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The Pivotal Role of Libraries in Sustainable AI Development

Le Rôle pivot des bibliothèques dans le développement durable de l'IA

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Résumé de l'article

Artificial Intelligence (AI) has gained exceptional public and media coverage since the launch of the ChatGPT platform, a generative conversational intelligence, in November 2022. Nevertheless, AI is already an integral part of our digital daily lives, as we navigate through social networks, use our GPS, or consult recommendations on e-commerce websites. Due to its pervasive influence across all sectors of our societies, AI is gradually becoming a pivotal subject in terms of regulation, societal direction, and legislation. As early as 2021, UNESCO published a report presenting avenues for ethical considerations in AI. In June 2023, the European Union also established a regulatory framework outlining requirements and obligations for AI usage. As a digital manifestation and given the "new ways in which its use influences human thinking, interaction and decision-making and affects education, human, social and natural sciences, culture, and communication and information" (UNESCO. General Conference, 41st, 2021), public libraries have a role to play in enabling residents within their communities to grasp this technology. Their role is all the more significant as AI generates concerns and distrust (Gillath et al., 2021) among populations when "libraries also continue to enjoy a high level of trust and appreciation in most of their communities" (Arlitsch & Newell, 2017). Understanding AI thus constitutes a new cornerstone for accessing the necessary information to advance sustainable development, as outlined in the Lyon Declaration (2014). Moreover, comprehension of AI aligns with the ethical concerns articulated by UNESCO in terms of explainability and transparency and aligns with several Sustainable Development Goals (SDGs) of the 2030 Agenda. These goals include quality education (4), industry, innovation and infrastructure (9), reduced inequalities (10), sustainable cities and communities (11), as well as responsible consumption and production (12). The role of public libraries in advancing the goals of the 2030 Agenda is beyond dispute (IFLA, 2016), and various digital literacies are already integral to their actions. As AI is predominantly developed by global economic giants and permeates all of our practices, "Shouldn't [libraries] be the bastions of information literacy and information privacy in an AI world?" (Cox et al., 2018). Thus, to what extent can public libraries take on this subject to promote and offer relevant literacy? For this study, we will conduct a cross-analysis among three European countries—Spain, France, and Italy—to provide insights into the diverse ways in which AI influences professional practices. Through a literature review and semi-structured interviews, the objective is to delineate the challenges of Artificial Intelligence within the framework of the Agenda 2030 program. Subsequently, we will delve into the specificity of AI Literacy in comparison to Information Literacy, a practice already adopted by libraries. Finally, we will analyze the current and prospective role of AI in libraries to propose avenues for implementing concrete actions.

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The Pivotal Role of Libraries in Sustainable AI Development

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Artificial Intelligence (AI) has gained exceptional public and media coverage since the launch of the ChatGPT platform, a generative conversational intelligence, in November 2022. Nevertheless, AI is already an integral part of our digital daily lives, as we navigate through social networks, use our GPS, or consult recommendations on e-commerce websites. Due to its pervasive influence across all sectors of our societies, AI is gradually becoming a pivotal subject in terms of regulation, societal direction, and legislation. As early as 2021, UNESCO published a report presenting avenues for ethical considerations in AI. In June 2023, the European Union also established a regulatory framework outlining requirements and obligations for AI usage. As a digital manifestation and given the "new ways in which its use influences human thinking, interaction and decision-making and affects education, human, social and natural sciences, culture, and communication and information" (UNESCO. General Conference, 41st, 2021), public libraries have a role to play in enabling residents within their communities to grasp this technology. Their role is all the more significant as AI generates concerns and distrust (Gillath et al., 2021) among populations when "libraries also continue to enjoy a high level of trust and appreciation in most of their communities" (Arlitsch & Newell, 2017). Understanding AI thus constitutes a new cornerstone for accessing the necessary information to advance sustainable development, as outlined in the Lyon Declaration (2014). Moreover, comprehension of AI aligns with the ethical concerns articulated by UNESCO in terms of explainability and transparency and aligns with several Sustainable Development Goals (SDGs) of the 2030 Agenda. These goals include quality education (4), industry, innovation and infrastructure (9), reduced inequalities (10), sustainable cities and communities (11), as well as responsible consumption and production (12). The role of public libraries in advancing the goals of the 2030 Agenda is beyond dispute (IFLA, 2016), and various digital literacies are already integral to their actions. As AI is predominantly developed by global economic giants and permeates all of our practices, "Shouldn't [libraries] be the bastions of information literacy and information privacy in an AI world?" (Cox et al., 2018). Thus, to what extent can public libraries take on this subject to promote and offer relevant literacy? For this study, we will conduct a cross-analysis among three European countries—Spain, France, and Italy—to provide insights into the diverse ways in which AI influences professional practices. Through a literature review and semi-structured interviews, the objective is to delineate the challenges of Artificial Intelligence within the framework of the Agenda 2030 program. Subsequently, we will delve into the specificity of AI Literacy in comparison to Information Literacy, a practice already adopted by libraries. Finally, we will analyze the current and prospective role of AI in libraries to propose avenues for implementing concrete actions.

