

RAQMYAT

Stratégies Numériques pour la Formation Doctorale
en Sciences Humaines et Sociales en Tunisie

Identification of Digital Resources and Best Practices for Doctoral Studies in Tunisia

November 2020





À propos de RAQMYAT

L'enjeu du projet RAQMYAT est de contribuer à faire émerger un nouveau modèle de formation doctorale en SHS à partir du cadre légal existant en Tunisie. Le parti-pris méthodologique est d'aborder ce travail sous l'angle de la mobilisation des pratiques numériques au service de la formation à la recherche des doctorants tunisiens dans les différentes disciplines des SHS et du développement de leurs compétences transversales, nécessaires à leur insertion professionnelle.

Partenaires

- UNIMED – Mediterranean Universities Union (Chef de file)
- Université de La Manouba (Coordinateur scientifique)
- Université de Kairouan
- Université de Sfax
- Université de Sousse
- Université de Tunis El Manar
- Université de Tunis
- Université Virtuelle de Tunis
- Université de Grenade
- Université de Vienne
- Fondation Maison de Sciences de l'Homme
- Ministère de l'Enseignement supérieur et de la recherche scientifique en Tunisie

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INTRODUCTION

The Raqmyat Project seeks to foster the emergence of a new model for doctoral training in Humanities and Social Sciences (HSS) based on Tunisia's existing legal framework. The methodological approach is to focus on boosting digital practices to enhance the training of Tunisian doctoral students in various HSS disciplines and develop their transversal skills necessary for professional integration. The project's activities aim to bring partners closer to those directly involved, including doctoral students and their trainers, as well as university and institutional leaders, heads of doctoral schools, sectoral doctoral committees, and research laboratories.

The Raqmyat project

The Raqmyat project has a general goal (1), divided into four specific objectives (2). These were identified through a preliminary analysis of needs, challenges, and constraints.

1) **General Objective**

The project aims to promote the emergence of a new doctoral training model in HSS in Tunisia through the development of digital practices.

2) **Specific Objectives**

- a. *Building a Community of Researchers and Trainers in Digital Humanities.* The project seeks to overcome institutional fragmentation in Tunisia's higher education and research landscape by creating a network of researchers and trainers in digital humanities. This involves mapping existing competencies, resources, and best practices in the country.



b. *Developing a Digital Strategy for Doctoral Schools.* The project will enable doctoral schools to craft and implement digital strategies to enhance their visibility and the quality of their programs. Each Tunisian institution will integrate digital resources into its doctoral programs. These strategies, drafted collaboratively with stakeholders and supported by experts from program universities, will adapt the project's general objectives to local specificities determined by the thematic specialties of doctoral schools and their socio-professional environments.

The strategies aim to:

- Improve recognition and visibility of doctoral schools and their students.
- Enhance the quality of doctoral training.
- Provide specialized training for trainers on digital research tools in HSS and soft skills, such as using digital tools to showcase work, communicate with the public, and ensure professional integration.
- Key initiatives include training trainers and developing online training modules, which will modernize doctoral training, align it with international standards, and offer interdisciplinary and specialized resources.

c. *The creation of online training courses,* which can be integrated into doctoral studies associated with the project, constitutes the third specific objective of Raqmyat. These modules will constitute an innovation allowing the modernization of doctoral training in SHS and the implementation which bring them up to international standards. Their aim will be to offer new resources, multilingual and transversal educational and scientific programs, adapted to the different SHS doctoral training. These courses will take into account the diversity of the doctoral students' acquired knowledge (it will include introductory courses and in-depth courses), and will focus on develop transdisciplinary resources (modeling and databases; textometry and textual analyses; geographic information systems and cartography; social network analysis) or specialized resources in areas where doctoral supervision is recognized as notoriously insufficient in Tunisia (archaeology and heritage). Two courses will have the objective of developing transversal skills, promoting professional integration (law, economics and management of digital science; publication and dissemination of science online)

d. *Creating a Doctoral Training Program Open to Socio-Economic and International Contexts.* The project aims to strengthen Tunisian doctoral students' interactions with their regional, national, and European environments and their participation in networks critical for professional integration. Activities will include intercultural exchanges, knowledge sharing, collective projects (e.g., summer schools, doctoral seminars), and the development of



transversal skills for effective communication with socio-professional partners and the public. A dedicated online platform (Raqmyat) will serve as a tool for promoting and sharing digital humanities resources.

Identification of Resources and Best Practices in Digital Tools for Doctoral Training in HSS: Survey Launch and Methodology

The first work package (WP1), titled “Identification of Resources and Best Practices in Digital Tools for Doctoral Training in HSS,” aims to assess the state of digital tools in Tunisian universities. Coordinated by the University of Sousse and the Fondation Maison des sciences de l’homme (FMSH), WP1 began with the Raqmyat project’s inaugural seminar on digital humanities in Tunis in March 2020 and concluded with a feedback workshop (initially planned for Sousse in fall 2020).

WP1 Objectives :

- Inventory and assess digital practices.
- Validate hypotheses from the needs analysis.
- Provide operational recommendations.

The methodology relied on an online survey and field studies targeting doctoral students, faculty researchers, and institutional leaders in doctoral training programs.

Survey Overview

The survey, conducted via Google Forms, consisted of three questionnaires targeting specific audiences within the partner universities:

- *Institutional Leaders*: Focused on digital strategies in their institutions and measures implemented (or planned) for doctoral students and faculty researchers.
- *Faculty Researchers*: Addressed digital humanities tools and practices used or provided for doctoral students. It highlighted strengths, best practices, challenges, and expectations.
- *Doctoral Students*: Focused on digital tools available in their HSS doctoral programs, their expectations, and challenges in conducting research.

A glossary accompanied the questionnaires to clarify technical terms and concepts. It is accessible on the Raqmyat research blog on Hypotheses.org (old website).

Questionnaire Sections :

11. Respondent Identification and Institutional Affiliation.



12. Digital Infrastructure and Services (e.g., access to internet-enabled rooms, dedicated researcher spaces with software, support for digital production, and multimedia resources).
13. Research Methodology, Tools, and Data.
14. Doctoral Training and Digital Practices in Higher Education.
15. Professional Integration in Research and the HSS Scientific Community.

The campaign, conducted from April to July 2020, received 71 responses:

- 17 from institutional leaders.
- 21 from faculty researchers.
- 33 from doctoral students.

The results form the basis of this report on the use of digital tools in HSS doctoral training.

The project "Digital Strategies for Doctoral Training in Humanities and Social Sciences in Tunisia" and WP1, titled "Identification of Resources and Best Practices in Digital Tools for Doctoral Training in Humanities and Social Sciences (SHS)," naturally guide our reflection, our report, and particularly the section on recommendations within the context of "Digital Technology at the Service of Humanities and Social Sciences," commonly referred to as "Digital Humanities," which finds its full significance here.

This is a new and emerging discipline aimed at defining, delineating, formalizing, standardizing, and unifying the use of digital technologies within the context of SHS and the Humanities.

Therefore, in order to properly frame the present survey, on the one hand, and to effectively highlight the proposed recommendations, on the other hand, this section of the report will be divided into three parts:

- The first part will focus on a review of the main characteristics of what is known as Digital Humanities.
- The second part will provide an overview of the survey results.
- The third part will concentrate on recommendations to help address the gaps and weaknesses identified in the prior survey.

PART I – CHARACTERIZATION OF DIGITAL HUMANITIES

To characterize, delineate, and properly define the concept of Digital Humanities, we must first define the notion of humanities.



Contrary to common belief, the concept of humanities admits multiple definitions, shaped by two predominant trends originating in Francophone and Anglo-Saxon contexts.

In the Francophone world, the definitions are broader: humanities refer to disciplines that address languages, literature, art, and the social and human sciences. In contrast, in the Anglo-Saxon world, the definitions are slightly more specific: humanities denote cultural sciences that study human creations in the realms of languages, literature, art, and the social and human sciences.

Consequently, the concept of Digital Humanities also encompasses multiple definitions, influenced by these Francophone and Anglo-Saxon perspectives, which in turn are shaped by the definitions of humanities mentioned earlier.

To harmonize and standardize these concepts, "unconferences" were created—spaces for exchange and international conferences, with the main ones being:

- THATCamp (The Humanities and Technology Camp), active in the Francophone context.
- UCLA/DH (University of California, Los Angeles) Digital Humanities, active in the Anglo-Saxon context.
- The Digital Humanities Conference (Alliance of Digital Humanities Organizations: ADHO), active globally.

These organizations have been active since the 2010s, working to create white papers, projects, and manifestos aimed at standardizing Digital Humanities. The outputs and manifestos from these organizations have evolved independently, yet they tend to converge on certain aspects.

For instance, one can read in:

- The THATCamp non-conference manifesto for Digital Humanities:
 1. The digital shift in society transforms and questions the conditions for producing and disseminating knowledge.
 2. For us, Digital Humanities encompass all social and human sciences, arts, and literature. Digital Humanities do not discard the past; on the contrary, they draw upon the paradigms, expertise, and knowledge specific to these disciplines while incorporating the unique tools and perspectives of the digital domain.
 3. Digital Humanities refer to a transdiscipline, carrying methods, tools, and heuristic perspectives linked to the digital field within social and human sciences.
- UCLA's platform for a DH manifesto:
 1. Digital humanities are not a unified field but an array of convergent practices that explore a universe in which print is no longer the exclusive or normative medium for producing or disseminating knowledge.



2. Digital Humanities do not constitute a unified [scientific] field but rather a convergent set of practices exploring a world where print is no longer the normative and exclusive medium for the production and dissemination of knowledge.

From literature analysis, we deduced that Digital Humanities ultimately depend on:

Multiple Considerations

- Digital Humanities can be seen as an evolution of humanities through the digital.
- They can also be considered as a new field for applying digital technologies.
- Alternatively, they may be regarded as a distinct discipline. For instance, Milad Doueihi conceives of digital technology as a cultural event, a true "digital conversion," representing a cultural transformation.

Multiple Periods

- Period 1: Digital Humanities dealt with electronic documents, metadata, hypertexts, XML, indexes, statistical tools, etc.
- Period 2: Digital Humanities evolved to address multimodal data analysis, semantic mining, artificial intelligence, prediction, blockchain, etc.
 - Currently, we can speak of a "version 2" of Digital Humanities, placing artificial intelligence at the core of processing and analysis.

Multiple Disciplines

Digital Humanities naturally depend on various disciplines, as defined earlier, distributed according to a schema that places them at the intersection of Computer Science, Natural Language Processing (NLP), and Humanities.

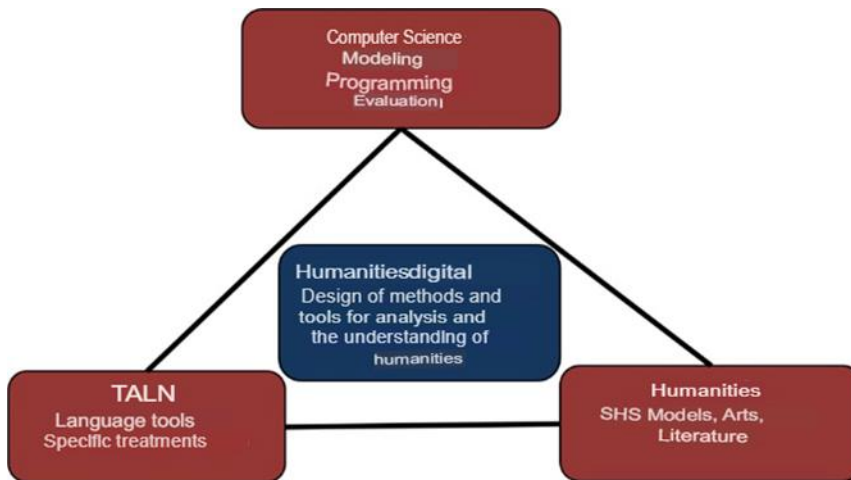


Figure 1. Digital Humanities at the center of several disciplines

From a technological point of view, we can think of the digital humanities as a set of norms, protocols, standards, etc. enabling the design of methods and tools for the automatic analysis and understanding of the humanities.

