital challenges, technological opportunities, digital strategy.*

**** Dr.Safraoui Fatima***

1. INTRODUCTION

Digital transformation constitutes a fundamental pillar in the reform of higher education systems worldwide, given the immense potential it offers in enhancing the quality of education, facilitating administrative processes, and expanding access to knowledge. The adoption of digital technologies is no longer a secondary option, but rather a necessary condition to keep pace with global changes and meet the demands of the era. In this context, recent years have witnessed numerous attempts to modernize the higher education system in Algeria through the integration of digital transformation tools, especially following the COVID-19 pandemic, which revealed the urgent need to adopt flexible, digitization-based educational models. Nevertheless, the pace of this transformation remains modest and faces a number of challenges related to infrastructure, technological resources, human capacities, as well as the absence of a comprehensive strategic vision.

Research Problem: Despite the awareness of Algerian higher education institutions regarding the importance of digital transformation in improving the quality of education and facilitating university services, the pace of implementing this transformation remains slow and limited. This raises a fundamental question:

To what extent does the Algerian higher education system face challenges that hinder the achievement of effective digital transformation, and to what extent can available opportunities be leveraged to overcome these obstacles?

Research Hypothesis: Based on the research problem, the following hypothesis can be formulated:

The Algerian higher education system faces multiple challenges that impede the realization of effective digital transformation. However, the existence of available human and technological capacities may enable overcoming these challenges, provided that a clear strategic vision and effective coordination among stakeholders are established.

Significance of the Research: The significance of this research stems from its role in highlighting the readiness of the Algerian higher education system to confront the challenges of digital transformation and capitalize on available opportunities for the development of digital education. It also aims to provide practical recommendations that contribute to improving the quality of education and modernizing university services, thereby enhancing the competitiveness of Algerian universities both locally and regionally.

Research Objectives: This research aims to:

- Analyze the theoretical concepts related to digital transformation in higher education.
- Diagnose the current state of digital transformation in Algerian universities by examining adopted policies and programs.
- Identify the main challenges impeding digital transformation, whether technical, organizational, or human.

- Explore the opportunities and available potentials to accelerate the pace of this transformation.
- Provide practical recommendations for building an effective national digital strategy in the higher education sector.

The study is structured as follows:

- Digital Transformation and the Difference Between Digitization and Digital Transformation
- Digital Transformation in Algerian Higher Education
- Challenges and Opportunities in the Digital Transformation of Algerian Higher Education

2. Definition of Digital Transformation and the Difference Between Digitization and Digital Transformation

In the rapidly evolving digital era, understanding the concepts of digitization and digital transformation is essential for organizations aiming to remain competitive. Though often used interchangeably, these terms represent distinct processes with different objectives and implications. Clarifying their definitions helps establish a clearer roadmap for digital progress.

This can be detailed as follows:

2.1.1 Definition and Examples of Digitization

Digitization refers to the process of converting analog information into digital form, where content is transformed into binary code (ones and zeros). This process does not alter the original content or activate it in a workflow; it simply changes the format. Common examples include scanning paper documents into PDF files, converting photographs into digital images, or encoding music from vinyl or cassette into MP3 format. In our daily lives, we encounter digitization through technologies like ATMs, barcode scanners, digital cameras, CDs, and mobile phones—all of which illustrate how digitization enhances convenience and reliability¹.

Digitization in the Educational Process

Digitization in education refers to the transformation of traditional paper-based data into digital formats that can be accessed, stored, and managed using modern computing technologies. This process involves the use of advanced digital tools to convert educational content into formats compatible with computers and digital platforms. Beyond simple data conversion, digitization encompasses a broader integration of media and communication

¹ - Hapon, M. (August 3, 2023). *What Is the Difference Between Digitization, Digitalization and Digital Transformation*, Retrieved from [:https://www.sap.com/mena/products/erp/digitization-vs-digitalization.html?utm_source=chatgpt.com](https://www.sap.com/mena/products/erp/digitization-vs-digitalization.html?utm_source=chatgpt.com)

technologies that facilitate the dissemination and storage of scientific knowledge across various platforms. These include e-learning systems that support the delivery of educational materials in more flexible, interactive, and accessible ways. ²