Keywords: public library, artificial intelligence, information literacy, sustainable development, algorithmic literacy, AI literacy

Introduction

Since the implementation of the Agenda 2030 global sustainable development programme, the role of libraries has been well established. IFLA has played an active role in including libraries in this action programme (IFLA, 2016). This recognition is also reflected in national policies: in France, for

example, libraries are identified in the Agenda 2030 roadmap as a necessary link in educating and informing people to build a sustainable world (Ministry of Ecological and Solidarity Transition, 2020). While sustainable development is at the crossroads of social, economic and environmental issues, our societies are witnessing the emergence of a technology that also impacts development as a whole (Lo, 2023). Artificial intelligence (AI) technologies have received exceptional media coverage since ChatGPT, a generative conversational intelligence platform, launched in November 2022. AI, of which generative intelligence is just one type, is already integral to our daily digital lives. It can be found when we surf on social networks, drive around using GPS, or receive product recommendations on streaming or e-commerce platforms. This technology is not only involved in our daily activities, but it is also present in several sectors of public life, with the example of predictive justice (Girard-Chanudet, 2023) or the interpretation of medical imaging (Solomonides, 2022). Thus, because of its pervasive influence in all areas of society, AI is gradually becoming a fundamental subject for regulation, political strategy and legislation. In 2021, UNESCO published a report outlining the ethical issues inherent in AI and highlighting the "new ways in which [using AI] influences human thinking, interaction and decision-making and affects education, human, social and natural sciences, culture, and communication and information" (UNESCO, 2021). On this last point, libraries have a decisive role in enabling users in their communities to grasp the ins and outs of AI. Understanding AI is thus a new cornerstone for accessing the information needed to promote sustainable development, as highlighted in the Lyon Declaration (2014). Understanding artificial intelligence is thus aligned with the ethical concerns articulated by UNESCO in terms of explicability and transparency. It meets the objectives raised by the Agenda 2030 in terms of education, reducing inequalities, designing sustainable cities and communities, and responsible consumption and production.

These developments highlight the need to educate and inform citizens about the artificial intelligence technologies that are profoundly transforming society. Libraries are already involved in various information and digital literacy projects. Then, to what extent can public libraries take hold of this issue to promote and offer appropriate literacy, which is a prerequisite for sustainable development and the long-term adaptation of populations to the technological transitions brought about by the arrival of artificial intelligence?

Methods

For this study, a cross-country analysis of three European countries – France, Italy and Spain – was carried out to provide perspectives on the different ways in which AI is influencing professional practices. Through a literature review, the compilation of a corpus of professional events and semi-structured interviews, the aim is to provide an overview

of the challenges arising from the development of the uses of artificial intelligence and their implications for societal development.

Literature Review

Regulatory Texts

As this is a comparative study of three countries, the literature review includes regulatory texts and policy guidelines to highlight the specific concerns of each territory. These documents convey a cross-societal discourse and, in this respect, address all the players in an ecosystem. In France, the "Stratégie nationale pour l'intelligence artificielle" (National strategy for artificial intelligence) (Ministry of the Economy, Finance, Industrial and Digital Sovereignty, 2023) is based on the 2017 report *Donner un sens à l'intelligence artificielle* (Giving meaning to artificial intelligence). In Italy, the document chosen, insofar as it proposes a national direction, is the "Programma Strategico per l'Intelligenza Artificiale 2022-2024" (Strategic Programme for Artificial Intelligence 2022-2024) published on 24 November 2021 and defined by the Ministry of University and Research, the Ministry of Economic Development and the Ministry for Technological Innovation and Digital Transition. In Spain, the "Estrategia Española de I+D+I en inteligencia artificial" (Spanish Strategy for Research, Development and Innovation in Artificial Intelligence) published in 2019 by the Ministry of Science and Innovation is intended to guide national policy. Still outside the fields of information and libraries, we have also explored supranational guiding documents, namely the European Union's AI Act¹ and UNESCO's preliminary study on the ethics of artificial intelligence². Regarding library issues, we paid particular attention to the IFLA Statement on Libraries and Artificial Intelligence published by IFLA (IFLA FAIFE, 2020). This literature review was an essential prerequisite for grasping the dynamics that cut across all sectors of society.

Introductory Literature Review

In this article, we conducted a limited literature review in conjunction with libraries to assess the extent to which the issue of AI literacy has been taken into account in the world of research.

To do this, we experimented with two approaches to querying the Web of Science search database (Figure 1). This literature review complements all the publications consulted and sometimes cited in this study. For this reason, this narrow

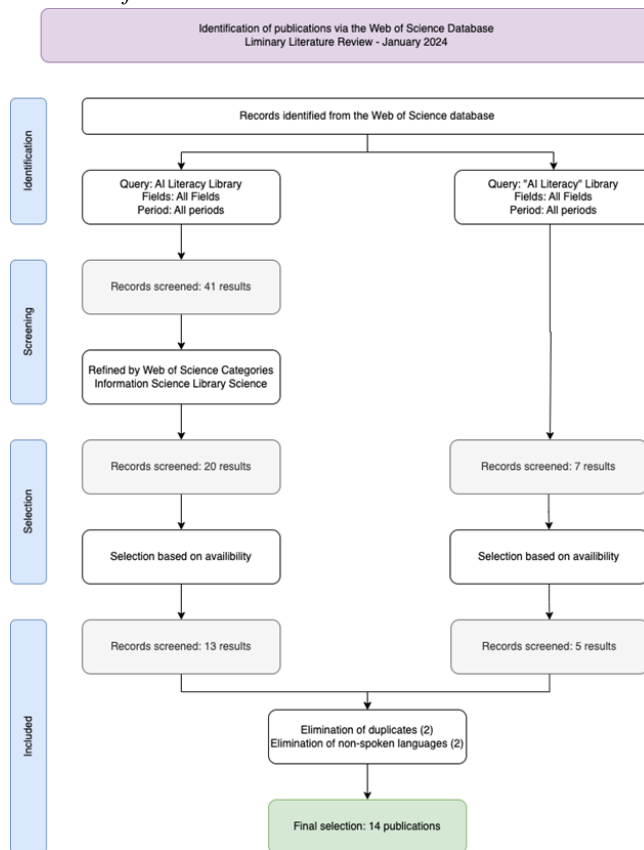
¹Proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on artificial intelligence (Artificial Intelligence Act) and amending certain union legislative acts, 2021, shorten as the EU AI Act, 2021

²World Commission on the Ethics of Scientific Knowledge and Technology, 2019, shorten as the UNESCO WCESKT, 2019

focus was a deliberate choice, enabling us to highlight the concerns of research specifically on the subject that interests us. This introductory literature review is thus composed of fourteen publications available in English.