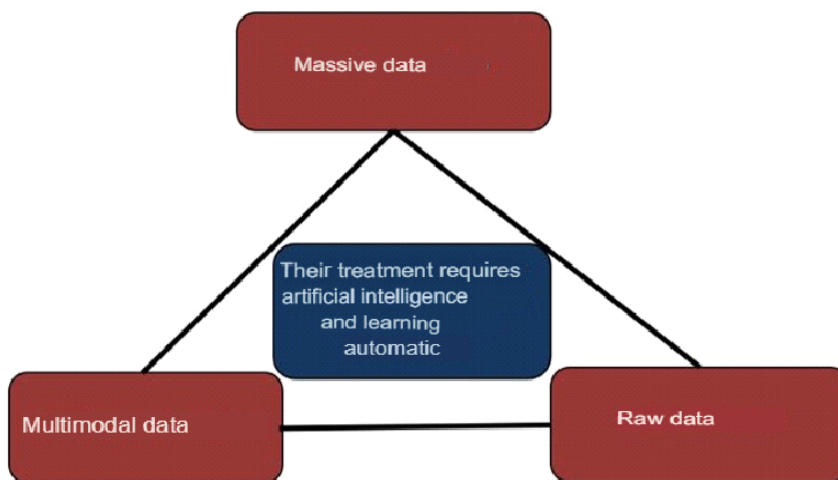


Figure 2. Characteristics of the data and processing of the Humanities

From a data and processing point of view, the automatic analysis and understanding of the humanities concerns large sets of raw, multimodal data that have encouraged the emergence of artificial intelligence and machine learning, which have become indispensable and unavoidable in this context.



PART II: STATE OF PLAY OF DIGITAL HUMANITIES IN TUNISIA

2.1 Digital Humanities: knowledge and importance of the notion

2.1.1 Knowledge of the concept

The concept of Digital Humanities is familiar to institutional leaders at the partner universities of the project (64.7%) and to teacher-researchers (52.4%), but it is less known among doctoral students (24.2%).

In general, it refers to the use of digital tools and methods in the humanities and social sciences, as well as their integration into teaching, research, and even administrative services. For many, it is also described as "a discipline at the intersection of computer science and the humanities and social sciences, using digital tools and methods to benefit research and studies in these fields," and as "a set of methods and practices leveraging the potential of computing to teach and conduct research in the humanities and social sciences."

Digital Humanities is seen as "a research field enabling scholars in the arts, literature, humanities, and social sciences to enhance their capacity for discovery, exchange, and knowledge valorization through the use of digital tools. This domain represents a synthesis between the humanities and new technologies."

All the surveyed teacher-researchers use digital tools in their research activities, compared to 87.0% of doctoral students who responded to the survey.

The majority of institutional leaders (70.6%) stated that their institutions, thesis committees, or doctoral schools have incorporated Digital Humanities or computing for the humanities and social sciences into their doctoral programs. According to them, this integration is reflected in:

Innovative teaching methods.

Dedicated programs, such as a research master's in "didactics of computer science," where "doctoral students develop computational tools to better understand language, reading strategies, motivation, and emotions in learners."

Specific courses on programming skills (Python, R, Machine Learning, Data Mining, Big Data, statistical analysis software such as SPSS, AMOS, Stata, etc.).

Training on the use and application of tools, such as web resource utilization (technical resources and bibliographic research), SPSS usage, online questionnaire creation, and software for content analysis.

The creation of a website or platform for the institution or doctoral school.



The COVID-19 crisis also contributed to the growth of digital tools, as Tunisian universities involved in the RAQMYAT project developed online courses.

2.1.2 Digital Humanities: Importance for Research

Institutional leaders agree that computing and digital tools are valuable for doctoral training in their field, with 93.8% agreeing or strongly agreeing. They consider them a significant concern or an important aspect of research in their domain. For the majority (62.5% strongly agree and 25% agree), computing and digital tools primarily facilitate doctoral students' access to documentation and data essential for their research. The use of ICT (Information and Communication Technology) also simplifies access to doctoral courses.

Institutional leaders believe that computing and digital tools are profoundly transforming the way research is conducted in their field, with 62.5% strongly agreeing and 18.8% agreeing. Over 90% of respondents consider new technologies essential for the professional integration of doctoral students.

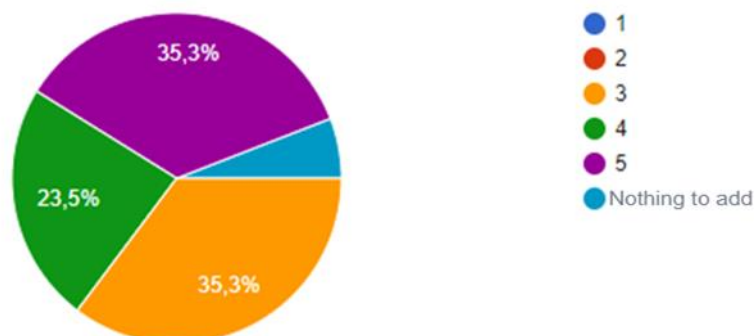
Three-quarters of institutional leaders strongly agree that computing and digital tools provide access to diverse resources such as databases, sectoral studies, and strategic studies, while also enabling data processing, including identifying and extracting information, organizing it, and performing both qualitative and quantitative analysis. Computing and digital tools allow for modeling (75.1% agree or strongly agree) and support collaboration, participation in events and meetings, and presenting research work and findings (93.8% agree or strongly agree).

Prioritization of Digital Strategies for Doctoral Training by Institutional Leaders (1 = Strongly Disagree < 5 = Strongly Agree):

[Note: The actual ranking or detailed points are not provided in the original text. If you'd like to include specific rankings, kindly share them.]

Focus on the needs to be met and not on the tool :

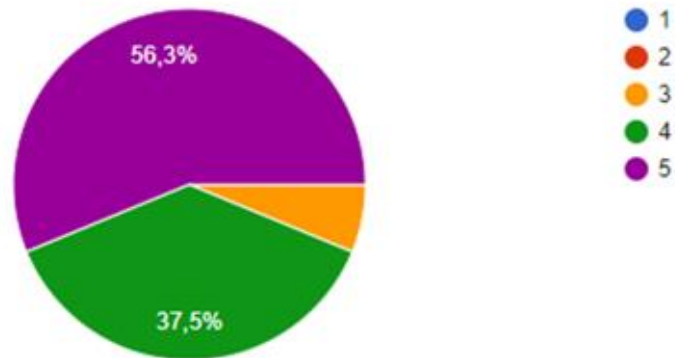
17 answers





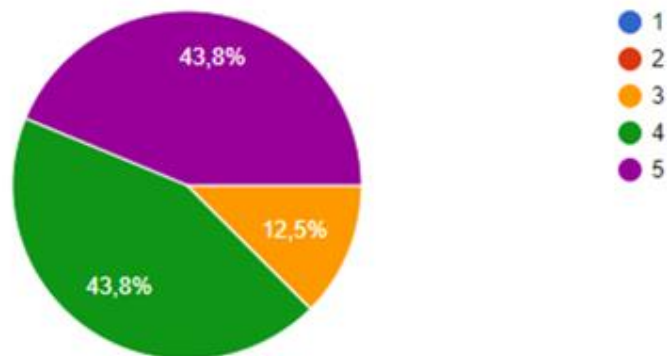
Support the adaptation of teaching practices to the digital context

16 answers



Accompany the project with adequate expertise in educational design

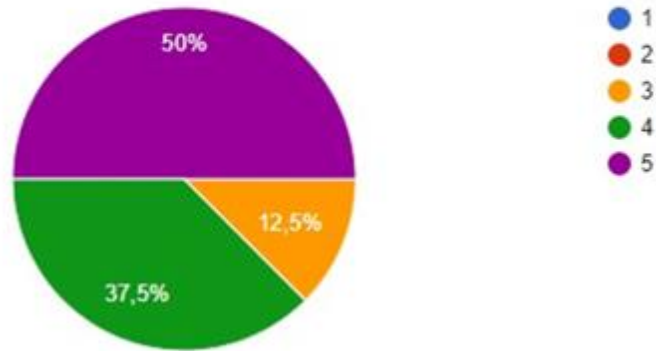
16 answers





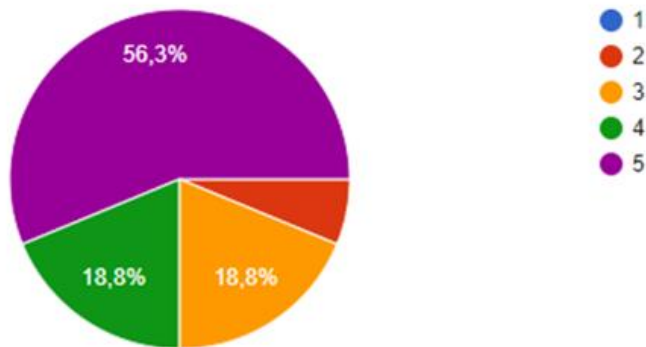
Promote the commitment of trainers and take into account the organizational dimensions:

16 answers



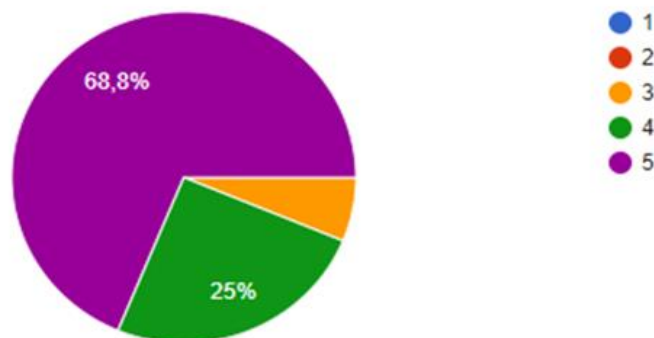
Being technically far-sighted :

16 answers



Foster a culture of experimentation and evaluate the results :

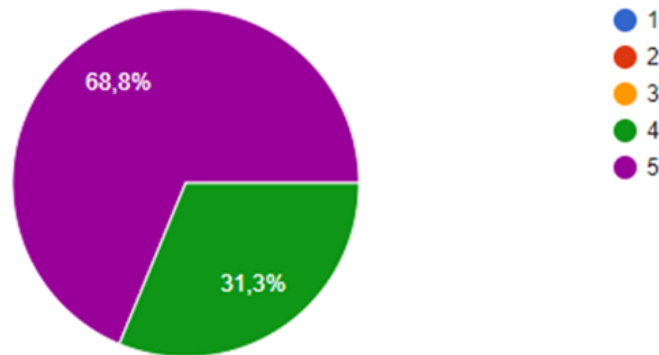
16 answers





Fostering learner engagement :

16 answers



Aware of the importance of ICTs, the partner universities involved in the project are striving to strengthen digital technologies in doctoral education by establishing partnerships with other national and international laboratories:

- **Partnerships with Tunisian laboratories identified in the survey:**

- CNUDEST, Research Unit ECOTIDI (16ES10) (Education, Cognition, ICTs, and Didactics) - ISEFC-UVT,
- Laboratory: Disability and Social Maladaptation LR 13AS01 (Manouba University),
- ARODEC and SMART: two Management Information Systems laboratories at ISG Tunis (University of Tunis),
- Laboratory: Risk Management and Research in Accounting and Finance (RIMRAF), LAMIDED, LAREMFIQ, Research Unit MOFID, LARIME, DEFI, ISBAT, Laboratory PHILAB.

