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Digital fluency and ethical use of information: the role of higher education librarians

Tatiana Sanches [1, 2]

[1]UIDEF, Instituto de Educação, Universidade de Lisboa, Portugal
[2]APPsy-CI, ISPA – Instituto Universitário, Lisboa, Portugal

Abstract: In the current digital context, there is an increased concern with access to information, as it has become exponentially mediated by technologies. Several problems can emerge: from restrictions on freedom of access to information or freedom of expression, due to the lack of knowledge to deal with technologies and digital information sources, vulnerability and lack of preparation regarding privacy management, to digital traps, fallacies, misinformation, or fake news. Are Portuguese librarians responding to these challenges? What actions and strategies have libraries been developed to promote digital fluency? What actions should be pursued, since young audiences are not only consumers, but also producers of online information and, at the same time, the internet has become a privileged resource for searching for easy and immediate information? It is important to reinforce skills with strategies that make it possible to detect, with quality criteria, the origin of the information, its diversity, and credibility, without forgetting, at the same time, under what circumstances and in what way the information can be reused ethically and legally. This is the basis for this exploratory study. To this end, a questionnaire survey base on the "European Framework for the Digital Competence of Educators: DigCompEdu" is carried out to those responsible for higher education libraries, to understand the pedagogic strategies that have been used with the academic community. Based on the results, we seek to observe the active involvement of librarians, particularly in the training of students, to enhance their critical thinking in the face of digital information, the evaluation of digital information sources, or the problem resolution. They must develop skills to be able to observe and compare information in a critical, creative, and conscious way, particularly in digital media. In this process, the social and ethical premises that support teaching and learning in the mission of higher education libraries should be promoted.

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1. Introduction

Digital competence goes far beyond the ability to technically operate an electronic device. It involves the safe and critical use of technologies at work, leisure, and communication, or the use of the computer to obtain, evaluate, store, produce, present, and exchange information, or to communicate and participate in cooperation networks via the Internet. For that reason, mastering these competencies is important to acquire the necessary digital competence for success in the workplace and to play an active role as confident citizens (Clifford et al., 2020). Furthermore, the digital competence of educators is extremely important to fully exploit the potential of digital technologies. This will enhance teaching and learning, and improve educators' capability of adequately preparing students for life and work in a digital society (Lucas & Moreira, 2018). As stated before (Bawden, 2001), library, media, and computer literacies are based largely on specific skills but have some extensions beyond them. They lead to general concepts, such as information literacy and digital literacy which are based on knowledge, perceptions, and attitudes, though reliant on the simpler skills-based literacies. In Bowden's words, "centered around a core of skills, all of them moved beyond this, showing that, as with literacy itself, these seemingly simple forms of literacy require a wide spectrum of skills, knowledge, understanding, and attitudes" (Bawden, 2001, p. 10). The development of citizens' digital skills seems to be a priority in a changing learning and working environment, where digital content resources allow new interactions with virtual information. In that way, librarians, not only in their role as information managers and organizers but also in the role of educators and trainers, need to develop digital literacy (Hamilton, 2021; Stripling, 2020), once their connection and influence on young people (and on general population) can provide important contributions to their digital needs (Levy & Roberts, 2005; Sterngold, 2008; Stripling, 2007). To be information literate, a person should be able to recognize when information is needed and have the ability to locate, evaluate, and use information effectively; therefore, information literacy entails not only information skills, library skills, and Internet skills, but also problem-solving and cognitive skills (Blignaut & Els, 2010). Nevertheless, it is important to acknowledge that information literacy has implications for Digital Literacy, lifelong learning, and collective intelligence, influencing contexts and content and generating energy and synergy in the Information Society. Digital literacy is embedded in information literacy, which requires the effective use of technologies, although it is not limited to these skills. It is an ability to use computers, including the use and production of digital media, the processing and retrieval of information, participation in social networks for the creation and sharing of knowledge, and a set of professional computing skills (Karpat, 2011). Digital literacy also encompasses the concern of using information ethically in the social and virtual context in which we live, respecting information users, individually or collectively. As citizens of the global world, we must use information effectively and efficiently, in addition to promoting the exercise of active and shared citizenship in the new informational and communicational paradigm. The identification of gaps and the level of