Figure 1

Flow diagram representing the selection method for the limited scientific literature review



Building a Corpus

To better understand libraries' position on the subject, a corpus of events and media documents combining the two subjects was studied. Analysis of these documents provides an opportunity to examine discourse at the level of a profession, enabling us to approach the subject through the dynamics and issues specific to a field of activity, namely that of documentary spaces between public libraries and academic libraries. This corpus meets the following criteria: the event must have been organized by an organization from the country under study, or the event must have taken place in that same country, it must have been broadcast between November 2022 and November 2023, and it must have had Libraries and Information Science (LIS) as its theme or must have been aimed at a public of librarians. This corpus comprises 18 entries in total (eight from Italy, five from Spain, and five from France)

and has been analyzed in terms of target audiences, organizing or producing bodies, the list of speakers, the list of subjects and themes covered and the methods of dissemination.

Semi-structured Interviews

The interviews took place at a later stage, particularly after the corpus had been compiled, which was a necessary step in identifying the key players in the world of libraries and artificial intelligence in their respective countries. In selecting these profiles, we focused on ensuring consistency between them. It was important for these people to see both the research issues and professional practices. As we will emphasize in the 'Results' section, the rarity of these profiles meant that it was not possible to compare perfect counterparts from one country to another. The statements do, however, provide a critical individual assessment of their national ecosystems and thus act as a bridge between the discourse presented in the literature review and that of a profession as a whole. The arguments put forward by the interviewees are at the crossroads of these questions and are more concerned with exploring the application of AI technologies in their field.

The three interviews were conducted in the native language of each interviewee and systematically by a different person. The interview grid, which was identical for all three interviewees, was worked on in such a way as to bring out several aspects: the profile and background of the interviewee, the challenges of AI in libraries, the conditions for approaching AI literacy and the ethical concerns inherent in this technology. The transcripts were analyzed using a table offering a finer granularity based on the aspects raised and the specific themes identified during the initial study of the interviews.

Results

There are many potential activities relating to artificial intelligence in libraries. Beyond the literacy issues that interest us here, there is a wealth of literature on the possible uses of these technologies in current and future libraries. They relate firstly to collections through automatic indexing, cataloguing, referencing, assistance with documentary research or even data analysis, where AI can be used to set up automated systems. But it also acts as a decision-making tool for management issues. Above all, implementing these AI applications requires the development of an AI literacy that can be useful, firstly to librarians and secondly to library users, particularly public libraries.

Conceptual Framework

To define the necessary conditions for these types of libraries to appropriate AI for promotional purposes and to provide real access to it, it is necessary to understand what AI literacy means. The expression "AI literacy" is based on the notion of literacy as conceptualized by Scribner and Cole

(1981) and reformulated as follows by Ridley and Pawlick-Potts: "literacy enables a reflective, critical, and integrative approach to information that utilizes a broad knowledge base for both understanding and communicating ideas" (Ridley & Pawlick-Potts, 2021). In addition to the knowledge to be imparted, literacy relates to tangible and intangible environments. It, therefore, makes it possible to contextualize learning and use in relation to a particular domain. This conceptual basis has led to many different forms of literacy, including informational and digital literacy, now widely practised in libraries.

The expression "AI literacy" is a recent one. The first recorded occurrence in the Web of Science or Scopus databases dates from 2016 in a proceedings paper in educational science. However, we could mention an appearance as early as 1972 in the working paper "A Biased Guide to AI Literacy for the Beginner", intended for AI hackers at MIT, but whose understanding of literacy was not then the approach used here.

AI literacy is, therefore, a concept that is not yet ten years old and is currently the subject of a number of research hypotheses. As such, AI literacy coexists with other concepts facing definitional issues: computational thinking, computer literacy, data literacy and digital culture. We list below the definitions expressed in the various documents that make up our overall corpus:

1. Literacy enables a reflective, critical, and integrative approach to information that utilizes a broad knowledge base to understand and communicate ideas (Finn, 2017; Ridley & Pawlick-Potts, 2021).
2. A set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace (Long & Magerko, 2020; Ridley & Pawlick-Potts, 2021).
3. AI literacy, as defined by the report, is a multifaceted concept that involves a comprehensive understanding of AI, its applications in education, its ethical implications, and the ability to engage in transparent and authentic dialogue about AI (Lo, 2023).
4. AI literacy is the ability to readily engage with AI by leveraging AI tools, systems, and frameworks to effectively and ethically solve problems in a wide range of sociocultural contexts (Wang & Lester, 2023).
5. A new dimension to information literacy (Cox, 2022).
6. In short, AI literacy can be conceptualized as entailing the following elements: - A basic understanding of how AI and ML work, their underlying logic and their limitations; - Understanding the potential societal impacts of AI, especially in the area of human rights; - Personal data management skills; - Media and Information literacy (IFLA FAIFE, 2020).

Although the training courses, conferences and study days

listed in the corpus do not appear to provide a definition of AI literacy, they do enable us to identify the contours of what is considered as such. The titles of the events and the content of the programmes give an idea of what AI literacy is for the library world. The terms "Alfabetizzare all'uso dell'intelligenza artificiale"³, "step-by-step deciphering of how an AI programme works"⁴ or "how to get to grips with AI" underline a desire to understand how artificial intelligence works and how it can be applied to libraries.

In the three countries studied, the events in the corpus cover both the theoretical aspects of the use of artificial intelligence in libraries and also offer very practical training in its uses. In Italy, for example, there are courses on AI copyright and personal data protection, as well as workshops on prompt engineering techniques.

