

***From Traditional Classrooms to Digital Space:
Pros and Cons of Digitization in Algerian Universities***

من الفصول الدراسية التقليدية إلى الفضاء الرقمي:

إيجابيات وسلبيات الرقمنة في الجامعات الجزائرية



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Abstract: Digitization in higher education in Algeria represents a qualitative leap toward improving the quality of education and expanding access to knowledge. It contributes significantly to enhancing distance learning, improving administrative efficiency, supporting scientific research, and developing digital skills among students and faculty members. Despite these benefits, the sector faces major challenges such as weak technological infrastructure, the digital divide between urban and rural areas, limited direct interaction between teachers and students, and high initial costs of implementing digital systems. To fully benefit from digitization, it is necessary to intensify efforts to improve infrastructure, train educational and administrative staff, and ensure equal digital opportunities for all students. This contributes to building a modern and effective educational system that includes all groups and promotes the development of higher education in Algeria.

Keywords: digitization, higher education, pros and cons, digital space, Algerian universities...

الملخص:

تمثل الرقمنة في التعليم العالي بالجزائر نقلة نوعية نحو تحسين جودة التعليم وتوسيع فرص الوصول إلى المعرفة، حيث تسهم بشكل ملحوظ في تعزيز التعليم عن بعد، تحسين الكفاءة الإدارية، دعم البحث العلمي، وتنمية المهارات الرقمية لدى الطلاب وأعضاء هيئة التدريس، وعلى الرغم من هذه الفوائد، فإن القطاع يواجه تحديات كبيرة مثل ضعف البنية التحتية التكنولوجية، الفجوة الرقمية بين المناطق الحضرية والريفية، محدودية التفاعل المباشر بين المعلمين والطلاب، وارتفاع التكاليف الأولية لتنفيذ الأنظمة الرقمية، ولتحقيق الاستفادة القصوى من الرقمنة، من الضروري تكثيف الجهود لتحسين البنية التحتية، تدريب الكوادر التعليمية والإدارية، وضمان تكافؤ الفرص الرقمية بين جميع الطلاب، وهو ما يساهم في بناء نظام تعليمي عصري وفعال يشمل جميع الفئات ويساهم في تطور التعليم العالي في الجزائر.

الكلمات المفتاحية: الرقمنة، التعليم العالي، إيجابيات وسلبيات، الفضاء الرقمي، الجامعات الجزائرية...

Introduction:

The world is currently witnessing a radical transformation in various fields due to technological developments, and the education sector has not been immune to this development. In this context, digitization in higher education has become an inevitable necessity to improve education quality and keep up with global advancements. Digital education in Algeria is characterized by the use of modern technologies to develop teaching and learning tools. This transformation has helped facilitate academic and administrative processes, but it has faced multiple challenges in terms of infrastructure and human resources. Accordingly, this research aims to shed light on digitization in the higher education sector in Algeria by analyzing its pros and cons and demonstrating its impact on the quality of education and the future of students and university institutions.

Research Importance:

The importance of the topic lies in its connection to a vital and fundamental issue in human societies, which is the pros and cons of digitization in the higher education sector in Algeria. The significance of this topic can be summarized as follows:

1. Digitization represents a means to modernize curricula, enhance interaction between professors and students, and provide advanced educational tools.
2. Digitization offers an opportunity for distance learning, facilitating access to higher education in remote areas.
3. Digitization helps accelerate administrative processes such as registration, student evaluation, and certificate issuance.
4. Digitization facilitates access to electronic resources, references, and global databases.
5. It equips students with digital skills that match modern labor market demands.

Research Objectives:

The topic "Pros and Cons of Digitization in the Higher Education Sector in Algeria" aims to achieve the following objectives:

1. Study the impact of digitization on the quality and efficiency of higher education.
2. Analyze the positive aspects and challenges facing digitization in Algerian universities.
3. Develop strategies to enhance the positives and overcome the challenges.
4. Understand the extent to which students benefit from and interact with digital tools.

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5. Propose mechanisms to ensure equal digital opportunities for all students.

