



THE INFLUENCE OF DIGITAL TECHNOLOGIES ON RESEARCH DEVELOPMENT IN ACADEMIA

HASSAINE Oumria

Aflou University Center, Algeria

o.hassaine@cu-aflou.edu.dz

Research Laboratory of Legal and Economic
Sciences, Aflou

MADANI Abdelkader *

Aflou University Center, Algeria

aek.madani@cu-aflou.edu.dz

Research Laboratory of Legal and
Economic Sciences, Aflou

Send Article Date: 17-07-2025

Date of acceptance of the article: 26-08-2025

Abstract:

In recent times, higher education has witnessed a profound move toward digitalization, marked by the steady adoption of modern technological tools within academic settings. This shift has been largely driven by the expansive use of the Internet and the continuous growth of online learning platforms. Additionally, numerous student-oriented applications have emerged, aimed at simplifying access to educational content and fostering better engagement between learners and their instructors.

Simultaneously, universities and academic institutions have begun to leverage digital tools in their administrative and governance processes, leading to greater efficiency and enhanced institutional outcomes. This digital evolution caters to the increasing demand for remote education, encourages more adaptable teaching methods, and equips both educators and students with the digital competencies needed to thrive in a contemporary academic environment.

key words: Digital transformation, tertiary education, virtual environments, e-learning systems, academic content access.

* MADANI Abdelkader.



Introduction:

The information revolution that the world is currently experiencing has forced all sectors to integrate it, and the higher education sector is considered among the most important of these sectors that have adopted a strategy and policy in order to modernize it and achieve the quality of scientific research, and this is by introducing digitization into the various functions that it performs in order to develop higher education and scientific research. Flexibility and speed in performing tasks and elevating the Algerian university to the ranks of major universities

In order to ensure this, the Algerian University, like other universities, has begun to shift towards digital transactions in various areas related to scientific research and pedagogical activity through an initiative by the Ministry of Higher Education and Scientific Research to activate the digital space under the book “Zero Paper” by adopting many measures. And the procedures that resulted in the adoption of digitization in the sector

The Algerian state has devoted attention to the legal and regulatory framework for digitization in the higher education sector through the establishment of the Directorate of Networks and Digitization Development pursuant to Executive Decree N°. 21/134.

Issued on April 7, 2021, the decree outlines the organization of the central administration of the Ministry of Higher Education and Scientific Research. Although transitioning to digital management is not an easy task and is fraught with challenges and obstacles, Algeria has sought to adopt this technology to advance higher education and scientific research. It has made

efforts to provide both material and immaterial resources, in line with the requirements of the digital environment.

In order to be able to understand the experience of digitizing higher education and scientific research that Algeria has undergone, we present the following issues: To what extent has digitization been activated in the higher education sector in a way that ensures achieving the country's orientation towards digitalization? Nah As an alternative option to advance the university situation The Algerian?

SECTION I : What is digitization in the higher education sector?

The concepts related to the term digitization vary according to the framework in which the term is used. Jurist Charlotte because will define it: "It is an approach that allows the transfer of data and information from the analog system to the digital system." (Ahmed, 2009, p. 18)

While Doug Hodges presents another concept in which digitization is considered a procedure for transforming the intellectual content available on the traditional physical storage medium.

First Requirement: Defining the digitization of higher education

Digitization in higher education has had several different definitions, including the definition that refers to realizing organizational change through its cycle based on digital technology and business models that aim to improve the



performance of the educational institution and provide better customer service. In this case, the student is the customer.

It also means everything used in the field of higher education in terms of information and communication technologies, which are used for the purpose of storing, processing and transferring information from one place to another, which works to develop and improve the educational process by all modern means such as the computer and its software, Internet network technologies such as electronic books, databases, Encyclopedias, periodicals, educational websites, e-mail, and distance education.

Second Section: Digitization in Education

The concept of digitization goes back to many historical developments in information facilities and institutions to conduct some library activities after the introduction of the computer into them, in all of the United States of America and Britain since the 1950s, according to what was stated in the Harter Report, through the results achieved, the disappearance of paper card records to be replaced by electronic records, but it allows libraries By participating in a network of records and exchanging them to replace electronic records in the field of collaborative indexing.