Looking at the corpus, a certain conception of artificial intelligence literacy emerges as the ability to understand a technology, apply it, use it, and master a system of symbols referring to it. The semi-structured interviews do not provide a precise definition of artificial intelligence literacy. Still, several aspects emerge from these discussions that corroborate the contours drawn by the corpus of events. Most interviewees saw literacy as the ability to understand artificial intelligence, acquire a general knowledge of it and know how to use it in an enlightened way to put it to good use. Theoretical knowledge of the technology must, therefore, be supplemented by advanced technical knowledge, enabling the user, in our case, the librarian, to carry out projects related to artificial intelligence in a given space. The speakers all stressed that while humans are aware of the opportunities offered by artificial intelligence, they must also be aware of the dangers and always approach the technology with a critical mind. Humans remain indispensable to any use of AI because they possess something that AI does not: logic. Therefore, literacy appears in their discourse as a set of theoretical and practical skills to be acquired so as not to passively endure the arrival of this new technology but rather to position oneself as a player in artificial intelligence. The definitions collected and the analysis of the discourses relating to the acceptance of AI literacy reveal that this type of literacy is deeply rooted in a global environment with strong concerns about the risks posed by this technology.

What role for libraries?

For many years now, digital literature has been an integral part of the activities offered in libraries in response to the

³Training sessions organized by the Associazione Italiana Biblioteche in December 2023: "Literacy in the use of general artificial intelligence through scientific research tools, chatbot and gamification".

⁴Study day organized by the BPI in November 2023: "Are libraries ready for artificial intelligence?"

challenges of reducing the digital divide and, above all, fulfilling their mission of providing information, given that the main channels for this are now digital systems. According to Ridley and Pawlick-Potts, libraries have traditionally been mediating and promoting literacy around emerging technologies (Ridley & Pawlick-Potts, 2021). Like digital technology, artificial intelligence technologies are taking over the information field and shifting its boundaries. From machine translation to deep fake, information is being handled and processed by new tools whose lack of understanding makes it impossible to make an informed assessment. The role of libraries in national and supranational strategies relating to artificial intelligence is mentioned on only one occasion. The Spanish national strategy refers to the role of libraries in the deployment of AI in relation to issues of conservation and access to heritage. It explicitly mentions the National Library of Spain and its open data portal. There is, therefore, no mention of their role in any of these strategic texts concerning literacy issues. Although libraries are not mentioned, looking at AI development strategies in terms of education, mediation or awareness-raising, subjects more widely present in public discourse than literacy was still interesting. In the case of France's national strategy, based on the Villani report, it is stated that mediation capabilities must be deployed nationally, relying in particular on "the networks of carers present within the communities" (Villani et al., 2018). One of the tasks of these carers networks is to facilitate access to public services, which are being largely dematerialized, a trend becoming more pronounced with the implementation of artificial intelligence technologies.

It should be noted that the fundamental rights mentioned in the report do not mention widespread access to information. Regarding education, which is a priority, it is a question of transforming learning subjects to provide the best possible training for teachers and students in the presence of AI in all sectors and rethinking the skills expected (by developing creative abilities, for example). Italy's national strategy makes the education system a priority for the development of AI, as it enables AI technology to be "understood, strengthened, integrated and disseminated" (Caputo et al., 2021). In terms of content, the European Commission's legislative proposal differs from the national strategies since it is a legislative text rather than a strategic one, and it draws on other publications produced by various European Union bodies. No mention is made of the need to educate the public. On the other hand, artificial intelligence publishers are expected to consider the level of education and experience of users in developing and distributing their products. It is specified that "due account must be taken of the technical knowledge, experience, education, training that can be expected of the user and the environment in which the system is intended to be used" (EU AI Act, 2021). Although no mention is made of training, education or literacy aspects, the draft law put forward by the European

Commission takes account of the resolution passed by the European Parliament on a framework for the ethical aspects of artificial intelligence, robotics and related technologies. This framework states that "it is necessary to integrate AI and digital literacy into education and training, including the promotion of digital inclusion, and to conduct information campaigns at EU level that give an accurate representation of all aspects of the development of AI"⁵. Thus, governmental texts show that priority should be given to education to train the artificial intelligence stakeholders of tomorrow, either on the creators' side, in which case they must be trained and conform to a level of appropriation of AI by the population, or on the users' side, which is a *sine qua non* condition for enabling an artificial intelligence economy to develop. Regarding international public policies, Europe, China, and the United States traditionally develop strategies that are quite different from each other (Papyshev & Yarime, 2023). While China is focused on developing AI technologies, the Anglo-American sphere, particularly the United States, tends to promote the innovative aspects of AI. Meanwhile, the European Union is considering principles of regulation and control as mentioned in the studied act. Nevertheless, the United States and China drafted and published two national framework documents, namely the National Artificial Intelligence Research and Development Strategic Plan (2023 update) and the New Generation Artificial Intelligence Development Plan (2017), respectively. The U.S. plan emphasizes promotion and innovation to maintain its leadership position while acknowledging the importance of ethical, legal, and societal implications generated by AI use. The Chinese plan reflects a comprehensive development strategy that includes increased support for AI education and training to expand its "talent pool". None of the three documents explicitly mention AI Literacy strategies and the involvement of libraries. However, significant attention is given to AI education, whether for ethical issues, with the European Union aiming to highlight AI biases and limitations; for innovation and technological development, with the United States aiming to recruit talent and maintain its global market leadership; or for increasing AI technological development capacity, with China aiming to bolster its development capabilities. Although universities or schools are cited in these documents, libraries can legitimately find a place in the educational programs being implemented by being integrated into these frameworks. Like the European Parliament's resolution, which focuses on ethical issues, UNESCO's Preliminary Study on the Ethics of Artificial Intelligence formally includes concerns relating to education. The study, published in 2019, focuses educational needs on the acquisition of "new forms of critical thinking" and recommends working on "algorithm awareness" and the ability to reflect on the impact of AI on information, knowledge and

⁵Framework of ethical aspects of artificial intelligence, robotics and related technologies, Brussels, 2020.