Research Problem:

Based on the above and considering the research purpose of this study, the nature of the topic and its aspects necessitate formulating the following main problem: How does digitization in the higher education sector in Algeria affect the quality of the educational and administrative process? And what are the most prominent pros and cons that Algerian universities face in adopting this transformation?

The hypothesis of this problem is as follows:

Digitization contributes to improving the quality of higher education in Algeria by facilitating access to academic resources and enhancing administrative efficiency. However, it faces multiple challenges related to infrastructure, human resource development, and digital equity, which hinder the full achievement of its goals.

Based on the research problem and to clarify the key features that will be the foundation for the action plan, the following sub-questions are posed:

1. What are the main pros that digitization offers in the higher education sector in Algeria?
2. What are the challenges and obstacles facing the implementation of digitization in Algerian universities?
3. How can digitization improve the quality of education and learning in higher education?
4. What is the impact of the digital divide on achieving equity among students in higher education?
5. What policies and procedures can be adopted to overcome the cons of digitization in Algerian universities?

Research Methodologies:

Analyzing the pros and cons of digitization in the higher education sector in Algeria requires integrating various methodologies to deeply analyze the current situation, identify strengths and weaknesses, and develop sustainable plans to improve the educational system to achieve the desired goals. The main methodologies include:

- 1. Descriptive method:** To study the current situation of the digitization process in higher education, identify practices, digital tools used, and their impact on educational institutions.
- 2. Analytical method:** To examine the impact of digitization on the quality of education, improve university administrative efficiency, and expand access to

knowledge, with a focus on challenges such as weak infrastructure or lack of training.

- 3. Historical method:** To study the development of digitization policies in the higher education sector in Algeria, from the first initiatives to the current situation, identifying major changes.
- 4. Comparative method:** To compare Algeria's experience in digitizing higher education with the experiences of other countries, especially in the Arab world or Africa, to learn about best practices and identify areas for development.
- 5. Experimental method:** It can be used to test specific digital tools or new digital educational strategies in Algerian universities and measure their impact on academic performance and education management.

Research Divisions:

To address this topic, the study was divided into the following axes:

Chapter One: The Concept of Digitization in Higher Education in Algeria

Chapter Two: Pros and Cons of Digitization in Higher Education in Algeria

Chapter Three: Evaluation of Digitization in Higher Education in Algeria and Its Future Prospects

Chapter One: The Concept of Digitization in Higher Education in Algeria

Digitization in higher education refers to the use of digital technology to improve and facilitate the educational and administrative process. It includes the use of electronic platforms, digital tools, and smart systems for delivering lectures, conducting exams, and accessing educational resources. From here, digitization can be defined and its importance recognized in the context of higher education.

Section One: The Concept and Importance of Digitization in Higher Education

Digitization is the process of converting traditional operations and activities into digital systems based on modern technology, such as computers and multimedia like images, sound, electronic libraries, and others¹. It represents a fundamental step toward developing the educational system at all levels. In higher education, digitization means applying advanced technological tools and methods to improve and facilitate the educational process through the use of e-learning platforms, data management through digital systems, and the provision of educational content via the internet.

¹ Haidar Hatim Faleh Al-Ajresh, *E-Learning: A Contemporary Vision*, Al-Sadiq Cultural House, Iraq, 1st Edition, 2017, p. 21.

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Digitization in higher education is one of the most prominent developments that have helped accelerate the shift toward more interactive and flexible learning environments. It enhances access to knowledge and educational resources, and provides multiple and diverse learning opportunities that match the needs of students in the digital age. Additionally, digitization improves administrative processes and reduces operational costs, enabling universities and educational institutions to offer high-quality educational services in a more organized and efficient environment. Thus, digitization in higher education is not merely new technology, but a tool for improving the quality of education, enhancing equal opportunities, and expanding participation in the educational process to meet the labor market requirements in the information age.

In the Algerian context, digitization represents a response to local and global challenges facing the higher education sector and an attempt to keep pace with technological developments that have become an urgent necessity to achieve regional and international competitiveness. Accordingly, digitization in higher education includes the following areas:

1. Developing e-learning and learning management platforms such as "Moodle".
2. Digitizing administrative processes such as admission and registration, exam management, and research submission.
3. Adopting distance education through virtual lectures and digital classrooms.

