



Digital Reform in Algerian Higher Education: Challenges, Strategies and Opportunities for Ownership

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Abstract

An ambitious process of digitization of higher education in Algeria was initiated with the publication of the Digital Master Plan in October 2022, followed by the National Conference Guide on Higher Education of April 2023. This reform aims to modernize the Algerian university by integrating digital tools to optimize the quality of teaching, research and institutional management. However, this digital transformation is accompanied by significant challenges, whether technical, educational or organizational. A comparative analysis of these two strategic texts would make it possible to identify concrete avenues and recommendations for a successful appropriation of digital technology by all actors in the sector.

Keywords : Digital transformation, national strategy, Digital blueprint, National foundations, modernization of higher education, digital challenges, strategic analysis.

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1. Introduction

Higher education plays a fundamental role in Algeria's development, with nearly 2 million students in more than 100 institutions. However, this sector faces major challenges, including rapid massification, the quality of education, the professional integration of graduates, and the adequacy to the socio-economic needs of the country. In this context, the modernisation of higher education has become an unavoidable priority for the Algerian authorities.

Among the strategic axes of this refoundation, the digital transition occupies a central place. Indeed, the integration of digital technologies, via modern infrastructures and innovative pedagogies, is perceived as an essential lever to transform teaching and learning modes, while promoting academic success and student employability.

This article is part of an in-depth reflection on the role of digital technology in the transformation of Algerian higher education. By analysing the convergences and divergences between two major strategic documents – the Digital Master Plan of October 2022 and the guide of the National Conference on Higher Education of April 2023 – we highlight the need for a systemic approach.

The objective of this article is to contribute to the scientific reflection on higher education reform strategies in Algeria, taking into account national specificities including governance reforms, programs, and research around the digital transition.

In addition to a contextual perspective on modernization policies, it aims to formulate concrete recommendations for a harmonious appropriation of digital tools by all actors in the sector.

To do this, as a first step, we will carry out an in-depth analysis of the Digital Master Plan and the guidelines issued by the National Conference. This analysis will make it possible to fully understand the

objectives of these two strategic frameworks, as well as their points of convergence and divergence. These guidelines will then be placed in the overall context of Algerian higher education, in order to identify the specific issues and needs.

In a second step, a comparative analysis will be conducted to identify commonalities as well as potential tensions between the two strategic visions. This step aims to assess the possible impacts of these divergences on the implementation of digital technology within higher education institutions in Algeria.

Then, we will cross-reference the collected data in order to refine our understanding of the dynamics at play and make concrete recommendations. These recommendations will propose strategies to optimize practices for a harmonious and concerted implementation of digital transformation in Algerian higher education.

Digital reform in the sector: what ownership strategy

Strategies for the appropriation of reforms in Algerian higher education revolve around two main axes: a structured technical transformation via the Digital Master Plan and a collaborative and inclusive transformation via the National Conference. These two approaches reinforce each other, ensuring a modernization that is both technically robust and socially accepted.

The analysis of sector reform strategies involves the study of the approaches undertaken and explained in "Vision-Schéma Directeur du Numérique" (MESRS, 2022), (henceforth referred to Digital Master Plan) and the "Guide des Assises sur l'Enseignement Supérieur et son modernisation" (MESRS, 2023), (hereinafter referred The National Conference Guide).

The document "Vision - Digital Master Plan in the MESRS sector – Algeria" (MESRS, 2022) is a strategic reference that defines a master plan for the integration of digital in higher education in Algeria. Developed, discussed and enriched at a national academic conference, it has been implemented since October 2022. This repository aims to guide digital development in the sector by providing a clear vision, identifying specific challenges and offering practical recommendations to ensure successful implementation.

In parallel, the National Conference Guide on Higher Education and its Modernization (MESRS, 2023) presents itself as a methodological document for an extensive consultation aimed at developing tangible proposals for the evolution of higher education in Algeria. This guide, developed as part of the meetings, takes a participatory approach through nine thematic workshops, involving all stakeholders, in order to map out a roadmap for the modernisation of the sector. The workshops address various issues such as the reform of the educational organization, the articulation between high school and university, the employability of graduates, innovation and entrepreneurship, research, the student living environment, the governance, visibility and attractiveness of the Algerian university, as well as social and societal responsibility. The deliverables, consisting of the summaries of the discussions and proposals of each workshop, will consolidate the final recommendations for a strategic roadmap resulting from the active collaboration of all stakeholders, thus offering a methodological structure that promotes a collaborative and inclusive approach to address the challenges of the sector in Algeria.