decision-making" (UNESCO WCESKT, 2019). Although the term literacy is not used, UNESCO's recommendations are reminiscent of elements of the conceptual framework delineated through the definitions proposed earlier. This text incorporates the issue of awareness and initiation into artificial intelligence technologies into its general principles by stating that "citizens should be informed by raising their awareness of algorithms and providing them with a basic understanding of how AI works". Finally, the study identifies as a central ethical issue both "education [in that] AI requires education to encourage AI literacy and critical thinking" and "communication and information [in that] AI should reinforce freedom of expression and universal access to information". While the role of libraries in relation to literacy issues is not mentioned in the texts cited above, it is clearly identified in the IFLA Statement on Libraries and Artificial Intelligence and in certain articles in the scientific literature. First of all, the statement points out that libraries have the capacity "to educate users about AI and help them thrive in a society which uses AI more extensively" (IFLA FAIFE, 2020) as a result of their existing activity in developing digital literacy skills. This statement then considers that "these efforts can be expanded to promote algorithmic literacy" and stresses that "libraries are inclusive spaces that specialize in information literacy – as such, they can be well-positioned to deliver such training to help people navigate the new information landscape. This could be one of the key roles libraries can play in ensuring that AI benefits society at large." The study, which provides support for professional associations and for libraries themselves, is also aimed at governments, which it calls on to take direct account of libraries as networks that are ready to adopt and use artificial intelligence technologies and that are capable of enabling the "development and implementation of cross-sectoral AI programmes and strategies". This IFLA study differs from the publications cited in that it stresses that "libraries can play an important role in making sure that AI literacy initiatives are fundamentally inclusive and available to all" (IFLA FAIFE, 2020). The scientific literature studied emphasises the need for libraries to play a role in literacy issues by placing them in a historical context of setting up actions to promote the appropriation of new information vectors. In this respect, Cox sees "Public libraries [as being] arguably more likely to be centrally concerned with the links between AI and information literacy" and that Data and AI literacy is the most likely use case in libraries (Cox, 2022) due to the central role to be played in the future by AI as a potential decision-making tool in all everyday activities. More than a secondary role, many consider that the daily activities and missions carried out by libraries make them key players in AI literacy. It is not just a question of playing a role, but they "can and must take a lead role in addressing the challenges" (Ridley & Pawlick-Potts, 2021). Especially as the ethical issues raised by the emergence of

AI need to be addressed in a local context and in conjunction with communities. In this respect, libraries are privileged because of their local presence. This same position allows them to be a place for debate and conversation (Lo, 2023). In addition to training and awareness-raising initiatives aimed directly at users, Lo believes that librarians have a role to play in evaluating artificial intelligence tools, given their multiple skills and missions. They can help to determine whether these tools meet sufficient criteria to be labelled as artificial intelligence technologies that help to improve the services provided to a community. Using the same technical approach to literacy, Cordell sees "libraries [as able to] become ideal sites for cultivating responsible and responsive ML" (Cordell, 2020; Ridley & Pawlick-Potts, 2021) and even "identify a further role in helping to make AI explainable in general" (Cox, 2022; Ridley & Pawlick-Potts, 2021). Because it is part of a digital mediation movement aimed at reducing digital and social divides, AI literacy benefits from a solid and well-defined action framework that ensures good coverage of the populations expressing this need. However, like any action, ensuring the relevance of program implementation requires evaluating its impact. Considering the recent nature of the AI literacy programs implemented and mentioned in this study, it is difficult to gather sufficient elements to measure their impact. Indeed, results published in November 2023 (Cox, 2023b) from a survey of library professionals indicate that only 3% of services are mature in promoting AI literacy in libraries, with the majority (47%) of projects still in the planning stage.

A further hindrance to impact evaluation is the absence of fundamental indicators specific to library users that can be adapted to the local realities of institutions. We can only hypothesize and wish for the potential impacts of these actions: mastering AI would allow each citizen to access new forms of learning (foreign languages, programming, etc.), enhancing their global awareness and professional skills, as highlighted by the Italian interviewee. Understanding how AI works is essential for every citizen to thrive in a society where AI is increasingly ubiquitous.

However, the scientific literature, particularly in the field of education sciences, is addressing these issues, and the first frameworks are beginning to emerge (Carolus et al., 2023; Çelebi et al., 2023; Laupichler et al., 2023; Pinski & Benlian, 2023; Wang et al., 2023). Studies on the impact of AI literacy at the level of academic and library professionals have already been conducted, revealing a gap between the potential understanding of AI and the ability to exploit it effectively, highlighting the need to further investigate these barriers (Lo, 2024).

The corpus of events studied undeniably bears witness to the strong positioning of libraries and information professionals on artificial intelligence. The Associazione Italiana Biblioteche, the professional association of Italian librarians,

devoted the entire programme of its last annual conference to the challenges of artificial intelligence in libraries⁶. Aware of the impact of artificial intelligence on the world of libraries and on the profession of librarian, the three countries studied have taken up the issue of this new technology in an attempt to respond to these new challenges by organizing an average of five events on the subject between November 2022 and November 2023. They did not wait to be formally identified by regulatory texts as essential actors in the use of AI by society: libraries have thus self-proclaimed themselves as actors in artificial intelligence, as shown by the organizing bodies of the training courses, conferences and study days in our corpus, all of which are closely linked to the field of libraries and information. There is not a single event in this corpus organized by an external body responsible for promoting the role of libraries in AI. Some of the titles of productions presented at events also highlight the desire of libraries to be part of the "circle" of AI actors: "BibliotecarIA in-the-loop: oportunidades y desafíos de la Inteligencia Artificial en instituciones GLAM" (BibliotecarIA in-the-loop: opportunities and challenges of artificial intelligence in GLAM institutions)⁷ in the same way as other professions or institutions responsible for educating citizens. Examples include a number of training courses organized in partnership with teachers, the university community and the publishing industry⁸. The inter-professional approach of these events reinforces the status of libraries as mediators, from literacy to artificial intelligence. From the corpus studied, it would appear that libraries have a dual role in the acquisition of literacy in this new technology: training their staff, both theoretically and practically, and training their users.