More broadly, digitization represents a modern pedagogical approach rooted in information and communication technology (ICT). It utilizes electronic portals and platforms designed to generate and distribute knowledge in line with the evolving demands of education. This shift not only optimizes time and resources but also aligns academic processes with the digital age. In the university context, digitization is instrumental in enhancing both educational and administrative functions. By incorporating digital technologies, institutions are able to streamline operations, improve instructional delivery, and create a more efficient, transparent, and student-centered learning environment. ³

2.1.2 The Origins and Evolution of Digitization

The roots of digitization trace back to 1679, when German mathematician **Gottfried Wilhelm Leibniz** developed binary arithmetic, the foundation of modern digital systems. However, digitization as a practical process began flourishing in the 20th century with the rise of computing technologies that demanded the conversion of analog inputs into digital data for storage and processing. This shift was pivotal in fueling the **Digital Revolution**, also known as the **Third Industrial Revolution**, which marked a transition from mechanical and analog systems to digital computing and automation. According to studies, in 1986, over **99.2%** of the world's information storage was analog, but by 2007, **94%** had become digital. Despite this dramatic shift, digitization continues to be a relevant and critical process for organizations and individuals, especially in safeguarding documents, photos, and media against loss or deterioration. ⁴

2.1.3 Classification of Digital Technology Usage in Organizations: Based on their analysis, experts have classified the use of digitalization within organizations into four main categories: ⁵

- **Beginners:** they use digital tools in a basic way, avoid taking risks, and consequently miss out on the opportunities that digital technology offers.
- **Conservatives:** show limited interest in digital technologies but demonstrate strong leadership capabilities.

² Boutarfa, R., & Khammar, Z. (2024). Digitization and its impact on the quality of higher education in Algerian universities. *International Journal of Innovative Technologies in Social Science*, 4(44), P 03

³ - Boutarfa, R., & Khammar, Z. Idid, P 03

⁴ - Hapon, Mateusz.Op Cit.

⁵George Westerman, Didier Bonnet, Andrew McAfee. *Gagner avec le digital : comment les technologies numériques transforment les entreprises ?* Diateino, 2016 (Harvard Business Review Press, 2014), P 79.

- Followers: are interested in digital technology but do not actively support or drive digital transformation.
- Digital masters: fully understand the importance and utility of digital technology and use it as a means (not an end) to achieve the overall goals of the organization.

2.2. 1 Definition and Key Characteristics of Digital Transformation

Digital transformation has become a crucial priority on the agendas of organizational leaders, yet there remains a scarcity of conceptual and empirical studies investigating the process through which organizations undergo digital transformation. Digital transformation is defined as “the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements such as enhancing customer experience, streamlining operations, or creating new business models.” It is described as “an organizational transformation that integrates digital technologies and business processes in a digital economy.” The term “transformation” rather than “change” emphasizes that an organization's digital transformation extends well beyond functional adjustments and takes a holistic view of the “comprehensiveness of actions” necessary to leverage opportunities or mitigate threats arising from digital technologies. Importantly, digital transformation is fundamentally not about technology, but about strategy, meaning that senior leadership teams must discover ways to harness new and unforeseen innovations in business models that enhance customer needs and experiences.⁶

In addition, Digital transformation is a multifaceted and complex process that involves significant shifts across various dimensions, including technology, organizational structures, strategic direction, and corporate culture. According to Vial (2019), digital transformation is defined as. **"A process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies."** This definition underscores the comprehensive and goal-oriented nature of digital transformation initiatives.⁷

In this regard, Maël says: **"We needed to raise our global digital IQ and overcome internal silos in order to be able to share information and specific business practices quickly..."**⁸.