The Digital Master Plan (SDN) and the National Conference Guide on Higher Education offer a complementary approach for the modernization of the education system in Algeria. The SDN adopts a technical and pragmatic approach, focusing on the digitization of infrastructures, the modernization of digital campuses, administrative management, digital services and the integration of technological tools into pedagogical practices. It defines clear strategic priorities, with short-, medium- and long-term objectives, thus ensuring a structured and measurable digital transition.

At the same time, the National Conference Guide is based on a participatory consultation involving all stakeholders. It addresses broader dimensions such as the governance of academic institutions, graduate employability, innovation and entrepreneurship, and the social and societal responsibility of universities. This guide offers a holistic vision that goes beyond simple digitization, integrating societal needs and

modern challenges facing higher education. Thus, the combination of the two approaches makes it possible to combine the operational efficiency of the SDN with the active participation of education stakeholders, creating a synergy favorable to the modernization of the sector.

However, a first reading shows that despite this complementarity, certain shortcomings must be noted. First, coordination between the top-down approaches of the SDN and the bottom-up approaches of the National Conference Guide can be difficult to implement, especially when institutions have to adapt national guidelines to their local realities without fluid communication between the different decision-making levels. Then there is a lack of monitoring and evaluation. The SDN foresees concrete projects, but without clear mechanisms to assess their long-term impact. In addition, the participatory approach of the Guide of the Conference risks losing effectiveness without rigorous follow-up of the recommendations.

Another point of weakness concerns the lack of in-depth reflection on the social and ethical implications of digitisation. The SDN mainly focuses on the technical aspect of the digital transition, neglecting important issues like data protection, equal access or bridging the digital divide. In addition, although the National Conference Guide focuses on employability, there is sometimes a lack of concrete proposals to align university training with changes in the labour market, especially in the technological sectors.

We would like to emphasize that the strategy adopted by Algeria, combining the Digital Master Plan (SDN) and the National Conference Guide, aligns with global trends in higher education reforms, where the digitization of educational infrastructures and practices, as well as participatory governance, are essential. The SDN, by modernizing administrative and pedagogical services through the digital training of teachers and the establishment of digital platforms, follows the example of countries such as Finland and Singapore. In addition, the National Conference Guide, through its inclusive approach, recalls the national consultations carried out in countries such as Canada and Germany to integrate the needs of teachers, students and administrators into reforms. In addition, the focus on graduate employability mirrors similar initiatives in Australia and the Netherlands, where universities are working to bridge the gap between academia and the job market by strengthening partnerships with business. However, there are some limitations that need to be noted. Indeed, a rigorous monitoring mechanism, such as those established in the reforms of the European Union, is lacking. The digital divide also remains a key issue: countries such as Estonia have ensured equitable access to technologies, a dimension that needs to be strengthened in Algeria to avoid regional disparities. Research and innovation, which are driving reforms on a global scale, particularly in the European Union and the United States, should be further supported in Algeria, with an increase in funding and collaborations between universities and industries. If these reforms are implemented well, the results could be significant: modernization of pedagogical practices, improvement of administrative management, and increase in the employability of graduates. Successful implementation of the SDN would allow personalization of teaching methods through digital tools, while digitization of administrative services would enhance the transparency and efficiency of academic processes. Finally, a better alignment of graduates' skills with the needs of the market could improve professional integration.

The second reading that we suggest subjects the Digital Master Plan and the National Conference on Higher Education and its Modernization in Algeria to SWOT (Strengths, Weaknesses, Opportunities, Threats) or AFOM (Analysis of Strengths, Opportunities, Threats) analysis. This step, sharper than the first, is an essential strategic phase to assess and anticipate the dynamics that will influence the success of the modernization of the sector.

The analysis ensures a holistic perspective and identifies internal strengths, weaknesses, external opportunities, and potential threats related to the implementation of the orientations defined in these documents.

On the *strengthside*, this approach will identify the assets and competitive advantages that the Digital Master Plan and the National Conference bring to Algerian higher education. This includes clarifying strengths, such as specific digitization programs, recommendations from national consultations, and detailed strategic visioning, which can provide a solid foundation for future development.

Weaknesses, on the other hand, will be scrutinized carefully to understand potential barriers to implementation. This can encompass aspects like gaps in digital education, budget constraints, or challenges related to university governance. An awareness of these weaknesses will make it possible to put in place mitigation and reinforcement strategies.