proficiency in digital competence in different strata of the population is extremely important, insofar as such knowledge contributes to the development of more significant training in this matter, which is measured across the digital transition. In the field of libraries and information, making digital skills relevant to every aspect of our lives seems also to be an important path. The information professionals working in Higher Education have been defining as a priority the establishment of training for users, where capacities are developed to know how to study well, and to use information in an adequate and meaningful way in their academic goals. Students need access to a wide range of information resources and for that, they must be able to proficiently deal with large and different amounts and qualities of information. Students who are dedicated to carrying out research are those for whom these needs are accentuated (Allan, 2010), and therefore those for whom strategies to foster information literacy, integrated with digital fluency, are most important. In that way, it became evident that, in a digital context, the need to invest in digital fluency and the ethical use of information is essential (Mansour, 2017). Digital fluency is based on information features and their good use. That means if we do not manage to be able to use a browser, do a good search on the internet, or use a Boolean operation, our digital fluency may be compromised. Digital fluency also implies surfing the internet safely, knowing what privacy is, respecting authorship, and all the questions information use issues imply. In times that are becoming more and more digital, it is also essential to make digital fluency development possible – in doing an online meeting, mastering email, knowing ethics and online netiquette, knowing how to critically interpret news, and identify disinformation – are conditions that will also facilitate safe and confident mobility in these means.

2. Literature review and background

2.1. Digital Fluency and Information Literacy

Digital competence can be defined as the safe, critical, and creative use of digital technologies to achieve goals related to work, employability, learning, leisure, inclusion, and/or participation in society (Lucas & Moreira, 2018). As society is immersed in technologies to produce, distribute, communicate, learn, and inform, among other functions, it is understood that digital skills can currently be transversal to different contexts. Although traditional skills remain important, a range of new skills such as critical thinking, problem-solving, communication, and collaboration are asserted as important in the digital age. There are many items and skills to be learned, to maximize the beneficial uses of the web, not only those that may have an impact on safety. There are many other specialized Internet issues to be learned as well, to potentiate the positive its use, particularly for learning. Knowledge, skills, and attitudes that are needed, to harness the new digital media for teaching and learning in the digital age, are an extension of many traditional skills, but with the complex addition of new skills and a changed focus, demanding new skills and understandings, namely developing digital fluency (Blignaut & Els, 2010; White, 2013). Flexible, interactive and relatively fluid hypertexts offer the ability to redefine

reader, author, and text relations (as the reader constructs the text in reading it), and all of this suggest new ways are needed to think about literacy (Jewitt, 2006) and its role in education, looking at it in a multimodal way. Miller and Bartlett underline the process and strategies to navigate the web, alerting to problems and pitfalls such as anonymity, absence of gatekeepers, generation divide, pseudo-sites and propaganda, imagery manipulation and bad uses, echo chambers and filter bubbles, and skittering and bouncing with frequent and light contacts rather than deeper research (Miller & Bartlett, 2012). The authors conclude that digital fluency is "the urgent challenge, therefore, for those with a stake in IL is that in less than two decades the internet has redrawn how people find, consume, understand, share and produce information, and, as a consequence, has caused an explosion in the available information of vastly differing quality" (Miller & Bartlett, 2012, p. 38). Likewise, Stripling refers, in the context of the academic library's activities, that "information fluency is the ability to access, make sense of, and use the information to build new understandings" (Stripling, 2007, p. 25). This also means that students have to be engaged in a coherent process of inquiry and learning, developing their skills and the abilities to search, collect, evaluate, synthesize, and present information in a critical way (Sanches, Lopes, & Antunes, 2021), knowing how to choose better options in the information landscape. Students do not passively acquire the skills needed to effectively and ethically navigate academic and professional digital landscapes simply because they are "digital natives" (Shiring, 2022). So is important to plan authentic learning as a means of developing students' digital fluency and to propose learning design as a pathway to action for teacher-developed authentic learning activities.

