

Bibliography in the digital age: challenges to ensure the democratization of information access

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ABSTRACT

Introduction: The Bibliography has a mediation function, which is extremely important to ensure information access, appropriation, and use. However, even nowadays, marked by the intense use of information and communication technologies (ICTs), democratizing information access still faces barriers regarding the accessibility (physical and cognitive) and usability of products or information systems. **Objectives:** With attention to the Bibliography principles, we reflected on the challenges related to the bibliographic work aiming to democratize information access in modern digital environments. **Methodology:** This exploratory research is based on bibliographic surveys, analysis, and systematization of findings. **Results:** Taking social inclusion as an empirical object and step towards achieving social justice, two challenges emerged. The first is related to comprehending the subject in a bibliographic work. And the second is associated with identifying the potential user, their informational demands, and contexts in which these demands arise, aiming to provide accessibility and usability, taking into account the user-content-context triad and relying on the facilities offered by the modern digital environments. **Conclusions:** The Bibliography principles are relevant resources to ensure information access democratization. However, given the intensive use of ICTs, the same principles that guide the bibliographic work should be rethought in light of the potential users of information products and services, their needs, and their respective usage contexts. At the same time, in the scope of ICTs, it is understood that such products and services must be part of an integrated network with other services/information products.

Keywords: bibliography; information user; informational accessibility; digital age.

INTRODUCTION

Contemporary society has benefited from various technological advancements from diverse scientific developments, including information and communication technologies (ICTs). These advancements have facilitated progress in different areas and transformed people's daily lives, particularly concerning social interactions. Such improvements are partly due to the widespread use of digital devices, which have also increased the volume, speed, and variety of information – and consequently, knowledge – produced and shared daily across different social spaces.

One of the potential applications of information is in the intellectual development of individuals. This same application also allows us to qualify information as a tool that assists and enables inclusive practices, such as those designed to ensure social justice. Thus, it is evident that, among other aspects, information

[...] possibilita ao cidadão a ampliação do conhecimento, produção de conteúdo, identidade cultural e organização de ideias que inevitavelmente resultam em profundas mudanças na forma de pensar, estudar, trabalhar e se comunicar. Todo cidadão é merecedor de um nível de participação e apropriação do sentido da informação, dentro de uma linha de ação individual ou coletiva, que o torne mais informado na sociedade na qual está inserido (Targino; Torres; Alves, 2012, p. 35)¹.

Therefore, it is noticeable that democratizing access to information is highly beneficial and necessary, especially in today's world. In this sense, considering one of the perspectives of the Bibliography, which relates it to activities inherent to “[...] tratamento documental [...] do ponto de vista de sua descrição, classificação, circulação e mediação” (Araújo, 2015, p. 119)², the present study aims to reflect on the challenges inherent to bibliographic work striving to promote the democratization of access to information in modern digital environments.

For this purpose, this study assumes that the principles of the Bibliography could be (re)visited and (re)thought in the light of contemporary digital information environments, considering how the general (especially the “common citizen”) access and uses in their everyday activities.

To some extent, the production, organization, distribution, and consumption of information in these environments have particular dynamics since the contexts surrounding use and users³ are diversified. Therefore, it is necessary to consider multiple variables, such as cultural, economic, and cognitive factors.

Among the initial aspects that guided the development of this study were: (1) the mediating function of the Bibliography, as seen by Araújo (2015) and Lara (2018); and (2) the observations of Alentejo (2015) and Lara (2018) regarding bibliographic work practices in the present day, given the convenience offered by ICTs.

Regarding the first aspect, Lara (2018) explained that

[a] bibliografia seria, primeiramente, um instrumento ou veículo de informação que desempenha uma função positiva ou negativa, conforme a intenção de fazer circular ou restringir o uso dos livros (a mediação positiva ou a mediação negativa). (Lara, 2018, p. 132)⁴.

Additionally, concerning the second aspect, the information available in digital environments still needs to be better investigated, considering the dynamics involved in the production, intermediation, and use of this information. In general,

[a] World Wide Web ou WWW ou Web tem se apresentado como espaço a ser explorado considerando a atratividade entre as dimensões subjetiva e social de informação, sobretudo no tocante às novas formas de interação e intervenção proporcionadas por esse ambiente digital e em rede (Rabello, 2017, p. 104)⁵.

Therefore, it is possible to assume that many of the principles used in bibliographic work can contribute to overcoming challenges inherent in democratizing information access in digital environments since the

Web se apresenta como um espaço virtual que permite distintas formas de inter-relação de conteúdos, de fluxos de informação, em canais ou fontes de informações em justaposição mediante interconectividade hipertextual (Rabello, 2017, p. 104)⁶.

While, on the one hand, there are restrictions on the access and use of ICTs in everyday life, on the other hand, there are opportunities for these technologies to be more widely used in mapping and representing knowledge aiming to promote the integration and interoperation of sources of information in relevant areas, such as social justice.

METHODOLOGY

This study analyzes bibliographic surveys applying a qualitative research approach (Minayo, 2002) of exploratory nature (Dencker; Viá, 2001) to present brief systematization of the research findings and the challenges identified.

In terms of the documents consulted and studied, this research drew upon books, specialized journal publications, legislation, technical standards, manuals, and scientific conference proceedings to first acquaint itself with the theoretical object of the study (Bibliography), as well as the concepts associated with contemporary digital information environments. Thus, the process of searching and selecting the literature surveyed and studied was supported by descriptors (in Portuguese and their English and Spanish equivalents) such as Bibliography, informational accessibility, information user, social justice, social inclusion, democratization of access to information, Web evolution, digital libraries, and digital information environments. The survey was conducted employing digital tools such as the online repositories Periódicos CAPES, Scopus, Base de Dados de Periódicos em Ciência da Informação (BRAPCI), Portal Scielo, Biblioteca Digital de Teses e Dissertações of Universidade de São Paulo, Web of Science, among others. Given that the investigation adopted concepts widely used in Library and Information Sciences, the literature surveys did not observe any chronological framework, but it prioritized publication of Brazilian scholars, including reference works in the areas closely related to this investigation.