These collaborations focus on ICT-related fields such as:

- Discourse Approaches / Language and Automatic Processing,
- Interpretative Methods / Discourse,
- Art, Music, and Economics / Geographic Information Systems,
- Training in Urban Planning, Cartography, Remote Sensing, and Environment.



- **Partnerships with French laboratories identified in the survey:**

- Cultures-Education-Societies - LACES EA 7437 (Bordeaux, France),
- Laboratory: Economic Theory, Modeling, and Applications (ThEMA) - University of Cergy-Pontoise.

The survey highlighted that the digital component is not always concretely or officially integrated into doctoral education. The implementation of digital technologies often stems from the personal initiatives of faculty members or resource persons who are skilled in specific disciplines and possess technical expertise.

Nadia Abaoud Ouertani, President of the Doctoral Commission in Economic Sciences and Director of the Economics Department at the Higher School of Commerce in Tunis (Manouba University), states that "digital technologies have yet to find their place in research work within the humanities." She attributes this to a "lack of willingness to collaborate and the high costs and time required for digital transformation." She also links this deficiency to a skills gap that should be addressed through enhanced training, the creation of a partner ecosystem, and increased budget allocations for these issues.

Mehdi Jrad, a specialist in modern history from the Faculty of Humanities and Social Sciences at Sousse University, attributes the lack of ICT integration in doctoral programs to the "absence of a clear strategy for developing digital technologies at universities." According to him, strategies to address this issue should include "accelerating training in new technologies, sharing experiences from other foreign universities, and providing digital training for doctoral students".

2.2 Infrastructures

2.2.1 Equipment and Connectivity

Nearly all doctoral students surveyed own a personal computer (97% use laptops), which they primarily purchase themselves.

Regarding the availability of functional internet connections, over 85% of respondents confirm having access. However, differences arise concerning Wi-Fi access: 82.4% of institutional representatives, 76.2% of faculty members, and 69.7% of doctoral students report having Wi-Fi access.



2.2 Spaces, Intranet and Portals

Half of the respondents across all three categories report that their institutions do not provide open-access computer spaces for students.

Universities are equipped with operational intranet/webmail systems for faculty and students (35.3% of respondents across the three categories), or exclusively for faculty (23.5%). However, 41.2% of respondents indicate no such systems exist for either group, and 39.4% of doctoral students note access to open-use computers in university libraries.

The question, "Does your institution have a specific documentary portal (separate from CNUDST)?" elicited varying responses: 88.2% of institutional representatives said no, compared to 61.9% of faculty members and 39.4% of doctoral students.

For 54.4% of doctoral students surveyed, universities lack digital-specific spaces. The remaining 45.6% cite examples such as media libraries, videoconferencing rooms, learning labs, resource centers, and research laboratories.

The majority of faculty members (90.5%) report that universities do not have dedicated digital support services for doctoral education (76.5% for institutional representatives). Nearly all faculty members (95.2%) state there is no specific service for processing collected data, whether for faculty or students (81.3% for institutional representatives).

Mounir Guirat, Director of the Doctoral School of Letters, Arts, and Humanities at the Faculty of Letters and Human Sciences in Sfax, points out that "basic research infrastructures at the faculty are weak" and laments "the misconception that humanities and digital technologies are incompatible." He highlights "the sometimes-significant gap between faculty and students due to varying levels of digital literacy among students—some are well-versed, while others are neither interested nor equipped with personal computers or Wi-Fi."

2.3 Research Tools

2.3.1 Data Collection

Faculty members use a variety of digital tools for data collection, including:

- Databases (24%),
- Search engines,
- Online questionnaires and survey tools such as Google Forms,
- Software like lexicometry tools, survey software, and data mining tools, among others.



Doctoral students primarily use laptops, PCs, tablets, or smartphones. They rely on tools like Google applications (Google Forms, Google Scholar, Google Books, Google Docs), office tools like Excel and Word, online surveys, and databases such as Zotero, ResearchGate, Science Hub, and Sphynx.

2.3.2 Communication Tools

Faculty members and doctoral students use email (30.3%) and videoconferencing platforms like Microsoft Teams, Zoom, Google Meet, or Skype. They also utilize MOOCs, webinars, forums, and social networks like Facebook, Messenger, Instagram, or WhatsApp.

2.3.3 Data Processing Tools

Faculty members utilize tools such as SPSS, Stata, Nvivo, Python, R, and Excel for data processing, with some not using any tools at all. Similarly, doctoral students use tools like Word, Excel, PowerPoint, Zotero, NVivo, and other specialized software for statistical analysis, programming, and bibliographic management.

2.3.4 Data Formats

Both groups primarily use Excel, text, or doc formats for input data.

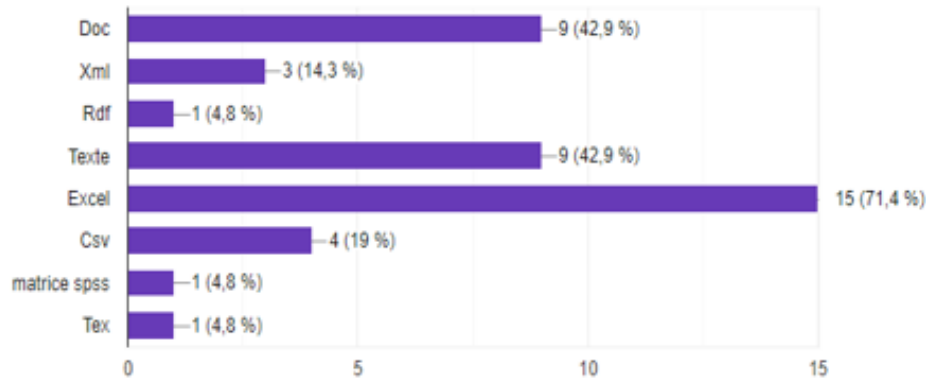
Approximately 80% of faculty members use free tools, with usage divided between remote (47%) and local (42%) settings. For doctoral students, 45% use free tools, while 30% use paid tools, favoring local usage (15%). Post-COVID-19, OpenVPN has been adopted for remote work.

This survey indicates that Tunisian faculty members are more accustomed to remote research work compared.



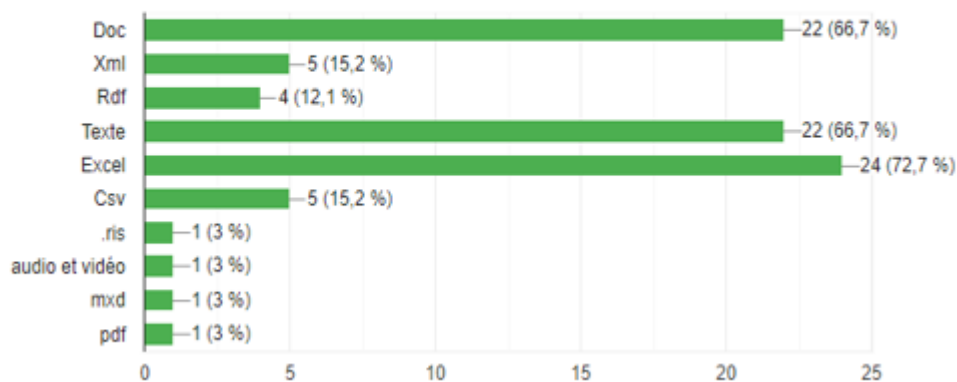
24. Quels sont les formats des données en entrée exigés par les outils utilisés ?

21 réponses



25. Quels sont les formats des données en entrée exigés par les outils utilisés ?

33 réponses

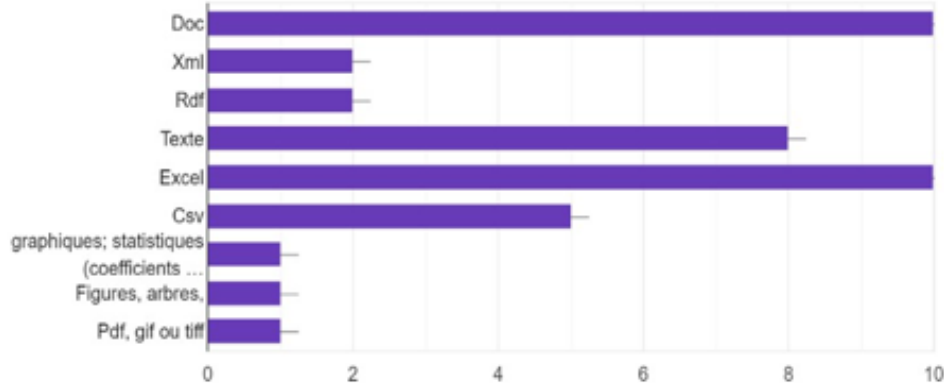


The tools used by teacher-researchers (purple graph) and doctoral students (green graph) mainly generate output data in Excel, text or doc formats.



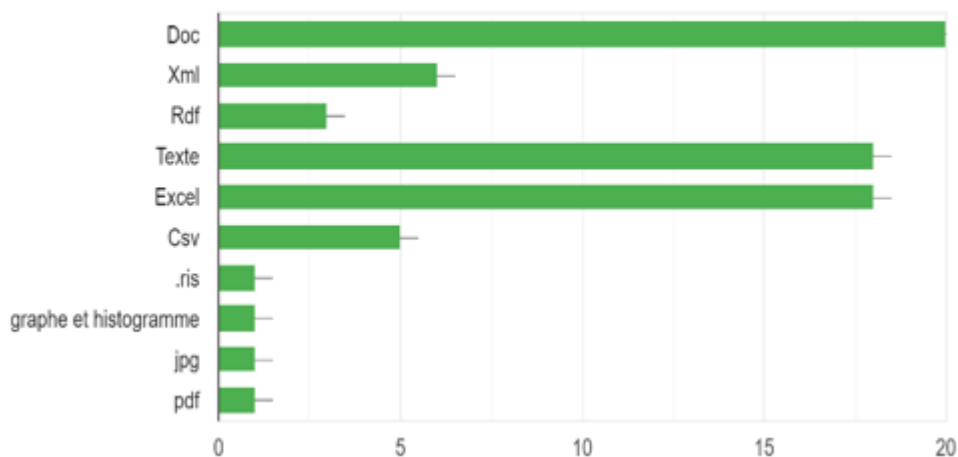
25. Quels sont les formats des données générées en sortie par les outils utilisés ?

21 réponses



26. Quels sont les formats des données générées en sortie par les outils utilisés ?

33 réponses



For 81% of the teacher-researchers and 81.8% of the doctoral students surveyed, the tools used correspond to their respective needs.

2.3.5 Identification of needs and difficulties encountered in the use of the tools

Researchers regret not having access to databases and software with legal licenses. Additionally, they highlight a lack of sufficient training in certain data processing software.

Doctoral students lament the lack of computers available in university libraries. They also point out the absence of software, databases, and digital versions of journals. One doctoral student suggested creating a digital platform that centralizes all exchanges between researchers, facilitating networking and information sharing.



When asked, "*What challenges do you face in using these tools?*", 30% of doctoral students reported no difficulties using digital tools, while 15% noted a lack of training to master the tools or insufficient time to self-train. They also cited challenges in downloading tools due to unreliable internet connections, financial constraints for paid licenses, and language barriers.

The surveyed researchers reported a lack of training and technical difficulties in properly handling the tools. They also mentioned issues with internet connectivity, which limits access to tools and data, as well as the cost of non-free tools. The versions they use are sometimes limited or obtained through piracy.

