



Digital Innovation and Higher Education: The Inevitability of Inclusion and Employability

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Abstract ;

This research paper aims to explore the latest developments and mechanisms of modern scientific research in light of the technological revolution that the world is witnessing. This revolution has brought about a qualitative leap at all levels, posing major challenges to the university as the cradle of research and knowledge. These challenges include fostering and keeping pace with these developments, engaging with their most important technological achievements, and working to invest and utilize them in the field of scientific research. This includes electronic media and the most important digital innovations, which have become essential tools in the research, teaching, and learning process.

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1. Introduction

The world is witnessing unprecedented developments and events in all fields, which in turn affect the level of thinking, creativity, and innovation in one way or another. This opens the door wide to the technological wealth that has become, thanks to its products, to control information through modern means of communication. This has made countries and societies enter into a competition to create and innovate at the level of modern mechanisms and seek to employ them in various fields, especially in the field of higher education and scientific research, which has become necessary to break out of the mold of traditional frameworks and keep pace with modern methods and technologies, especially what is known as the digital age and information. The university found itself facing major challenges in a time when electronic methods and means prevailed, which can achieve gains that benefit the student, researcher, university, and economy. It saves them time, money, and technology, which qualifies them to occupy the highest positions, through the adoption of an integration policy and methods of employment.

The university, as a center of scientific radiation, works to ensure quality and achieve welfare, security, stability, and prosperity, and to drive economic development. This has inevitably led it to keep pace with developments and innovations in the field of information and how to employ and distribute it to partners. For this reason, it has been and still is a field of experiments for ideas and

research projects to serve digital creativity on the one hand and benefit from it on the other. This is reflected in the various digital products that the university has invested in, such as the Internet, social media platforms, and various programs and platforms that can strengthen the foundations of scientific research and link the relationship between the student, teacher, and university in various crises that can affect the performance of scientific research within the university environment, and facilitate the process of receiving lessons and communication. In the face of crises such as the Corona pandemic.

What technology has produced in this digital age of ours calls for us to stop at an important problem, which is the extent to which higher education deals with digital innovations. This stops us in front of some questions that we cannot do without:

- To what extent can digital innovation and modern digital innovations be reconciled within the university environment?
- What are the ways of employing digital creativity within higher education?

1. Concepts and Definitions

1.1. Digital Innovation

Digital innovation (Digital Innovations) is one of the dimensions adopted in the assessment of the digital vitality of countries according to the Digital Evolution Index developed by the Fletcher School at Tufts University in partnership with Mastercard. Hence, digital innovation

is the process of using digital technologies and strategies to create new products, services, processes, and business models that can contribute to achieving satisfactory results at all levels, starting from considering the accuracy and quality factors related to the following elements:

- **Impacts:** Represented by the extent to which the results of digital innovation can be crystallized and highlighted within the social environment.

- **Access to innovation:** This highlights the importance of innovative products and their ability to spread and expand on all levels and scales, and to the furthest extent that affects other geographical areas of societies.

- **Inputs:** They are represented by the creation of sound components and tools to ensure the process of growth and enhance the bonds of civilizational development.

- **Availability of talent:** This is one of the most important elements that should contribute, especially human resources that have the spirit of initiative, innovation, creation, and creativity that is dedicated to serious and distinguished research, and paves the way for every effective digital product. (review, 2020)

Since higher education is one of the most important pillars on which indicators of success, progress, and prosperity are built, it has become imperative for countries to keep pace with the various emergencies occurring on the global

scene, from digital technological accumulations, and to adapt them to research and education technologies by investing in the most important digital products and employing them in the teaching and learning process, in order to expand the horizons of higher education and open it up to information networks and various technological media that can drive the learning process towards a bright future.

(And accordingly, it is necessary to develop the university's digital environment through unified information systems and applications that are generalized to all university institutions. It is necessary that the digital field be in the service of governance in order to control the course of study, grant certificates, manage classes and groups, and use the time of professors ...) (Report, 2019)

This allows those working in the field of higher education to develop their personal capabilities and control modern technologies that have become today's necessities to keep pace with modern teaching methods and approaches that have become largely dependent on digital mechanisms and media, whether in research or in education or in communication between the student, the teacher, and the administration, which facilitates the process of reception, research, and communication in comfortable and effective conditions.