As for the structure and organization of this study, the papers begins with a general bibliographic review, followed by an analysis of the World Wide Web (WWW) relating its evolution with the one perceived in those of libraries and repositories, also covering the concepts of information user, accessibility, and usability, in order to frame the challenges of democratizing access for potential users of information products and services. Finally, the paper offers some considerations on these challenges, taking social inclusion as the empirical object and one of the supporting steps to social justice practices.

AN OVERVIEW OF BIBLIOGRAPHIC WORK

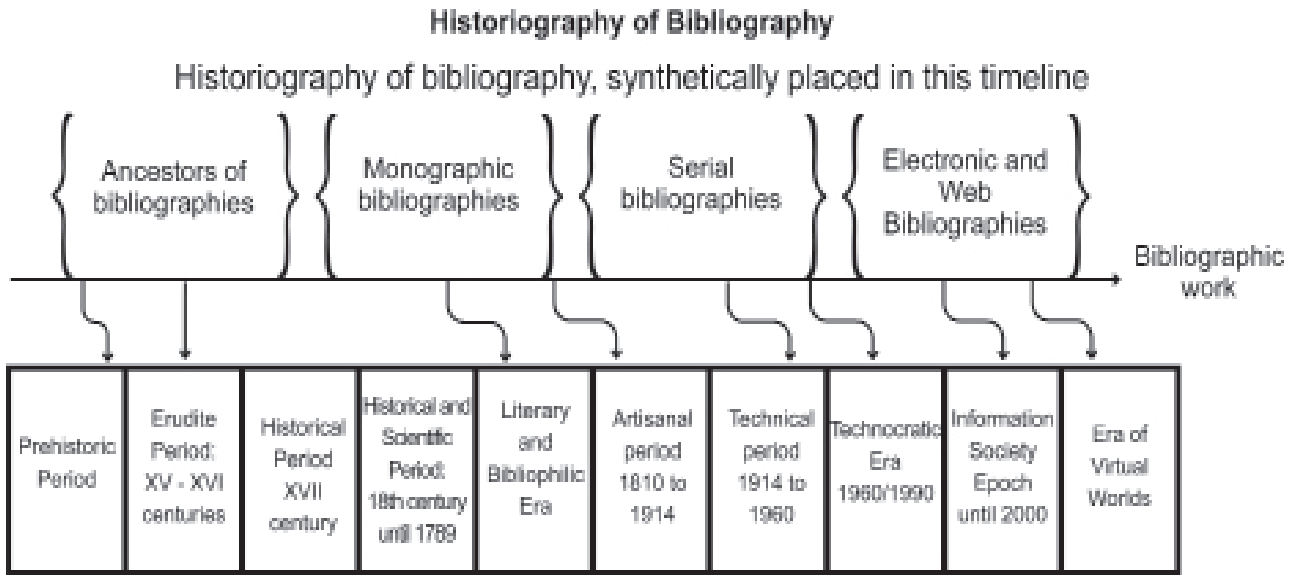
Although understanding the characteristics and origins of the scientific foundations that guide bibliographic work is relevant, this study does not aim to present a history of Bibliography. Works such as those of Balsamo (1998), Alentejo (2015), Araújo (2015), Ortega and Carvalho (2017), and Lara (2018), among others, provide essential contributions on the history and evolution of the Bibliography, qualifying it as a science that is not limited to offering a product.

Figure 1 – created by Alentejo (2015) using the works of Walter W. Greg, Theodore D. N. Besterman, Louise N. Malcès, Laura M. de Figueiredo, and Lélia G. C. da Cunha – shows a chronological overview of the development of bibliographic work, indicating the types of bibliographies and when they were produced. This figure indicates that the bibliographic work can be adapted to each era's social contexts and technologies.

Regarding products or systems/services arising from bibliographic works, Ortega and Carvalho (2017) listed:

[...] bibliografias nacionais; bases de dados especializadas; bases de dados cadastrais (eventos, especialistas, outros); catálogos comerciais (de livrarias, por ex.); sistemas de informação ao cidadão; bases de dados bibliométricas; sistemas de produção de revistas eletrônicas; e portais de informação da Internet. (Ortega; Carvalho, 2017, p. 38)⁷.

Figure 1 – *Timeline of the Bibliography’s Evolution*



Source: Alentejo (2015, p. 44, editorial translation).

Such products or systems/services are created considering the information in documents that have undergone a previous selection, organization, storage, and availability check to meet the user's informational needs.

Despite the manifold contributions to document treatment, founded on theoretical and methodological, “Bibliografia é um termo polissêmico utilizado para nomear um produto, uma atividade, um campo disciplinar” (Lara, 2018, p. 128)⁸.

This ratifies the difficulty in establishing consensus about this term, as Araújo (2015) presented, and along this line. The same author (Araújo, 2015) highlighted two interfaces (or spheres): (1) the librarianship and (2) the material. The first focuses on documental processes (production, selection, organization, access, and mediation), and the second emphasizes the (physical) materiality of the document (traditionally, referring to books).

Still, regarding the definitions of the term, Lara (2018), based on Luigi Balsamo's work, underlined the cultural dimension of the Bibliography produced by cultural dissemination actions.

This phenomenon occurs because bibliographies and repertoires are also seen as mediation tools (Araújo, 2015; Lara, 2018) that enable cultural and documentary transmission, among other possibilities. Additionally, such tools usually present an “index,” which records and identifies different works. Therefore, they are instruments that disseminate what is known about a particular subject at a given time and allow one to access the selected works.

In this sense, the same instruments allow for visualizing memory and cultural dissemination functions, making them products/systems/services of public interest. Thus, for better use of these instruments in digital environments, and also the integration and interoperability of such instruments with other services, one of the contemporary challenges is to allow their use by different audiences and in diverse contexts while respecting, among other aspects, two of Ranganathan's dictums, as Lara recalled (2018): (1) “todo leitor tem seu livro” (Lara, 2018, p. 146)⁹ and (2) “todo livro tem seu leitor” (Lara, 2018, p. 146)¹⁰.