⁶ - Zhu, Q. L. (2024). Research on business model innovation of enterprises in the context of digital transformation. *IBusiness*, P 240.

⁷ -Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28, P 09.

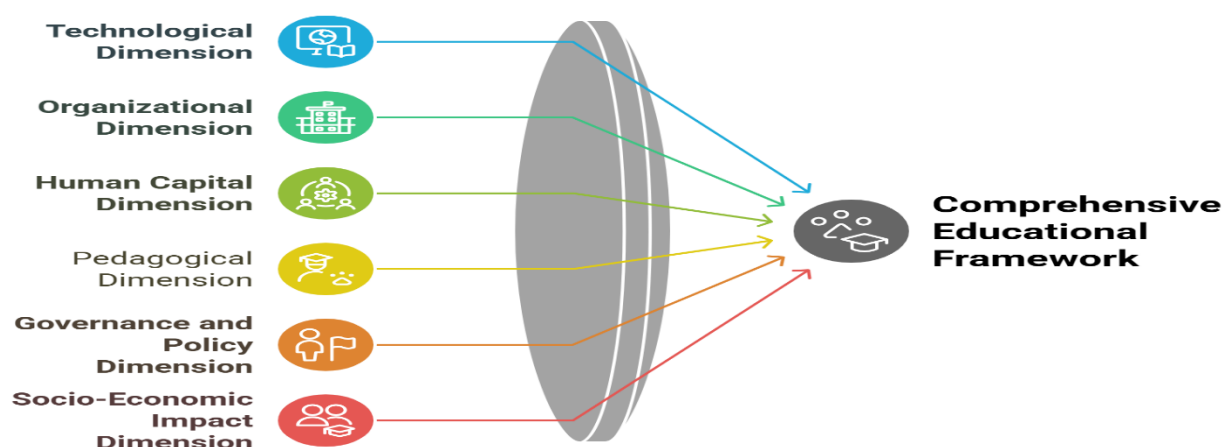
⁸ - Tannou, M. (2015, February). Winning the digital battle at Pernod Ricard. *Dossier DIGITAL*, No. 253, France: Publisher Name, p. 06.

2.2.2 Several core characteristics define digital transformation:⁹

- **Technology-Driven:** Digital transformation is fundamentally enabled by technologies such as artificial intelligence, big data analytics, cloud computing, and the Internet of Things. These technologies provide the essential infrastructure and tools that drive transformation efforts.
- **Comprehensive:** The impact of digital transformation spans all areas of an organization, influencing business operations, customer engagement, organizational design, and business models.
- **Ongoing and Iterative:** It is not a one-time upgrade but a continuous process of innovation and adaptation to emerging digital trends and market demands.
- **Value Reconfiguration:** Organizations redefine how they create, deliver, and capture value through digital transformation, reshaping their value propositions and operations.
- **Ecosystem-Oriented:** Emphasizing collaboration, this characteristic highlights the need for co-innovation and integration with partners, customers, and other stakeholders in the broader business ecosystem.

Together, these features establish the theoretical foundation for digital transformation and provide a strategic framework for companies navigating the digital age. Importantly, digital transformation extends beyond the mere implementation of technology. It represents a systemic shift that encompasses strategic, cultural, and organizational changes. To successfully undergo this transformation, companies must consider these characteristics holistically and develop cohesive, organization-wide strategies that drive sustainable digital advancement

Figure 01: Illustrates the primary dimensions and attributes of digital transformation



Prepared by the Researcher

⁹ - Zhu, Q. L. Op Cit, 16(4),P 241.