2.2. Librarians' pedagogic role

The role of the library and the librarian, in this sense, leaps the historical work of providing a collection, physical space, and an automatic system, and assumes a more pedagogical position (Grazia Melchionda, 2007). The librarian becomes a kind of caregiver, who relates in an affective dimension with the student, seeking to help him, according to his specificities, to develop and learn, an advisor, assisting the development of autonomy of student and school - a means to achieve, knowledge the link knowledge (which links the student-learning information), which has a strategic view of the processes (Stripling, 2010). This change in focus implies knowing who they are, what they want, and how library users behave. It also implies, above all, rethinking the nature of the library. And last but not least, to use all possible means (social networks, etc.) and strategies. It is therefore important that the user knows what the library offers and the resources it has so that their expectations are more realistic. Of course, this conjuncture framework forces us to rethink the services that are made available and the way they are made available to the user. In that sense, libraries need to balance the strong external forces of change to encourage the ongoing development of services and collections, in a digitally changing environment (Ingersoll & Culshaw, 2004). However, proximity to the user must always be encouraged because this direct contact can quickly identify their needs,

expectations, and problems and this can even present new solutions and new changes that will be useful for the proper functioning of the library. The advance in informatics, networks, and technologies for the storage of information, in the change in the organization and creation of libraries, forced librarians to acquire new knowledge and skills, including the ability to search in the wide range of databases that are offered and for solving technical problems (Levy & Roberts, 2005).

2.3.A national quest: Portuguese digital and technological initiatives

At an international level, the global desire to promote digital skills is visible, given the results expressed in various diagnoses: 42% of the EU population does not have basic digital skills, 20% of young people do not reach a basic level of digital skills, 39% of teachers feel ready to use digital technologies in their work, 29% are not confident they can identify misinformation and 72% believe robots will take their jobs. Statistics from the 2020 Digital Economy and Society Index Report (European Commission, 2021a), Digital Education Action Plan Fact Sheet (European Commission & School Library Systems Association, 2021), Online Fake News and Misinformation Report (Catana, Debremaeker, Szkola, & Williquet, 2021), and Attitudes towards the Impact of Digitization and Automation of Daily Life Research Findings (Strategy, 2017), show the acting urgency on digital fluency. But not everything is to be done. European examples such as All Digital Weeks (https://www.alldigitalweek.eu/) which is an annual European campaign for digital inclusion and empowerment that involves everyone: digital competence centers, libraries, community centers, schools, and other locations across Europe. These initiatives mainly aim to respond to the European Digital Education Action Plan (European Commission, 2021b), whose two strategic priorities are the promotion of a high-performance digital education ecosystem and the reinforcement of digital skills and competencies for the digital age. According to the Digital Economy and Society Index Report (European Commission, 2021a), Italy, Belgium, Portugal, and Cyprus are among the countries with the lowest proportion of ICT graduates (below 3%) in the European Union. Several countries have sought to develop digital skills in their population. In England, a study underlined that stronger democratic and educational goals will benefit due to a digital skills policies agenda (Eynon, 2021). The Portuguese Government announced in September 2012 the Digital Agenda 2015, later updated (DRE, 2021), an initiative framed in the Technological Plan, in parallel with the Europe2020 Strategy and the European Digital Agenda. Within the scope of these policies, important progress has been achieved in connecting households to broadband, in the use of the Internet, in the number of students per computer in schools, in the effort to increase scientific and technological skills, and in the mobilization of companies for R&D. The Technological Plan (Governo de Portugal, 2020) was designed and implemented by the Government to qualify the Portuguese for the knowledge society (Axis 1- Knowledge), overcome scientific and technological backwardness (Axis 2 – Technology) and give new impetus to innovation (Axis 3 – Innovation). These documents continue the strategy of the Digital Europe