This is for the purpose of making all sources searchable via the Internet as a space for information and knowledge in libraries, and then extending to many meetings between the major powers to digitize libraries by intensifying the linking of numbers between various libraries with the intention of expanding knowledge to the widest limits, after many meetings between these powers, the most important of which is a meeting

Brussels in 1995 to support development in the economic, social, scientific and cultural fields, which the United States of America adopted, with funding from the National Science Foundation and the space agency of the Ministry of Defense. This project includes the establishment of digital libraries that contribute to the higher education sector and scientific research with the support of active institutions in the United States of America. (Al-Kubaisi, 2008, p. 6)

The second requirement is reasons digitizing the Higher education and its importance

Here we will try to study each of the reasons driving digitalization events in higher education and determine its importance for the sector.

The first section: Justifications for the digitization of the higher education sector

The reasons for the digitization of the educational system are due to several reasons that can be summarized below

Firstly: Enhance access

This is done by identifying the group of beneficiaries, as it is natural for a private institution to focus on specific needs and target a specific category of users. As for a public institution, it needs to meet the different needs of a broader category of beneficiaries.

The technical requirements for digitization depend on how the digital image is intended to be used (for example, does the amount of information captured during digitization set limits on the use of digital images?



Secondly: Facilitating new forms of access and use

In this context, the use of collection materials—such as manuscripts, archives, maps, works of art, rare books, and others—is enhanced.

It cannot be viewed in its original form except by visiting the repository

- It has been damaged and therefore it is necessary to use artistic techniques to restore its content
- It is preferable to facilitate access to it in a simpler and more efficient manner by using computer technologies such as Optical Character Recognition (OCR) or text encoding of converted content.

Third: Preservation

When the digitization process relates to materials that are vulnerable to damage, the primary goal is to create copies on a medium that preserves these materials for a long time. In this case, the selection process is not done by request, and therefore these copies must meet the needs of current users and potential users in the future and be of a high quality. Of quality and possesses a physical presence that can be maintained over time.

Enhancing access to information and facilitating the use of new forms of data availability and utilization are among the main objectives of digitization, while also ensuring the preservation of content. However, this does not mean that digitization is the sole method of preservation, but it plays a positive role by providing digital copies that help reduce the risk of damage or corruption to original materials (Jaddou, 2015, p. 73).

The second section is important Higher education summit

For digitization in the higher education system its great importance can be summarized in the following points:

- Providing access to information in a wide and in-depth manner, including its origins and branches
- The ability to print information from it when needed and issue an exact copy of it
- Ease and speed of obtaining knowledge and information from its vocabulary
- Reducing the costs of obtaining information and saving time
- Obtaining information in audio, video, and colors as well
- Possibility of integration with other means of audio, image and video.
- Forming interactive communication networks for concurrency, decentralization, connectivity, mobility, publicity, popularity, diffusion and Globalization (Mounir, 2011, p. 174).
- It is also distinguished from other technologies by reducing time and space and sharing intellectual tasks with the machine.

SECTIONII : the reality of its digitization system Higher Education

Studying the reality of the digitization of higher education requires identifying the areas of digitization in the higher education sector, as well as studying the obstacles facing digitization, while highlighting the ministry's efforts to reduce these problems and obstacles, as follows:



The first requirement: Areas of digitization of higher education and scientific research

The Ministry of Higher Education and Scientific Research has ensured the implementation of the digitization process in a way that covers all areas included in the sector, whether administrative or pedagogical, and this was done as follows:

Branch the first: Digitizing university records

The Ministry of Higher Education and Scientific Research has allocated unified websites for all new successful students in the baccalaureate, which enables at the same time providing first registration services, directing them to university institutions in an interactive manner, ensuring access to the results of the directives, as well as receiving and studying appeals, so that the final registration process finally ends with their confirmation..