2.2.3 Benefits of Digital Transformation

Digital transformation has become a crucial process for organizations striving to stay competitive and innovative in today's fast-changing business environment. By leveraging digital technologies effectively, companies can enhance their operations, improve customer experiences, and drive sustainable growth. Below are some of the key benefits that digital transformation offers to organizations.¹⁰

- **Increased Productivity:** Digital transformation enables organizations to streamline processes, reduce operational constraints, and foster continuous innovation. This leads to more precise and responsive workflows, improved internal communication, and better strategic decision-making.
- **Enhanced Efficiency and Performance:** A successful digital transformation improves efficiency both externally with customers and internally among employees. It helps companies understand customer needs better, providing customized solutions and strengthening customer relationships. Additionally, it promotes employee empowerment through standardized and autonomous processes.
- **Better Employee Engagement and Management:** Digital tools facilitate improved management of human resources and empower employees by offering new responsibilities and opportunities for growth, leading to higher job satisfaction and performance.
- **Cost Reduction and Increased Profitability:** Adopting digital transformation helps organizations reduce operational costs and risks while increasing revenue. Leading companies that master digital technologies often outperform competitors, achieving significant revenue growth with similar infrastructure.
- **Sustainable Competitive Advantage:** Digital transformation allows businesses to innovate discreetly, stay ahead of competitors, and adapt quickly to market changes, ensuring long-term sustainability and success.

2.3 Understanding the Difference Between Digitization and Digital Transformation

In today's digital age, it is essential to distinguish between digitization and digital transformation. While these terms are related, they represent different stages in the adoption of digital technology within a business. Therefore, the difference between them can be understood as follows:¹¹

¹⁰ - Westerman, G., Bonnet, D., & McAfee, A. Op Cit, P80.

¹¹ - Hapon, M. Op Cit.

2.3.1 Digitization

Digitization is the process of converting information from a physical or analog format into a digital one. It involves creating digital versions of data so it can be processed and stored by computer systems. For example, scanning paper documents into PDFs or converting VHS tapes into digital files.

2.3.2 Digital Transformation

Digital transformation refers to the comprehensive change in business processes, products, and models to fully utilize digital technologies. It goes beyond digitization by automating workflows and creating new ways of delivering value, improving efficiency, and enhancing customer experience. For example, using automated apps to analyze data from digital sources and generate customer insights with minimal human intervention.

3. Digital Transformation in Algerian Higher Education

Government policies play a pivotal role in advancing the digitization of Algerian universities. A comprehensive digital transformation strategy focuses on gradually empowering universities according to their capacities. Key initiatives include enhancing digital infrastructure and developing digital skills through partnerships with telecommunications and other institutions.

A bold initiative to digitize higher education in Algeria began with the release of the **Digital Master Plan** in October 2022, followed by the **National Conference Guide on Higher Education** in April 2023. This reform seeks to modernize Algerian universities by embedding digital tools to enhance the quality of teaching, research, and institutional governance. Nevertheless, this digital transformation brings with it a range of significant challenges—technical, pedagogical, and organizational. A comparative analysis of these two strategic documents can offer valuable insights and concrete recommendations to ensure the effective and inclusive adoption of digital technologies across the higher education sector.¹²

3.1 Key Dimensions of Digital Transformation in Algerian Universities:

Digital transformation in Algerian universities is a complex process that involves multiple interconnected dimensions. Successful implementation requires addressing various organizational, technical, human, and strategic factors. From these dimensions, the following

¹² Maouchi, A. (2024). Digital reform in Algerian higher education: Challenges, strategies and opportunities for ownership. *Linguistic and Philosophical Investigations*, 23(1), P 1066.

are particularly critical for achieving a sustainable and effective digital transformation in higher education institutions in Algeria.¹³

3.1.1 Organizational Dimension

The digital transformation of Algerian universities requires comprehensive organizational change, which encompasses several aspects. Universities may need to restructure their departments and administrative units to better align with the demands of the digital era. This restructuring could include the integration of information technology across all departments and the establishment or strengthening of dedicated digital transformation units. Additionally, it is essential to develop the necessary digital infrastructure, such as high-speed wired and wireless networks, modern hardware, and the required software to support e-learning processes and data management. Equally important is the development of human capacities through training programs that enable staff to effectively use advanced digital technologies in teaching, research, and administration. Promoting a digital culture within the universities is vital, encouraging the use of digital tools in all aspects of university life and enhancing digital communication among students, faculty, and administrative personnel. Furthermore, updating policies and procedures to support the effective and secure use of digital technologies, including data protection and cybersecurity policies, is a critical component of this dimension.