The analysis of external *opportunities* will shed light on untapped avenues to strengthen the modernization of higher education in Algeria. These opportunities may include strategic partnerships, external funding, or adoption of international best practices.

We ultimately assess the potential *threats*, such as political, economic, or technological constraints, will help develop risk management strategies and anticipate potential challenges.

S	Strengths: These are the internal strengths of Algeria's digital strategy, such as investments, training, equipment, governance...
W	Weaknesses: These are the internal vulnerabilities of this strategy, such as lack of resources or skills, resistance to change...
O	Opportunities: These are the external opportunities that favor the development of digitalization, such as partnerships, technological innovations, student needs...
T	Threats: These are external obstacles that may hinder the success of the digital transition, such as competition, legislative or cultural barriers...

Tab 1: Presentation of the SWOT Analysis

2.The objective of the application of the approach

The objective of the SWOT or AFOM analysis that we operate on both documents will provide decision-makers and stakeholders with an in-depth understanding of the internal and external elements that will influence the implementation of the orientations defined in these key documents. This is an essential tool for making informed decisions, maximizing opportunities, mitigating risks, and strengthening the sustainability and success of the higher education modernization process in Algeria.

3.Digital Master Plan SWOT Analysis

The SWOT analysis highlights the robustness of the Digital Master Plan, highlighting its visionary strengths and digitization programs. However, it also highlights the need to overcome implementation challenges and maximize opportunities for innovation and partnership while mitigating potential risks associated with resistance to change and technological dependence.

The result of the SWOT analysis of the Digital Master Plan in Algerian Higher Education is summarized as follows:

Strengths (S)
1.Clear strategic vision: The Director Plan offers a clear and detailed vision of the digitization of higher education in Algeria, establishing a solid foundation for future initiatives.
2. Digitization programs: The establishment of a three-level governance (national, regional, local) demonstrates a comprehensive approach with precise identification of strategic axes and programs to be implemented, alongside the political will to digitize the sector at all levels.
3.Teacher Training: Axis 1 of the plan emphasizes the training of teachers in digital tools, thereby strengthening the necessary skills for a successful transition.
Weaknesses (W)
1.Implementation challenges: The complexity of implementing 102 projects across different levels

(national, regional, local) could present logistical and organizational challenges.
2.Limited resources: The ambitious realization of the projects could be hindered by limited financial and human resources, requiring efficient management of available means.
Opportunities (O)
1.International partnerships: Digitization offers an opportunity to strengthen partnerships with international institutions, fostering the exchange of best practices and access to additional resources.
2.Pedagogical innovation: The integration of digital tools paves the way for innovative teaching methods, offering opportunities to improve the quality and relevance of programs.
Threats (T)
1.Resistance to change: Potential resistance to change, particularly among academic staff, could pose a threat to the successful implementation of the plan.
2.Technological dependence: Increased dependence on digital technologies exposes the system to risks such as technical failures, necessitating robust contingency plans.

4. Comment on results

This SWOT analysis of the Digital Master Plan in Algerian Higher Education shows the balanced perspective of the strengths, weaknesses, opportunities and threats associated with this major initiative:

Informed strategic vision is a fundamental strength, which provides a clear direction for the digitization of higher education. It creates a solid framework to guide future actions and mobilize stakeholders towards common goals.

Digitalisation programmes, with 102 projects at different levels, reflect a comprehensive approach and broad ambition, demonstrating commitment to meaningful transformation at all levels of the education system.

Focusing on digital teacher training is a smart strategy, building the skills needed for a successful transition to digital educational practices.

The potential challenges related to the implementation of 102 projects at different levels underline the logistical and organizational complexity that could hinder the full achievement of the objectives.

Limited financial and human resources could represent a weakness, requiring rigorous management to maximize the effectiveness of the means available.

International partnerships offer a strategic opportunity to strengthen cooperation with global institutions, fostering the exchange of knowledge and resources to enrich the implementation of the scheme.

Pedagogical innovation is a major opportunity, with digitization enabling innovative educational approaches that can improve the quality and relevance of programs.

Potential resistance to change, especially among academic staff, emerges as a significant threat that could hinder the successful implementation of the scheme. It highlights the need for an effective change management strategy.

Accelerated technology dependency exposes the system to risks such as technical failures. It highlights the need to develop robust contingency plans to minimize potential interruptions.

5. SWOT analysis of the National Conference guide on higher education and its modernization

The SWOT analysis of the National Conference Guide on Higher Education and its Modernization emphasizes the shared vision and holistic approach it offers. However, to maximize its impact, it will need

to overcome logistical challenges, effectively manage resistance to change, and leverage partnership opportunities to ensure a comprehensive and sustainable modernization of higher education in Algeria.