2.1. Definition of Digitization

Digitization can be defined from the perspective of converting and reformulating knowledge products and

scientific data into digital form, using various technological means, such as computers and scanners, for formatting, reorganization, and storage, for the purpose of using them in various fields and in very advanced ways. (Digitization refers to the conversion of continuous analog signals to pulsed digital signals. In library and information science, digitization refers to the process of creating digital texts from analog documents.) (Hadi, 2011)

2. *New Technologies in Higher Education*

Here lies the importance of digitization in the field of acquiring and providing information in various fields, ensuring its presence and rapid spread among administrative and educational institutions, especially the university, which relies heavily on digital books for preparing lessons, scientific research, and graduation theses.

The field of higher education is open to all global developments and modern technological products that are indispensable to invest in, given the technologies and software they contain that can change the pattern of education and research through the mechanisms and technological media that have invaded the world of higher education, and have become significantly affecting it through the Internet and various search engines, and different means of communication and interaction that have opened the way for those working in the field of education to receive, participate, interact, and exchange information and experiences.

And these technological products have greatly contributed to shortening time and effort, and produced a comprehensive scientific and knowledge acquisition through their use of visual clips, music, pictures, and drawings...

And due to the flexibility of dealing with these media, and what they offer in great services to society and the university, we must ask about their main source, the field in which they were raised, and the most important elements used in them, as some believe that they stem from three basic elements produced by the technological and information revolution, namely: the computer with its automatic systems, communications, and the audiovisual field, where we can use sound and image instead of paper prints.

Experiments have proven that learning through listening gains a person 20% of knowledge and delivery and watching 40%, which allows for deepening education and learning in the individual and staying for a long time, so the learner, whatever his level and at whatever stage he is, must deal with what is visible and audible. (Samia Khawatra and others, Digitization: A Guarantee for the Quality of Higher Education and Scientific Research and Achieving Sustainable Development - A collective book within the proceedings of the international conference, Vol. 2, February 21-22, 2021, Boumerdes, Algeria, p. 82)

And thanks to these technologies, the quality of the educational process is improved, especially the global Internet, which is a means of storing information and an endless source for it, which has

made the world rely on it at the present time in education, dialogues, holding virtual conferences, and exchanging messages, data, and information...

3. The University and the Digital Dimension

1.3. Developing New Parallel Digital Dimensions

The process of revitalizing higher education and the university as a whole cannot be achieved except by creating parallel tools that are also at the service of the sector's infrastructure, including teachers, pedagogical teams, technicians, and administrators, in order to ensure the smooth running of institutions, impose good and effective education, and thus achieve innovative acquisition and training, by investing in various digital mechanisms, such as e-learning platforms, online seminars, virtual classes, and distance learning. (In order for the digital project to be a means of achieving this transformation, there must be leadership that owns the project and directs it towards solving problems. It is necessary for each university president to be an activist and mobilize teachers and technical teams for digitization that targets solving the problems that hinder quality), therefore it is necessary for him to do so by considering this a strategic goal to develop the capabilities of research professors and students from a position of digital consumption to a position of producing digital solutions, technologies, and uses for the benefit of quality and training.

2.3. The Necessity of Keeping Pace with the Era of Digital Education

The world is witnessing an astonishing transformation in the level of digital innovation and information technology, which has become one of the most important pillars adopted in scientific research, which necessitates its presence within the university environment through the employment and investment of various technological products, and keeping pace with social and economic changes and the various major challenges facing societies.

This calls for moving away from traditional educational patterns and goals and adopting digital educational methods and goals. This enhances the quality of education, creates equal opportunities for everyone to achieve educational goals regardless of geographical location or social level, and gives the student the opportunity to learn independently and effectively, and meet his individual needs.

Thus, digital education can determine priorities and reduce the proportion of expenses that may burden students through supplies, research, and books that are not available in university libraries, requiring arduous research and strenuous travel, and consuming time and effort, whether within or outside the country.