3.1.2 Technical Dimension

The technical dimension of digital transformation focuses on enhancing the quality of education and research as well as improving the experiences of students and staff through advanced technological solutions. Key aspects include the development of IT and communication infrastructure that ensures fast, secure, and reliable connectivity between students, employees, and academic institutions. The implementation and continuous improvement of e-learning platforms are fundamental to facilitate remote learning and provide diverse, accessible educational content. Learning Management Systems (LMS) play a critical role in managing educational content, delivering lessons, monitoring student progress, and conducting assessments online. Cybersecurity measures are indispensable to protect the sensitive personal data of students and staff, necessitating robust security protocols and privacy regulations. Moreover, transitioning to cloud computing offers flexible and easy access to applications and technical resources while reducing infrastructure costs, thereby supporting the scalability and sustainability of digital transformation efforts.

¹³ -Berarma, R., & Toumi, H. (2024). Digital transformation strategy for Algerian universities: A vision to enhance digital empowerment in the higher education sector. *Algeria: Afaaq Journal of Management and Economics*, 08(02), P 92-95.

3.1.3 Human Competency Dimension

The success of transforming Algerian universities into digital environments hinges on the availability of diverse human competencies. University staff must possess sufficient technical knowledge to operate various digital systems and tools essential for distance education and electronic university management. Academics should also have a strong understanding of digital instructional design, including the creation and delivery of online learning content and guiding students through virtual environments. Effective digital leadership and management skills are crucial for university leaders to efficiently oversee the transformation process by formulating policies, planning investments, and motivating staff to adopt new technologies. Additionally, faculty and students need to be proficient in digital communication and social interaction within virtual platforms, utilizing social media and electronic forums for collaboration and engagement. Awareness and understanding of cybersecurity are equally important for university employees to ensure the safe handling of information and protection of personal data while interacting with digital systems.

3.1.4 Strategic and Policy Support Dimension

A successful digital transformation requires a strong strategic foundation supported by comprehensive policies at both the institutional and national levels. Governance frameworks must be clearly defined to coordinate digital initiatives and ensure accountability. Capacity building and training programs are essential to enhance digital literacy and equip staff and students with the necessary skills. Collaboration and partnerships between public and private sectors play a significant role in fostering innovation and sharing resources that facilitate transformation. Finally, establishing a clear national vision for digital transformation ensures the alignment of infrastructure development, policy-making, and educational objectives, thereby guiding universities toward a cohesive and sustainable digital future.

3.2 Digital Projects in Algerian Universities

In recent years, important digital projects have been launched to support and modernize Algerian universities. The Ministry of Post and Telecommunications and the Ministry of Higher Education and Scientific Research have signed several framework agreements to strengthen the infrastructure and digital services in the higher education sector, which include the following:¹⁴

¹⁴ -Ministère du Plan et des Territoires, *Qualitative Cooperation with Different Sectors: Sustaining and Supporting Higher Education and Scientific Research Sector*, Algiers: Ministry of Post and Telecommunications, 2021, accessed April 30, 2025, Retrieved from : <https://www.mpt.gov.dz/qualitative-cooperation-with-different-sectors/sustaining-and-supporting-higher-education-and-scientific-research-sector/>

3.2.1 Strengthening Telecom Infrastructure

The Ministry of Post and Telecommunications and the Ministry of Higher Education and Scientific Research signed several framework agreements aimed at enhancing telecom infrastructure in Algerian universities. This includes expanding high-speed and very high-speed internet networks to facilitate connectivity and provide a digital environment that supports educational and research activities.

3.2.2 Modernizing the Academic Research Network

Algerie Telecom corporation collaborated with the Research Center for Scientific and Technical Information (CERIST) to establish a framework for modernizing the academic research network serving universities, contributing to enhanced digital communication among researchers and facilitating the exchange of scientific information.