In such regard, Lara (2018) presented the need to “estabelecer a relação documentos-públicos, o que demanda identificar elos de significação por meio dos quais as trocas entre emissão e recepção possam acontecer com mais acuidade” (Lara, 2018, p. 146)¹¹.

Such issues could be overcome using ICTs, and the latest versions of the Web (e.g., Web 4.0) with the help of elements associated with the user's identity, usage context, ubiquity, and connectivity of information systems/services, minimizing possible impacts regarding the fact that "not everything displayed in collections (and/or archives) is suitable for everyone." Therefore, it is possible to speculate that the demands of a community for using a product or service/system can be expanded if such products are tailor-made considering the user and context of such community. This action would somewhat require considering the attributes of form, content, accessibility, and usability of information products or systems/services derived from bibliographic work.

Considering bibliographic work as "[...] aquele que se ocupa de referenciar o conhecimento produzido por meio de sistemas, serviços e demais ações que possibilitem o uso qualificado da informação" (Ortega; Carvalho, 2017, p. 43)¹², and given the wide use of ICTs in producing, transmitting, and consumption of information, one can always perceive Bibliography's contribution in implementing information products/systems/services in digital environments aiming at the general public (e.g., government services).

Therefore, specifically in social inclusion initiatives, it is necessary to have diversified and complete sets of information available. For, in the words of Relinda Kohler, "[u]ma bibliografia nacional geral pobre dá idéia de uma produção intelectual também pobre, já que aquela reflete o estado da cultura do povo que representa" (Kohler, 1977, p. 188)¹³. Moreover, when inclusion is of concern, the lack of access to informational content due to "inadequate" or "incomplete" bibliographic work constitutes a barrier to accomplish the inclusion mentioned above, intending to realize practices of social justice.

THE WORLD WIDE WEB AND TODAY'S LIBRARIES

Regarding the issue of access to information in the current age of connectivity and networks, Alentejo (2015) highlighted the need for local instrument entries (for example, a library catalog) to serve as nodes in a connectivity web of diverse environments (Amazon, WorldCat, Google, PubMed) such as the libraries collections, for,

[...] no ambiente da informação em rede, o controle bibliográfico não pode continuar a ser visto como sendo limitado a catálogos de bibliotecas ou aos serviços de resumos e índices. Isso sugere que no contexto do trabalho bibliográfico, os serviços e produtos bibliográficos passaram a abarcar temas que são de interesse ao campo da Bibliografia, tais como: sistemas de informação federados; busca federada; sistema de coleta de metadados [...] e inteligência coletiva [...], preservação digital [...] e arquitetura da informação [...]. (Alentejo, 2015, p. 30)¹⁴.

There is currently a strengthening of human ties with the digital world due to the ubiquitous nature of the Internet. In part, this gives one the feeling of being "always connected," changing how people access, use, interact with, and share information. Such a sensation has led to little differentiation between "online" and "local". Thus, there are plenty of digital communication services in ever-faster mobile networks (5G, for instance) capable of dealing with various tasks that previous technologies could not. However, the high costs restrict such services to only a fraction of the population.

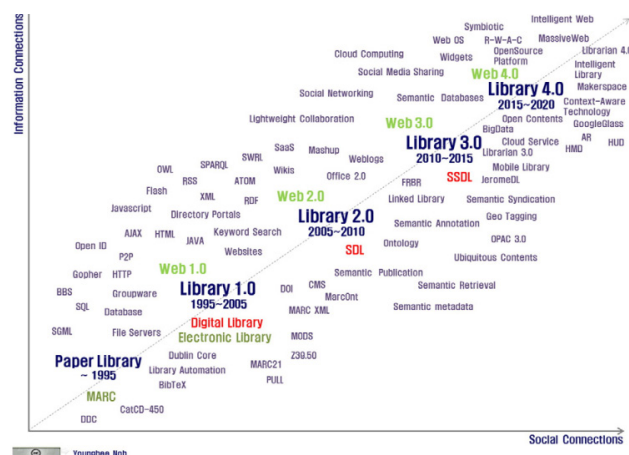
Concisely speaking, there were four characteristic moments in the evolution of the WWW (Noh, 2015): Web 1.0 (one-dimensional or sharing; Web of reading; personal pages and websites are examples of some services), Web 2.0 (user participation or interaction; Social web; Web of reading and writing; online social networks, blogs, and Wikis being good examples), Web 3.0 (Semantic or immersive Web; enables reading, writing, and execution of tasks; integration of different services, delivery of personalized services and more significant interaction between users and equipment, including platforms of large companies such as Google and Amazon) and Web 4.0 (Smart Web; with own agents for reading, writing, execution, and cooperation; a goal of offering only the necessary information and as needed).

This evolution, according to Patel (2013) and Noh (2015), has its onus and bonuses and leads to an increasingly close relationship between users (people) with ICTs.

Keeping pace with the web's evolutions, and the new volume and dynamics of production, circulation, availability, and access to information, the instruments and strategies used in information retrieval have also undergone improvements (Noh, 2015). For example, from the folders and files from the era of the personal computer and Web 1.0, we moved on to search based on keywords; in Web 2.0 (Social Web), the concept of tagging emerged; in Web 3.0 (Semantic Web), efforts have been made to develop searches based on natural language processing, resulting in popular equipment such as Amazon's Alexa. In turn, Web 4.0 (Intelligent Web) focuses on inference processes and enhancing products and services developed in the previous Web versions.

These developments are also being felt and influencing different information devices, such as public, community, thematic, specialized libraries, museums, archives, and information services for citizens. Such innovations require reevaluating how information is offered, which also implies considering other variables in current documentary treatment based on Bibliography. Therefore, in line with what Alentejo (2015) and Lara (2018) noted about the resignification of bibliographic work in the digital age, it is equally necessary to observe what Noh (2015) exposed (figure 2) about the evolution of libraries in this new era. Thus, as social connections increase, so do informational connections, requiring specialized information organization and retrieval tools.

Figure 2 - Library 4.0 development process



Source: Noh (2015, p. 795).

Noh's (2015) view on the evolution process of what has been called Library 4.0 shows several protocols and strategies for organizing, accessing, distributing, and providing information. Another aspect to consider in this scenario is interoperability, as both informational and social connections have grown substantially, which also tends to impact bibliographic works.