Our three speakers are also convinced of the legitimacy of libraries positioning themselves as actors in artificial intelligence literacy, a form of literacy which, as they all emphasize, is an extension of their actions in favour of digital literacy. The social role of libraries within society gives them the legitimacy to take part in the challenges of artificial intelligence. The library is an institution with sufficient authority to take a stance on the subject without necessarily being supported by a global policy or government directives for the time being. Over and above this question of legitimacy, which was never called into question in our interviewees' speeches, it was more a question of duty that was put forward: libraries must take a stance on the subject. It is part of their mission. Their role is to raise awareness among users, inform them about the opportunities and threats of artificial intelligence, and educate them on the ethical and responsible use of these tools. All these actions align with their mission to provide access to information and their commitment to a certain vision of the world. A kind of emergency to act emerged from the three interviews conducted: libraries can talk about artificial intelligence, and they have the right to do so, but above all, they have a duty to do so because, like other educational institu-

tions, they have a crucial role to play. They must become true "flagship of artificial intelligence literacy" (Italian librarian). They must not question their legitimacy and place at the table of an information ecosystem that tends to forget them.

Positioning of Librarians

According to the systematic literature review by Harisanty et al. (2023), librarians' skills in artificial intelligence are developing rapidly. However, the study points out that AI as an innovation raises concerns within the profession. These include the fear of losing one's job and seeing one's profession replaced by robots. However, this fear was not shared in the Cox study, where survey respondents considered the effect of AI "as mostly positive and not likely to involve the replacement of librarians or disintegration of the library" (Cox, 2018), even though in their 2017 study, Frey and Osborne predicted that 99% of library assistants would be replaced. According to Roger and Shoemaker (Harisanty et al., 2023), the slowness of implementation and, in particular, the resistance in libraries to the new technologies brought about by AI is due to a lack of understanding of the risks and difficulty in assessing the benefits, which makes it even more difficult to manage the challenges of this complex technology.

Finally, "at this stage, libraries are only familiar with the term artificial intelligence, in general" (Harisanty et al., 2023). This difficulty in getting involved in the issues raised by AI has to do with questions of legitimacy and the need to reflect on the librarian profession and its skills. In this respect, Ridley and Pawlick-Potts point out that "it is a misconception to think of algorithms, and AI more generally, as arcane topics beyond the ability of library staff to understand and teach" (Ridley & Pawlick-Potts, 2021).

The corpus of events compiled for this study reveals that most speakers at the training courses and conferences listed are in strategic positions and at high hierarchical levels: research directors, library directors, journalists, and teacher-researchers. A minority of them are librarians.

Therefore, information and library professionals are getting involved in the subject, but at a level that is still very strategic, potentially dealing with the lack of a clear position from governments and other decision-making bodies on their place in the artificial intelligence ecosystem. The corpus studied does not allow us to understand whether only these stakeholders with high decision-making power have benefited from training or at least an initial approach to artificial intelligence and its issues, but it does reveal that librarians are less

⁶"Biblioteche e tecnologie al tempo dell'intelligenza artificiale" - AIB National Congress 2023.

⁷Title of a poster presented at the Spanish Information and Documentation Days in June 2023 in Spain.

⁸Study day on "What artificial intelligence is changing at university" organized by the Nantes University Library and the UNESCO Relia Chair.

visible on the subject, particularly in France. This is less the case in Italy, where librarians identified as specialists in artificial intelligence provide practical training in the use of AI (learning prompt techniques, training in the use of ChatGPT, etc.).

Similarly, the corpus does not allow us to know if these librarians who can offer practical training on using AI in libraries have received specific training or are self-taught.

Generally speaking, the titles of the events listed reflect a real awareness among librarians and information professionals of the changes brought about by AI in their professions: "Inteligencia Artificial: ¿Cuál es el rol de los profesionales de la información?" (Artificial intelligence: what is the role of information professionals?)⁹, "Le printemps des métiers 1, 2, 3... IA ! Intelligence artificielle, métiers et compétences"¹⁰ (Artificial intelligence, jobs and skills).

They see this development in an ecosystem that is sometimes broader than that of libraries, as shown by the titles of some of the papers presented at the study days "BibliotecaIA in the loop: oportunidades y desafíos de la Inteligencia Artificial en instituciones GLAM" (Galleries, libraries, archives and museums) in Spain, or the study days for librarians, teachers and the academic community as a whole in France¹¹. Similarly, the training courses identified reveal that the range of possibilities AI offers for librarians is very wide. One example is the training course on AI applied to personal branding for librarians.

The three interviews conducted with Spanish, French and Italian librarians revealed great enthusiasm for the challenges of artificial intelligence in their field of activity. Self-taught, all three approached AI initially out of personal intellectual curiosity, and they emphasize the opportunities that its use generates in the development of their professions and careers. They are unanimous that all librarians are concerned by this new technology and need to take hold of it.

Their role must be to support users in using artificial intelligence. They need to be identified as the people to turn to to find out how these tools work, gain access to them, and use them responsibly and informedly. Librarians can also be called upon to use their skills in selecting reliable, high-quality sources to help users embrace AI ethically and develop genuine AI literacy.

Nevertheless, these infectiously optimistic interviews must be considered and compared with the rest of the library community. The three interviewees testify to a strong interest in issues relating to artificial intelligence in libraries, but they also emphasize the great reticence affecting the library community. In their view, this lack of interest in AI stems from several factors. On the one hand, there is a real lack of training, leaving librarians feeling incompetent. Artificial intelligence literacy seems difficult to acquire because it is not generally well understood, it is difficult to identify experts on the subject in libraries, and it is often presented,

particularly by the media, as a threat. Some interviewees stressed that skills in artificial intelligence literacy must be integrated into university library science curricula to provide future librarians with basic general knowledge and thus give them the legitimacy to position themselves as specialists in these subjects. On the other hand, a lack of confidence on the part of librarians who do not feel able to master these tools can be highlighted.

However, as our Spanish speaker pointed out, librarians, with their expertise in information selection, cataloguing, and metadata management, are best placed to tackle these issues. They are already trained in digital literacy.