Based on the instructions of the Secretary General of the Ministry of Higher Education and Scientific Research, the national digital platform was also allocated for the registration of students who have obtained a bachelor's degree and wish to enroll in a master's program.

Among the areas covered by the digitization process that affected the higher education and scientific research sector is the candidacy process for the doctoral competition. The Ministry of Higher Education and Scientific Research made a digital platform available to receive applications for doctoral candidacy. This initiative ensures several advantages for applicants, most notably the simplification of application procedures and the guarantee of equal treatment in the processing of candidacy files.

Second section: Digitization of university libraries

By relying on digital technology, university libraries have been modernized through the digital transformation of their collections, with the aim of optimizing the use of their documentary resources—both on-site and remotely—and facilitating access to national documentary materials. A network has been established to enable remote communication between libraries, support their interconnection and interaction, and allow for the exchange of services among them, all while linking them to the national university network and advancing efforts to create a virtual university library.

Section Three: Digitized by the National Documentation System

Ministry of Higher Education and Scientific Research, with the assistance of the Center for Scientific and Technical Research, has decided to establish a national digital documentation system (Sndl), which allows researchers at the Algerian university level to access a reliable digital information base through the digitally processed books, dissertations and scientific journals it contains. Electronic portals have also been created, such as the university libraries portal (Bibliouniv) and the national portal for notifications of dissertations. Algerian Scientific Periodicals (ASJP) is a portal for inclusion within the framework of a national system for scientific and technical information. It was established for the purpose of protecting researchers and protecting their intellectual product from the fake and opportunistic publication sites of some publishers (Awatif Bouterfa, 2021, p. 434).

Section Four: Pedagogical management and university services management number



Following up on students' paths, administering exams, and issuing certificates and their appendices is done through digitization at the level of institutions of higher education and scientific research in Algeria. The management of university services, including accommodation, food, and transportation, has also been digitized. A website has been designated to register new students who wish to benefit from these services. (Awatif Bouterfa, 2021, p. 436)

Section Five: Section Five: Pedagogical Production through Digital Tools

In an effort to renew pedagogical content, teaching methods, and curricula, recent initiatives have focused on the production of digital and interactive educational materials. These efforts aim to support in-person instruction in universities, national schools, and higher institutes by developing online lessons for the benefit of regular students who are registered on the university's website. This platform enables students to access and make use of digital pedagogical resources available online.

Section Six: Digitization of higher education institution management

Within the framework of technical support for the process of managing higher education and scientific research and promoting the use of digital means in management, the latter issued Ministerial Resolution No. 50 of 2018 stipulating the establishment of a committee charged with technical support for the process of digitizing the administration of higher education and scientific research, which was granted several powers, including supporting the accompaniment of organizational

endeavors, as well as Proposing all measures that allow dividing the progress of objective processes into implementation in order to generalize electronic administration and also encourage every process aimed at modernizing governance.

The second requirement: Obstacles to implementing the digitization of higher education and scientific research

Despite the keen and continuous efforts of the Ministry of Higher Education and Scientific Research and its commendable efforts in the process of digitizing the sector, many obstacles still stand as a barrier to the success of the process of digitizing all fields and activities of higher education and scientific research. Among the obstacles there is an obstacle from the organizational, legislative, and technical aspects. , financial and human, and we will discuss them below Come.

Firstly: From an organizational standpoint

The organizational obstacles that prevent the proper implementation of digitization projects at the level of the higher education and scientific research sector can be summarized in the lack of clarity of the policy pursued by those in charge of managing the higher education sector with regard to the two numbers strategy in the sector. We also see the absence of a link between digitization, a goal that the guardian ministry aspires to achieve and reach. Through it, to renew the concept of electronic management, and to show our number as a field project that requires technical and material supports and human competencies to make the smooth transition towards adopting the digital model in the management of the higher education and scientific research sector successful, as we find that the Ministry spared no effort in



organizing the digitization process, but this assistance was incomplete due to the absence Pre-planning that would create an integrated digital environment with effective field dimensions

Secondly: From a legislative standpoint

One of the most important obstacles that we believe have contributed to the faltering process of digitization of the higher education and scientific research sector is the lack of a comprehensive legal system that frames the digitization process. Referring to the official bulletin for higher education and scientific research starting from the year 2007 until now 2019 We found that the decisions related to regulating the process of registering the shortage of higher education and scientific research are few and far between in terms of the date of their issuance, and this is not in line with what the digital transformation requires in terms of keeping pace with legislation and the continuous nature of the variables of the digital environment. This is what created the incompatibility of the old legislation with the new requirements required by the digitization process.

