

Ethics of Digital Scientific Communication in Algeria and the Limits of Distinguishing Between Legal Regulations and the Need for Scientific Information

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Received: 11/09/2025

Accepted: 07/11/2025

Abstract:

The study examined the ethics of digital scientific communication in Algeria by addressing the tension between legal regulations governing digital publishing and researchers' growing need for easy access to scientific information. National platforms such as PNST, ASJP, and Web Reviews have played a key role in disseminating knowledge and fostering transparency. Nevertheless, the digital environment has created major challenges, including plagiarism, weak compliance with ethical standards, and infringements of intellectual property rights.

To address these issues, the Algerian legislator has introduced several laws, most notably the Law on the Protection of Personal Data (18-07) and the Electronic Signature Law (15-04). However, the study concluded that the enforcement of these regulations remains limited, given researchers' increasing demand for open access to knowledge and the persistence of technical and legislative barriers. It further highlights the importance of updating legal frameworks, strengthening digital infrastructure, and promoting awareness of digital scientific ethics as a means to achieve a balance between safeguarding intellectual property rights and ensuring the right to scientific information.

Keywords: *Algerian Legislation; Digital Environment; Digital Scientific Communication; Ethics of Scientific Communication; Intellectual Property.*

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I. INTRODUCTION

In the context of the information revolution, digital scientific communication has become a fundamental pillar for disseminating and exchanging knowledge among researchers and scholars. Electronic platforms and digital repositories have provided a wide space for sharing scientific output at both national and international levels.

However, this rapid development has been accompanied by ethical and legal challenges related to protecting authors' rights, ensuring the integrity of scientific research, and combating plagiarism and infringements of intellectual property. In Algeria, despite the efforts made through the establishment of national scientific platforms and the enactment of laws regulating digital publishing and data protection, significant challenges remain, particularly in light of researchers' pressing need for open access to scientific information.

This raises the question of how to achieve a delicate balance between complying with legal frameworks that safeguard scientific production and creating an environment that allows knowledge to circulate smoothly and responsibly. Against this backdrop, the present study seeks to shed light on this issue by adopting an approach that combines ethical, legal, and practical dimensions within the context of digital scientific communication in Algeria.

1.1. Research Problem:

Scientific communication is considered one of the most important branches of specialized communication, aiming to disseminate scientific and technical knowledge on the widest possible scale. However, the rapid pace of technological advancement, particularly with the emergence of Web 2.0, has provided vast opportunities for information exchange through digital platforms, thereby enhancing researchers' and the public's access to scientific content. Yet, this openness has simultaneously given rise to multiple challenges related to weak adherence to the ethics of digital scientific communication, such as plagiarism, violations of intellectual property rights, and the publication of research without prior authorization from its authors.

The Algerian legislator has sought to address these issues by enacting specific laws concerning the protection of personal data, the regulation of electronic signatures, and the security of digital transactions. Nevertheless, these legal frameworks often collide with the imperative of ensuring access to scientific information and facilitating its availability, given its recognition as a fundamental right for researchers and the scientific community.

Accordingly, the central question of this study is: How can a balance be achieved between compliance with the legal regulations governing digital scientific communication and the growing need for open and responsible access to scientific information in Algeria?

From this main question, the following sub-questions emerge:

- What is the current state of digital scientific communication in the Algerian academic environment within theoretical frameworks?
- What role does digital scientific communication play in meeting researchers' needs for scientific information?
- How do Algerian legislations contribute to the regulation, dissemination, and circulation of digital scientific communication?
- To what extent do national scientific platforms such as PNST, ASJP, and Web Reviews contribute to promoting the ethics of digital scientific communication?

1.2. Significance of the Study

The significance of this study lies in its focus on a contemporary and sensitive topic, namely the ethics of digital scientific communication in Algeria, and the challenges it raises concerning the protection of scientific production in the digital age. It highlights the transformations brought about by digital platforms in the processes of producing, publishing, and circulating scientific knowledge, along with the accompanying challenges related to intellectual property, plagiarism, and weak adherence to ethical standards.