One researcher noted that the tools available primarily focus on Tunisia and the Maghreb region, creating challenges when their research field lies outside these areas.

2.3.6 Training in Tool Usage

According to 57.9% of researchers and 63.6% of doctoral students, the tools they use are well-documented. However, only 19% of researchers and 36.4% of doctoral students received formal training in the tools they use.

Researchers have been trained in tools such as website creation, Office, Anaconda, Stata, SPSS, and Blockchain.

Doctoral students have been trained in tools such as SPSS, messaging platforms, Stata, Endnote, Nvivo, R, Zotero, Word, Excel, the faculty library portal, and Sphinx.

2.4 Research Methodology

2.4.1 Used Methodologies

Researchers primarily use statistical methods (23%), empirical methods (19%), mixed approaches (19%), and artificial intelligence techniques (23%). They also employ econometric, analytical, qualitative (notably through research interviews), and quantitative methods (via surveys). Specific tools and methods include ACP (Principal Component Analysis) and panel data regression.

Doctoral students use statistical methods (21%), empirical methods (18%), and mixed approaches (18%). They also employ analytical methods (e.g., multiple regression), legal, qualitative, and quantitative methods, as well as artificial intelligence techniques and specific tools like R, ACP, AFC, and SEM.



2.4.2 Research Methodology Steps

While research methodologies vary among doctoral students, commonalities emerge. Most follow these stages:

1. **Research Topic Analysis and Literature Review** (not always explicitly cited but reflected in reading, documentation, and bibliographic research).
2. **Hypothesis Development and Exploratory Research**, sometimes involving case study selection, including quantitative and qualitative data collection (e.g., surveys and interviews).
3. **Data Analysis and Hypothesis Verification**, followed by **writing and interpretation of results**.

The timing of creating outlines and defining problems differs among respondents. Work schedules are rarely mentioned. The use of software for data processing and analysis is less frequently noted. When mentioned, they include statistical software like SPSS, Excel, R, ACP, AFC, correlation, regression, and Structural Equation Modeling.

2.4.3 Application or Reuse of Existing Approaches, Data Models, and Processes

Only 9.5% of researchers surveyed propose or recommend existing data approaches, such as organizing training sessions and knowledge-sharing workshops or using structural equations and empirical models.

Similarly, only 18.2% of doctoral students apply a standard or team-defined approach. They collect data, start with general cases before focusing on specifics, and apply intercultural or qualitative analyses.

A minority of researchers (9.5%) propose or recommend existing data models, including AI-based approaches. Only 12% of doctoral students apply existing data models.

The majority of researchers (95.2%) do not suggest or recommend existing process models to their doctoral students. Only 21.2% of doctoral students report applying or reusing existing process models, such as qualitative methods (e.g., semi-structured interviews), data analysis methods like ACP, AFC, correlation, regression, structural equation modeling, technology acceptance models, and intercultural analysis processes.

2.4.4 Methodological Challenges

Several researchers (23.8%) report challenges, including a lack of training and skill refinement in software use, such as data models, processing high-frequency data, and software proficiency.



Around 30.3% of doctoral students report difficulties, particularly in accessing data, as well as in data collection and analysis. They highlight methodological and procedural issues, as well as a lack of training in using tools and software.

These gaps in using tools, best practices, methodologies, and approaches, according to Mehdi Jrad, a modern history specialist at Sousse's Faculty of Humanities and Social Sciences, stem from the **"lack of alignment between undergraduate, master's, and doctoral learning programs."** He also recommends **"integrating digital tools into all disciplines."**

2.4.5 Needs in Research Contexts

Most researchers (66.7%) and doctoral students (72.7%) report no specific needs in their research context.

The researchers who identified needs mainly called for training and better access to databases. They expressed a desire to be informed and trained, particularly in qualitative data processing. They also wish for increased storage capacity for their data and access to specific tools/software like SPSS, Amos, and Nvivo.

One researcher mentioned a need for data related to governance and corporate social responsibility.

2.5 Data and Corpora for Research

2.5.1 Fieldwork and corpus

The responses regarding research fields from researchers and doctoral students are highly varied, and in some cases, the answers suggest that the concepts of "field" and "corpus" are not fully understood by both groups.

While some researchers state their research fields as "Tunisian companies and banks," "financial markets," or "educational institutions," others provide disciplines or answers that do not clearly define research fields, such as archaeology, literature, artificial intelligence, the Arab world, scientific journals, national and international contexts.

The same is true for doctoral students, who mention: the Moroccan Parliament, insurance companies, banks, websites, associations, the Ministry of Justice, prisons, and more vaguely defined fields like Tunisia, Europe and the USA, books and articles, laboratories, PDFs, leadership, and management.



Regarding responses about research corpora, researchers appear to have a better grasp of the question, while the majority of responses from doctoral students reveal difficulty in understanding the notion of a research corpus.

Among researchers who answered the question, examples include: archaeological materials, Tunisian companies, literary criticism, literature, philosophy, history, scientific articles and datasets, documentary sources, quantitative studies using questionnaires, qualitative studies using research interviews, databases and articles, scientific articles, tables, annual reports, interview excerpts, primary data, and quantitative data.

For doctoral students, only one response clearly indicates a corpus: video/audio recordings and transcripts, seminars organized with a working group of researchers and practitioners as part of a collaborative research project, and practitioners' experience narratives. Other responses include: "no idea," research room, text, PDF, documents, books, video recordings, conferences, video corpora of classroom sessions, behavioral economics, financial statements.

2.5.2 Formats, Volumes, Storage and Backup

The formats of the initial corpora used by researchers and doctoral students are (in order of priority):

- **For researchers:** 66.7% text, 61.9% doc, 38% Excel, 19% CSV, 14% XML, 5% RDF, PDF, and SPSS matrix.
- **For doctoral students:** 30.3% doc, 27.3% Excel, 24.2% text, 6% PDF, and only 3% video.

Both researchers and doctoral students struggled to answer the question about the approximate/estimated volume of input and output data (in gigabytes). The majority replied that they did not understand the question, did not know, or provided answers that were insufficient for evaluation. Examples include: 400 KB, unlimited, 500, 8 MB, significant volume, 1 GB, 500,000 bytes. Only one researcher and two doctoral students answered with 4 gigabytes for both input and output.

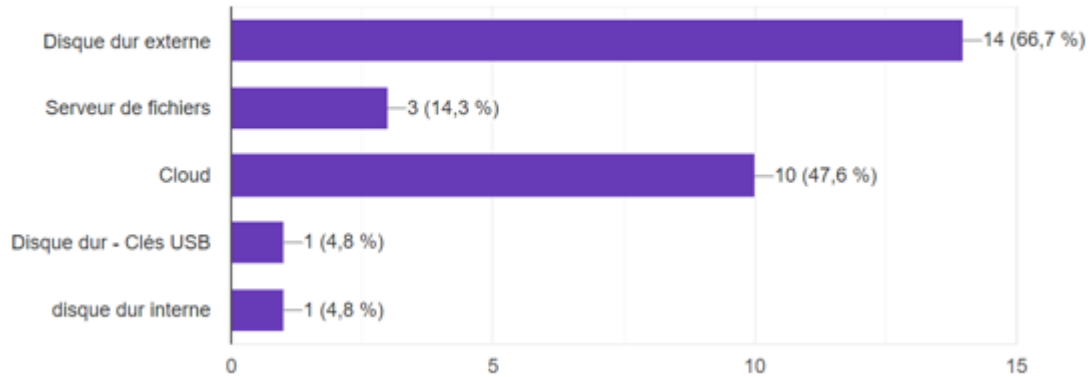
The desired formats for results are (in order of priority):

- **For researchers:** 47.6% doc, 42.9% text, 61.9% Excel, 28.6% CSV, 23.8% XML.
- **For doctoral students:** 36.4% doc, 27.3% text, 18.2% Excel, 6% CSV, 3% AVI, graph, image, and video.



37. Quel est le support de stockage utilisé ?

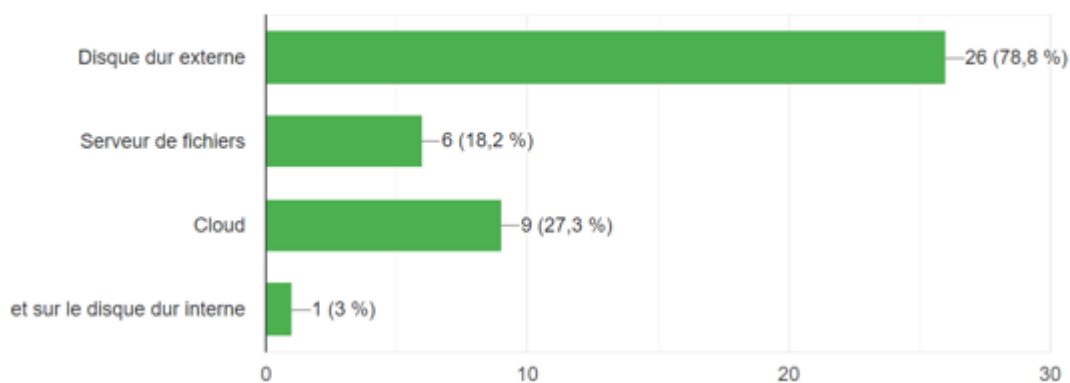
21 réponses



The PhD students:

38. Quel est le support de stockage utilisé ?

33 réponses



66.7% of researchers and 78.8% of doctoral students report that the storage system includes a backup service, but 66.7% of researchers and 63.6% of doctoral students state that the storage system does not comply with archival standards.



Among the nine researchers who answered affirmatively, the majority did not specify the standards used; only two mentioned standards: Dublin Core and RDF, DC, IMS, IEEE.

Of the 12 doctoral students who responded affirmatively to the question about archival standards, only seven provided details (Dublin Core, RDF, OAI, Word).

71.4% of researchers and 54.5% of doctoral students say they do not share data. Those researchers who do share data do so within their working teams or with their students. A small proportion of data is shared with colleagues when needed; however, researchers do not specify the methods or means of transmission. Doctoral students mainly share their data with their supervisors via Dropbox, Google Drive, or email.

42.4% of the doctoral students surveyed use external data, whether public or private, such as financial statements, APIs, UTICA databases, student grades, benchmarks, articles, documents published on websites, theses, and reports.

The majority of researchers (76.2%) and doctoral students (81.8%) state that they do not have specific data needs. For those who answered affirmatively, the identified data needs are as follows:

- **For researchers:** financial data, CSR data (ESG scores), governance data, several paid databases, data sharing, archives.
- **For doctoral students:** employee or management databases, scientific articles, bibliographic resources, data on the integration of ICT in Tunisia, and conference papers.

85.7% of researchers report not using data from others. Among the three who do, the data used includes publications, scientific output, and Excel files from some institutions.

2.6 Doctoral Training/Use of Tools or Online Resources

2.6.1 Scientific Monitoring

Doctoral students are generally aware of search engines for social sciences and humanities (SSH), such as Academia, Google Scholar, and ResearchGate, as well as Scopus, ScienceDirect, and Live Academic Research. This is due to 66.7% of researchers encouraging their use, while 60.6% of doctoral students feel they are aware of these tools.

Nearly half of the researchers surveyed encourage doctoral students to engage in scientific monitoring (47.6%), though only 33.3% of doctoral students feel incentivized to do so, particularly through tools like Zotero, Mendeley, and EndNote. Institutional support for scientific monitoring could be expanded, as 76.2% of researchers believe this would be beneficial.