USERS, ACCESSIBILITY, AND USABILITY

When addressing the concept of information system/service, in the view of Rabello and González de Gómez (2017), such a concept must be understood as

[...] o ordenamento lógico de informação com vistas a atender às necessidades de determinada comunidade. Sistemas dessa natureza geralmente estão estruturados em subsistemas, por meio dos quais tornam possíveis, após armazenamento de informação, os processos de organização, disseminação, acesso e recuperação (Rabello; González De Gómez, 2017, p. 26)¹⁵.

Likewise, Fujino (2000) previously regarded information service as “[...] o conjunto de atividades sistemáticas, cujo objetivo é possibilitar ao usuário, o acesso às fontes de informação, para atender a necessidades específicas” (Fujino, 2000, p. 48)¹⁶. He also highlights that evaluating the contexts of production and use of information is necessary.

Fujino's remarks are in line with what Foskett (1969) presented as the social function of an information service: "investigar o que se conhece acerca de determinado assunto e proporcionar ao consulente tanta informação quanto seja necessária, a fim de preencher uma lacuna em seu conhecimento" (Foskett, 1969, p. 15)¹⁷. This task correlates to bibliographic work since,

[...] instituições como biblioteca, museu, arquivo, centro de documentação e unidades informacionais afins podem ser considerados sistemas infraordenados por subsistemas, como acervos, coleções, fundos arquivísticos, exposições museais; estes, por sua vez, têm sua operacionalização quando infraordenados por subsistemas tecnológicos, como bases de dados, catálogos, bibliografias, índices, dentre outros instrumentos para organização e recuperação da informação (Rabello; González De Gómez, 2017, p. 27)¹⁸.

In a way, preparing and delivering information services and systems typically involve producers, intermediaries, and consumers of information. Thus, regarding the "consumers", also referred as users it is important to highlight that

[o] usuário é um elemento fundamental de todos os sistemas de informação, pois a única justificativa das atividades destes sistemas é a transferência de informações entre dois ou mais interlocutores distantes no espaço e no tempo (Guinchat; Menou, 1994, p. 481)¹⁹.

Therefore, this paper also recognizes that "[o] usuário deve ser a base da orientação e da concepção das unidades e dos sistemas de informação, a serem definidos em função de suas características, de suas atitudes, de suas necessidades e de suas demandas" (Guinchat; Menou, 1994, p. 482)²⁰. Such elements also influence the implementation of the technological subsystems, as identified by Rabello and González de Gómez (2017).

Similarly, Sanz Casado (1994) considered an information user an individual (person) who needs information to perform a particular task. However, with the evolution of ICTs, such as natural language processing technologies and conversational robots (chatbots), we are currently seeing the emergence of both human and non-human users.

This situation indicates that we need to pay better attention to the interactions that specific computational algorithms operate regarding searching, analyzing, and inferring specific informational content, both on web pages and databases in general.

Given the importance of the user in the development of products or services/information systems, user studies have emerged as

[...] investigações que se fazem para saber o que os indivíduos precisam em matéria de informação, ou então, para saber se as necessidades de informação por parte dos usuários de uma biblioteca ou de um centro de informação estão sendo satisfeitas de maneira adequada (Figueiredo, 1994, p. 7)²¹.

To this end, there are several approaches, as those presented by Rabello (2013; 2017) and González-Teruel (2005; 2017).

Complementarily, considering that informational environments mimic spaces of symbolic exchanges, the conditions of access and use - respectively, accessibility and usability - must be evaluated regarding the implementation of these environments considering particular characteristics of the user communities to which the products or services/information systems are intended. Thus, particularly in the digital era, the full use of digital information environments by heterogeneous groups of users depends on understanding the variables present in the "user-content-context" triad presented by Morville and Rosenfeld (2006) from the perspective of Information Architecture. For this triad generally seeks to provide better access conditions and use of information services/systems.

Particularly in the Brazilian context, item I of article 3 of Law nº 13,146 (Brasil, 2015) stipulates the definition of accessibility as

[...] possibilidade e condição de alcance para utilização, com segurança e autonomia, de espaços, mobiliários, equipamentos urbanos, edificações, transportes, informação e comunicação, inclusive seus sistemas e tecnologias, bem como de outros serviços e instalações abertos ao público, de uso público ou privados de uso coletivo, tanto na zona urbana como na rural, por pessoa com deficiência ou com mobilidade reduzida (Brasil, 2015, p. 1)²².

Despite being very important, it becomes noticeable that the Law mentioned above deals with accessibility from a physical point of view, aiming to enable the user to ‘reach’ the services. The same Law also lists a set of barriers and addresses assistive technologies, including communication guidelines and universal design principles. For example, the Brazilian Standard (NBR) 9050, from ABNT (Associação Brasileira De Normas Técnicas, 2015), also addresses physical accessibility for buildings, furniture, spaces, and urban equipment, including the disposition of anthropometric parameters. These principles contributed, in part, to creating better conditions for use. However, such conditions are still insufficient for information services’ universal use.

Regarding this matter, it is essential to observe that physical access or the ability to “reach” products or services/information systems does not ensure universal use. Regarding products or services/information systems, in addition to the physical accessibility that respects the capabilities and limitations of each person, it is necessary to guarantee that the user can effectively appropriate the informational content available. Considering the triad ‘user-content-context’ mentioned by Morville and Rosenfeld (2006), this also requires observing the form of presentation of informational content and the interactions that users establish with these contents.

Therefore, when providing products or services/information systems resulting from bibliographic work, it is also essential to consider Fujino’s (2017) reflections about accessibility and the challenges this represents for user studies when correlated to the Law of Access to Information (LAI). As Fujino (2017) argues,

[...] na Ciência da Informação, a acessibilidade informacional depende do conhecimento das necessidades de informação do potencial usuário, além dos aspectos que envolvem a infraestrutura para acesso e divulgação, condições fundamentais para o desenvolvimento de mediações que viabilizem o acesso cognitivo e apropriação das informações pelo usuário (Fujino, 2017, p. 237)²³.