Accordingly, digitization can also be defined as the process of converting traditional operations into operations based on digital technology to simplify and improve educational and administrative performance. It includes the use of technologies such as electronic systems, distance education, and digital platforms, in addition to the continuous development of curricula to keep up with global developments.¹

The importance of digitization lies in the ability of educational institutions to use digital technology to transform the educational system, including its methods, resources, policies, and curricula. This transformation can contribute to reducing reliance on traditional methods such as classrooms and paper libraries² and enables access to innovative and easy educational resources. Digitization also enhances the national and international competitiveness of educational institutions, improves students' educational experiences, and increases their

¹ Smyth, K., MacNeill, S., & Johnston, B., *Conceptualising the Digital University: The Intersection of Policy, Pedagogy, and Practice*, Palgrave, London, 2018, p. 21.

² Mohamed Ali Shalaan, *Governance of Digital Transformation in Saudi Vision 2030*, The Engineer Magazine, Saudi Association of Engineers, Issue 100, (February 2017), p. 49.

performance levels, helping retain high-performing students. On the other hand, digitization improves the quality of educational services, including education and curricula, reduces dropout rates, and facilitates administrative processes such as registration and administrative operations (Progress), thereby improving the financial efficiency of educational institutions and increasing their ability to compete¹.

Digitization is also important for individuals across various sectors by enhancing the speed and effectiveness of task completion, improving performance quality and efficiency. It provides ease in implementing new services quickly and flexibly and contributes to increasing transparency and governance, which reduces the chance of errors and enhances performance monitoring. Additionally, digitization increases productivity levels and improves products and services, ensuring business continuity and development. It also offers the opportunity to benefit from modern technologies in performance development and future analysis, thereby enhancing the ability of individuals and institutions to forecast and plan more accurately and efficiently².

Many factors have contributed to the emergence and expansion of digitization applications in higher education institutions in Algeria. Among the most prominent are the reduced cost of devices and equipment such as central processing units, memory units, data storage means, and input/output devices. In addition, the ease of programming and methods of dealing with data and information has accelerated this transformation. The ability to replace mechanical and electrical components with microelectronic elements and software has also facilitated the process of modernization and development. Furthermore, increased commercial and international competition has necessitated adapting to technological developments. Digitization also provides clear professional advantages and material gains for institutions, making it an effective tool for achieving academic and administrative excellence.³

Section Two: Objectives of Digitization in Higher Education in Algeria

Digitization has many objectives in the field of higher education in Algeria, as follows:

¹ Brooks, C., & McCormack, M., *Driving Digital Transformation in Higher Education*, EDUCAUSE, ECAR Research Report, Louisville, CO: ECAR, June, p. 10.

² Mohamed Fathi Abdel Hadi, *Digitization of Arab Journals: The Project for Digitizing Journals at the Egyptian National Library – A Case Study*, King Fahd National Library Journal, Volume 17, Issue 02, (November 2011), pp. 02-03.

³ Hassan Jaafar Al-Tai, *Information Technology and Its Applications*, Dar Al-Bidaya, Jordan, 2013, p. 143.

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First: Expanding access to education: Digitization allows students to access educational resources from anywhere and at any time, contributing to improved education in remote and underserved areas.¹

Second: Improving education quality: Providing innovative educational tools such as interactive simulations, educational videos, and electronic tests, and facilitating interaction between students and professors through forums and digital platforms.

Third: Enhancing administrative efficiency: Simplifying administrative procedures, reducing human error, and improving student tracking and evaluation using advanced electronic systems.²

Fourth: Supporting Scientific Research: Providing access to global scientific databases and resources, and facilitating collaboration between researchers locally and internationally through digital platforms.

Fifth: Learning Flexibility: Offering options for distance learning, which helps students with geographical or time constraints, and enhancing self-learning and personalized interaction with content.³

Sixth: Adapting to Global Changes: Helping Algerian universities keep pace with the Fourth Industrial Revolution and the demands of the digital economy.