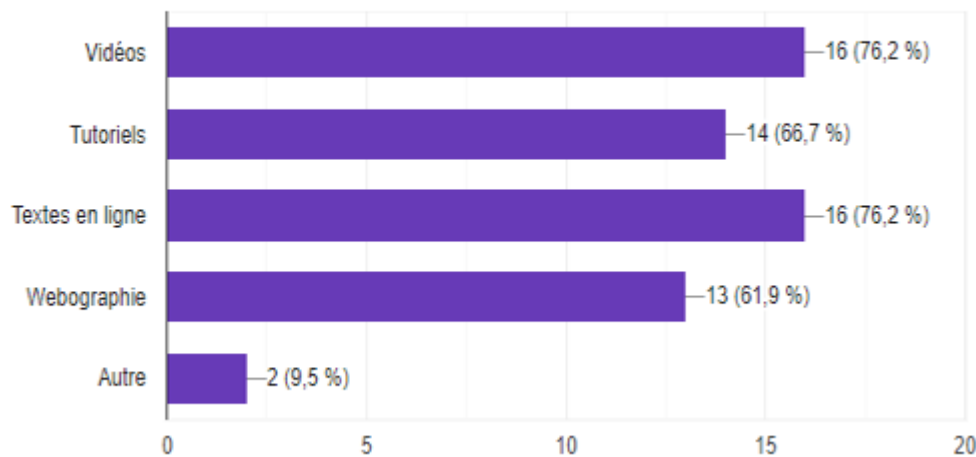


2.6.2 Tools for Sharing and Course Organization

Courses or seminars that include digital resources remain limited (only 23.8% of researchers incorporate them). Discussion forums between researchers and doctoral students are used sparingly by researchers (33.3%), but are more commonly used by doctoral students (60.6%). Both doctoral students (87%) and researchers (100%) express a desire for the development of these methods to facilitate course organization, both among students and between students and supervisors.

All the researchers surveyed state that they recommend digital resources to their students, such as videos, tutorials, online texts, webography's, and Zoom. However, 66.7% of doctoral students do not feel encouraged to use these tools as part of their training.

21 réponses



Answers from the research faculty on the type of digital resources recommended to their students.

A little over a quarter of researchers use digital tools specific to certain disciplines (e.g., archaeology, heritage, art, and design), including databases, image processing software, mapping tools, data show, Colab, Cloud, Spark, R, and video capsules. The majority of students surveyed (93%) do not use specialized software for their fields. For the minority who do, the tools include simulators or CAD software.

Collaborative platforms and content-sharing tools are used by 47.6% of researchers with their students, including, to a lesser extent, tools like SlideShare and WordPress. Among students, 24% use these tools, in order of preference: SlideShare, WordPress, and Blogger. Supervisors who do not use these tools are nevertheless aware of them (81%).



Virtual classes, prepared during and before the COVID-19 crisis, were implemented by 42.9% of surveyed researchers using Zoom and Google Classroom. 33.3% of students reported participating in these initiatives (online courses or training via webinars, Google Meet, Moodle, MOOCs, SPOOCs, UniCollaboration, Virtual ERASMUS+, and the German Academic Exchange Service – DAAD).

The majority of researchers and doctoral students agree that videoconferencing is a useful tool for delivering lectures. It can enable international researchers specializing in specific topics to teach without being physically present. Delivering remote sessions to students from various Tunisian or international institutions is also a widely supported idea among researchers and students. Barriers to developing such “blended mobility” include a lack of training, inadequate infrastructure (poor internet connection), insufficient equipment, financial constraints, a lack of regulatory framework, and sometimes resistance or a lack of motivation.

Some MOOCs have been offered by surveyed researchers (28.6%) or Tunisian institutions (e.g., virtual courses on the UVT platform, MOOCs organized for events, initiatives like the Voltaire project, or the MOOC *Radicalizations and Terrorism*). Few doctoral students (18.2%) reported using MOOCs provided by their institutions. When they do, these include webinars, the TU-MOOC platform from UVT, COURSERA courses, online courses in digital marketing, or entrepreneurship from EBS (European Business School Paris).

Researchers appear to be familiar with e-learning: 47.6% encourage their doctoral students to expand their knowledge through MOOCs from other institutions. However, only 33.3% of doctoral students feel encouraged to do so. Examples of MOOCs mentioned include those from Laval University in Canada, Cambridge University in England, Coursera from Claude Bernard University in Lyon, and CNAM (Conservatoire National des Arts et Métiers) in France.

2.7 Integration into Research Careers / Scientific Community in Social Sciences and Humanities (SSH)

2.7.1 Professional Integration Programs

Few programs related to the professional integration of doctoral students have been implemented within institutions, doctoral schools, or thesis committees. Existing programs identified by institutional representatives include doctoral days promoting engagement with companies for young researchers (e.g., internships), doctoral workshops (FSEG Tunis), doctoral symposia and seminars welcoming professors and professionals, and the initiatives of 4C (Center for Careers and Skills Certification).



2.7.2 Links with the Socio-Economic World

Some partnerships between doctoral schools, thesis committees, or institutions and socio-economic actors have been established around digital tools and doctoral training, according to the institutional representatives interviewed. These partnerships were primarily initiated at the institutional level, involving organizations like the Tunisian Ministry of Education, the Ministry of Higher Education and Research, the Ministry of Employment and Vocational Training, the National Center for Adult Education, the National University Center for Scientific and Technical Documentation, and the Maison du Maghreb des Sciences de l'Homme at the University of Sfax. Some socio-cultural associations were also involved.

Challenges in establishing partnerships with organizations such as companies or NGOs regarding digital tools and doctoral training were highlighted.

More than half of the researchers surveyed have links with socio-economic actors. In contrast, 72.7% of doctoral students do not. For the 27.3% who do, these connections are mainly through civic activities within associations or NGOs, researcher groups on social networks, or certain research institutions (e.g., the Arab Council for the Social Sciences, CASS, based in Beirut).

2.7.3 International Outreach

Institutional representatives from universities, doctoral schools, or thesis committees show a strong interest in the internationalization of doctoral training. This is evident through international agreements with foreign universities and co-supervision of theses. International mobility is promoted for students through internships abroad and alternating scholarships, as well as for researchers through research grants or invitations to participate in international conferences.

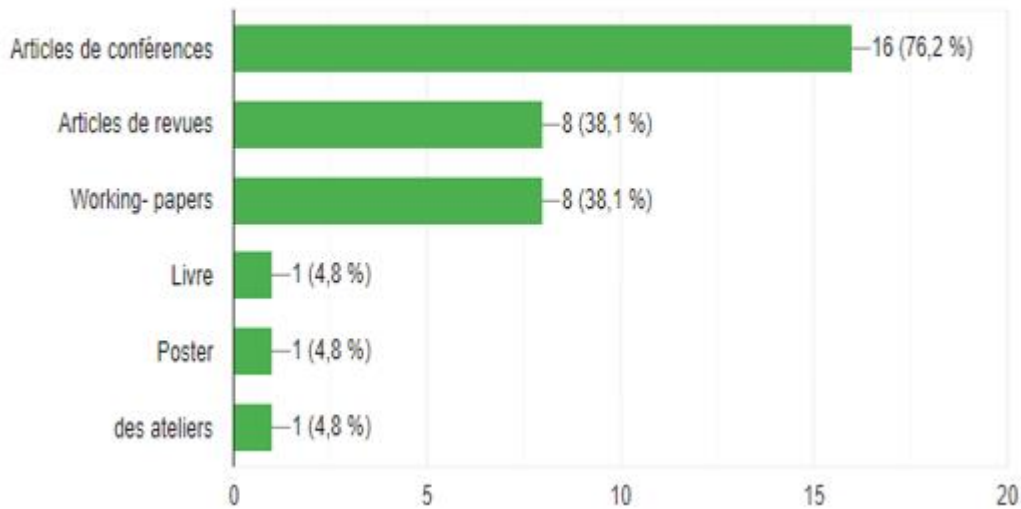
Tunisian institutions also organize international events (conferences, seminars), which sometimes result in publications.

2.7.4 Research Valorization and Online Publication

57.6% of doctoral students report having produced research data or documents, whether published or unpublished. Among them, several types can be identified:



21 réponses

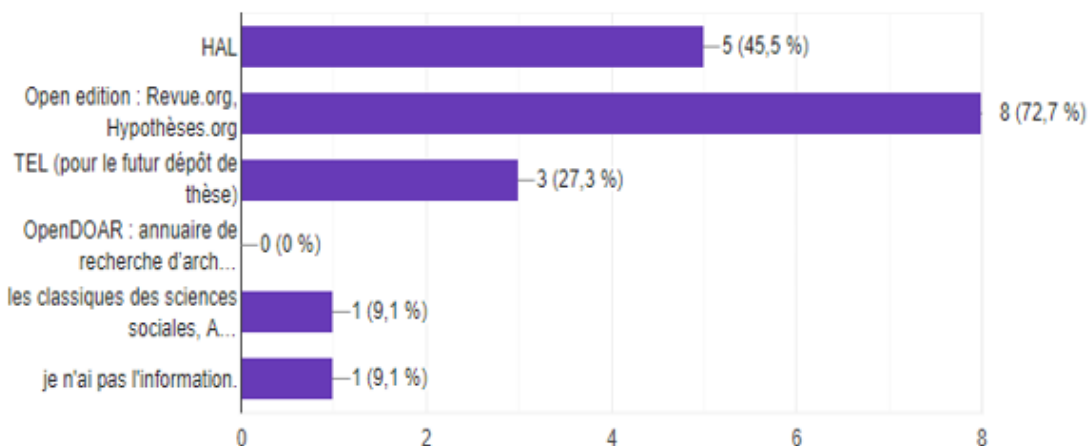


27.3% of doctoral students' publications are indexed.

The majority (75.8%) report having needs regarding publication and/or indexing, primarily in the form of guidance on conferences, journals, publishers, and funding support for publication. They also seek assistance for conference participation and funding opportunities.

2.7.5 Awareness of Ethical and Legal Issues

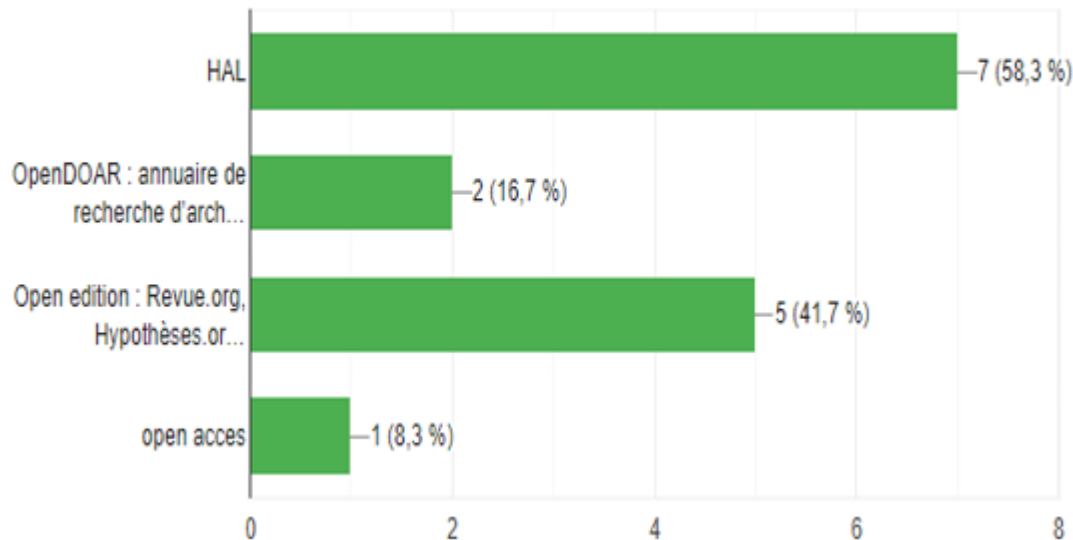
61.9% of Tunisian researchers report that doctoral students are made aware of online publishing, particularly through tools such as HAL, Open Edition (*revue.org* and *hypotheses.org*), TEL, and *archives.org*. However, only 30% of doctoral students feel adequately informed.