In regards to usability in connection with the NBR 9241-11, which focuses on the use of computers or computer systems, the term (usability) refers to “[m]edida na qual um produto pode ser usado por usuários específicos para alcançar objetivos específicos com eficácia, eficiência e satisfação em um contexto específico de uso” (Associação Brasileira De Normas Técnicas 2002, p. 3)²⁴. This definition encompasses crucial elements: a product or system used in a given context and with predefined objectives; such uses produce a result that, when compared with the objectives mentioned above, can generate some measures of effectiveness, efficiency, and satisfaction.

Additionally, according to NBR 9241-11,

[a] ISO 9241-11 enfatiza que a usabilidade dos computadores é dependente do contexto de uso e que o nível de usabilidade alcançado dependerá das circunstâncias específicas nas quais o produto é usado. O contexto de uso consiste de usuários, tarefas, equipamentos (hardware, software e materiais), e do ambiente físico e social, pois todos esses podem influenciar a usabilidade de um produto dentro de um sistema de trabalho. As medidas de desempenho e satisfação do usuário avaliam o sistema de trabalho como um todo, e, quando um produto é o foco de interesse, estas medidas fornecem informações sobre a usabilidade daquele produto no contexto particular de uso proporcionado pelo restante do sistema de trabalho. Os efeitos das mudanças em outros componentes do sistema de trabalho, tal como: tempo de treinamento do usuário ou melhoria de iluminação, podem também ser medidos pelo desempenho e satisfação do usuário (Associação Brasileira De Normas Técnicas, 2002, p. 2)²⁵.

In this regard, it is worth highlighting that some of these standard norms may shed light on some aspects of the bibliographic work. Firstly, the standards mention the “specific context of use,” as defined by “[u]suários, tarefas, equipamento (hardware, software e materiais), e o ambiente físico e social no qual um produto é usado” (Associação Brasileira De Normas Técnicas, 2002, p. 3)²⁶.

The standard norms further explain that the user is the “[p]essoa que interage com o produto” (Associação Brasileira De Normas Técnicas, 2002, p. 3)²⁷. On the other hand, the norm also presents the definition of something difficult to measure: satisfaction.

According to NBR 9241-11, this concept (satisfaction) is defined as “[a]usência do desconforto e presença de atitudes positivas para com o uso de um produto” (Associação Brasileira De Normas Técnicas, 2002, p. 3)²⁸. Although these parameters are sometimes abstract and difficult to estimate, it is necessary to consider them, at least in terms of strategies for offering access and presenting sensitive content (for example, specialized or confidential content).

RESULTS AND DISCUSSIONS

The development of this study was based on the democratization of access to information in contemporary times, particularly in modern information environments. In order to achieve this, the focus was placed on the conditions of “[...] produção e difusão de documentos (instrumentos) de registro, organização, representação, acesso e mediação da cultura escrita” (Araújo, 2015, p. 120)²⁹ in digital environments, which have a constant presence in people’s daily lives. As a result, several challenges have emerged that must be overcome:

- Understand and comprehend the empirical object upon which bibliographic works will be developed;
- Identify the potential users of the products/services of bibliographic work, their information demands, and the contexts in which these demands arise to provide accessibility and usability, utilizing the advantages offered by the digital environment;
- Offer tools to access and utilize the information that diverse audiences can use in varied contexts;
- Provide a digital interface to the information user, based on the principles of Web 4.0, respecting the “user-content-context” triad (Morville; Rosenfeld, 2006);
- Consider local instrument records (e.g., library catalogs) as nodes in a web of connectivity among different environments with library collections, as highlighted by Alentejo (2015); and

- Observe interoperability principles (Andrade; Lara, 2018) of information systems, aiming to ensure the connectivity of different information environments.

If we take social inclusion as an empirical object as an example, with social inclusion being understood here as the means to achieve social justice and “dar a cada um o que lhe é devido” (Barzotto, 2003, online)³⁰, it would be necessary to observe the following steps: (1) “[...] considerar o tipo de relação social que a justiça social se propõe a regular” (Barzotto, 2003, online)³¹; (2) “[...] determinar qual é o bem buscado pela justiça social” (Barzotto, 2003, online)³²; (3) “[...] qual é o tipo de atividade em que a justiça social é aplicada” (Barzotto, 2003, online)³³; and (4) “[...] explorar como se manifestam na espécie justiça social, os elementos do gênero justiça: alteridade, dever, adequação” (Barzotto, 2003, online)³⁴. These four stages exemplify a context in which bibliographic works can be developed, as highlighted by Ortega and Carvalho (2017).

[...] considerando as práticas seculares de produção de repertórios bibliográficos e aquelas realizadas em bibliotecas, podemos dizer que conteúdos selecionados, descritos e ordenados segundo interesses previamente identificados se mostraram socialmente relevantes, conduzindo a composições disciplinares próprias (Ortega; Carvalho, 2017, p. 38-39)³⁵.

Once we know the empirical object on which the bibliographic works will be developed, it is then necessary to identify potential users (or communities) since,

[...] a Informação, vista como instrumento para Inclusão Social, só tem sentido se puder contribuir para empoderar cidadãos na construção de uma sociedade em que comunicação, educação e cultura tenham como base o respeito à[s] diferença[s] e a igualdade de oportunidades para todos (Fujino, 2017, p. 238)³⁶.

At this point, it becomes evident that ensuring accessibility (physical and cognitive) to contents and their usability are vital concerns. However, for information products or systems/services intended for the general public and made available in digital environments, ICTs offer some possibilities, such as: providing an adequate interface for user-system interactions based on users' context (e.g., context-aware applications); natural language processing, including conversational robots (chatbots); standards for interoperability and information exchange; presentation of multimedia information (e.g., texts, sounds, images, and videos); and interactions with other user communities, including experts or gatekeepers (Kremer, 1981).

Works such as those by Alentejo (2015) and Lara (2018) offer meaningful and necessary reflections for rethinking bibliographic work in digital environments, especially concerning the information access democratization. Despite substantial scientific and technological advances, many people need information access to exercise citizenship. In contrast, others struggle to use existing products/services/information systems due to the cost of ICTs, interface complexity, and lack of practical use for daily activities/needs.