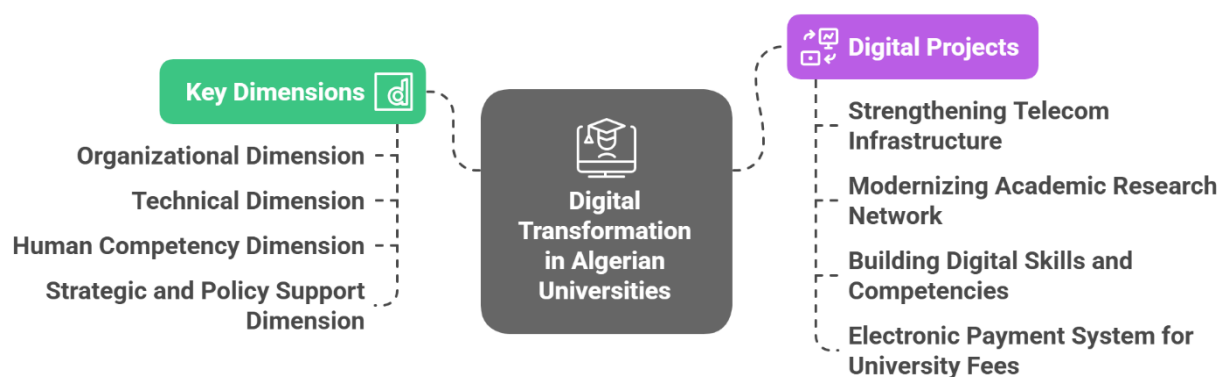
3.2.3 Building Digital Skills and Competencies

The two ministries organized a workshop in partnership with Deloitte Algeria to review and analyze the labor market's demand for digital competencies in the higher education and private sectors. The workshop aimed to build an ecosystem that supports the development of essential digital skills to encourage the digital economy in Algeria.

3.2.4 Electronic Payment System for University Fees

Algerie Poste launched an electronic system for remote payment of university registration fees using the Edahabia card. This system covers registration fees, transportation, and housing, with over 2.4 million electronic transactions recorded in the 2023-2024 academic year, showing a significant increase compared to previous years.

Figure 02: Digital Transformation in Algerian Higher Education



Prepared by the Researcher

4. Challenges and Opportunities in the Digital Transformation of Algerian Higher Education

The shift toward digitalization in Algerian higher education represents a pivotal moment for modernizing the academic system. This transformation brings both promising opportunities for innovation and notable challenges that require strategic planning and support.

4.1 Challenges Facing Digital Transformation

Despite the potential benefits of digital transformation, Algerian universities face several obstacles. These include technical limitations, lack of infrastructure, and human resource constraints, all of which must be addressed to ensure successful implementation.

4.1.1 Technical Challenges

Technical challenges play a crucial role in slowing down the digital transformation of Algerian higher education, and these challenges are represented as follows:

- **Legislative and Institutional Environmental Challenges in Higher Education:** This category includes legislative, regulatory, and institutional barriers that hinder the digital transformation of Algerian higher education. These challenges are represented as follows:¹⁵
- **Legislative and Regulatory Challenges:** The official authorities have attempted to keep up with the digital transformation by adjusting the legal and regulatory framework. However, most procedures rely heavily on issuing policies that require amending laws and regulations without sufficient discussions, while still depending on paper documentation, which hinders full digital integration. The legal framework remains complex and requires building strong digital infrastructures and enhancing digital capacities, especially given the weak internet coverage in universities and research institutions.
- **Challenges Related to the University Environment:** Universities face issues of weak internet networks and insufficient digital processing equipment, limiting the use of modern technologies. There is an urgent need to establish genuine partnerships with economic sectors to exploit scientific research outputs and convert them into valuable products. Additionally, the lack of mechanisms facilitating access to innovation and research discourages researchers despite the significant financial returns.
- **Challenges Related to the Training of University and Research Staff:** Wide segments of higher education staff lack the necessary digital skills, along with weaknesses in foreign languages, especially English. Available training is often basic and insufficient to meet professional and research development needs. Training on digital management technologies

¹⁵ -Gheziz, Mohamed Taher, and Bouhouna Kouï. (2020), *Reforming the Higher Education System in Algeria in Light of the Digital Age*. Algeria: Journals of Politics and Law, 51(20), P 268.

during internships fails to achieve the desired objectives, requiring combined efforts to overcome these obstacles.