Digital education contributes to the design of curricula that combine various sciences, which ensures the expansion of knowledge, the comprehensiveness, diversity, and abundance of scientific and knowledge acquisition, and thus enhances the means of developing scientific competencies, not only on the pedagogical

level but also in the field of management, organization, and programming.

This saves time and effort in order to focus on the interactive educational process between the teacher and the student. This undoubtedly leads to increasing the efficiency of education and developing digital skills for both the student and the teacher, which may benefit education, the university, and the labor market.

This is done by creating new opportunities for innovation in education and employing modern technologies such as artificial intelligence and virtual reality to improve the quality of education and the student's ability to learn. (It is worth noting that the European Union has presented a framework for excellence in the fields of ICT uses... It states that the skills of using and benefiting from ICT enhance the value of the institution and are considered a measure of the skills of individuals and hence their competitiveness. Therefore, European Union countries saw the need to re-plan individual skills in the direction of raising ICT usage skills, so that the maximum benefit can be taken from the digital transformation.) (Ghada Musa, Reforming Higher Education and Keeping Pace with the Era of Digital Education - Part Five, <https://www.masrawy.com>, Date of inclusion: 02/19/2019, Date of access: 05/15/2022)

This is what developing countries must follow if they want to catch up with developed countries and keep pace with the latest developments in digital innovations and transformations, which

are indispensable for reviving the dynamism of research, competition, and raising the value and quality of education within the university.

3.3. Developing the Digital Field for Better Engineering and Pedagogical Approach

It is clear that what the world has reached today in the field of technological development and the emergence of various media and communication tools and their clear implications for the labor market, educational dynamics, and various organizational processes across various institutions, has made these modern mechanisms and digital media occupy a large part of the attention of countries and societies, which have sought to employ them in all sectors in order to give a new breath to services, economic growth, and market dynamics. (Artificial intelligence, digital platforms, digital security, big data, as well as the emergence of modern technological tools, will make the digital revolution have a great impact on changing the horizons of work and professions radically in the coming decades.) (raport, 2019)

From this perspective, higher education will face major challenges to keep pace with this tremendous technological revolution and its most important implications for digital transformations and the educational process that affects all aspects of activity, practice, and research that falls on the shoulders of university students, who will inevitably find themselves facing the inevitability of integration and proving their capabilities by entering the experience and innovation

in the face of the digital transformation that the university is witnessing in its various specializations, which necessitates the need to work and persevere, and raise the pace of education quality by integrating what is digital and creating channels between digital products and the rest of the organizational structures in order to create qualitative dynamics at the level of the pedagogical aspect.

(The digital field should pedagogically contribute to reconciling the democratization of higher education and demographic growth on the one hand, and quality on the other, by offering hybrid training courses in order to create a new and innovative form of training). This, of course, can only be achieved through the effective use of technology and its good use in the teaching and learning process, which requires the teacher and the student to acquire techniques and skills that facilitate communication and interaction, and receive lessons through the available digital media in an appropriate and effective manner.

4. Digitization and Higher Education

There is no doubt that digitization has a great impact and a prominent role in raising the pace of research and the quality of education, as it has produced digital media, modern software, and technologies that can drive the wheel of development by supporting the process of teaching and learning and enhancing the importance of information and communication technologies in order to preserve information.

Thus, it facilitates scientific research and knowledge acquisition through storing, processing, retrieving, and transferring information from one place to another. (It works to develop and improve it using all modern means such as computers and their software, the Internet, databases, encyclopedias, periodicals, educational websites, e-mail, voice mail, written and voice communication, video conferences, virtual classrooms...) (Zeid, 2007)

All of these aforementioned media can save time and effort, and pave the way for research for students interested in collecting and obtaining scientific material in the best conditions through various search engines available on the Internet and social networks that facilitate communication and interaction and receiving information with all accuracy and honesty.

1.4. Requirements for achieving digitization in the higher education and scientific research sector

In order to meet the requirements of digitization and keep pace with the digital transformations in the higher education sector, it is necessary to consider the various pillars on which these transformations are based, namely:

-Investing in various modern technologies and the most important digital media in the field of information and communication and their proper use in the educational process. This requires the intensification of efforts and the intensification of training processes in the field of automation.