Third: From a technical and financial standpoint

The obstacles to digitization are not limited to the regulatory and legislative side only, but we also find aspects related to the technical side, most notably the weakness of the necessary infrastructure, the inadequacy of the available digital devices, the rapid and continuous modernization of technologies, whether in their material or software aspects, and the insufficient financial allocation allocated to keep pace with the continuous development of digitization technology.

It is also considered one of the prominent difficulties: the insufficient budget allocated to prepare the infrastructure necessary to create a digital environment and the lack of financial allocations for its development, renewal and continuous monitoring, in addition to the weakness of the budget for training employees in the field that has embraced digitization.

Fourthly: In terms of human competencies

It is considered one of the most difficult obstacles to the digitization process. We find weak information efficiency among many of the benefits of digitization processes at the level of the higher education and scientific research sector, whether administrators, professors, or even students. There is also a fear of integrating into the digital transformation environment due to their lack of confidence in their competencies, in addition to computer illiteracy among a group. A large number of employees, which hinders the proper implementation of this digitization process. We also notice the lack of programs organizing training courses in the field of digital technology, which severely hinders the process of digital transformation at the level of the higher education and scientific research sector.

The third requirement: The efforts of the Ministry of Higher Education to modernize its sector

In this context, the Ministry of Higher Education and Scientific Research emphasizes the use of all means within the framework of digitizing the educational system for the following:

Firstly: Ali's education is of recognized quality

The Ministry seeks to strengthen the position of higher education institutions and to rise to the international



classification. Digitization gives them this possibility. It provides them with opportunities to make their tasks more attractive by allowing students to learn and experience, as well as professors to implement stimulating and diverse teaching and evaluation curricula.

Secondly: Scientific research that generates value

The Ministry aspires for higher education institutions to become more competitive, which enhances their presence and ability to innovate at the international level of research. Therefore, research remains that interacts with the outside world and responds to the needs of the market and society, as the possibility of digitization is essential for them, which helps them develop their competencies. At the international and national levels

Third: An environment that encourages learning

This is demonstrated by creating a comprehensive, integrated environment that enhances enthusiasm and learning by focusing on improving the skills of professors in this field and enhancing as much as possible the student's independence at the academic level by providing him with the latest tools at the digital level or the digital space.

Fourthly: Modern engineering

It is important to highlight the Ministry's ambition to create an open, technologically advanced, and securely managed ecological environment that encourages integration. Equal attention is being given to addressing compatibility issues essential for the exchange of digital tools and systems. These challenges are significant, as digitization will inevitably give rise

to new needs, workplace behaviors, and operational requirements — all of which are expected to lead to fundamental transformations within the higher education system.

The Ministry of Higher Education and Scientific Research is determined to make digitization a basic condition for every pedagogical activity or research related to governance within university institutions and the educational system as a whole. However, in order to determine the chances of success of this project, the goal raises questions that need clear and gradual answers regarding the vision that falls in the long term with the aim of Effective integration of digitization into higher education, scientific research, and modern university services in order to truly support student concerns.

Conclusion:

As a conclusion to what was discussed, we conclude that Algeria's strategies in digitizing education and the educational system are based on a set of precise steps, represented by integrating this number into your choice to develop and reform the higher education and scientific research system and dedicate it as an effective mechanism to modernize it and ensure its quality in line with the goals of this system. In this context, we have achieved To a set of conclusions and recommendations that we decided to present in the form of paragraphs as follows

Between the conclusions, we conclude that we conclude the following:

- ✓ This number is for university registrations, and in this context, the Ministry of Higher Education and Scientific



Research has allocated a national digital floor and has included specific and unified sites for university registrations for those who have passed the baccalaureate degree and for registrations for master's training and even nominations for the doctoral competition, as well as numbers for pedagogical management and use of university services.