Programme (European Commission, 2020) to promote the country's development based on knowledge, innovation, and technology and are articulated with the European Digital Agenda, framed in the Europe 2020 Strategy - a strategy for smart, sustainable, and inclusive growth to provide a response to the crisis, improve competitiveness and productivity, better compete with emerging economies (BRIC) and better combat environmental risks, population aging, and social inequalities. More recently, in 2017, the Portuguese government created the "National Digital Competence Initiative e.2030, Portugal INCoDe.2030", an integrated public policy program aimed at promoting digital competencies and operationalized by the Dynamic Framework of Reference for Digital Competence (INCoDe.2030, 2019). In this alignment, the Portugal INCoDe.2030 initiative is envisaged in a broad scope for the integrated promotion of digital development, starting with digital inclusion and literacy, passing through the education of the new generations, from childhood, by the qualification of the active population to the specialization of graduated people to occupy advanced digital jobs and research, to make the country an effective driver of new digital developments. Within this document, digital competence is understood fully, comprising the notion of digital literacy (i.e. the ability to access digital media and ICT, to critically evaluate and communicate effectively), as well as the production of new means of knowledge through research activities. Meanwhile, in the scope of librarianship, the Portuguese Association of Librarians, Archivists, and Documentation and Information Professionals, has been working toward the qualification of these professionals. In the working group of the Higher Education Libraries (GT-BES), a broader guiding document has become the general orientation to frame all the work, initiatives, and purposes in this context. The Recommendations for Higher Education Libraries in Portugal 2020-2022 are a guiding document for librarians (Principe et al., 2020) intended to inspire their performance. These 12 recommendations, fall under the four axes: i) Support for teaching and learning, ii) Support for research, iii) Professional and organizational development, iv) Networks, culture, and heritage. In the scope of Support for Teaching and Learning, one of the recommendations is to promote digital fluency and the ethical use of information, and it states: *"Develop intervention plans that promote digital fluency and the dexterity of accessing and using technological means in learning and research, underlining the importance of the ethical use of information and the right to privacy and the relevance of the ability to critically interpret in the fight against fakes news, supporting safe and responsible mobility in the digital universe."*

But how can higher education librarians proceed with this purpose?

This Recommendation calls for the positioning of librarians to enhance their role, through the skills they already have and which they can promote to their audiences. On the one hand, by providing reliable, complete, and credible data and information, especially as agents of the Open Science movement, they make the digital context safer, enhancing the use of scientific information by a wider audience; on the other hand, by investing in the combined training of digital literacy with media and information literacy, they will be strengthening users'

skills, which will allow them to browse the internet in a more informed and safe way. Actions around this Recommendation should be carefully pursued, since young audiences are not only consumers, but also producers of online information and, at the same time, the internet has become a privileged resource for searching for easy and immediate information. It is therefore important to reinforce skills and strategies that make it possible to detect, with quality criteria, the origin of the information, its diversity, and credibility, without forgetting, at the same time, under what circumstances and in what way the information can be reused ethically and legally. Thus, the active involvement of librarians is encouraged, integrated into the training of students to enhance their critical thinking in the face of information, knowing how to evaluate sources of information, verify facts, observe and compare previous information, in a critical, creative and conscious way, particularly in digital media. In this process, the social and ethical premises that support teaching and learning in the mission of higher education libraries should be promoted.

3. Objectives

This study aims to understand the pedagogic strategies that have been used by higher education librarians in Portugal towards the academic community to contribute to improving digital fluency, particularly among students.