-Organizing awareness-raising courses in the field of technology and digital transformation for the benefit of the university family with all its users and students. This should highlight its effective role in information and communication, and clarify what qualitative development it can bring about at the level of quality, education and scientific research, as well as contribute to economic and social development.

-Working to provide the equipment, facilities and material and technical means that will lay down the foundations for digital innovation, such as the Internet, digital media and various means that fall within the infrastructure to achieve digitization of the sector.

-Working to create the human resource that will keep pace with digital products, by refining talents and developing skills through training courses and workshops in the field of automation and information and communication technology.

-Exchanging experiences with leading countries in the field of digital innovation, and striving to benefit from their expertise and experiences through internships and scientific and training missions. (Mabrouk, 2020).

5. Higher education and the introduction of information systems

One of the most important strategies adopted at the level of the higher education sector is the introduction of information systems in order to keep pace with the requirements of digitization to ensure quality in higher education.

Therefore, universities and educational institutions have made use of what is available in terms of media and software, and have worked on developing and employing them to serve the sector and the educational process at all stages, as well as scientific research and the preparation of theses and the completion of projects that cannot in any way dispense with information systems in scientific and cognitive attainment.

-The Progrès system (système progres): It is a national digital platform that includes digital databases that track the academic progress of university students in the first, second and third cycles, as well as manage university services for students with regard to housing and grants, in addition to managing the professional and pedagogical path of university professors. The process has been extended to programming theses discussions in a paperless format, where all documents and files are deposited by students via Progrès, where the file is monitored and reports are prepared until the discussion, not to mention the process of filling in the marks, depositing appeals by students, and all the promotion processes that concern professors, and other services provided by this platform, which has greatly contributed to solving some of the obstacles that plagued students and teachers, including the hassle of commuting, costs, and effort...

-University library management system: système normalisé de gestion de bibliothèque It is a digital system for managing university libraries created and developed by the Scientific and Technical Information Research Centers (CERICT)

and operates on local and internet information networks. This computer program is designed to manage various operations within the university library, relying on modern methods and techniques, including indexing and classifying books through digital files that facilitate the search process for students by providing them with the available titles through the electronic services it provides, which undoubtedly helps to raise the level of skills and increase the quality of services within libraries, and manage resources effectively and systematically, and save effort and time in reaching information on various research topics, not to mention the possibility of providing accurate and reliable statistics on the use of the library, and strengthening cooperation between libraries.

-The national online documentation system: système national de documentation en ligne It is a system created by CERICT for digitizing doctoral and master's theses and searching for them online, known for short as SNDL. This digital platform, which has proven its effectiveness in providing access to a large number of scientific and information resources in Algerian universities, especially those related to students and researchers in all specializations, by providing scientific and information material, encouraging the process of serious research and innovation, and opening channels of communication and contact between researchers in Algeria and abroad to exchange experiences, establish partnerships and enhance cooperation opportunities in the field of scientific research. One of the most

prominent features of this system is the possibility of listing a huge collection of electronic books, scientific articles, university theses, databases, and research reports.

-The Algerian portal for scientific journals: platform Algerian scientific journals It is a digital platform known for short as Asjp dedicated to scientific journals, where scientific research is published in all journals, created by the Scientific and Technical Information Research Center (CERIST) and is technically managed by the aforementioned center and scientifically by the editors-in-chief of the journals. This portal includes many classified and unclassified scientific journals, providing researchers with the possibility of publishing articles and following the publishing steps through their personal account, and provides valuable services to students and researchers, including: the possibility of counting, knowing and browsing scientific journals in all their specializations and classifications, downloading various published scientific articles with flexibility, and viewing article abstracts in Arabic and foreign languages.

-The pedagogical digital platform: E-learning It is an interactive pedagogical digital platform, where lesson summaries are placed in all their forms, and it is a digital communication tool between teachers and students. It was created by the Moodle development program. This digital platform aims to strengthen the teaching and learning process through the educational services it provides that serve as a link between the student and the

teacher. It also seeks to improve the quality of the educational process by developing technical skills and controlling the use of technology, and working to create and create an effective interactive environment. One of the most prominent features of this platform, in addition to its ease of use and free of charge, is the provision of a huge amount of educational services and tools, such as educational materials and digital content, communication and interaction capabilities, and cooperation tools between students and researchers...