Regarding the products or information systems/services resulting from bibliographic work in the digital era, a relevant challenge remains - how to conform users' needs with what is offered by these products/systems/services, including the tasks of each user, in order to enrich experiences. As noted by Shneiderman (2006), from the perspective of usability of these information environments, considering that ICTs “[...] são mais apreciadas quando os usuários têm a sensação de segurança, domínio e realização” (Shneiderman, 2006, p. 13)³⁷. This observation can also be extended to bibliographic work products considering their peculiarities.

FINAL CONSIDERATIONS

Currently, in the digital era, we still need to overcome several challenges to ensure democratic and inclusive offer of information. Based on the objective of this paper, the theoretical contributions examined, and the results obtained, one conclusion is that bibliographic work represents an important area of research today. The principles surrounding it support the planning and offering of products and/or systems/services of information integrated with other products/systems/services, making them more suitable for user communities, especially in social inclusion initiatives.

Assuming that social connections increase alongside informational connections, we observe that the need for appropriate instruments for organizing and retrieving information must be adapted to these connections. The same principle applies to different information institutions - such as libraries (public, community, thematic, specialized), museums, archives, and other information services offered to the public. Therefore, it is necessary to rethink the offering of information products and services, which also implies considering other contemporary variables in document treatment.

The research for this paper was curtailed by a lack of studies about information users affected by social justice initiatives that consider the specificities and contexts of such initiatives. Another limitation concerns the scarcity of instruments for evaluating information offerings regarding social justice initiatives developed in different social groups. In terms of novel and original research, there is a need to expand investigations on Bibliography in the digital era that take into consideration different propositions and implementations of strategies that promote the interoperability of information systems/services in digital environments alongside collections of information institutions (e.g., libraries, archives, museums, and information services for the general public). Another research opportunity would be using bibliographic works or principles to develop tools designed for automatic responses which are based on artificial intelligence algorithms.

BIBLIOGRAPHY

- ALENTEJO, E. S. Bibliografia: caminhos da história contada e da história vivida. *Informação & Informação*, Londrina, v. 20, n. 2, p. 20-62, 2015. DOI 10.5433/1981-8920.2015v20n2p20.
- ANDRADE, J.; LARA, M. L. G. Interoperabilidade e mapeamentos entre sistemas de organização do conhecimento: Bioportal do National Center for Biomedical Ontology-NCBO. *Revista de Saúde Digital e Tecnologias Educacionais [online]*, v. 3, p. 43-61, 2018. Edição especial. Available at: <http://periodicos.ufc.br/resdite/article/view/39704>. Access on: 5 Aug. 2022.
- ARAUJO, A. V. F. Pioneirismo bibliográfico em um polímetra do séc. XVI: Conrad Gesner. *Informação & Informação*, Londrina, v. 20, n. 2, p. 118-142, 2015. DOI 10.5433/1981-8920.2015v20n2p118.
- ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). *Acessibilidade a edificações, mobiliário, espaços e equipamentos urbanos* (NBR 9050:2015). Rio de Janeiro: ABNT, 2015.
- ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). *Requisitos ergonômicos para trabalho de escritórios com computadores: parte 11 - Orientações sobre usabilidade*. (NBR 9241-11:2002). Rio de Janeiro: ABNT, 2002.
- BALSAMO, L. *La bibliografía: historia de una tradición*. Madri: Trea, 1998. 214 p.
- BARZOTTO, L. F. Justiça social: gênese, estrutura e aplicação de um conceito. *Revista Jurídica Virtual*, Brasília, DF, v. 5, n. 48, maio 2003. 21 p. Available at: <https://revistajuridica.presidencia.gov.br/index.php/saj/article/view/747/738>. Access on: 6 Aug. 2022.
- BRASIL. *Lei nº 13.146, de 6 de julho de 2015*. Institui a Lei Brasileira de Inclusão da Pessoa com Deficiência (Estatuto da Pessoa com Deficiência). 2015. Available at: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2015/lei/13146.htm. Access on: 1 Aug. 2022.
- DENCKER, A. F. M.; VIÁ, S. C. *Pesquisa empírica em ciências humanas: com ênfase em comunicação*. São Paulo: Futura, 2001.
- FIGUEIREDO, N. M. *Estudos de uso e usuários da informação*. Brasília, DF: IBICT, 1994.
- FOSKETT, D. J. *Serviço de informação em bibliotecas*. Tradução de Antônio Agenor Briquet de Lemos. São Paulo: Polígono, 1969. 160 p.
- FUJINO, A. *Serviços de informação no processo de cooperação universidade-empresa: proposta de um modelo de mediação institucional para micro e pequenas empresas*. 2000. 272 f. Tese (Doutorado em Ciências da Comunicação) - Escola de Comunicações e Artes da Universidade de São Paulo, São Paulo, 2000.
- FUJINO, A. Acessibilidade informacional de pcd no contexto da lei de acesso à informação: desafios para estudo de usuários. *Informação em Pauta*, Fortaleza, v. 2, p. 237-257, out. 2017. Edição especial. Available at: <http://hdl.handle.net/20.500.11959/brapci/41406>. Access on: 13 Aug. 2022.
- GONZÁLEZ-TERUEL, A. *Los estudios de necesidades y usos de la información: fundamentos y perspectivas actuales*. Gijón: Ediciones Trea, 2005. 181 p.
- GONZÁLEZ-TERUEL, A. Referentes teóricos y dimensiones aplicadas en el estudio del usuario de la información. In: GONZÁLEZ DE GÓMEZ, M. N.; RABELLO, R. (org.) *Informação: agentes e intermediação*. Brasília, DF: IBICT, 2017. p. 153-194.
- GUINCHAT, C.; MENO, M. *Introdução geral às ciências e técnicas da informação e documentação*. 2. ed. rev. e aum. por Marie-France Blanquet. Tradução: Miriam Vieira da Cunha. Brasília, DF: IBICT, 1994. 540 p.
- KOHLER, R. Bibliografia nacional: uma co-responsabilidade da classe bibliotecária. *Revista da Escola de Biblioteconomia da UFMG*, Belo Horizonte, v. 6, n. 2, p. 185-195, set. 1977. Available at: <http://hdl.handle.net/20.500.11959/brapci/71968>. Access on: 14 Aug. 2022.
- KREMER, J. M. Os gatekeepers na engenharia. *Ciência da Informação*, Brasília, DF, v. 10, n. 1, p. 19-33, 1981. DOI 10.18225/ci.inf.v10i1.158.
- LARA, M. L. G. Conceito de bibliografia, ou conceitos de bibliografia?. *Informação & Informação*, Londrina, v. 23, n. 2, p. 127-151, maio/ago. 2018. DOI 10.5433/1981-8920.2018v23n2p127.
- MINAYO, M. C. S. Capítulo 1 - Ciência, técnica e arte: o desafio da pesquisa social. In: MINAYO, M. C. S. et al. (org.). *Pesquisa social: teoria, método e criatividade*. 20. ed. Petrópolis: Vozes, 2002. p. 9-29.
- MORVILLE, P.; ROSENFELD, L. *Information Architecture for the World Wide Web: designing large-scale web sites*. 3rd. ed. Sebastopol, CA: O'Reilly, 2006.
- NOH, Y. Imagining Library 4.0: Creating a Model for Future Libraries. *The Journal of Academic Librarianship*, Ann Arbor, v. 41, n. 6, p. 786-797, Nov. 2015.
- ORTEGA, C. D.; CARVALHO, M. C. O papel da bibliografia na construção do conhecimento em Ciência da Informação: o caso da Escola de Ciência da Informação da UFMG. *Perspectivas em Ciência da Informação*, Belo Horizonte, v. 22, p. 36-64, jul. 2017. Edição especial. DOI 10.1590/1981-5344/3232.
- PATEL, K. Incremental Journey for World Wide Web: Introduced with Web 1.0 to Recent Web 5.0 - A Survey Paper. *International Journal of Advanced Research in Computer Science and Software Engineering*, [s. l.], v. 3, n. 10, p. 410-417, Oct. 2013.
- RABELLO, R. Leituras sobre usuário e uso de informação na ciência da informação. *Perspectivas em Ciência da Informação*, Belo Horizonte, v. 18, n. 4, p. 152-184, 2013. Available at: <http://hdl.handle.net/20.500.11959/brapci/35796>. Access on: 10 Aug. 2022.