4. Methods

As part of the European Dig Comp initiative, the European Digital Competence Framework for Educators – DigCompEdu (Ferrari, Punie, & Bre, 2013) – was published in Portugal (Lucas & Moreira, 2018). This is a document aimed at teachers, from Pre-School Education to Secondary Education, Higher Education, and Adult Education, including general and professional training, special education, and non-formal learning contexts. In it works are performed; in 2 areas of competence, organized: a) Engagement b) Digital Resources; c) Teaching and Learning; d) Assessment: e) Training of learners; and f) Promotion of learners' digital skills. In addition, there is a progression model to help teachers assess and develop their digital competence. Of these six areas, only one was selected – Facilitating Students' Digital Competence. Although designed for higher education teachers of different levels of education, it is easy to recognize the pedagogical role of teacher librarians in teaching.

In this study, we chose to distribute a survey to a convenience sample obtained from the universe of the 177 Libraries of Portuguese Higher Education Institutions (registered in the BAD Directory, at https://www.bad.pt/diretorio).

The questionnaire concerned librarians' identification; and the six subareas where digital skills are important: Information and Media Literacy, Digital Communication and Collaboration, Digital Content Creation, Responsible Use, and Digital Problem Solving. In this sense it was divided into four parts:

- an introduction, to clarify the content of the questionnaire to respondents; questions for the characterization of the respondent librarians; the core of the survey, with six questions, and; an open question in the end, if the respondents wanted to leave some suggestion or opinion.

The guiding questions that librarians respond, to intend to know the pedagogical strategies used in students' training, on the following topics:
1. Information and Media Literacy - To incorporate learning activities, assignments, and assessments that require learners to articulate information needs; to find information and resources in digital environments; to organize, process, analyze and interpret information; and to compare and critically evaluate the credibility and reliability of information and its sources.
2. Digital communication & collaboration - To incorporate learning activities, assignments, and assessments that require learners to effectively and responsibly use digital technologies for communication, collaboration, and civic participation.
3. Digital content creation - To incorporate learning activities, assignments, and assessments which require learners to express themselves through digital means, and to modify and create digital content in different formats. To teach learners how copyright and licenses apply to digital content, how to reference sources, and attribute licenses.
4. Responsible use - To take measures to ensure learners' physical, psychological and social wellbeing while using digital technologies. To empower learners to manage risks and use digital technologies safely and responsibly.
5. Digital problem solving - To incorporate learning activities, assignments, and assessments that require learners to identify and solve technical problems, or to transfer technological knowledge creatively to new situations.
Finally, an open question was included to ask what other actions or strategies are being included in libraries to promote digital fluency.

5. Results

In the March 2022 period, a total of 22 responses were archived from 20 female and 2 male respondents (from a universe of 177 possible answers). A descriptive analysis was performed, concerning the higher education librarians' characterization, showing the scope of scientific areas covered (Life and Health Sciences, Science and Technology, and Social Sciences and Humanities). The ages of the respondents were between 31 and 45 years old (5), 46 and 60 years old (15), and 2 respondents with more than 60 years old, representing the population of higher education librarians.
Concerning Information and Media Literacy, most librarians (8 responses) state that implements activities to promote information and media literacy, some (2 responses) can be considered in an initial stage, once they make little use of strategies to encourage students, while other are in a medium stage, implementing and developing some actions around information and media literacy. None uses innovative ways to do this kind of action.