In addition to the above objectives, digitization aims to empower individuals in educational sectors and institutions to enhance educational productivity while ensuring sustainable growth and prosperity of investment in this sector. Digitization also contributes to improving research processes that rely on knowledge, leading to an expansion in the exchange of knowledge, services, and expertise between teachers and students. Through digitization, knowledge can be stored, organized, and shared effectively, making it accessible to all. Consequently, researchers can engage in scientific discussions at a global level and participate in building specialized knowledge circles across various fields, thereby enhancing teamwork and allowing for the integration of ideas and

¹ Ahmed Abdullah Al-Saghir Al-Banna et al., *Requirements for Implementing Digitization in Kuwaiti Public Universities in Light of the Experiences of Some Developed Countries*, Scientific Journal of the Faculty of Education, Assiut University, Kuwait, Volume 40, Issue 08, (August 2024), p. 272.

² Talq Owaidallah Al-Sawat, Yasser Sayer Al-Harbi, *The Impact of Digital Transformation on the Efficiency of Academic Performance*, Al-Mahalal Arab for Scientific Publishing, Issue 43, Jordan, (May 2022), p. 654.

³ Hajar Mami, Sara Dramshiya, *The Algerian University's Dependence on E-Learning as a Mechanism to Ensure the Continuity of University Education During the COVID-19 Crisis*, Horizons Journal of Sociology, Volume 10, Issue 1, (July 2020), p. 191.

knowledge across borders through digital platforms that connect researchers and contribute to the development of joint research projects.¹

Accordingly, digitization is not just a means to improve the educational process, but a central strategy to transform higher education into a more efficient, inclusive, and high-quality system. In Algeria, digitization carries the potential to enhance higher education to become more competitive at both regional and global levels, with the necessity to confront challenges related to infrastructure and human resources to achieve maximum benefit.

Chapter Two: Pros and Cons of Digitization in Higher Education in Algeria and Its Future Prospects

Despite the many benefits of digitization in higher education, there are several challenges facing Algerian universities in this area. Nevertheless, the future holds many opportunities and positive prospects that can be leveraged to achieve a qualitative leap in this sector. This can be analyzed as follows:

Section One: The Cons of Digitization in Higher Education in Algeria

Despite the advantages that digitization offers in higher education, there are many challenges and obstacles facing its implementation in Algeria, including:

First: Lack of Technological Infrastructure: Some universities suffer from weak internet coverage and insufficient technological equipment, in addition to the absence of equitable distribution of technological resources between urban and rural areas.²

Second: Weak Digital Training for Educational Staff: Some professors and staff lack the necessary skills to efficiently use digital systems, and there is a need for continuous training programs to keep up with technical developments.³

Third: Weak Funding for Digitization: The cost of acquiring technological devices and maintaining digital systems represents a burden for universities with limited resources, and the budget allocated for developing digital education in Algeria is insufficient.⁴

Fourth: Cybersecurity Risks: The exposure of students' and professors' personal data to hacking and data theft risks, along with the need to develop effective security systems to protect digital platforms.

¹ Ahmed Abdullah Al-Saghir Al-Banna et al., p. 278.

² Hajar Mami, Sara Dramshiya, *Op. Cit.*, pp. 194-195.

³ Hajar Mami, Sara Dramshiya, *Op. Cit.*, pp. 194-195

⁴ Amal Boub, Ikram Boudbza, *The Impact of Organizational Change on the Success of Digital Transformation in Algerian Public Institutions: A Survey Study of a Sample from the Municipality of Skikda*, *The New Economy Journal*, Volume 10, Issue 03, (September 2019), p. 50.

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Fifth: The Digital Divide: Inequality in opportunities among students due to varying levels of access to technology. This disparity leads to an increased social gap among students in different regions.

Sixth: Impact on Human Interaction: Digital education reduces direct interaction between students and professors, which may affect the quality of educational relationships and weaken students' social communication skills due to heavy reliance on digital tools.

Accordingly, digitization in higher education in Algeria faces several challenges related to infrastructure, digital equity, staff training, and ensuring the quality of the educational process. All of these negatives require effective strategies to overcome them, including improving infrastructure, training staff, and supporting students in remote areas to avoid disparities and enhance the effectiveness of digital education.