- **Technical, Pedagogical, and Institutional Support Challenges:** This category involves technical difficulties, pedagogical challenges, and institutional support issues that impact the effectiveness of digital education in Algeria. These challenges are represented as follows:¹⁶
- **Technical Challenges:** Faculty members suffer from unstable internet connectivity and slow speeds, especially in certain regions, which obstructs effective online teaching. They also face difficulties using digital platforms related to login issues and system errors, in addition to a shortage of essential devices for students and staff, deepening the digital divide. Challenges in learning new platforms and lack of sufficient training further slow the adoption of technology in education.
- **Pedagogical and Interaction Challenges:** It is difficult to maintain student engagement online as in physical classrooms. Traditional teaching methods often fail to adapt well to the digital environment, especially with the lack of real-time interaction. Faculty and students sometimes feel isolated due to the absence of face-to-face communication, negatively impacting learning quality.
- **Institutional and Support Challenges:** Insufficient specialized training and timely technical support are major obstacles for faculty members. Infrastructure suffers from limited internet bandwidth and server capacity, which negatively affects platform performance and user experience. Socioeconomic disparities widen the gap in access to technology, and some faculty members resist adopting digital tools due to preference for traditional methods.

4.2 Digital Reform in Algerian Higher Education: Strategies for Ownership

Digital reform in Algerian higher education is a crucial step toward modernizing the sector to meet current global standards. Effective strategies for ownership ensure that all stakeholders—students, faculty, and administrators—actively participate in the transformation process. This collaborative approach aims to create sustainable and inclusive changes that enhance learning, research, and administration.

4.2.1 Digital Transformation through the Digital Master Plan and the National Conference Guide (SDN)

The adoption of digital reforms in Algerian higher education is anchored in two principal approaches:¹⁷

- **Technical and Structured Transformation:** Through the Digital Master Plan (SDN), a strategic framework developed by the Ministry of Higher Education and Research (MESRS)

¹⁶ -Chiheb, A., & Fennour, N. (2024). Digital platforms in Algerian universities: Needs and challenges of university faculty members. *Journal of Legal and Social Studies*, 9(3), p 14-16

¹⁷ - Maouchi, A. Op Cit, P 1067.

in 2022. This plan prioritizes the digitization of infrastructure, the modernization of digital campuses, enhancement of administrative management and digital services, and the integration of technological tools into teaching methodologies. It outlines clear short-, medium-, and long-term objectives to facilitate a systematic and measurable digital transition.

- **Collaborative and Inclusive Transformation:** Guided by the National Conference Guide (MESRS, 2023), which is a methodological document resulting from extensive consultations with all relevant stakeholders. This participatory process involved nine thematic workshops addressing topics such as educational reform, university governance, graduate employability, innovation and entrepreneurship, research, student life, institutional visibility, and social responsibility. The conclusions drawn from these workshops contribute to a comprehensive set of recommendations that shape a strategic roadmap reflecting a shared vision for modernization.