The study also underscores the role of Algerian legislation in establishing legal frameworks to regulate such practices, while pointing out their limitations in the face of researchers' growing need for quick and easy access to scientific information. Its importance further stems from its attempt to strike a balance between the legal and epistemic dimensions, by seeking practical solutions that safeguard authors' rights while ensuring the right to access knowledge. Consequently, this study provides an academic and intellectual contribution that enriches the debate on the future of digital scientific communication in Algeria and supports policymakers in developing more effective policies and legislation.

1.3. Research Objectives

The study aims to achieve several key objectives, including:

- Assessing the current state and ethical practices of digital scientific communication in Algeria by examining the behaviors of researchers and academic institutions.
- Identifying the legal framework regulating digital scientific communication in Algeria, particularly the laws related to the protection of digital scientific content.
- Differentiating between the legal regulations governing digital scientific communication and the pressing need of researchers for access to scientific information.
- Exploring the role of national platforms, namely PNST, ASJP, and Web Reviews, in promoting scientific integrity and ensuring transparency in digital publishing.
- Contributing to the scholarly discourse on the future development of digital scientific communication in Algeria.

II. Digital Scientific Communication:

1. The Concept of Digital Scientific Communication:

Researchers "**Chacha**" and "**Karziz**" define digital scientific communication as "the use of digital platforms and electronic databases to publish and document scientific output, facilitating the exchange of knowledge among researchers worldwide and increasing its visibility in the digital space" (Chacha & Karziz, 2019, p. 216).

Researcher "**Seghiri**" defines digital scientific communication as "the employment of modern digital media and technologies to disseminate knowledge and scientific research through electronic platforms, allowing for a broader reach, faster and easier access to scientific information, and enhanced interaction between researchers and the public" (Seghiri, 2019, p. 83).

In general, digital scientific communication can be described as all activities and practices that rely on digital platforms—such as institutional repositories, electronic journals, and international databases—for publishing, documenting, and exchanging academic scientific

output. This enables the measurement of its visibility through indicators such as citation counts, download and access rates, and presence within academic collaboration networks.

2. Scientific Communication and the Need for Scientific Information:

Scientific communication is considered a branch of specialized media that aims to simplify scientific content and convey it to a broad audience at different levels, while maintaining the precision of scientific language and presenting it in a clear and engaging manner that provides direct benefit to the public (Abu Riyash, 2016, p. 45).

Scientific and technical communication takes various forms, including articles, reviews, scientific literature, technical specifications, patent notices, and bibliographic databases, in addition to grey literature, open archives, and online data repositories (Khalif, 2020, p. 103).

While communication serves as the intermediary between scientists (knowledge producers) and the public, the modern information and communication revolution has imposed new roles on scientific communication, aiming to bridge the gap between the two parties and reduce the knowledge divide caused by the absence of channels for scientific dialogue (Durant & Gregory, 2021, p. 5).

Scientific communication is also one of the most important means of promoting scientific culture and raising public awareness of the role of scientific discoveries in individual and societal life, through continuous monitoring of research developments and their positive and negative impacts (Al-Yassin, 2018, p. 89).

At its core, scientific and technical communication seeks to enhance informational awareness among researchers and meet their academic and professional needs. However, limitations of some available tools—such as the lack of information sources, absence of electronic payment methods, or technical issues—may lead some individuals to bypass research ethics, for example, by accessing digital sources without authorization or appropriating the work of others (Trench & Bucchi, 2019, p. 481).

3. Applications of Digital Scientific Communication in Algeria:

In recent years, Algeria has increasingly embraced applications of digital scientific communication as a strategic means to disseminate scientific knowledge and facilitate its exchange among researchers and academic institutions. These applications promote the principle of open access to knowledge and enable researchers to share their findings locally and internationally while fostering transparency and objectivity in scientific publishing.

Nevertheless, these applications continue to face technical and legislative challenges related to communication infrastructure, intellectual property protection, and ensuring the quality of published scientific content. Developing these applications is a crucial step toward enhancing Algeria's position in the digital scientific landscape and achieving a balance between the right to access knowledge and adherence to research ethics.