Responses from the teaching staff on publication tools to which doctoral students are sensitized.

12 réponses



Answers from PhD students on the publication tools they feel are familiar with.

While doctoral students seem to be knowledgeable about the use of digital tools, awareness of ethical issues remains insufficient (as noted by 52.4% of the surveyed faculty researchers and 69.7% of doctoral students), as do the legal aspects of research in the digital age (reported by 66.7% of faculty researchers and 78.8% of doctoral students). According to some, this can be attributed to a lack of institutional training or insufficient long-term support, even when awareness modules or training programs are available. When these topics are addressed, particularly in introductory research courses, they tend to focus more on intellectual property and plagiarism.

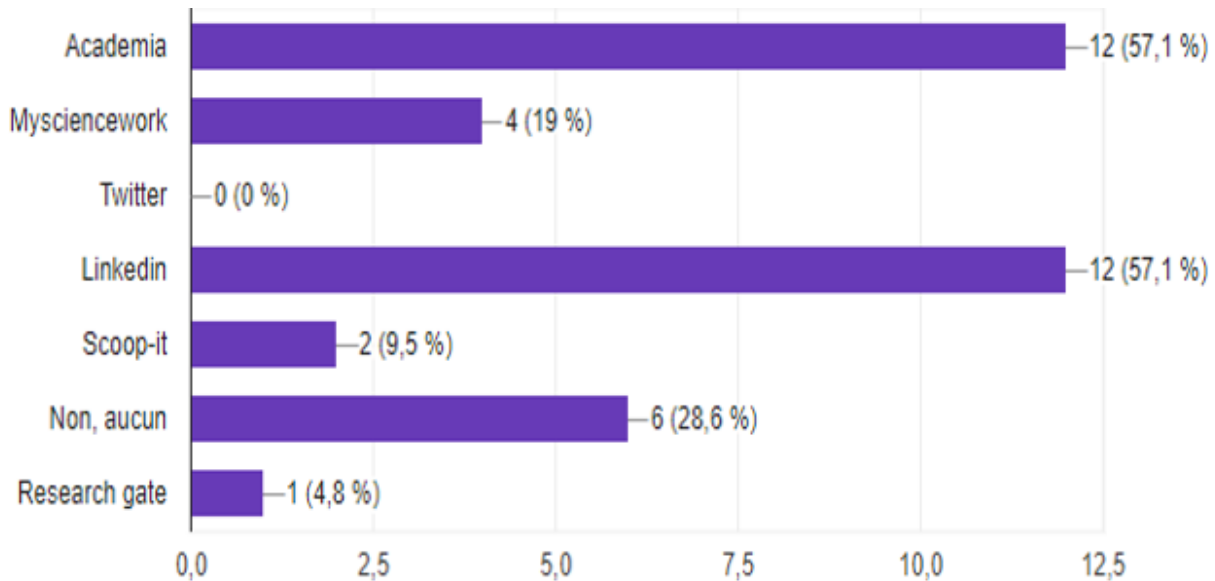
For several doctoral students, while raising awareness of ethical issues is essential in research, the processes involved in publication are sometimes unclear. Some doctoral students are aware of unauthorized downloads and turn to their institutions to access scientific resources that are not freely available. However, the survey of faculty researchers suggests that not all doctoral students are fully aware of the risks associated with plagiarism and the use of digital tools in research, such as employing pirated software to obtain bibliographic references.

If some doctoral students resort to using pirated software, this could also be linked to the financial costs of official software not covered by their institutions.



2.7.6 Research Communities

60.6% of surveyed doctoral students report being familiar with "scientific" social networks such as LinkedIn, Academia, Twitter, and Facebook. The majority of faculty researchers participating in the survey state that they encourage doctoral students to engage with these networks, including:



Responses from the research faculty regarding social networks for which PhD students are aware.

2.7.7 Soft Skills/Mad Skills

66.7% of the surveyed faculty researchers report having needs related to the development of soft skills (languages, communication) and mad skills, such as teamwork, the use of digital tools, communication, improving English proficiency, and developing "collective and emotional intelligence." Similarly, 48.5% of doctoral students express a need for soft or mad skills, prioritizing public speaking and communication in English, as well as proficiency in certain software or programming languages (e.g., JAVA, LaTeX) and statistical software.

2.8 Other Points Highlighted by Respondents

In the survey conducted among institutional leaders, the importance of online training and virtual national and international meetings was emphasized as a means to enhance employability and research potential. The need to create specific programs focusing on the relationship between



science, technology, and society was also highlighted. Mounir Guirat, Director of the Doctoral School of Letters, Arts, and Humanities at the Faculty of Letters and Human Sciences in Sfax, recommends:

"Improving access to various databases for faculty researchers and doctoral students, as well as encouraging regular discussion forums between faculty researchers and doctoral students to share experiences and expertise."

Beyond teaching and research, digital tools should be more extensively integrated into the administrative management of institutions, for example, through platforms to handle doctoral student files: registration, missing courses, total credits earned, communication with doctoral students, sharing student information with the university, and expediting the

approval process for thesis defenses by university presidents.

In the survey conducted among faculty researchers, a lack of collaboration in digital practices between institutions within the same university was noted.

There is a clear desire for more initiatives, information, and training on digital tools for faculty researchers so they can adopt new practices and pass them on to their doctoral students. Developing a digital culture among this target group could subsequently promote collaboration between institutions and enhance digital practices with students. This point was emphasized by Mehdi Jrad, a specialist in modern history at the Faculty of Social and Human Sciences in Sousse, who recommends:

"Organizing periodic meetings on digital tools to raise awareness among faculty and doctoral students."

Additionally, the lack of financial, material, and human resources, limited research budgets, and insufficient recognition of research and its outcomes are cited by a respondent as reasons for the demotivation of young researchers.

Doctoral students, for their part, emphasize the importance of soft and mad skills and express a need for better access to research and digital documentation platforms, dedicated workspaces, and reliable internet connectivity. They agree that digital practices should be strengthened within institutions. The COVID-19 pandemic highlighted this deficiency, particularly in doctoral training traditionally reliant on in-person learning.

PART III GOOD PRACTICES, RECOMMENDATIONS AND STRATEGIES



This section of the present report is dedicated to contextualizing (from a technological perspective) and providing recommendations that could assist policymakers in developing strategies for the deployment and popularization of digital technologies in doctoral training in the Humanities and Social Sciences (HSS) in Tunisia.

The proposed elements are derived from the findings of the survey conducted during the first phase of the RAQMYAT project, specifically under Work Package 1 (WP1). The results of this survey have been introduced, explained, and discussed in previous sections.

The recommendations proposed in this report explicitly and/or implicitly reference Digital Humanities, their requirements, and their characteristics as previously described. These recommendations are organized according to the main sections of the survey questionnaires:

- **Data, Tools, and Research Methodologies**
- **Infrastructures**
- **Doctoral Training / Use of Online Tools and Resources**
- **Professional Integration / Scientific Community in HSS**

It should be noted that, for the sake of simplification and consistency, the sections on "Data, Tools, and Methodologies" have been addressed together. This is because, on the one hand, they share many concepts, which we aimed to address collectively to avoid repetition. On the other hand, they form a coherent whole where these categories are complementary.

3.1 Data, Tools and Methodologies

In this section, related to data, tools, and methodologies, the analysis and evaluation of the survey results indicate that scientific production in the Tunisian context is quite rich and diverse. However, it suffers from gaps and issues primarily related to the use and integration of digital tools in doctoral training, which is the focus of our study.

Below, we propose recommendations and some best practices that could help policymakers develop strategies to address these challenges. At the end of this section, we suggest pathways that could contribute to achieving these goals.

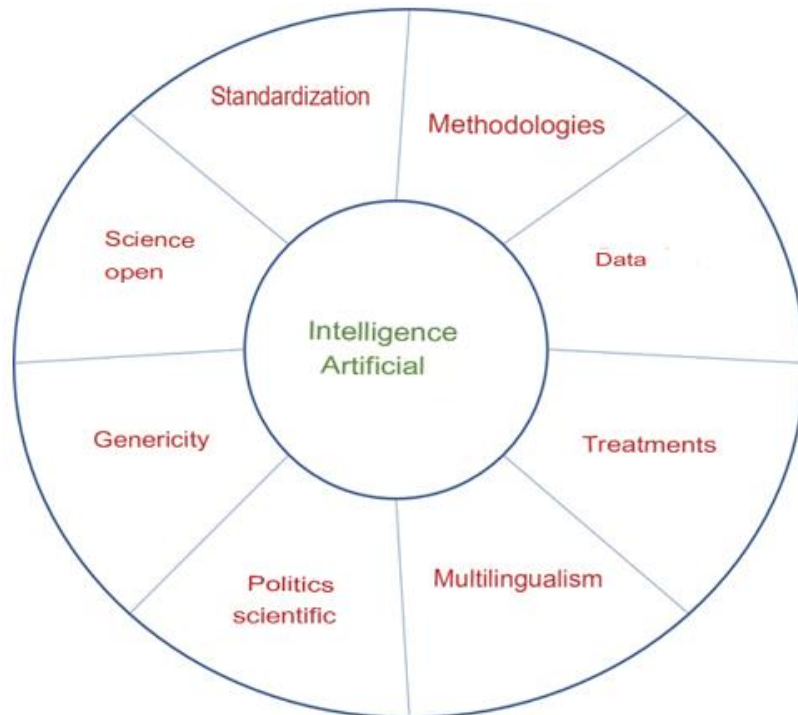


Figure: Artificial Intelligence at the Core and in Service of Modern Digital Humanities

3.2 Scientific and Digital Policy: Multidisciplinary, Regional, Temporal Balances and Transversality

Balancing disciplines, regions, and timeframes, along with fostering interdisciplinarity across these dimensions, is crucial. This applies to both investments in and the use of digital tools across disciplines and the distribution of research efforts. It is strongly recommended to respect these balances and ensure that no research is marginalized or underfunded in terms of digital resources.

The widespread use and adoption of digital technology, while naturally essential, also serve as a powerful lever to help balance scientific policy in the domain of Social Sciences and Humanities (SSH). For example, if scientific data from different disciplines, regions, and research periods are digitized, structured, and annotated, dashboards and indicators can be generated from this data, enabling decision-makers to make adjustments and better direct their scientific policies.



3.3 Multilingualism

The survey's results highlight several issues. Research conducted in doctoral programs spans multiple languages, primarily French, English, and Arabic. However, this research is unevenly distributed, with English and French dominating.

Arabic, in particular, is a technologically under-resourced language, hindering its integration into the digital world and Digital Humanities. Even when considering only English and French, most existing solutions are monolingual, typically favoring English. Addressing multilingualism and multiculturalism is a significant challenge for Tunisian doctoral programs.

A broader vision is recommended to successfully integrate these doctoral programs into the unified Digital Humanities ecosystems of the Maghreb and/or Euro-Mediterranean regions.

3.4 Open Science

Survey results also indicate a lack of infrastructure supporting cooperative research and open science. To address this, we recommend developing scientific and technological solutions to create networks of Tunisian researchers and assist them in joining international networks. These solutions aim to facilitate researcher collaboration, encourage the formation of young researcher communities in Digital Humanities, and provide functionalities for creating, sharing, and accessing research knowledge in an open, intelligent, and personalized manner.

3.5 Standards

The survey reveals disparities in data formats and structures, even when data is structured. To ensure compatibility and integration with third-party systems, adhering to international and/or community standards is strongly recommended. Standards such as ISO and those from the Semantic Web, like RDF, are particularly vital. Using standardized data and tools facilitates processing and reusability, including leveraging existing tools and datasets.