Section Two: The Pros of Digitization in Higher Education in Algeria

Digitization in higher education in Algeria represents a major shift toward modernizing the educational and administrative process. It contributes to improving the quality of education and enhancing institutional effectiveness. The following are the most prominent advantages brought by digitization in the higher education sector in Algeria:

First: Expanding Access to Education: Digitization enables students from various regions, including remote and rural areas, to access quality higher education. Through distance learning and digital platforms, students can attend lectures and lessons from anywhere, helping to reduce the educational gap between major cities and other areas.

Second: Improving the Quality of Education and Learning: Digitization builds new work models that help simplify procedures and reduce service delivery time to develop educational content¹. Lessons can be delivered through videos, interactive graphics, and simulations, enhancing the learning experience and making it more interactive. Digital tools also provide opportunities for self-learning, which helps students develop their skills further.

Third: Greater Learning Flexibility: Through digitization, students can study at the time and place that suits them. Distance learning allows students to better

¹ Mustafa Mohamed Ali Shadid, *The Impact of Digital Transformation on the Performance Level of Services Provided: A Case Study on Employees of the General Traffic Administration in Cairo Governorate*, *Journal of the Faculty of Economics and Political Science*, Egypt, Volume 22, Issue 04, (October 2021), p. 203.

organize their time, enhancing the effectiveness of education, especially for those with professional or social obligations.

Fourth: Improving Interaction Between Professors and Students: Digital educational platforms provide an interactive environment between professors and students, where discussions can be held via online forums, questions can be asked easily, and real-time interaction can take place through live lessons (webinars) and digital seminars. This enhances effective communication and contributes to providing direct academic support.

Fifth: Enhancing Administrative Efficiency: Digitization contributes to simplifying administrative procedures such as course registration, fee payment, and electronic examinations. It also helps in managing academic data more quickly and accurately, leading to reduced wasted time and increasing the organizational effectiveness of universities.

Sixth: Supporting Scientific Research and Academic Collaboration:

Providing access to digital databases and online scientific journals contributes to enhancing scientific research. Digitization also facilitates academic collaboration between Algerian universities and global research institutions, opening opportunities for scientists and researchers to benefit from diverse research resources and exchange knowledge.

Seventh: Providing High-Quality Education:

Through digitization, curricula can be developed and enhanced, and advanced educational resources can be utilized to offer students a comprehensive learning experience. Educational platforms also provide digital assessment tools that allow continuous evaluation of student performance, thereby aligning education with labor market demands.

Eighth: Supporting Environmental Sustainability¹:

Digitization can reduce government spending on services, improve their performance, and introduce new services². By reducing reliance on paper in education and administrative procedures, it diminishes the environmental footprint of higher education. Additionally, reliance on digital resources helps conserve natural resources and enhances energy efficiency.

Ninth: Enhancing Response to Global Competition:

Digitization helps higher education institutions compete regionally and internationally, enabling them to attract students from abroad and exchange

¹Mustafa Mohamed Ali Shadid, *Op. Cit.*, p. 204.

² Saad Ali Raihan Al-Mohammadi, *Strategic Management and Contemporary Management*, Al-Yazouri Scientific Publishing and Distribution, Jordan, 2022, p. 92.

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academic experiences with global universities, thereby enhancing their position in global rankings.

Therefore, the advantages of digitization in higher education in Algeria represent a significant opportunity to improve education quality, expand access, and increase interaction between students and professors. Digitization also contributes to enhancing administrative efficiency and supporting scientific research, thereby elevating the level of higher education in Algeria and making it more adaptable to global technological developments.

Chapter Three: Evaluating Digitization in Higher Education in Algeria and Its Future Prospects

Higher education in Algeria has witnessed a significant shift towards digitization in recent years, with the government and educational institutions striving to adapt the academic system to global digital transformations. Consequently, digitization in Algerian higher education has shown potential to improve access to knowledge, streamline administrative procedures, and offer a more flexible and effective learning experience. However, this transformation faces a set of challenges that need to be addressed to ensure sustainable success in the future.