-The professional email: Email institutionnel It is an email used to communicate between universities and between them and the ministry, and to communicate between the administration and professors. It is also made available to students to communicate with professors in the pedagogical field.

6. Effectiveness of digital platforms and the inevitability of integration

The digital movement that the educational process is witnessing through educational and university institutions has left a significant impact on scientific research in terms of depth, quality and accuracy in dealing with information that has become available through digital platforms, which are one of the interactive fields with electronic content management systems through the Internet. The latter links together the various actors in the field of higher education and scientific research, from students, professors and administrators, to exchange information and services, empower professors to publish lectures and propose research and applications for directed and applied work,

and create an interactive space between students by creating a group through social networks.

The launch of the digital platform requires procedures and capabilities that help to create it, such as human resources. In order for any process to be successful, it is first necessary to develop and strengthen human resources, as human capital is one of the most important elements on which the success of the institution is based. Therefore, it is necessary to pay attention to this element by developing its skills and refining its talents, especially in the field of modern technologies that require adaptation to their most important modern products and technologies. Therefore, it is necessary to create a human resource that possesses the technologies that qualify it to keep pace with the technologies required to manage electronic sites, such as managing digital platforms and controlling computer technologies in order to raise the level of the institution to which it belongs, and contribute to improving its visibility and educational level. This, of course, goes through several steps, the most important of which are:

-A web hosting server or what is known as a space on the Internet web.hosting: It is a service that enables the storage and preservation of various files related to electronic sites on a server connected to the Internet, which makes these files available to researchers and students from all over the world, not to mention the reliability, security and update that it provides.

-A special name stone for the electronic platform Domain: The importance of the latter lies in helping to build and strengthen brands, add a kind of professionalism and credibility to electronic sites, and give them a distinctive identity that is easy to remember. It also makes it easy for students, researchers and various visitors to find electronic sites, not to mention improving the appearance of the electronic site in search results through various search engines.

-Draw the plans and shapes that are to be implemented within the site and all the movements and methods of interaction

-The actual design of the plans.

-Implementation by using the Internet and the site that was booked to upload scientific content on it and determine the interaction and communication with the professors.

It is worth noting that it is possible to create a platform for a fee, which can be expensive sometimes, and it is also possible to use free platforms. The most famous e-learning platform is Moodle on the site <https://moodle.org/>, and it can be downloaded on the beneficiary's own site and then start working directly. (Samia, 2021)

There are many ways that enable the creation of educational digital platforms. These methods are represented in the creation of a specialized website for distance education, which requires knowledge of the software tasks and

technologies required to establish a website on the Internet.

6.1. Advantages of digital platforms

-Flexibility and simplicity: Digital platforms offer great flexibility in the educational process, through the search engines available on the Internet, where students can browse many sites that provide a vast amount of information in a short time. It also enables the student and researcher to see the latest news of the university as soon as they access the various links, pages and sites of the university or college. This makes it flexible and easy to deal with, whether by the teacher or the student, as it is available anytime, anywhere. Everything that is written on it from lectures or curricula and scientific measures can be easily modified or updated, and even deleted. This has mitigated the shortcomings of traditional education.

-Variety of media used in education: The educational digital platform allows the teacher and the student to use multiple media, as the lecturer management system program can be used or recorded in audio or visual form as a YouTube video or in PowerPoint form through an explanatory picture and sound explanation. Therefore, it is preferable for the teacher to have the tools to control these media and devices in general, and for the student as well.

-Interactivity and elimination of individual differences between students: The digital platform is considered an interactive environment where users can participate and interact with the educational content and various services

provided by teachers and educational institutions. This highlights the use of digital platforms for all the different technologies associated with the web. Thus, teachers and professors can publish lessons and objectives, set homework, apply educational activities, and communicate with students using various technologies. It also allows for conducting electronic tests, helps in exchanging ideas and opinions between teachers and students, sharing scientific content, and enables communication with all students, which helps in achieving high-quality educational outputs.