RABELLO, R. Sujeito e agência informacional: comportamento, prática e ação. *In: GONZÁLEZ DE GÓMEZ, M. N.; RABELLO, R. (org.). Informação: agentes e intermediação. Brasília, DF: IBICT, 2017. p. 101-152.*

RABELLO, R.; GONZÁLEZ DE GÓMEZ, M. N. Agentes, intermediações e institucionalidades: apontamentos acerca de um mosaico interpretativo no campo informacional. *In: GONZÁLEZ DE GÓMEZ, M. N.; RABELLO, R. (org.). Informação: agentes e intermediação. Brasília, DF: IBICT, p. 21-40, 2017.*

SANZ CASADO, E. *Manual de estudios de usuarios*. Madrid: Fundación Germán Sánchez Ruipérez; Pirámide, 1994. 279 p.

SHNEIDERMAN, B. *O laptop de Leonardo: como o novo Renascimento já está mudando sua vida*. Tradução: Vera Whately. Rio de Janeiro: Nova Fronteira, 2006.

TARGINO, M. G.; TORRES, N. H.; ALVES, C. A. Informação e cidadania: relação construída via biblioterapia no âmbito da biblioteca pública. *CRB8 Digital*, São Paulo, v. 5, n. 2, p. 33-40, 2012. Available at: <http://hdl.handle.net/20.500.11959/brapci/10106>. Access on: 18 Aug. 2022.

ENDNOTES

- ¹ Translation: "[...] provides citizens with opportunities for expanding their knowledge, producing content, developing cultural identity, and organizing ideas, which inevitably result in profound changes in how they think, study, work, and communicate. Every citizen deserves a level of participation and appropriation of the meaning of information within a line of individual or collective action that makes them better informed in the society in which they are inserted" (Targino; Torres; Alves, 2012, p. 35, editorial translation).
- ² Translation: "[...] documental treatment [...] from the point of view of its description, classification, circulation, and mediation" (Araújo, 2015, p. 119, editorial translation).
- ³ We chose in this study to use the term "information user" (or simply "user") to maintain compatibility with the terminology applied in most of the consulted literature.
- ⁴ Translation: "[the] Bibliography would be, first and foremost, an instrument or vehicle of information that plays a positive or negative role, depending on the intention behind, either the act of circulating a book or restricting its use (positive or negative mediation)" (Lara, 2018, p. 132, editorial translation).
- ⁵ Translation: "[the] World Wide Web or WWW or Web has emerged as a space to be explored, considering the attractiveness between the subjective and social dimensions of information, especially concerning new forms of interaction and intervention provided by this digital and networked environment" (Rabello, 2017, p. 104, editorial translation).
- ⁶ Translation: "Web is a virtual space that allows different forms of interrelation between content, information flows, channels, or sources of information juxtapositioned to hypertextual interconnectivity" (Rabello, 2017, p. 104, editorial translation).
- ⁷ Translation: "[...] national bibliographies, specialized databases, registration databases (events, specialists, others), commercial catalogs (e.g., from bookstores), citizen information systems, bibliometric databases, electronic journal production systems, and Internet information repositories" (Ortega; Carvalho, 2017, p. 38, editorial translation).
- ⁸ Translation: "Bibliography is a polysemic term used to name a product, an activity, a disciplinary field" (Lara, 2018, p. 128, editorial translation).
- ⁹ Translation: "Every reader has their book" (Lara, 2018, p. 146, editorial translation).
- ¹⁰ Translation: "Every book has its reader" (Lara, 2018, p. 146 editorial translation).
- ¹¹ Translation: "establish the relationship between the document with the audience requires identifying the links of meaning through which exchanges between emission and reception can happen more accurately" (Lara, 2018, p. 146, editorial translation).
- ¹² Translation: "[...] that which is concerned with referencing knowledge produced through systems, services, and other actions that enable the qualified use of information" (Ortega; Carvalho, 2017, p. 43, editorial translation).
- ¹³ Translation: "[a] poor national bibliography gives an idea of an intellectual production that is also poor since it reflects the state of the culture of the people it represents" (Kohler, 1977, p. 188, editorial translation).
- ¹⁴ Translation: "[...] In the networked information environment, bibliographic control can no longer be seen as limited to library catalogs or abstract and index services. In such context, bibliographic work, bibliographic services, and products have come to encompass topics relevant to the field of Bibliography, such as federated information systems, federated search, metadata collection system [...] collective intelligence [...] digital preservation [...] and information architecture." (Alentejo, 2015, p. 30, editorial translation).
- ¹⁵ Translation: "[...] the logical organization of information to meet the needs of a specific community is often achieved through systems structured into subsystems that enable storage, organization, dissemination, access, and retrieval processes" (Rabello; González De Gómez, 2017, p. 26, editorial translation).
- ¹⁶ Translation: "[...] the set of systematic activities, whose objective is to enable the user to access the sources of information, to meet specific needs" (Fujino, 2000, p. 48, editorial translation).
- ¹⁷ Translation: "to investigate all that one knows about a given subject and to provide the user with the necessary information to meet users needs" (Foskett, 1969, p. 15, editorial translation).