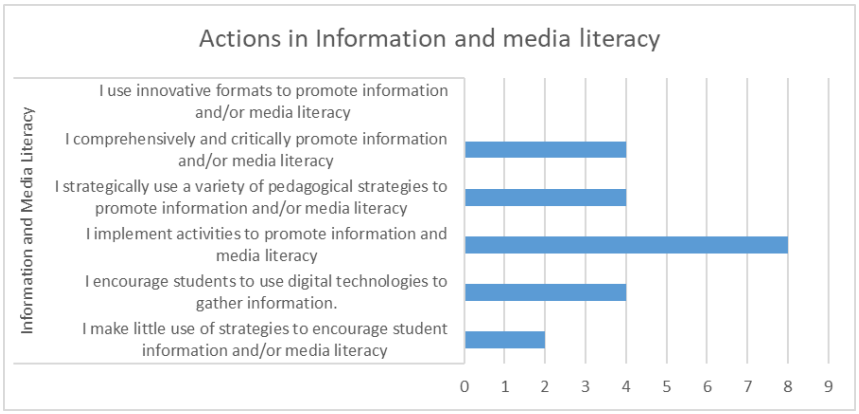

Figure 1. Librarians' Actions in information and media literacy
(Source: the author, 2021)

As previously stated, digital communication and collaboration are essential aspects of digital fluency, as they contribute to building bridges between community members. Collaborative work proves to be an essential competence to develop and it becomes important, also in a digital environment, to promote it. How do higher education librarians see themselves developing these skills in students? Figure 2 indicates the responses related to this topic.

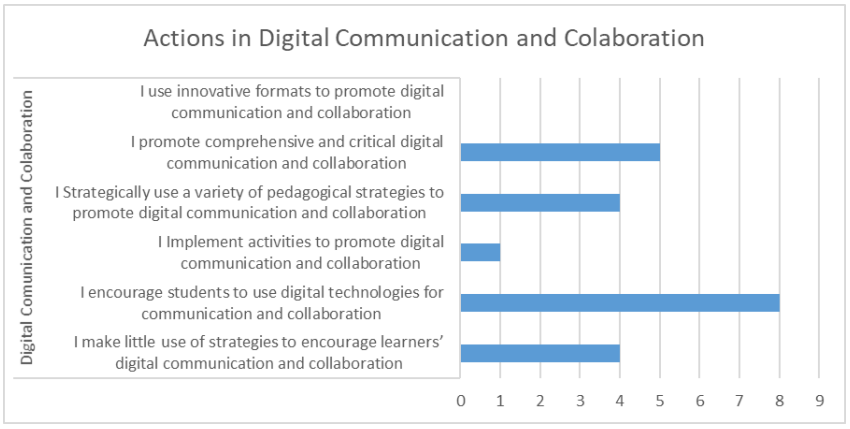

Figure 2. Librarians' Actions in digital communication and collaboration
(Source: the author, 2021)

There is a predominance of actions to encourage communication and collaboration strategies in digital media, with 8 responses. Once again, no librarian innovates in this area and only one implements concrete activities. Nevertheless, some use pedagogical strategies in this sense (4 responses) or promote an understanding and critical attitude towards collaboration. availability, still 4 librarians make little use of librarians in this scope. The

digital culture encourages new constructions and interactions. From an educational perspective, digital culture promotes new spaces for creation and autonomy in training processes, involving the cognitive, sensory, and conceptual domains in new forms of expression and communication (Corrêa, Boll, & Nobile, 2022), showing the importance of developing this facet.

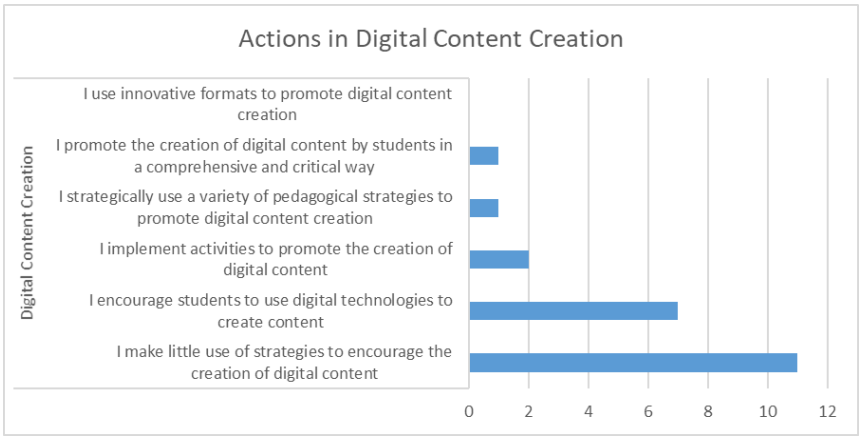

Figure 3. Librarians' Actions in digital content creation
(Source: the author, 2021)