- ✓ Working to invest in the field of renewing pedagogical content, teaching methods and curricula through producing digital pedagogical content and interactive content and supporting training in universities, national schools and higher institutes..
- ✓ Implementing a national digital Tewfik system with the assistance of the Ministry of Higher Education, Scientific Research and Assistance, and its Research Center in Scientific and Technical Media..
- ✓ Relying on the use of digital technology to rehabilitate university libraries through digital conversion of their collections and facilitating access to their documentary resources.
- ✓ Our number is considered one of the modern mechanisms for reconsidering pedagogical activity on the one hand and scientific activity on the other hand. Positive results have emerged by facilitating pedagogical work and providing digital spaces that guarantee achieving the quality of scientific research at the Algerian university.
- ✓ The adoption of digital platforms has greatly contributed to alleviating the pressure on employees of the administrative departments of universities, who were suffering from

pressure due to the significant number of students waiting to benefit from university services.

In light of these results, we suggest presenting some suggestions that may be useful for activating digitization in the university environment

- Paying attention to the legislative framework regulating digitization and electronic dealing by issuing a special law for the “I” number, which expands on the various digitization processes and procedures, as many countries of the world have done.
- It is necessary to pay more attention to the digital process, not only as a slogan, but in reality, by providing the necessary capabilities and techniques for this, in order to avoid the malfunctions experienced by various digital networks.
- Training administrators and professors in the field of digitization and the technical information they need
- Educating university students about the importance of the digital space and its necessities for developing various fields to achieve the so-called digital student
- To carry out advertising campaigns in public spaces and across various digital platforms, highlighting the services they offer to the university environment.

Footnotes

Ahmed, A. F. (2009). , Digitization Inside or Outside the Information Institution: A Study in Problems and Selection Criteria, , 2009, Issue 04,. *Information Studies Journal*, pp. pp. 08-11.

Al-Kubaisi, A. (2008). *The development of automated systems in libraries from computing to Arabic virtual digitization*. Yemen.



- Awatif Bouterfa, O. A. (2021). The imprint of digitalization on the interface of higher education and scientific research in Algeria No. 1, Volume 6, Algeria, . , *Research Journal*,.
- Briza, B. (2022). Digitization and Its Role in Modernizing Higher Education in Algeria. *article published in the Journal of Public Service Quality for Sociological Studies and Administrative Development*, 02(02), p. 72.
- Jaddou, N. (2015). Digitization of the Arabic Language: Professors and Students of theas a Case Study. Arabic Language and Literature Department at Bouira University , Bouira.
- Mounir, A.-H. (2011). */Digital Libraries and Electronic Documents Bulletin*. Constantine: Dar Al-Maia for Publishing and Distribution.

Bibliography

Books:

- Al-Kubaisi, A, The development of automated systems in libraries from computing to Arabic virtual digitization. Yemen, 2008.
- Jaddou, N. Digitization of the Arabic Language: Professors and Students of the Arabic Language and Literature Department at Bouira University as a Case Study. Bouira, 2015.
- Mounir, A. H, Digital Libraries and Electronic Documents. Constantine: Dar Al-Maia for Publishing and Distribution, 2011.

Articles:

- Ahmed, A. F, Digitization Inside or Outside the Information Institution: A Study in Problems and Selection Criteria. *Information Studies Journal*, N° 4, 2009.
- Awatif, B, & Bouterfa, O. A, The imprint of digitalization on the interface of higher education and scientific research in Algeria. *Research Journal*, N° 6, 2021.
- Briza, B, Digitization and Its Role in Modernizing Higher Education in Algeria. *Journal of Public Service Quality for Sociological Studies and Administrative Development*, N° 2, 2022.