Strengths (S)
1.Shared vision: The guide presents a common vision developed through national consultations, reinforcing the legitimacy and support for the modernization of higher education in Algeria.
2.Holistic approach: By addressing various dimensions such as governance, employability, and innovation, the guide adopts a comprehensive approach that takes into account the diversity of sectoral issues.
3.Thematic workshops: The proposition of nine thematic workshops demonstrates a strong commitment to consultation with stakeholders, facilitating consensus building and the emergence of collaborative solutions.
Weaknesses (W)
1.Implementation challenges: The implementation of proposals formulated during national consultations may face logistical and organizational challenges, requiring effective planning and coordination.
2.Complexity of themes: The diversity of the dimensions addressed in the guide may complicate the coherent implementation of proposals, demanding special attention to harmonizing actions.
Opportunities (O)
1.Strengthening partnerships: The process of the National Conferences offers an opportunity to reinforce partnerships with national and international actors, creating a favorable environment for the exchange of best practices.
2.Multidimensional modernization: The guide's holistic approach offers the opportunity to modernize higher education in a comprehensive manner, integrating various facets for complete transformation.
Threats (T)
1.Resistance to change: Resistance to change, particularly in aspects such as governance, may pose a threat to the successful implementation of proposals formulated during the National Conferences.
2.Financial constraints: The realization of the proposals may be hindered by financial constraints, requiring prudent management of available resources.

6. Comment on results

The strengths identified in the context of the National Conference for the Modernization of Higher Education in Algeria present a set of positive points. The “Shared Vision” emphasizes the importance of a common vision, developed through national consultations, which strengthens legitimacy and adherence to modernization. This suggests an inclusive process that takes into account diverse perspectives.

The ‘holistic approach’ is also a notable strength, as it addresses several dimensions such as governance, employability and innovation. This indicates a thorough understanding of the various issues at stake in the higher education sector.

“Thematic workshops” are another strength, showing a willingness to consult and collaborate with stakeholders. Consensus building and the emergence of collaborative solutions are key elements for successful implementation. However, there are concerns about the weaknesses identified. “Implementation challenges” suggest that logistics and organization could be potential barriers. Effective planning and coordination will be key to overcoming these challenges.

The "complexity of the themes" underlines the need for special attention to the harmonisation of actions, given the diversity of the dimensions addressed. This underscores the importance of an integrated and consistent approach.

In terms of opportunities, "Strengthening Partnerships" is a major advantage. The National Conferences offer a platform to strengthen collaborations with national and international actors, promoting the exchange of good practices.

The "multidimensional modernization opportunity" highlights the possibility of modernizing higher education in a holistic way, integrating the different facets for a complete transformation.

As for threats, "resistance to change" can be a challenge, especially in sensitive areas such as governance. Effective management of the change process will be fundamental to overcoming this threat.

The "financial constraints" underline the need for prudent management of resources to ensure the successful implementation of the proposals made at the National Meetings. Sound financial planning will be decisive in overcoming this potential threat

7. Common monitoring indicators: Comparative study

The table below (Tab 2) summarizes the main results of the comparative SWOT analysis between the Digital Master Plan (SDN) and the National Conference Guide (GAN) for the modernization of higher education in Algeria

Comparative SWOT Analysis	SDN	GAN
Strengths	Strategic vision	Shared vision
	Concrete programs	Holistic approach
	Teacher training	Stakeholder consultation
Weaknesses	Implementation challenges	Implementation challenges
	Limited resources	Complexity of themes
Opportunities	Pedagogical innovation	Comprehensive sector modernization
	Strengthened partnerships	Strengthened partnerships
Threats	Resistance to change	Resistance to change
	Technological dependence	Financial constraints

Tab 2: Comparative SWOT Analysis between SDN and GAN

Some solutions that could be proposed to make the most of this comparative SWOT analysis of the Digital Master Plan (SDN) and the the National Conference Guide (GAN):

→ Establish a joint steering committee to ensure close coordination between the two initiatives and consistent implementation.

→ Develop a complementarity matrix between SDN digitization programs and GAN themes to identify synergies and strengthen them.