Currently, each individual participates in a digital culture, where he traces the particular trajectory that allows him to develop learning in virtual contexts. Regarding content creation, it is clear that librarians still do not develop innovative actions to promote this ability in students (0 responses). They rarely use pedagogical strategies or focus, during the training provided, on developing critical attitudes towards the creation of digital content (1 or 2 responses). However, they recognize encouraging students to use technologies in content creation, even if they use these strategies poorly.

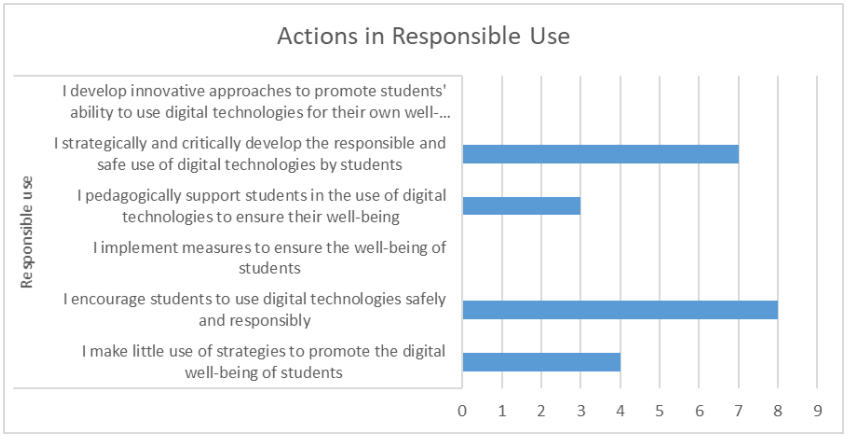

Figure 4. Librarians' Actions in the responsible use
(Source: the author, 2021)

As for the responsible use of digital content, it is clear from the graph with two empty options for answers that librarians still do not feel comfortable developing or implementing initiatives that promote the well-being of students in the face of digital environments (0 responses) or even promote measures that ensure this well-being (0 responses). However, they reveal to be concerned about their digital security, devising strategies for the responsible use of digital technologies (7 responses), and some even develop pedagogical strategies thinking about it (3 responses). Most assume to encourage students in the safe and responsible use of technologies (8 responses) although some reveal to be still at an early stage to promote digital well-being (4 responses).

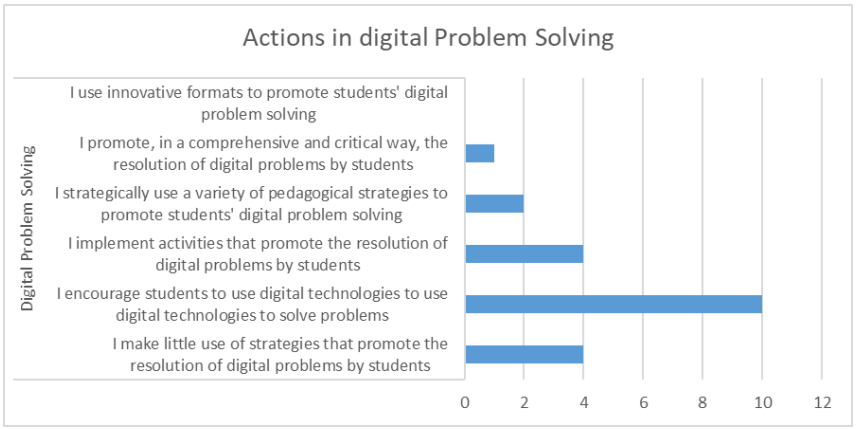

Figure 5. Librarians' Actions in digital problem solving
(Source: the author, 2021)