1. Interaction of Academics with Scientific Social Networks:

Scientific social networks are specialized digital platforms designed to allow researchers and academics to create scientific profiles, publish their work, exchange knowledge, build collaboration networks, and track scientific impact through citations and alternative metrics

(Qasim, 2018, p. 144). Major types of scientific social networks include (Al-Shammari, 2020, p. 215).

2. Scientific publishing networks:

such as ResearchGate and Academia.edu, which are used for sharing articles, building researcher profiles, and interacting with the academic community.

- **Citation management networks:** such as Mendeley and CiteULike, which facilitate reference management and the creation of bibliographic citation lists.
- **Researcher identification networks:** designed to provide a unified digital identity for researchers, such as ORCID and Google Scholar Profiles.

A study by "**Ben Bouzid Hadjira**" revealed that 40.9% of researchers at a particular Algerian university use ResearchGate to publish and exchange their research with local and international colleagues, enhancing scientific communication and creating opportunities for academic collaboration (Ben Bouzid, 2024, pp. 275–288).

2. Publishing in International Scientific Journals:

Publishing in international scientific journals involves making research findings available in peer-reviewed academic journals with global circulation, often indexed in international databases such as Scopus or Web of Science. This type of publication is essential for evaluating research quality and increasing the visibility of scientific output, as it contributes to higher citation rates, improved university rankings, and broader knowledge exchange internationally.

A study by "**Mashhouq**" and "**Adimi**" at an Algerian university indicated that scientific publishing constitutes a strong indicator in global university rankings, accounting for approximately **20–30%** of the overall evaluation. Despite this importance, Algerian universities have yet to achieve high positions in international rankings, highlighting the need to enhance the visibility and global presence of published research through well-planned publication strategies (Mashhouq & Adimi, 2022, pp. 446–457).

3. Building Digital Repositories and Information Products:

Digital repositories are a fundamental mechanism for preserving an academic institution's scientific output and making it accessible to beneficiaries. They also serve as tools for developing diverse services in managing digital materials produced by researchers and institutions, enabling their organization, processing, and long-term preservation (Kerthieu, 2011, p. 123).

Digital repositories are defined as collections that capture and store the intellectual output of one or more academic institutions, including scientific articles, conference proceedings, theses, dissertations, research reports, and studies (Ben Guida, 2016, p. 82).

Soper notes that open-access repositories at universities provide long-term preservation of diverse content, including journal articles, theses, databases, audiovisual materials, and educational files, while ensuring free access (Ben Gida, 2016, p. 83). According to the Glossary of Library, Information, and Archival Terms, a digital repository is a web-accessible database that preserves and provides long-term access to research works, either as subject-specific or institutional repositories (Naji, 2016, p. 28).

These definitions agree that academic digital repositories are online databases that collect researchers' scientific outputs and organize them in a way that facilitates their access and retrieval. Universities and research institutions seek to establish digital repositories due to their advantages, including diverse content formats (text, visual, audio, educational), provision of digital access to scientific output, adoption of content management systems, compliance with international standards, reinforcement of researcher responsibility in depositing their work, and free access to information (Fouzi, 2017).

4. Virtual Presence:

Virtual presence is a key element in enhancing scientific awareness among the public by disseminating knowledge and connecting individuals with technological developments, thus contributing to building a society capable of engaging with human civilization and participating in development (Al-Qafari, 2009, p. 55). The objectives of virtual presence include:

- Supporting informational awareness: It contributes to spreading scientific culture and connecting individuals with research and technological achievements through continuous monitoring of discoveries (Arab Organization for Education, Culture, and Science, 2010, p. 12).
- Encouraging creativity and innovation: By highlighting researchers' and innovators' achievements and enhancing their social status, thereby promoting engagement with scientific disciplines (Al-Qafari, 2009, p. 56).

Moreover, virtual communication plays a role in knowledge dissemination and influencing attitudes and behaviors, which requires media and documentary institutions to strengthen their connections with scientists to attract audiences toward adopting scientific thinking and understanding recent advancements (Al-Mashaqbeh, pp. 16–17).