Here is a template (Tab 3):

SDN Programs	Corresponding Themes	GAN	Synergies to Develop
Digital equipment for	Governance	and	Optimize budgets allocated for quality

institutions	financing	equipment
Teacher training in digital tools	Teaching staff	Integrate digital skills into continuous training programs
MOOC development	Pedagogy and student life	Increase the use of MOOCs in face-to-face curricula
Opening of digital campuses	Graduate employability	Offer online certification courses aligned with labor market needs

Tab 3: Complementarity Matrix between SDN and GAN

The principle of a complementarity matrix between two strategic initiatives such as the Digital Master Plan (SDN) and the National Conference Guide (GAN) consists in systematically comparing the different components and components of each initiative, for example, the SDN programmes and the GAN themes. It is then a question of identifying, for each SDN program, to which Gan theme(s) it relates and is complementary, and vice versa for each Gan theme by determining with which SDN programs it presents links.

Further analysis of synergies and interdependencies between the two initiatives is then needed. The results of this analysis make it possible to deduce recommendations on how to strengthen these complementarities in operational implementation. The ultimate objective is to highlight the correlations that were not necessarily obvious at first glance between initiatives that may seem distinct.

This process makes it possible to develop an integrated and systemic vision, to identify all cross-cutting leverage effects, and ultimately, to deploy actions in an optimized and harmonized manner. The matrix thus becomes a practical tool for strategic steering, contributing to the coherence and effectiveness of reforms.

- Develop strategic partnerships with key national and international actors, building on the opportunities opened by both approaches.
- Design an integrated communication and change management plan to promote ownership of reforms by all stakeholders.
- Implement blended training programs for teachers, combining digital skills (SDN) and new pedagogies (GAN).
- Seek additional funding from national and international institutions to support the implementation of initiatives.
- Define common monitoring indicators between the SDN and the GAN to assess the progress and impact of the actions undertaken. Some potential monitoring indicators are summarized in this table (Tab 4):

Monitoring Indicators	Concerned Initiatives	Measurement Methods
Percentage of higher education institutions equipped with quality IT equipment and internet connection	SDN	Surveys and institutional audits
Percentage of teachers who have received training in digital and pedagogical skills	SDN/GAN	Monitoring of training programs and surveys among teaching staff
Number of university programs offering part of the courses remotely or online	SDN	Analysis of academic programs and institutional reports

Percentage of students using digital educational resources and tools	SDN	Monitoring the use of digital learning platforms
Evolution in the number of partnerships with foreign institutions	GAN	Analysis of agreements and reports on international collaborations
Proportion of teacher-researchers engaged in international research projects	GAN	Monitoring of research projects and international collaborations
Employment rate of higher education graduates 6 months and 12 months after graduation	GAN	Surveys among graduates and employment rate tracking

Tab 4: Common Monitoring Indicators between SDN and GAN

→ Capitalize on SDN's digital innovation to enrich the global modernization promoted by GAN.

Domain	SDN Indicators	GAN Indicators
Digital equipment	% of institutions equipped with IT equipment	% of institutions with high-speed internet connection
Digital skills	% of teachers trained in digital skills	% of teachers using digital tools in their teaching
Production of digital resources	Number of MOOCs produced	% of programs offering digital resources
International cooperation	Number of partnerships with foreign institutions	Number of participants in international MOOCs
Professional integration	6-month employment rate for graduates	% of graduates certified in digital skills

Tab 5: Integrated dashboards for joint monitoring of the Digital Master Plan (SDN) and the Guide of the National Conference (GAN)

8. Conclusion

The strengthening of strategies for reforming the higher education sector is also based on several improvements to be undertaken. It would be useful to create coordination cells in each institution to ensure local implementation of the SDN guidelines, while tailoring initiatives to specific needs. These cells could organize regular meetings between SDN officials and institutions to harmonize priorities. In addition, the implementation of key performance indicators (KPIs) to assess the effectiveness of digital projects and reforms resulting from the Foundation Guide is essential. These indicators should be reviewed regularly to adjust strategies based on the results achieved.

It is also essential to integrate the social and ethical dimensions of digital into the SDN. An axis dedicated to the digital divide and equal access to digital resources should be added, with particular support for remote areas. Encouraging reflection on the ethical impacts of digital, particularly in terms of data protection and the responsible use of technologies, is crucial to ensuring a responsible digital transition. Finally, strengthened actions to improve the employability of graduates must be put in place, such as the development of strong partnerships with local and international companies, practical training, internships, as well as post-graduation support programs to facilitate the rapid integration of young graduates into the labor market, especially in the digital sectors.

Thus, these adjustments would ensure a sustainable and inclusive modernization of higher education in Algeria, while strengthening its international competitiveness.

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