In the case of data models, it is recommended not only to structure and create data but also to follow domain conceptualizations recognized by research communities, known as ontologies. These ontologies represent a consensus within a group or research community, enabling a shared "language" for collaboration.



3.6 Genericity and Operationality

Survey findings indicate that 81% and 87% of respondents do not reuse tools or methodologies for research. A persistent issue, particularly in Tunisia, is the lack of genericity and reusability of data, tools, and methodologies in research information systems.

Implementing strategies that promote or even mandate genericity is an important recommendation. This would enable researchers in the humanities to:

- Focus on their core work
- Save time on their projects
- Avoid redeveloping the same tools for each new project

3.7 Artificial Intelligence (AI)

The purpose of this section is to encapsulate everything recommended in this part regarding artificial intelligence (AI) within the context of its norms and applications. Specifically, this involves designing all elements in accordance with AI standards.

Below are some motivations and recommendations on the use of AI in Digital Humanities, particularly within Social Sciences and Humanities (SSH).

As with other aspects, the use and deployment of AI remain limited according to the conducted survey, despite its emergence as a crucial field, particularly within the context of Digital Humanities supporting SSH.

Recommendations:

We propose strategies to facilitate the integration of AI (tools, datasets, best practices) into experimentation and research in Tunisian Digital Humanities and SSH.

Multimodal unstructured data—also called raw data—dominates data production and publication across disciplines, including SSH, accounting for more than 80% of total data according to various studies. These datasets are rich and valuable in terms of information and knowledge, making their integration essential in analytical and exploitation processes for research purposes.

Analyzing and leveraging such raw data is particularly challenging in SSH due to the lack of tools and resources for numerous digital pre-processes (formalization, normalization, tools, dictionaries, corpora, annotations, methodologies, etc.) for natural language processing (NLP).

In this context, we propose and recommend providing AI-based solutions for handling massive and raw data. The goal is to enable unified and centralized access to an exhaustive collection of



existing, new, or adapted technological solutions specific to the SSH context in Tunisia. These should be accompanied by guides for best practices to facilitate proper reuse.

Examples: In semantic analysis of textual data (e.g., semantic text mining), workflows can be formalized for initial common analysis phases. These workflows could include tools for morphological analysis, grammatical annotation (part-of-speech tagging), sentence segmentation, named entity recognition (NER), and more. These tools must be encapsulated in user-friendly interfaces to streamline their use.

These elements can serve as a shared foundation for many multimodal data analysis processes or be tailored for specific treatments.

For textual data specifically, this would help researchers address two main issues:

- The lack of linguistic resources (datasets, dictionaries, thesauri, processed corpora).
- The lack of digital tools for NLP (morphological, syntactic, and semantic analyzers).

Key Objectives: The primary goals can be summarized in five axes:

- Develop tool collections for SSH researchers: These should include specific tools for early-stage data analysis (e.g., morphological, syntactic) and reusable tools for advanced analysis (e.g., semantic). These collections would form a well-documented, Tunisian-specific digital toolbox, supporting operational solutions and training opportunities.
- Develop datasets: Avoid researchers needing to create learning and evaluation corpora for every project. These collections should be categorized by domain, discipline, or issue type.
- Extend and enrich collections with methodologies, approaches, and best practices formalized and tested within supported or completed projects in Tunisia or abroad. For instance, in text semantic mining, AI-based approaches for data preparation (using existing tools or unsupervised methods) and subsequent supervised methods can save time and resources while maintaining analysis quality.

Encapsulate solutions in ergonomic interfaces to simplify data analysis for researchers without requiring advanced IT expertise. This includes collaboration with IT departments to develop easy-to-use interfaces for the proposed tools.

- Establish environments for data exploitation and experimentation specifically for SSH researchers.

Further Considerations

Implementing such a strategy requires a national-level approach, involving units, working groups, and governmental services. Recommendations include:



- Aligning scientific policies for funding and calls for proposals with AI and digital humanities.
- Monitoring and evaluating funded projects to ensure quality.
- Creating project engineering units within institutions to support SSH researchers in proposing innovative projects.
- Addressing legal aspects with dedicated legal support services.
- Promoting researchers' participation in national and international standardization organizations to influence and not just follow imposed norms (e.g., ISO, W3C).
- Prioritizing quality in data, **tools, and** methodologies to ensure accurate analysis outcomes.
- Encouraging collaboration and resource-sharing within SSH and digital domains.
- Increasing funding access and supporting dissemination of scientific results through events, platforms like Calenda, or social media

In this regard, it is strongly recommended to standardize and expand these infrastructures by equipping all students, researchers, and even institutional leaders. This would establish a solid foundation for implementing the other recommendations outlined below, addressing scientific and technological aspects.

3.8 Infrastructure

According to the survey conducted, it was observed that basic research infrastructure is sometimes weak or even nonexistent. This primarily concerns infrastructure, networks, systems, Wi-Fi, personal equipment, and similar resources

3.9 Doctoral Training/Use of Online Resources

The surveys conducted highlighted several areas to be developed for better integration of digital technologies into the organization of doctoral courses and training programs:

- Establishing methodology workshops for scientific research aimed at doctoral students, including:
 - Preparing research by defining the subject and creating a corpus of keywords.
 - 3.10 Professional integration Providing guidance on scientific and documentary monitoring using dedicated tools (e.g., Zotero, Mendeley, or EndNote).
 - Supporting investigation methods (quantitative, qualitative, and mixed approaches).



- Raising awareness of ethical and legal aspects of research (e.g., developing modules on intellectual property and plagiarism, where they exist).
- Providing information on online publication platforms.
- Introducing pedagogical innovation training delivered by Tunisian universities for teacher-researchers.
- Increasing the use of collaborative platforms, content dissemination tools, and discussion forums in doctoral courses. Strategies such as "flipped classroom" methods could also be implemented, where lectures are watched in advance, and practical work is carried out in class to promote interaction.
- Encouraging doctoral students to enhance their knowledge and skills (soft and mad skills) through e-learning, virtual classes, and MOOCs organized by Tunisian or international universities.
- Promoting blended mobility (hybridization of in-person and remote practices):
 - For Tunisian teacher-researchers, by participating in conferences or courses abroad, and for foreign teacher-researchers, through events organized by Tunisian universities.
 - For Tunisian doctoral students, through programs such as Erasmus+, which promote inclusion and innovation, to enhance their skills.
- Encouraging participation in learning-focused social networks to interact and debate with other doctoral students.
- Ensuring visibility on scientific social networks to stay informed and seize potential opportunities in the research field.

3.10 Professional integration

Recommendations to Improve the Skills of Doctoral Students and Early-Career Researchers for Their Future Integration into the Job Market

- Encourage all stakeholders—institutions, administrators, researchers, and doctoral students—to recognize the importance of doctoral training for professional integration. This awareness will help to reshape the perception of the doctorate, which is often viewed solely as a qualification for teaching. This perception is inaccurate, as evidenced by the significant number of researchers who transition successfully into the corporate sector. For instance, in the context of digital sciences and related fields like digital humanities, the



boundary between research and development is virtually nonexistent. Companies see value in investing in research to remain competitive. This is equally applicable to other disciplines in the humanities and social sciences (HSS).

- Such connections create a strong, favorable link between the socio-economic sector and the research community, particularly young researchers and doctoral graduates, which should be leveraged to full advantage.
- Transform doctoral training programs into pathways of excellence, well-aligned with labor market demands. This requires a genuine reform of doctoral programs to ensure they are:
 - Selective, to raise academic standards.
 - Equipped with high-quality curricula tailored to the needs of the labor market and modern research.
 - Open to collaboration with the corporate sector.
 - Internationally oriented.
- Foster favorable relationships and establish administrative, institutional, and legal frameworks to facilitate cooperation between academia and the socio-economic sector.
- This involves encouraging and providing incentives for companies to engage in research by contributing to research funding, among other initiatives. Such measures can create demand for research within companies and cultivate appropriate skills within universities, thus promoting professional integration. Steps to achieve this include:
 - Establishing systems similar to the French CIFRE model (Industrial Agreement for Training through Research) to fund doctoral theses in companies.
 - Implementing tax incentives akin to the French CIR model (Research Tax Credit) for companies.
 - Offering opportunities for researchers to undertake joint university-company assignments, such as consultancy missions.
- Expand professional development training alongside doctoral studies.
- This should include:
 - Training on business operations.
 - Language courses.
 - Development of specific skills required by the corporate sector.



- Coaching on soft and mad skills.
- Inform doctoral students and early-career researchers of all measures and opportunities available to help them enter the job market.
- To achieve this, dedicated platforms and information systems should be established to provide access to various opportunities, such as training, scientific meetings, exchanges, open days, company events, funding options, and more. For example, these systems should centralize job postings and applications specifically aimed at doctoral students.

ANNEX 1

Progress and progress of WP1's work

Initial Schedule (3 Phases)

The initial project schedule consisted of three main phases:

- The first phase in mid-April, involving the organization of meetings at each site to inform all concerned colleagues and distribute three different questionnaires.
- The second phase in May/June, conducted as field research by the two experts from FMSH and the University of Sousse: Hammou Fadili and Sonia Ayachi Ghannouchi.
- End of June/early July: a meeting to present the results of WP1, combined with the launch of WP2 and the partners' meeting in Sousse.

However, due to the global situation related to the COVID-19 pandemic, decisions were made by the partner countries, which impacted the progress of the RAQMYAT project, particularly the activities of WP1. This required modifications to the schedule and the approach to ensure the project continued smoothly in the given circumstances.

Revised Schedule

The revised project schedule also consisted of three main phases:

- Sending out the questionnaires (online) at the end of April. The distribution of Questionnaire 15 had started, beginning with those intended for institutional leaders, which already led to some early feedback. For the two other questionnaires, it was decided to individually approach a small group of teachers and doctoral students to test them before ensuring broader distribution by the end of May.



- Postponing field visits to June.
- Postponing the planned meeting at the end of June/early July in Sousse to the third week of September. Regarding this last point, the situation remains uncertain. The June-July field visits also could not take place, and it is uncertain whether we can hold the meeting in person in September (or possibly October). It is likely that this event will be converted to a remote meeting.

Target Audience Questions:

Note that the distribution of the first form is coordinated with the launch:

- The RAQMYAT research notebook dedicated to the project, providing access to various project-related information. It consists of a series of posts (e.g., quick-off meeting interventions, thesis & doctoral school commission workings), shared on social media such as Facebook and Twitter.
- The MOODLE platform established by UVT to allow different WP teams to work together and promote collaboration among project stakeholders or beneficiaries, such as doctoral students, researchers, or institutional leaders.
- A glossary of technical terms to facilitate understanding of concepts related to digital tools and technologies. Respondents may not be familiar with these terms, so the glossary ensures the questionnaires are as accessible as possible.

In the first section (Identification), questions focus on the institution's name, the respondent's position within the institution, their research laboratory, the discipline of their research, and their working language(s).

In the second section (Infrastructure and Services within the Institution), questions cover internet access from the institution (especially wireless access) and the presence of rooms with free access to computers or other spaces dedicated to digital work (such as recording rooms, video-conferencing rooms, learning labs, etc.). It also seeks information on services or departments dedicated to digital tools (teams supporting course design and online delivery).

The third section (Research, Methodology, Tools, and Research Data) is divided into three subsections:

- Methodologies, Data Models, and Processing Models: This includes describing the adopted research methodology, the use (or not) of digital tools, and the reuse of existing data models or processing models. It also mentions encountered difficulties and specific methodological needs.