Section One: Evaluating Digitization in Higher Education in Algeria

First: Digital Infrastructure:

One of the main challenges facing digitization in higher education in Algeria is the weak digital infrastructure in some universities, especially in remote areas. Although some universities have started establishing digital educational platforms, internet quality and technological equipment still fall short of the required standards in many institutions.

Second: Training and Digital Skills:

Training in the use of digital tools is a fundamental factor for the success of digitization in education. Despite efforts to train professors and students, there is an urgent need to provide continuous training programs that keep pace with modern technological developments to ensure effective use of these tools. For instance, the recent project for training university professors initiated by the Algerian Ministry of Higher Education is a significant step towards enhancing the quality of higher education, as it contributes to developing professors' academic and technological skills, improving the teaching process, and keeping up with modern challenges in digital education and educational technologies.

Third: Interaction and Distance Learning:

Algerian universities offer some distance learning platforms, but these platforms still need improvement, especially regarding interaction between students and

professors and academic performance evaluation. There is a need to enhance digital content and develop teaching methods to align with students' needs in the digital age, which the Algerian Ministry of Higher Education has focused on through training newly employed university professors.

Therefore, it can be said that Algeria has made significant initial steps towards digitization through platforms like "University Portal" and "Distance Learning," but it still requires comprehensive strategies to improve infrastructure and training. The experience of education during the COVID-19 pandemic highlighted the importance of digitization but also revealed significant challenges associated with it.

Section Two: Prospects of Digitization in Higher Education in Algeria

Digitization in higher education in Algeria represents an important step towards modernizing the educational system and improving its quality, with enhanced access to knowledge. Despite the challenges Algeria faces in this field, the prospects of digitization promise a bright future. The main prospects can be summarized in the following points:

1. Improving Technological Infrastructure:

It is expected that Algeria will witness significant improvements in digital infrastructure in the near future through government investments and partnerships with information technology companies. This will enhance internet coverage across the country, including remote areas and university campuses, and equip universities with the latest technologies such as computers, servers, and advanced communication systems, encouraging broader use of modern technologies. This was confirmed by Minister of Postal Services and Telecommunications, Karim Bibi Triki, who stated that the "new program for universal electronic communications service," an initiative by the Algerian state to enable areas with fewer than 2,000 residents to benefit from mobile phone and internet services, will be implemented soon. He noted that this program includes 1,400 areas distributed across the entire national territory.¹

2. Expansion of Distance Learning:

With the increasing reliance on distance learning, Algerian universities are expected to continuously develop electronic platforms. This will allow students from all over the country to access academic content without the need to be

¹ Algeria Achieved a "Qualitative Leap" in the Field of Information and Communication Technology Infrastructure, *Algerian News Agency*, Published on June 1, 2024, Accessed on March 1, 2025, Available at:

<https://www.aps.dz/ar/sante-science-technologie/163728-2024-06-13-15-44-04>

physically present on campus, contributing to inclusivity and expanding educational opportunities.

3. Supportive Government Policies:

The Algerian government is expected to continue supporting digitization by developing digital educational policies, such as the "Digital University" initiative, and providing financial and legislative incentives to support the use of technology in education, thereby improving the effectiveness of the educational system and aligning it with global digital transformations.

4. Cultural and Social Challenges:

With the increasing reliance on technology, society may face some cultural and social challenges in accepting this transformation. Therefore, continuous efforts in raising awareness about the importance of digitization and involving the community in the digital educational process will be crucial to ensure its success and avoid resistance to change.

5. Enhancing Human Resource Training:

By offering continuous training programs for professors and administrators on using modern technology in education, where the total number of human resources specialized in information and communication technology is 136,662 workers, representing 1.46% of the total workforce. Additionally, the state's ability to provide training in this field plays an important role in **enhancing efficiency and meeting market needs**¹; for example, the training project for university professors aims to improve the quality of education in Algerian universities and raise the competency level of instructors, while also creating an interactive environment for sharing experiences among them.