4.2.2 Higher Education Reform in Algeria: Integrating Digitalization and Artificial Intelligence

Algeria is actively reforming its higher education system by integrating digital technologies and artificial intelligence. This integration aims to modernize teaching, research, and administration, aligning educational outcomes with the demands of a knowledge-based economy. This is achieved through the following:¹⁸

- **Reforming the Algerian Higher Education System Through Digitalization and Artificial Intelligence:** Algeria has embarked on deep reforms in its higher education sector in response to global digital and AI transformations. The LMD system (Licence-Master-Doctorate) was adopted in 2004, but challenges in bridging the digital divide prompted further structural changes. These reforms aim to shift universities from traditional academic institutions into active players in a knowledge-based economy. By leveraging AI and digital tools, the system seeks to enhance its capacity for sustainable development. The ultimate goal is to align educational outcomes with economic and societal needs.
- **Integrating Digitalization and Artificial Intelligence in Higher Education Reform Projects:** Digitalization and AI integration have become dual pillars of Algeria's education reform strategy. Legal and regulatory frameworks have been updated to reflect technological advancements and labor market needs. Laws like 15/21 were enacted to support research and innovation, encouraging knowledge transfer and technological application. Agencies were created to manage research valorization and tech transfer. These efforts aim to build a higher education system grounded in both academic excellence and economic utility.
- **Adapting University Objectives and Curricula to Digital and AI Requirements:** Algerian universities have revised their missions and curricula to align with the demands of the digital era. Pedagogical content was modernized to include technological skills, especially in AI and digital literacy. Policies focused on replacing outdated teaching

¹⁸ - Gheziz, Mohamed Taher, and Bouhouna Kouli. Op Cit, P 265- 2067.

methods with tech-driven approaches. Collaborations with ministries such as Postal Services advanced the vision of e-governance in education. These changes reflect a shift toward a university system that merges academic, economic, and technological functions.

- **Adopting Distance Learning as a Permanent and Parallel System to In-Person Education:** The COVID-19 pandemic catalyzed the shift toward distance education, initially as a temporary solution, but later formalized through ministerial decisions like Decree 992 (2022). Platforms like Moodle were implemented nationwide to deliver lectures, assignments, and assessments. Distance learning is now embedded at all academic levels, supported by supervision committees. This model ensures flexibility and accessibility, promoting resilience in the educational system while fostering digital learning skills among students and faculty.
- **Aligning Higher Education Outputs with Socio-Economic Needs:** To better serve the national economy, Algeria is reorienting higher education outputs toward labor market relevance and entrepreneurship. Specialized institutions have been created in strategic areas like AI, ICT, and applied mathematics. Distance education programs in bachelor's and master's degrees have been launched as full academic pathways. The sector has also undergone widespread digital transformation, with more than 40 platforms supporting administrative and academic functions. Incubators and entrepreneurship hubs ("Maison de l'Entrepreneuriat") were established to support student innovation and transform research into viable projects.

Figure 03: Challenges and Opportunities in the Digital Transformation of Algerian Higher Education



Prepared by the Researcher

5. Conclusion

In light of the above, it is clear that digital transformation in the Algerian higher education system represents both a challenge and an opportunity. Therefore, achieving this transformation requires concerted efforts and the development of clear strategic plans supported by strong will from all stakeholders. By addressing the challenges and leveraging available opportunities, Algeria can build a modern and advanced educational system that

meets the demands of the digital age and strengthens its position regionally and internationally. Thus, digital transformation becomes not merely a technological choice but a strategic necessity to ensure the sustainable development of higher education and the achievement of academic excellence.

5.1. Results

- The weakness of digital infrastructure constitutes a major obstacle to the implementation of digital transformation in Algerian universities.
- The lack of specialized training and insufficient digital skills among academic and administrative staff limits the effectiveness of applying digital technologies.
- The absence of a clear national strategy has led to fragmented efforts and weak coordination among the various stakeholders.
- There are promising human and technological potentials that provide opportunities to develop the higher education system through digital transformation.

5.2. Recommendations

- Adopt a comprehensive national strategy for digital transformation in higher education that clearly defines objectives and mechanisms, and ensures coordination among all stakeholders.
- Enhance investment in digital infrastructure to ensure that universities are equipped with the necessary modern tools and technologies.
- Develop continuous training programs aimed at improving the digital skills of academic and administrative staff.
- Encourage collaboration between universities, the private sector, and technology institutions to foster innovation and develop effective digital solutions.

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