Holding these three interviews also raises the question of visibility. It was not easy to find librarians who were identified as specialists in artificial intelligence. Therefore, this study suggests that librarians must gain confidence in these subjects and not hesitate to identify themselves as resources in order to act as mediators, passing on knowledge and mastery of AI for the benefit of their colleagues and library users.

Besides, several obstacles are identifiable when discussing using artificial intelligence in libraries. The first and most obvious seems to be the lack of training and technical skills among library staff, who need "training to adjust to the possible shifts in their workplace roles" (IFLA FAIFE, 2020). Next come ethical concerns such as bias, intelligibility, and confidentiality; indeed, libraries do not necessarily own the data related to collections or users, which limits or even excludes the use of AI. In addition, there is a lack of quality data: libraries have a much smaller stock of data than Big Tech, and Google in particular. This data stock is also not of the same quality. The information generated by AI is of poor quality or even unreliable and requires more time for verification to ensure its accuracy. Furthermore, it is possible to automate up to 65% of the tasks performed by librarians (Frey and Osborne, 2017). AI could be a technology for automating routine tasks, such as robotic process automation (RPA). RPA has potential applications in the daily work of academic libraries, for example, in the processing of bibliometric data (Cox, 2023a). This would allow workers to develop a new challenge by focusing on the job's more creative and social aspects. Finally, and not least, the workforce employed in the AI industry is inherently not diverse and is linked to cultural associations between technology and masculinity. This suggests that overall, AI is more likely to have a negative impact on social equality, just as equality, diversity, and inclusion are being recognized as a priority.

⁹Title of a poster presented at the Spanish Information and Documentation Days in June 2023 in Spain.

¹⁰Study day organised by ENSSIB in May 2023.

¹¹Study day on "What artificial intelligence is changing at university" organized by the Nantes University Library and the UNESCO Relia Chair.

Examples of Applications

Although AI literacy has not yet been clearly defined, several examples can be found in all the texts in the corpus studied. From the most technical applications to those most likely to be embraced in libraries in the near future, the examples listed below relate to experiments that are either prospective or already underway. It should be stressed that AI literacy is aimed at two audiences: librarians and users. Library professionals are the priority audience for this type of learning and, as such, require a more significant increase in skills.

For the communities served by the library, the urgent task is to raise awareness, demonstrate the societal challenges of AI, develop skills, and showcase uses (Ridley & Pawlick-Potts, 2021). In terms of raising awareness, the Toronto Public Library in Canada organizes learning circles on the basics of AI and presents cases of the use of AI in the daily life of its community via a Finnish MOOC on introduction to AI (Cox, 2022; IFLA FAIFE, 2020; Ridley & Pawlick-Potts, 2021). The Miami-Dade Public Library and the DC Public Library in the United States offer a discussion programme to raise awareness of AI and develop digital citizenship (IFLA FAIFE, 2020).

Another initiative is the Tor Vergata University Economics Library in Rome, Italy, which organizes meetings called "A Coffee With" to encourage discussion between students and librarians on subjects relating to information issues, particularly the use of artificial intelligence. In January 2024, the economics students had the opportunity to discuss the issues surrounding the use of chatbots, and ChatGPT in particular, with a librarian who is a passionate specialist. In terms of skills development, the Frisco Public Library in the United States uses AI Maker Kits to run AI technical awareness sessions.

Applications can also be positioned on the core business of libraries, directly on their digital systems, which then become tools in the service of literacy and enable librarians to experience the ethical issues specific to their missions. For librarians, Lo suggests that "AI literacy could involve understanding how AI tools work, how they can be used to enhance library services, and how to navigate potential ethical issues related to AI" (Lo, 2023). The librarians interviewed report using artificial intelligence in their work practices, particularly ChatGPT, to help them generate new ideas and correct or synthesize texts. As far as users are concerned, artificial intelligence can give them new ways of accessing information by using new tools established by libraries.

Among these applications is the Alfabética project being developed in Italy in December 2021 by the ICCU (Istituto Centrale per il Catalogo Unico delle biblioteche Italiane e per le informazioni bibliografiche – Central Institute for the Single Catalogue of Italian Libraries and for Bibliographic Information). This is a single general catalogue available to the public, enabling them to explore, discover and share

cultural experiences in greater depth while at the same time searching all the documentary material networked by over 6,500 libraries of the National Library Service. The tool creates links between the various documentary resources on the portal to offer the curious citizen the most exhaustive possible overview of a subject and, above all, suggestions and links between resources and bibliographic information, enabling them to discover unexpected connections and find new ideas for research. The same type of initiative is being set up in Spain as part of the BNELab¹² project aims to promote the heritage and collections of the Spanish National Library.

Given the reluctance and reserve of librarians to embrace AI, one possible position is advocacy. The jobs of library professionals are built around specific considerations that must be taken into account in terms of neutrality, bias, personal data, and respect for privacy. Many library resources can be used to provide information on these particular subjects. This is part of advocacy skills. Also, "librarians can provide insights into the types of information resources that users frequently access, the common challenges users face when searching for information" (Lo, 2023).

Finally, one concrete application demonstrates the recognition of librarians' expertise in the information field. By teaming up with CILIP – the British Library and Information Association – the NHS – and the British National Health Service – have worked to train their staff in the literacies inherent in digital technology, from data literacy to AI literacy. This example illustrates a collaboration where several literacy issues (information and health) intersect while at the same time demonstrating the added value of library science knowledge in the context of the emergence of a new information systems technology.

Discussion

As a prelude to all the skills that emerge from our study and are detailed below, implementing actions in support of AI literacy in libraries represents a definite investment. The IFLA Statement notes in this respect that "this can require significant time and resource investment, as well as upskilling on the part of librarians."