6. Legislation Related to Digital Education:

Law No. 05-99 (as amended in 2000 and 2008), which regulates higher education and promotes the role of universities in developing scientific research, disseminating knowledge, and improving the scientific and cultural level of citizens, and Law No. 21-15 (2015), which directs scientific research and technological development toward achieving economic and social development, and aims to develop national information and communication systems and strengthen the information society². Higher education laws are expected to adopt

¹ Faris Qarini, *The Reality of the Information and Communication Technology Infrastructure in Algeria*, *Eliza Journal for Research and Studies*, Algeria, Volume 04, Issue 01, 2019, p. 45.

² Mohamed Ahmidato, *Research Paper on the Digitization Policy in Higher Education and Scientific Research*, *The Algerian Journal of Legal, Political, and Economic Sciences*, Algeria, Volume 57, Special Issue on the National Conference titled: "The Role of Digitization in

legislative amendments that support digitization in universities, including the regulation of distance education and ensuring students' access to electronic study materials. Legislation should focus on how to integrate e-learning and digital technologies into educational institutions to ensure smooth interaction between students and digital tools.

7. Protection of Personal Data:

It is necessary to enact legislation to protect the personal data of students and professors with the use of digital systems in universities, ensuring the security of academic information and protecting it from unauthorized access, while defining the entities authorized to view such data, thus ensuring privacy and protecting individual rights.

8. Investment in Cybersecurity:

Given the challenges associated with digital threats, Algerian legislation is expected to include the strengthening of legal frameworks related to cybersecurity. This aims to protect digital systems in universities from cyberattacks and safeguard educational networks from hacking attempts.

9. Intellectual Property Rights in the Digital Environment:

The political and legislative framework for digitizing the higher education and scientific research sector is mainly evident in the "Algeria Electronic Strategy 2013" and the legislative provisions in the laws regulating this sector. This strategy aims to enhance the capacities of education, scientific research, and innovation, thereby contributing to the development of the academic system and achieving technological advancement in educational institutions¹. Accordingly, legislation is expected to strengthen protection for authors' rights in the field of digital education, which will ensure the safeguarding of research and scientific content published in digital learning environments, allowing professors and researchers to retain their intellectual property rights.

10. Open Access:

Open access policies for scientific content are expected to be promoted in Algeria, allowing students and researchers to access research and academic content through open platforms, enhancing transparency and increasing the availability of scientific knowledge.

Quality in Higher Education," Faculty of Law - University of Algiers 1, March 1, 2020, organized by the Quality Assurance Unit of the Faculty of Law - University of Algiers 1, (May 2020), p. 233.

¹ Mohamed Ahmidato, *Op. Cit.*, p. 288.

11. Required Legal Reforms:

In addition to Executive Decree No. 21-135 dated 24 Shaaban 1442 corresponding to April 7, 2021, which includes the organization and functioning of the General Inspectorate of the Ministry of Higher Education and Scientific Research¹, and the powers enjoyed by the Minister of Higher Education and Scientific Research under Executive Decree No. 13-77 dated 18 Rabi' al-Awwal 1434 corresponding to January 30, 2013, which defines the minister's responsibilities—several legal reforms are anticipated to update laws governing digital education and enhance digitization in higher education². Algeria is expected to adopt legislation that supports universities in providing modern technologies, allocating budgets for developing digital infrastructure, and encouraging innovation in this field.

12. Blended University Education:

Algeria is expected to see progress in blended university education, which combines traditional and online learning. A legal framework will be needed to regulate this type of education in Algerian universities.

13. International Cooperation in Digital Education:

According to Article 26 of Law No. 21-15 related to scientific research and technological development, the state works to encourage cooperation between different sectors and develop international cooperation in scientific research and technological development fields. The state is represented by the ministry responsible for scientific research and the relevant ministries³. Accordingly, Algeria is expected to engage in international cooperation in the field of educational digitization, signing international agreements related to the development of digital education and the protection of academic data, contributing to the improvement of digital learning environments in Algeria in line with international standards and activating partnerships between Algerian universities and global educational institutions.