-Continuous updating: Digital platforms are constantly updated with new content and new services, and users can be sure that they are getting the latest information and services available.

Content diversity: Digital platforms offer a wide variety of content, from lessons and educational materials to interactive activities, tests, and assessment tools. Users can also choose from a wide range of content that suits their needs and educational level.

-Support: Digital platforms provide support to users through various channels, such as email, phone, and forums. Users can also get the help they need when facing any difficulties.

-Enhancing cooperation between students: Digital platforms allow students to collaborate with each other on projects and assignments, which helps them develop communication and teamwork skills.

6.2.Objectives of digital platforms

The objectives of digital platforms vary greatly and differ from one platform to another. However, in general, digital platforms contribute to the generalisation and deepening of students' understanding of the scientific material, as they help everyone to follow and review lessons. Thus, receiving lessons through digital platforms has eliminated many of the negatives of the traditional educational system. This has led to a focus on developing cognitive aspects, performance and mental skills, providing opportunities to deal with diverse sources of information and achieving educational goals. These goals are achieved through reviewing many of the literature, knowledge and information sources related to the field, as well as by following up on the work of seminars and conferences. Some of the objectives of digital platforms can be listed as follows:

-Providing information and services: The primary goal of digital platforms is to provide information and services to users in an easy and effective way. This information and services may include news, events, education, shopping, entertainment, and more.

-Communication and interaction: Digital platforms strive to create an interactive environment that allows users to communicate with each other and share their ideas. This is done through discussion forums, comments, private messages, and other communication tools.

-Building relationships: Digital platforms help build relationships between users and

the companies or organizations that manage these platforms. This can be done by providing support services, after-sales services, promotional programs, and more.

-Data collection: Some digital platforms strive to collect data about users in order to improve their services or target them with advertising. This data may include personal information, such as name, age, and gender, or behavioral information, such as the sites the user visits and the products they purchase.

-Profit: Some digital platforms strive to make a profit by selling advertising or offering paid services. This can be done by displaying ads on the platform's pages or by offering paid subscription services.

In addition to these objectives, digital platforms may have other objectives, such as:

-Supporting education: It enables teachers to create virtual classrooms for students to conduct group discussions, send messages, and exchange files between teachers and students. It helps in creating electronic tests, facilitates the creation of many groups in the electronic platform, and also provides a digital library containing learning resources for the scientific content, with the possibility of downloading it to smartphones and tablets. (Maryam, 2010) Thus, it is clear to us that digital platforms provide opportunities for lifelong learning, as users can access educational content and services anytime, anywhere, not to mention using them to raise awareness about social and environmental issues, and support economic development by

providing job opportunities and opening new markets. This is in the context of developing the educational process and scientific curricula within the university through modern and effective digital content in distance education, and investing in various electronic media that enable the dissemination of digital lessons on digital platforms.

8. Conclusion:

The foregoing highlights the utmost importance of digital creative products and the necessity of employing them in the field of higher education by introducing digital means and media such as distance education platforms, and employing various communication and information means and the need to master and deal with them by both teachers and students in order to ensure quality in universities, and to create dynamism in the field of research and access to various scientific publishing media, to create a kind of competitiveness, and raise the level of the university and its scientific value, and thus drive the wheel of economic development, and ensure the means of prosperity and well-being, and job opportunities through companies with the economic environment, and this cannot be achieved except by developing a strategy that is in line with the labor market that today enables it to use and benefit from digital controls that must inevitably be used, which brings us to several proposals and recommendations, which are as follows:

-The necessity of opening up to modern digital experiences of leading countries

and integrating them into the field of higher education.

-Educational institutions must invest in developing their digital infrastructure to provide an educational environment suitable for digital innovation by training students, teachers and the administrative staff of colleges and institutes in the field of digital technologies.

-The need to control modern technologies and communicate even after crises to ensure the continuity of higher education.

-Work on creating and training high-quality digital educational content that meets the needs of students in various research fields, through the development of interactive educational materials.

-Educational institutions must establish links and partnerships with other economic institutions in order to create innovative solutions in the field of digital education.

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