III. Digital Scientific Communication and Intellectual Property Rights:

The publishing industry has witnessed significant development thanks to the use of automated media, which has contributed to reducing the production costs of scientific and cultural works and expanding the scope of copyright protection. Various technologies, including satellites, video, personal telephony, and the Internet, have facilitated this transformation (Tellier, 2005, p. 45). Tellier asserts that the digital environment relies on three fundamental components: the digitization of information, modern communication technologies, and technical tools that enable users to access information (Tellier, 2005, p. 47).

With the emergence of Web 2.0, publishing became accessible to any user without the need for licenses or prior authorization, offering wide freedom accompanied by risks linked to weak content control. This development prompted states to enact laws aimed at protecting authors' rights and intellectual property in the digital environment (Naji, 2016, p. 28). However, many national legislations have yet to be updated to keep pace with rapid technological advances (Fouzi, 2017, p. 91).

Accordingly, any act of publishing, copying, or storing works via electronic media requires the author's permission; otherwise, it constitutes a legal violation punishable by law, safeguarding creators' rights and ensuring the organized circulation of intellectual production

(Ben Guida, 2016, p. 82). Digital scientific communication has become one of the most prominent tools for knowledge dissemination in the modern era, enabling researchers and academic institutions to share scientific output through digital repositories, electronic journals, and open databases (Ben Guida, 2016, p. 81). This transformation has enhanced the visibility of research and increased scientific citations (Suber, 2012, p. 15). Nevertheless, the broad openness of digital publishing has posed challenges regarding the protection of copyright, especially given the ease of copying and republishing online (Naji, 2016, p. 28).

Intellectual property rights constitute the essential legal framework for balancing the researcher's right to protect their work with society's right to access knowledge (Tellier, 2005, p. 47). The Berne Convention (1886) and the WIPO Treaty (1996) both emphasize the protection of intellectual works in the digital environment. Technical solutions such as Digital Rights Management (DRM) systems have also emerged to regulate usage.

Conversely, open-access initiatives such as Creative Commons licenses provide legal alternatives that allow open publishing while preserving authors' rights. Therefore, digital scientific communication remains a pivotal tool for advancing scientific research, provided that clear policies are established to balance knowledge openness with legal protection.

In the era of digitization, scientific communication has undergone fundamental transformations, making it a strategic tool for disseminating knowledge and facilitating its wide circulation. Digital platforms and electronic databases have provided tremendous opportunities for researchers and the public to access scientific information quickly and efficiently, enhancing the value of digital scientific communication as a primary source for building knowledge societies. However, this development has been accompanied by complex challenges related to intellectual property rights, plagiarism, and the protection of intellectual output from manipulation or unauthorized use. Consequently, safeguarding digital scientific communication has become essential to ensure the credibility of scientific research, protect authors' rights, and achieve a balance between the principle of open access to information and legal and ethical protection rights. This underscores the importance of national laws and international agreements in providing a secure and reliable environment that ensures the sustainability of digital scientific communication and its effective use in advancing scientific and knowledge-based development.

1. Legal Deposit as a Mechanism for Protecting Digital Scientific Communication:

Legal deposit represents a fundamental mechanism for safeguarding works, obligating authors and publishers to submit copies of their productions to official institutions, primarily the national library, for preservation, documentation, and protection of intellectual property rights. With the development of the digital environment, this procedure now includes electronic works such as e-books, software, databases, and audiovisual content, which are deposited either via electronic media (CDs, USB drives) or through official digital platforms (Executive Decree No. 03-301, 2003).

Digital legal deposit aims to document works and establish proof of their existence, protect authors' rights, preserve digital cultural heritage, and provide a national database for cultural statistics (Executive Decree No. 96-298, 1996). Subsequent amendments to Law 03-05 on copyright extended this protection to digital works.

However, the virtual environment has made it difficult for authors to monitor the

circulation of their works, leading to the establishment of collective rights management organizations such as the Société des Auteurs et Compositeurs Dramatiques (SACD) in France, followed by organizations like SUIA in Switzerland and GEMA in Germany. Collective management has proven effective in protecting electronic exploitation of works by collecting and distributing revenues to rights holders (SACD, 2023).