- ¹⁸ Translation: "[...] institutions such as libraries, museums, archives, documentation centers, and related information units can be viewed as hierarchical systems consisting of subsystems, such as collections, archival funds, museum exhibits, and others. To make these subsystems operational, they are further divided into technological subsystems, such as databases, catalogs, bibliographies, and indexes, which serve to organize and retrieve information" (Rabello; González De Gómez, 2017, p. 27, editorial translation).
- ¹⁹ Translation: "[the] The user is a fundamental element of all information systems, as the sole justification for the activities of these systems is the transfer of information between two or more interlocutors distant in space and time." (Guinchat; Menou, 1994, editorial translation).
- ²⁰ Translation: "[...] the user should be the foundation of orientation and design of units and information systems, which must be defined based on their characteristics, attitudes, needs, and demands" (Guinchat; Menou, 1994, p. 482, editorial translation).
- ²¹ Translation: "[...] investigations conducted to find out individuals need in terms of information, or to figure whether the information needs of the users of a library or an information center are being adequately met" (Figueiredo, 1994, p. 7, editorial translation).
- ²² Translation: "[...] the possibility and condition of accessing and using spaces, furniture, urban equipment, buildings, transportation, information, and communication, including their systems and technologies, as well as other services and facilities open to all for public, private or collective use, both in urban and rural areas and by per person with a disability or with reduced mobility" (Brasil, 2015, p. 1, editorial translation).
- ²³ Translation: "[...] in Information Science, informational accessibility depends on knowing the information needs of the potential user, in addition to aspects involving the infrastructure for access and dissemination, two fundamental conditions for the development of mediations that enable the user's cognitive access and appropriation of information" (Fujino, 2017, p. 237, editorial translation).
- ²⁴ Translation: "[t]he extent to which specific users can use a product to achieve specific goals with effectiveness, efficiency, and satisfaction in a specific context of use" (Associação Brasileira De Normas Técnicas 2002, p. 3, editorial translation).
- ²⁵ Translation: "[the] ISO 9241-11 emphasizes that computer usability depends on the context of use and that the level of usability achieved will depend on specific circumstances in which the product is used". The context of use consists of users, tasks, equipment (hardware, software, and materials), and the physical and social environment, all of which can influence the usability of a product within a working system. Performance and user satisfaction measures assess the working system as a whole. When a product is the focus of interest, these measures provide information about the product's usability in the particular context of use provided by the rest of the working system. The effects of changes in different working system's components, such as user training time or display improvements, can also be measured by user performance and satisfaction" (Associação Brasileira De Normas Técnicas, 2002, p. 2, editorial translation).
- ²⁶ Translation: "[u]sers, tasks, equipment (hardware, software, and materials), and the physical and social environment of use" (Associação Brasileira De Normas Técnicas, 2002, p. 3, editorial translation).
- ²⁷ Translation: "person who interacts with the product" (Associação Brasileira De Normas Técnicas, 2002, p. 3, editorial translation).
- ²⁸ Translation: "the absence of discomfort and the presence of positive attitudes towards the use of a product" (Associação Brasileira De Normas Técnicas, 2002, p. 3, editorial translation).
- ²⁹ Translation: "producing and disseminating documents (instruments) for recording, organizing, representing, accessing, and mediating written culture" (Araújo, 2015, p. 120, editorial translation).
- ³⁰ Translation: "give each person what they are due" (Barzotto, 2003, online, editorial translation).
- ³¹ Translation: "[...] consider the type of social relationship that social justice aims to regulate" (Barzotto, 2003, online, editorial translation).
- ³² Translation: "[...] determine the good aspired by social justice" (Barzotto, 2003, online, editorial translation)
- ³³ Translation: "[...] identify the type of activity to which social justice applies" (Barzotto, 2003, online, editorial translation).
- ³⁴ Translation: "[...] explore how different elements of the justice manifests themselves in regards to social justice, such as otherness, duty and, adequacy" (Barzotto, 2003, online, editorial translation).

³⁵ Translation: "[...] considering the longstanding practices of producing bibliographic collections and those conducted within library settings, we can say that selecting, describing, and ordering content according to previously identified interests has proven to be socially relevant, leading to distinct disciplinary compositions" (Ortega; Carvalho, 2017, pp. 38-39, editorial translation).

³⁶ Translation: "[...] Information, seen as an instrument for social inclusion, only makes sense if it can help empower citizens in building a society based on respect for differences and equal opportunities for all" (Fujino, 2017, p. 238, editorial translation).

³⁷ Translation: "[...] are most appreciated when users have a sense of security, mastery, and achievement" (Shneiderman, 2006, p. 13, editorial translation).