¹ Executive Decree No. 21-135, dated 24 Sha'ban 1442 (April 7, 2021), which includes the organization of the General Inspectorate of the Ministry of Higher Education and Scientific Research and its operations, Chapter Two on the Institutional and Organizational Structure of the Higher Education and Scientific Research Sector, from Subsection Two, the Institutional and Organizational Framework for Higher Education and Scientific Research, Official Gazette, Algeria, Issue 27, (2021), pp. 16-18.

² Mohamed Ahmidato, *Op. Cit.*, p. 234.

³ Law No. 21-15, dated 18th of Rabi' al-Awwal 1437 AH, corresponding to December 30, 2015, which includes the framework law on scientific research and technological development, Algeria, Official Gazette, Issue 71, p. 10, amended by Law No. 20-02, dated 5th of Sha'ban 1441 AH, corresponding to March 30, 2020, Official Gazette 2020, Issue 20, pp. 7-8.

Through these prospects, it becomes clear that digitization in higher education in Algeria carries many opportunities to improve education quality and expand access, but it requires comprehensive legal and technological measures to ensure the success of this digital transformation.

Conclusion:

In conclusion, digitization in Algeria's higher education sector represents an important step toward modernizing the educational system and keeping up with rapid global transformations. Despite major challenges such as infrastructure issues, shortage of trained human resources, limited funding, and the digital divide, the benefits of digitization outweigh these difficulties. Among the most prominent benefits are increased access to education, improved administrative efficiency, and support for scientific research—making digitization an urgent necessity at present.

However, the success of this digital transformation requires a comprehensive update of the legal frameworks governing this sector. This necessitates the development of legislation covering digital education, personal data protection, cybersecurity, intellectual property rights, and open access laws. These laws contribute to creating a safe and flexible educational environment, protect the rights of students, professors, and researchers, and ensure the security of academic information.

Moreover, this legal update will stimulate innovation in digital education and promote international cooperation between Algerian universities and global educational institutions. Ultimately, updating legal frameworks and ensuring the state and universities commit to developing infrastructure and training personnel will enhance Algeria's ability to respond to future challenges and achieve sustainable development—contributing to the creation of a generation capable of adapting to digital transformations and actively participating in the global knowledge economy.

Based on the above, a set of findings and recommendations can be drawn to support the digitization of higher education in Algeria, as follows:

First: Key Findings

1. There is an urgent need to update the legal frameworks managing digitization in higher education, by including laws on data protection, cybersecurity, intellectual property rights, and promoting open access.
2. Digitization has provided greater opportunities for students in remote areas to access lectures and educational resources.

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3. It has contributed to reducing the time and effort required for administrative processes such as registration, payment, and issuing certificates.
4. Weak internet coverage in rural areas and lack of equipment in some universities hinder the achievement of comprehensive digital transformation.
5. Inequitable access to devices and internet among students has led to unequal educational opportunities.
6. There is an urgent need to train professors and students on the effective use of digital tools.
7. Universities face technical and security problems such as system malfunctions and weak cybersecurity.

Second: Key Recommendations

1. Improve infrastructure by investing in internet networks and expanding their coverage to include all areas, and provide the necessary technical equipment for universities, especially in remote areas.
2. Enhance digital training by organizing workshops for professors and students to effectively use digital tools and platforms, while gradually and appropriately integrating technology into educational programs.
3. Achieve digital equity by providing computers and free or subsidized internet access for underprivileged students, as well as offering innovative solutions to ensure everyone's participation in digital education.
4. Strengthen cybersecurity by developing systems to protect academic and administrative data and raising awareness among students and professors about the importance of digital security and how to protect their information.
5. Rely on blended learning by combining traditional and digital education to ensure human interaction and maintain education quality.
6. The need to update higher education laws to comprehensively include aspects of digitization, including e-learning, personal data protection, and intellectual property rights.
7. Develop clear legislation to regulate cybersecurity in educational institutions and protect digital academic content.
8. Encourage international cooperation by enhancing partnerships with international universities and educational institutions in the field of digital education, enabling the exchange of experiences and modern technologies and benefiting from successful international digitization experiences in ways that suit the specific context of the Algerian educational system.

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