2. Technical Protection of Digital Scientific Communication:

With the widespread distribution of digital content, technical protection has become essential for safeguarding intellectual property against piracy and breaches. This protection relies on various technologies, including encryption to restrict unauthorized access, and Digital Rights Management (DRM) systems that monitor attempts to open digital documents. Electronic signatures ensure message authenticity and integrity, while digital fingerprints provide precise means of identifying the source of electronic messages and verifying their authenticity. Electronic payment systems compensate authors for the use of their works, while technical solutions prevent illegal copying.

Experience has shown that national laws alone are insufficient to address the challenges of the virtual environment, necessitating the adoption of advanced technical tools. Encryption involves two primary stages: first, converting texts into encoded symbols using specialized algorithms, and second, decoding them with appropriate keys. These keys may be secret, public, or hybrid depending on the required security level. Thus, technical digital protection complements legal and administrative safeguards for digital works (ALA, 2021, pp. 33–35).

3. Legal Protection of Scientific and Technical Communication in Algeria:

Digital intellectual property has become a natural outcome of the convergence of technology and creativity in the context of globalization, prompting Algerian legislators to establish specific protections for digital works.

In software, these works are considered literary creations under Order 97-10, establishing a foundational legal framework for protecting software innovation nationally (Journal Officiel de la République Algérienne [JORADP], 1997).

1. Civil Dimension of Protection:

Under the amended and supplementary Order 03-05, authors and holders of related rights have the right to seek judicial recourse against any infringement of their works, including digital works. Article 143 allows claims for compensation for damage resulting from unauthorized exploitation, while Article 146 regulates the confiscation of counterfeit copies and mandates their deposit with the National Office of Copyright and Related Rights (JORADP, 2003). These measures combine civil and regulatory procedures to ensure more effective protection.

2. Criminal Protection:

The legislator also established parallel punitive protections. Article 151 of Order 03-05 criminalizes any unauthorized exploitation of literary or scientific works, including reproduction or dissemination via digital media. Article 152 criminalizes the manufacture, sale, or possession of technical tools used to circumvent digital protection systems (e.g., cracking encryption or bypassing DRM). These provisions represent a qualitative leap, as they protect

not only the final works but also the technical infrastructures safeguarding them (JORADP, 2003).

3. Modern Protection Measures:

In response to the rise of cybercrime, Law 09-04 sets rules to counter attacks on information technology, including assaults on digital university repositories or scientific publishing platforms (World Intellectual Property Organization [WIPO], 2009). Law 15-04 and Executive Decree 16-142 reinforced the legal validity of electronic signatures and the preservation of digitally signed documents, ensuring reliable academic transactions (JORADP, 2015; Ministère de la Poste et des Telecommunications, 2016).

Additionally, Law 18-07 on personal data protection safeguards the privacy of researchers and beneficiaries in the context of digital scientific publishing (JORADP, 2018a). Law 18-05 regulates e-commerce, specifying suppliers' obligations when marketing scientific digital content or electronic licenses (JORADP, 2018b).

Key recent Algerian laws relevant to the protection of digital scientific communication include:

- **Law 18-07** on the protection of natural persons in the processing of personal data: Ensures the protection of personal data for individuals, including researchers and academic beneficiaries, establishing strict rules for processing scientific data linked to identity or research, emphasizing explicit consent and the right to correction or deletion.
- **Law 15-04** on electronic signature and certification: Provides a legal framework guaranteeing the reliability of digital signatures, enabling academic institutions to protect documents and electronic transactions while ensuring the integrity of scientific research in digital repositories.
- **Executive Decree 16-142**: Specifies procedures for preserving electronically signed documents and maintaining their legal validity, aiding academic institutions in archiving and publishing scientific output.
- **Law 18-05 on e-commerce**: Regulates the marketing and sale of digital products, including scientific articles and e-books, imposing obligations on suppliers to protect consumers' rights and ensure transparency.
- **Law 09-04** on preventing and combating information technology crimes: One of the first laws addressing breaches of information systems and attacks on databases, including university digital repositories, criminalizing unauthorized access or disruption of systems.