- Digital Tools for Research: This covers the digital tools used, specifying whether each tool is paid, free, or provided, as well as their usage (local, remote, etc.). It also addresses the data formats required by the tools, the output formats generated, the adequacy of the tools for researchers' needs, tool documentation, training, and difficulties encountered.
- Corpus, Data Sets, Research Results, and Fieldwork: This includes details about the fieldwork, the initial corpus format and associated volume (GB), the desired results format and volume, storage media, backup services, adherence to archiving standards (OAI, RDF, Dublin Core, etc.), data sharing practices, and
- publication needs (type of publication, indexation, publisher, funding for publication, etc.).

The fourth section (Doctoral Training/Digital Practices in Higher Education) is divided into two subsections:

- Scientific Monitoring: Includes awareness of social science research engines (e.g., Academia, Google Scholar, Scidure, Isidore, live academic research) and encourages doctoral students to engage in bibliographic monitoring using tools like Mendeley or Zotero.
- Course Sharing and Organization Tools: Covers the existence of discussion forums between teachers and doctoral students, recommendations for accessing digital resources like videos, tutorials, texts, webographies, etc. It also discusses digital tools specific to disciplines (e.g., Archaeology/Heritage, Art and Design), the use of collaborative platforms/content sharing tools with students (e.g., WordPress, Blogger, SlideShare), and virtual class initiatives (e.g., online sessions by foreign expert researchers or joint sessions with students from multiple institutions).

The fifth section (Professional Integration in Research/Scientific Community in SHS) is divided into four subsections:

- Publication: Focuses on raising awareness among doctoral students about open-access publishing and related tools (e.g., HAL, Open Edition, TEL for thesis submission).
- Regulation: Concerns ethical and legal issues in digital research.
- Networks: Focuses on the institution's connections with the socio-economic world, businesses, and NGOs, encouraging doctoral students to engage in academic social media networks (e.g., Academia, My Science Work, LinkedIn, Twitter).
- Soft Skills: Addresses specific needs in terms of soft skills, such as languages and communication.



ANNEX 2

Questionnaire on good digital practices in doctoral schools: "institutional managers" version

Identification

1. Your name:
2. Your institution:
3. Your position within the institution:

IT Infrastructure and Support Services in Your Institution

4. Does your institution have an internet connection? Yes/No:
5. Does your institution provide Wi-Fi access? Yes/No:
6. Does it offer a space with computers for doctoral students' free use? Yes/No:
7. Is it equipped with an intranet/webmail?
 - Yes, for both faculty and students
 - Yes, only for faculty
 - No (neither for faculty nor students)
8. Does it have a specific documentation portal (distinct from CNUDST)? Yes/No:
9. Does it have spaces equipped for digital use?
 - If yes, which ones:
 - A media library
 - Videoconferencing room
 - Recording room
 - Learning lab
 - Other
 - No spaces
10. Does it have a dedicated support service for digital tools in doctoral training? Yes/No:
 - If yes, is online help available for users?
11. Is there a specific service for handling data collected by doctoral students? Yes/No:



- If yes, what data analysis software is available for qualitative and quantitative analyses?

Digital Humanities

12. Have you heard of Digital Humanities before?

- If yes, how would you define Digital Humanities in a few lines?

13. Have your institution, thesis committee, or doctoral school implemented courses in doctoral programs that integrate Digital Humanities or computer science for social sciences?

- If yes, please provide more details:

Importance of IT and Digital Tools for Training, Research, Documentation, and Professional Integration

14. Evaluate the following statements about the importance of IT and digital tools in training, research, documentation, and professional integration. (1 = Strongly Disagree < 5 = Strongly Agree)

- IT and digital tools are valuable for doctoral training in your field.
- IT and digital tools are a major focus of research in your field.
- IT and digital tools primarily facilitate doctoral students' access to documentation and data needed for their research.
- IT and digital tools are used to facilitate doctoral training (e.g., access to doctoral courses).
- IT and digital tools fundamentally change research methods in your field.
- IT and digital tools play a critical role in doctoral students' professional integration.
- IT and digital tools provide access to resources (databases, sectoral studies, strategic studies, etc.).
- IT and digital tools enable processing of collected data (identifying and extracting information, organizing information, qualitative and quantitative analysis, etc.).
- IT and digital tools allow modeling.
- IT and digital tools enable collaboration, participation, and presentations.

Priorities in Digital Strategies for Doctoral Training



15. What are the conditions for successfully integrating digital tools into doctoral programs in your institution? Rate the importance of these proposals from 1 to 5 (1 = Strongly Disagree < 5 = Strongly Agree):

- Focus on addressing needs rather than tools.
- Support the adaptation of teaching practices to digital contexts.
- Provide adequate instructional design expertise for the project.
- Be proactive on technical planning.
- Encourage trainers' engagement and consider organizational dimensions.
- Promote a culture of experimentation and evaluate outcomes.
- Encourage learner engagement.

Partnerships to Strengthen Digital Integration in Doctoral Training

16. Which research laboratories are connected to your doctoral school, thesis committee, or institution for the digital aspects of your doctoral training?

17. Which socio-economic partners work with your doctoral school, thesis committee, or institution on the digital aspects of your doctoral training?

Professional Integration in Research/Scientific Community in Social Sciences and Humanities

18. What measures have been implemented by your doctoral school, thesis committee, or institution to support doctoral students' professional integration?

19. What measures have been implemented by your doctoral school, thesis committee, or institution to support the internationalization of doctoral training?

Miscellaneous

20. Share your thoughts on any topics not covered in the questionnaire or provide additional details on the role of digital practices in your doctoral training programs.

Questionnaire on good digital practices in doctoral schools: "researchers" version

Identification



1. Your name:
2. Name of your institution:
3. Position (institutional leader, researcher-teacher, etc.):
4. Laboratory:
5. Research themes:
6. Disciplines involved:

7. Language(s) used:
8. Have you heard of Digital Humanities?
9. If yes, can you explain in a few lines what you understand by Digital Humanities?
10. Do you use digital tools in your research?

IT Infrastructure and Services within the Institution

11. Does your institution have an internet connection? Yes/No:
12. Does your institution allow Wi-Fi access? Yes/No:
13. Does your institution provide a space with computers freely accessible to students?
Yes/No:
14. Does it have an intranet/webmail system?
 - Yes, for researchers and students
 - Yes, only for researchers
 - No (neither for researchers nor students)
15. Does it have a documentary portal? Yes/No
16. Does your institution have rooms dedicated to digital tools? If yes, which ones:
 - Media library
 - Video-conferencing room
 - Recording room
 - "Learning Lab" room
 - None
 - Other



17. Does your institution have a service/department specifically dedicated to digital tools?

Yes/No

- If yes, is there online help available for users?

18. Is there a specific service responsible for managing data collected by researchers/students?

- If yes, what data analysis software is available for qualitative and quantitative analysis?

Research Tools

19. What IT tools are used for data collection?

20. What IT tools are used for communication?

21. What IT tools are used for processing and analysis?

22. List and describe other IT tools used in your research:

23. Can you specify the nature (paid, free) and type (local, remote, cloud...) of the tools used?

24. What are the input data formats required? Doc, Xml, Rdf, Text, Excel, Csv, Other

25. What are the output data formats generated by the tools used? Doc, Xml, Rdf, Text, Excel, Csv, Other

26. Are the tools used well adapted to your needs? Yes/No

27. If no, what are your needs in terms of tools for your research?

28. What difficulties do you encounter in using these tools?

29. Are the tools used well documented? Yes/No

30. Have you been trained? Yes/No If yes, on which tools?

Data and Corpus for Research

31. What are your research fields?

32. What are your corpora?

33. What are the formats of your initial corpora (doc, xml, rdf, text, Excel, csv, etc.)?



34. What is the approximate/estimated volume of your input data (in GB)?
35. What are the desired formats for your results (doc, xml, rdf, text, Excel, csv, etc.)?
36. What is the approximate/estimated volume of your output data (in GB)?
37. What storage medium is used?
- External hard drive
 - File server
 - Cloud
 - Other
38. Does the storage system have a backup service? Yes/No
39. Does the storage system comply with archiving standards? Yes/No
- If yes, which standards are used (OAI, RDF, Dublin Core, ...)?
40. Are your data shared? Yes/No
- If yes, how and with whom:
41. Have you used data from others? Yes/No
- If yes, which ones?
42. Do you have specific needs in terms of data? Yes/No
- If yes, which ones?

Research Methodology

43. What are your methodologies? Do you use statistical methods, symbolic methods, mixed methods, empirical methods, Artificial Intelligence, or other?
44. Do you propose or advise existing approaches (standard or defined within your research team)? Yes/No If yes, which ones?
45. Do you propose or advise existing data models and structures (from literature or your research team)? Yes/No If yes, which ones?
46. Do you propose or advise existing data processing models (from literature or your research team)? Yes/No
47. Have you encountered any particular difficulties in terms of methodology, approach, data model, or processing method? Yes/No If yes, which ones?



48. Do you have any specific needs in this context? Yes/No If yes, which ones?

Doctoral Training / Use of Tools or Online Resources

49. Do you raise awareness among doctoral students about search engines in Social Sciences (e.g., Academia, Google Scholar, Scidure, Isidore, Live Academic Research)? Yes/No

- If yes, please specify which ones:

50. Do you encourage doctoral students to practice bibliographic monitoring with software like Mendeley, Zotero, etc.? Yes/No

- If no, do you think your institution could implement this?

Course Organization and Sharing Tools

51. Have you taught or given seminars at the doctoral level that involve the use of digital tools? Yes/No

52. Do you use discussion forums between teachers and doctoral students, or between doctoral students? Yes/No

- If no, do you think this would be interesting to implement?

53. Do you advise your students on digital resources? Yes/No If yes, which ones?

- Videos
- Tutorials
- Online texts
- Webography
- Other

54. Do you use digital tools specific to your discipline (e.g., Archaeology, Heritage, Art and Design)? Yes/No

- If yes, which ones?

55. Do you use collaborative platforms/content dissemination tools with your students? Yes/No If yes, which ones?

- WordPress (to create a website)
- Blogger
- SlideShare



- Other If you do not use them, are you aware of them? Yes/No

56. Are there virtual classroom initiatives? Yes/No

- If yes, please specify:
- If no, do you think this could be implemented:
- In the context of a session delivered remotely by a foreign expert on a specific topic?
Yes/No
- In the context of sessions attended by students from different institutions?

57. What do you think would be the obstacles?

58. Have you ever proposed MOOCs? Yes/No

59. Have MOOCs been implemented within your institution? Yes/No

- If yes, please specify:

60. Are doctoral students encouraged to deepen their knowledge through MOOCs from other institutions? Yes/No

Professional Integration in Research / SHS Scientific Community:

Publications

61. Are doctoral students made aware of open access publishing? Yes/No If yes, through which tools?

- HAL:
- Open Edition: Revue.org, Hypotheses.org
- TEL (for future thesis deposit)
- OpenDOAR: directory of open archives by discipline
- Other

62. Are your doctoral students made aware of the ethical issues of research in the digital age?
Yes/No Please specify and describe in more detail:

63. Are your doctoral students made aware of the legal issues of research in the digital age?
Yes/No Please specify and describe in more detail:



Networks

64. Do you have links with the socio-economic world, companies, and NGOs in Tunisia or internationally? Yes/No

65. Do you encourage your doctoral students to follow “scientific” social networks?

- Academia
- MyScienceWork
- Twitter
- LinkedIn
- Scoop.it
- Other
- No, none

Soft & Mad Skills

66. Do you have any specific needs to implement soft & mad skills (languages, communication, etc.)? Yes/No

- If yes, which ones?

Miscellaneous

67. Other (express yourself on topics not addressed in the questionnaire):