A core set of skills has already been theorized by Long and Magerko (2020; Ridley & Pawlick-Potts, 2021), who identify 15 AI literacy skills organized into 5 categories:

- What is AI?
- What can AI do?
- How does AI work?
- What should AI do?
- How do people perceive AI? (Long & Magerko, 2020)

This competency framework starts with technology to propose a progression in acquiring AI-related knowledge and

¹²BNELab, consulted on 19 February 2024. <https://bnelab.bne.es/en/>

practices. In this section, considering the obstacles and facilitators identified in the results, we have organized what we consider to be the key elements of AI literacy based on the skills currently used in libraries.

Information technologies and data in contemporary society. Information and knowledge are now criss-crossed by data systems, the mastery of which has rapidly become an imperative for understanding the world around us. Mastering AI knowledge and practices must be approached according to the same principles. AI literacy authorizes "critical reflection on how intelligent computer systems have been involved in recognizing information needs, selection, interpretation, storage and representation of data" (UNESCO WCESKT, 2019). The skills cited in the preliminary UNESCO study are not unlike the day-to-day activities performed by librarians. According to Cox (2018), AI literacy extends information literacy already widely applied in public libraries. Libraries are also characterized by the collections they manage. According to Harisanty et al (2023), AI is contributing to a change in the perception of libraries in that they are increasingly seen as data and metadata warehouses in which AI can be easily implemented. Although librarians struggle to feel legitimate, libraries have nevertheless been identified as resource centres for understanding artificial intelligence.

Knowledge of one's community. As Ridley and Pawlick-Potts (2021) point out, quoting Karen Nicholson, literacy is not neutral and is a socio-cultural practice. As such, in public libraries, there is a need to identify the needs of an area and its various social groups. Understanding the implications of AI and its repercussions on different individuals is essential. Therefore, the proximity maintained between libraries and their communities represents an asset: "Librarians possess a deep understanding of the needs and contexts of their users. This knowledge can significantly inform the design and implementation of AI tools" (Lo, 2023).

Knowledge of issues relating to bias and neutrality. As managers of collections and organizers of events, questions of neutrality permeate librarians' professional practices. In a profession where discriminatory choices are part and parcel of the professional essence, librarians have to deal with issues of plurality and diversity on a daily basis. These long-standing concerns are all tools that make it possible to grasp the issues of bias and help to recognize them in artificial intelligence applications (Cox, 2022) that cannot be described as neutral.

Technology watch. Ensuring information literacy implies monitoring developments in information infrastructures. The same mechanisms need to be implemented to monitor developments in AI, characterized by its versatility and omnipresence in the information universe.

Pedagogy and learning/training. "Incorporating data and AI literacy into [information literacy] and other user training implies some basic knowledge of AI combined with librarians already increasing understanding of pedagogy" (Cox,

2022). Libraries are not called upon to carry out pedagogical missions in the strict sense of the term, but they do carry out a number of activities relating to the training of the communities they serve, particularly in digital technology. As a result, new training content can be more easily incorporated into an ongoing offering for which librarians have developed experience and skills. Integration into a pre-existing form of training is also easier for users to identify. As awareness-raising and introductory offers are not subject to a strict normative framework in terms of the information at stake, librarians have the opportunity to offer active and creative approaches to learning by developing "scaffolding strategies, storytelling, and aesthetic approaches" (Hsu et al., 2018; Ridley & Pawlick-Potts, 2021).

Partnership and collaboration. In line with the recommendations of the 17th sustainable development goal of the Agenda 2030, the successful implementation of AI literacy in library practices depends on the ability of libraries to establish partnerships. In a global context, IFLA stresses that libraries "need to be supported in these efforts – and they could also partner with other organizations or sectors to help deliver algorithmic and digital literacy education" (IFLA FAIFE, 2020). In a more context-specific framework, Lo recommends that academic libraries align themselves with other initiatives led by the universities to which they belong to foster "synergies that enhance the effectiveness of AI" (Lo, 2023). This situation can be transposed to the environments in which public libraries operate.

Practising advocacy. By drawing on the ethical considerations that run through library professions and missions, advocacy represents both a specific issue of AI literacy applied to librarians (Ridley & Pawlick-Potts, 2021) and a means of engaging users in public debate on what is desirable in the future development of these technologies in society (IFLA FAIFE, 2020).

While the role of libraries is perceived, even unnoticed, in very different ways, those who take a close interest in their involvement in connection with the emergence of artificial intelligence point to applications relating to AI that go beyond simply training users. Libraries need to grasp the ethical issues associated with literacy in all its forms and propose a comprehensive approach. The above classification aims to start from the skills that have been acquired or are being developed to facilitate the design of a curriculum that can be more detailed according to the needs identified by a library for its community.

Conclusion

In a society where artificial intelligence is discreetly omnipresent in our daily digital and physical lives, the need for artificial intelligence literacy for citizens is obvious. In the words of David Lankes, AI risks creating "a class of people who can use algorithms and a class used by the algorithms".

In this context, the role of libraries, even if it is not identified in the regulatory texts and national strategies of the three studied countries, is undeniable, as shown by the positions already taken by libraries and certain librarians.

Indeed, the acquisition of AI literacy is fully in line with libraries' missions of access to information and their commitment to social and economic sustainability, as underlined by IFLA: "The tools and services libraries offer can provide equitable lifelong learning opportunities, particularly for vulnerable or marginalized populations" (IFLA FAIFE, 2020).

The above study reveals that, while many librarians are still reluctant to take up AI literacy, they already possess many of the professional skills essential for acquiring and transmitting it.

However, several limitations have emerged, particularly concerning identifying AI expert figures on whom to rely to raise awareness of AI in libraries and concerning gaps in training for librarians and, therefore, trickle-down training for users.

Furthermore, it seems important to emphasize that not all aspects of artificial intelligence could be addressed in the context of this study, particularly about sustainable development and its impact on the environment. Analyzing the role of libraries through the prism of the issues raised by the use of AI in terms of its impact on resources and energy could be the subject of new research combining AI, sustainable development and libraries.

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