IV. Digital Scientific Communication Ethics and Available Alternative:

The ethics of scientific communication consist of a set of professional principles and standards that regulate the production and dissemination of scientific information across various media, ensuring accuracy, objectivity, respect for intellectual property rights, avoidance of bias or misinformation, and serving the public interest of both the scientific community and the general audience (Sturgis & Allum, 2004, p. 60).

Abdel Karim Miftah defines scientific communication ethics as the professional and ethical standards governing journalists and researchers in disseminating scientific knowledge, aiming to ensure information credibility and protect it from falsification or manipulation (Miftah, 2019, p. 112). In essence, scientific communication ethics encompass the principles

and standards employed by media professionals and academics in handling scientific information - through publication, documentation, interpretation, and simplification a to maintain scientific integrity and prevent misuse or distortion of knowledge.

Key pillars of digital scientific communication ethics include (Miftah, 2019, p. 115):

- Credibility and scientific accuracy: Verifying information before publication using reliable and peer-reviewed sources, while avoiding exaggeration or manipulation of research results.
- Transparency and accountability: Disclosing data sources, collection methods, and analytical procedures.
- Intellectual property and authors' rights: Proper attribution of ideas and discoveries, compliance with copyright and academic citation laws, and safeguarding the privacy of researchers or study participants while maintaining academic rigor.

Scientific communication ethics naturally extend the principles of research ethics, sharing the core aim of ensuring integrity, accuracy, and objectivity in knowledge production and dissemination. These ethics rely on fundamental principles such as honesty in reporting data, adherence to laws to ensure legitimacy, academic freedom to explore new challenges, and vigilance to minimize methodological and human errors.

Internet ethics represent a participatory, self-regulatory commitment often adopted by bloggers and digital platform users. They closely mirror the ethical standards of traditional media, especially regarding privacy, source verification, and publication validity.

A distinction exists between official platforms, such as universities and research centers, which impose clearer ethical obligations, and blogs or social networks, where adherence is largely voluntary. While the latter are widely used due to their accessibility, they raise legal and ethical issues related to content legitimacy and authorship rights (Nasir & Mahmood, 2023).

Researchers often face multiple challenges during their work, including limited access to specialized materials, time constraints, and research pressures, which can sometimes lead to practices conflicting with scientific honesty.

In this context, Algeria has placed particular emphasis on scientific research in recent years through the establishment of the Center for Research in Scientific and Technical Information (CERIST). CERIST oversees specialized national databases such as the National Portal for Thesis Notifications (PNST), the Algerian Scientific Journals Electronic Portal (Web Reviews), and the Algerian Scientific Journals Platform (ASJP). These initiatives represent significant steps toward promoting integrity, objectivity, and transparency in academic publishing.

However, despite these efforts, challenges remain due to the digital environment's nature, characterized by anonymity and pseudonymous identities, complicating the monitoring of violations and enforcement of compliance. Furthermore, the rapid development of Web 2.0 applications necessitates parallel updates to legislation and regulations to align with these technological changes (Younsi, 2020, p. 145).

Additionally, national databases and university websites in Algeria face technical challenges related to Internet and communication infrastructure, negatively affecting the ease

of access to scientific information (Boulifa & Berrached, 2022, p. 57).

Therefore, enhancing digital scientific communication ethics cannot be separated from providing an adequate technical and legislative environment that allows researchers to access scientific knowledge easily while respecting authors' rights and upholding principles of honesty and objectivity.

V. Conclusion:

The ethics of digital scientific communication in Algeria constitute a reference framework aimed at ensuring integrity and transparency in the production and dissemination of knowledge, alongside the technical and legislative challenges inherent in this process. The Algerian legislator has enacted a set of laws addressing intellectual property, personal data protection, electronic signatures, and information security, with the goal of regulating digital practices and minimizing violations.

However, despite the importance of these legal safeguards, practical limitations emerge when they intersect with researchers' pressing need for rapid and flexible access to scientific information, particularly in the context of insufficient digital infrastructure and occasional technical malfunctions. Thus, balancing legal regulation with the right to information remains a central challenge, requiring a nuanced approach that both protects the rights of authors and institutions and ensures researchers can access knowledge freely and responsibly.

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