In line with the previous perspectives, we find the librarians' answers regarding the actions developed to solve digital problems very incipiently. Very few reveal actions that are more structured, innovative, or applied to the reality of problem-solving. Most of them (10 responses) just show encouraging students to use technologies to solve problems, but they seem, from the set of responses to this topic, they don't feel enough confidence to prepare specific training on it. Finally, in the open question, librarians were asked what other actions or strategies have been developed by libraries to promote digital fluency. In this sense, only four responses were obtained. One respondent mentioned training actions on various topics related to digital fabrication. Another respondent said that, in addition to training users, where this content is present, workshops are also given in the field of digital fabrication. These include both the use of specific software and the handling of machines that aim to support different projects in the areas of Science and Technology. Another librarian, in his response, expressed that students are "digital natives" and therefore have it

easier than librarians, concluding that “we learn from them every day!”. The last respondent mentioned that in this context his school' several initiatives reach all students, and therefore there is no overlapping of the library. Individually and in a training situation, strategies and tools are communicated to improve student performance, but constant action is not taken.

6. Discussion

UNESCO, in a new report (UNESCO, 2021) states that everyone should enjoy and expand their educational opportunities throughout life and in different cultural and social spaces. To that end we should connect natural, built, and virtual sites of learning, carefully leveraging the best potentials of each. Libraries have an important role in supporting the right to education, which needs to be broadened to be lifelong and encompass the right to information, culture, science, and connectivity. IFLA, in reflecting and interpreting these future challenges, stresses that embedding literacy of all types into a new social contract for education is critical for success. And states: “this includes traditional literacy, but also digital, scientific, textual, ecological, and mathematical literacy. Literacy helps create an understanding of how to participate in the civic process – it is required to build critical thinking skills and create independent and ethical thinkers and doers” (IFLA, 2022, p. 7). Digital resources and the digital literacy necessary to explore them and to browse the internet, to understand how technologies can be used for academic work, are still not fully explored, revealing a field to be worked on, namely on the several aspects related to information and media, communication and collaboration, digital content creation, responsible use and digital problem solving. Despite some evident hesitations in the librarians' answers – maybe even some of the respondents are implementing truly innovative strategies but don’t consider them as such - there is already some sensitivity to the topics analyzed, revealed by the way they seem to incorporate, in the training they develop, initial notions on these topics. So, it is demonstrated that there is an important way to go in the promotion of digital literacy so that librarians can effectively contribute to the digital fluency of users.

7. Conclusions

In the current digital context, there is an increased concern with access to information, as it has become exponentially mediated by technologies. Several problems can emerge: from restrictions on freedom of access to information or freedom of expression, due to the lack of knowledge to deal with technologies and digital information sources, vulnerability and lack of preparation regarding privacy management, to digital traps, fallacies, misinformation or fake news. This study pretended to understand the extent to which digital skills teaching is being carried out, namely through the implementation of training strategies by higher education librarians. Thus, a survey inspired by DigCompEdu was sent to librarians, making it possible to study these actions and draw conclusions about the commitment and strategies of Portuguese librarians, which will reflect benefits for users. Data reveal the importance of knowing strategies but

demonstrate a very early stage of the practical application of concrete actions in the training of higher education students. These results are in line with the literature review. Higher education librarians in Portugal are mainly dedicated to training students in information literacy, generally applied to the exploitation of library resources. Librarians should be more attentive to the opportunities that the characteristics of libraries - namely in terms of digital collections, digitization, and the use of computers for different tasks - allow. These can and should be optimized to enhance digital literacy and fluency in academia, contributing to the desideratum expressed in global political options that envision the need for a social commitment in the face of a more conscious and effective digital transition.

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