Digital Curation in Information Science: Information Design Strategies

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CHAPTER 9

DIGITAL CURATION IN INFORMATION SCIENCE: INFORMATION DESIGN STRATEGIES

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ABSTRACT

The aim of this study is to present Information Design and User Experience Design as digital curation strategies for information preservation, access and sharing. The applied methodology is theoretical-exploratory, based on an excerpt from the Digital Curation cycle proposed by Higgins. The study highlights Information Design and User Experience Design strategies to improve information access and sharing available on digital information environments, which, in turn, favor its preservation. Information Design, once incorporated into the curation planning of digital environments, leads to the effectiveness of communication processes on digital environments by orchestrating material, informational, sensory, cognitive and humanistic aspects of the subjects who interact with the environment.

Keywords: Information and technology, Digital curation, Information Design.

RESUMEN

El objetivo de este estudio es presentar el Design de la Información y el Design de Experiencias como estrategias de curación digital para la preservación, el acceso y el intercambio de la información. La metodología empleada es teórico exploratoria, basada en un trecho del ciclo de Curación Digital propuesto por Higgins. El estudio resalta estrategias del Design de la Información y del Design de Experiencias para el perfeccionamiento del acceso y del intercambio de la información proporcionada en entornos informacionales digitales, que, por su vez, favorecen su preservación. El Design de la Información, una vez incorporado a la planificación de curación de entornos digitales, lleva a la eficacia de los procesos comunicacionales en entornos digitales al organizar aspectos materiales, informacionales, sensoriales, cognitivos y humanísticos de los sujetos que interactúan con el entorno.

Palabras clave: Información y tecnología, Curación digital, Design de la Información.

1 INTRODUCTION

Knowledge construction after the Technological Revolution has been shaped by a series of new factors that profoundly impacted information access, production, organization and sharing. The emergence and ubiquity of social media, mobile technologies and low-cost Internet access impose new challenges for different areas of knowledge, especially Information Science (IS).

IS, an area concerned with the processes through which information passes throughout its life cycle, was understood in the past as exclusive to studies in documentation, librarianship and archival science. With the increase in digital information volume observed from the post-World War II Technological Revolution, IS comes to incorporate inter and transdisciplinary studies as the object of information is not an exclusive concern of the area.

For Saracevic (1996, p. 42), IS addresses the human problems of effective knowledge communication in social context, fundamentally characterized as: interdisciplinary by nature and in constant aggregating movement; inexorably linked to information technology; and an active participant in the evolution of the information society, converging with other fields of research and application. Therefore, IS must also encompass as a social discipline associations related to information, as well as permeate physical, cognitive, contextual and social aspects of information.

One of IS's goals is to provide resources to improve information access and sharing to adequately satisfy information needs. In the same sense, according to Orna and Stevens (1991, p. 197), Information Design (ID) can be broadly understood as "[...] all the activities which go to making ideas visible, to showing their structure and the relations between them - so that others can use them and make their own". Such a way of thinking about information both in IS and ID means reflecting and finding solutions to the problems that emerge throughout information life cycle, to favor communication processes efficiency and effectiveness.

Capurro (1992) suggests in the article *What is Information Science for*? *A philosophical reflection* that the focus of IS studies, based on information technology studies, is closely related to the

possibilities that these technologies have in relation to the subjects' bodily capabilities, which does not imply evaluating only the ease of use (usability) and ergonomic design (structural issues) of information systems. Thus, Capurro (1992) highlights the observation by Orna and Stevens (1991), in which the authors describe a relationship/ alliance between IS and ID when considering all dimensions of human existence that, in addition to aesthetic and bodily issues, also include the individual's perception and behavior as a whole. ID emerges as a discipline that addresses design issues prior to structural problems by highlighting information organization in physical and digital spaces, by dealing with representation in a three-dimensional way, by producing meaning and understanding through language, signs, words and shapes; ID therefore seeks to address large volumes of information, especially on digital environments.

In the same scope of interdisciplinarity with IS, Digital Curation (DC) is a convergent discipline to the area that provides a holistic and systematized approach to the processes that permeate the digital information life cycle. For the Digital Curation Center (DCC) (2020), DC is a complex process that involves maintenance, preservation, appraisal, re-appraisal, use and reuse of digital information throughout its life cycle, as this process reduces threats to its long-term preservation and reduces the risks caused by technological obsolescence.

Although the DCC adopts the terms use and reuse as the model focuses on data stored on digital repositories, in this study we have adopted the terms access and sharing to refer to the same phase of the Digital Curation life cycle. This is because the focus is on digital informational environments, from a post-custodial perspective of Information Science.

The post-custodial paradigm represents a transition from the previous paradigm, the custodial, characterized by a technicist, historicist and patrimonial behavior, focusing on the custody of documents rather than facilitating their access and sharing. On the other hand, the post-custodial paradigm presupposes the search for mediations between institutions and societies that strive for the active participation of subjects who, in a network, also play the role of mediators, from the creation and sharing of information resources and the content construction (Lemos, Jorente, & Nakano, 2014). In this

post-custodial context, individuals and communities that interact with information environments go beyond the role of mere information users when they produce and share content. Thus, using a more adequate nomenclature to their active role in the processes of information interaction is demanded.

In this sense, ID and Experience Design present themselves as contributing elements to the DC life cycle. The DC systematization is applicable to the management of digital information on Web environments, while ID knowledge supports, especially, the DC access and sharing phases.

The life cycle model proposed by the DCC presents digital curation actions applicable to different contexts. Illustrated by Higgins (2008) and adopted by the DCC (Figure 1), this model involves continuous and iterative processes that range from digital object conceptualization to metadata designation, digital object appraisal for decision on preservation or disposal, the transformation (migration to avoid obsolescence) access, sharing and re-appraisal.

Figure 1 presents the processes and agents that make up the Digital Curatorship life cycle.

Figure 1: Digital curation life cycle proposed by Higgins (2008)
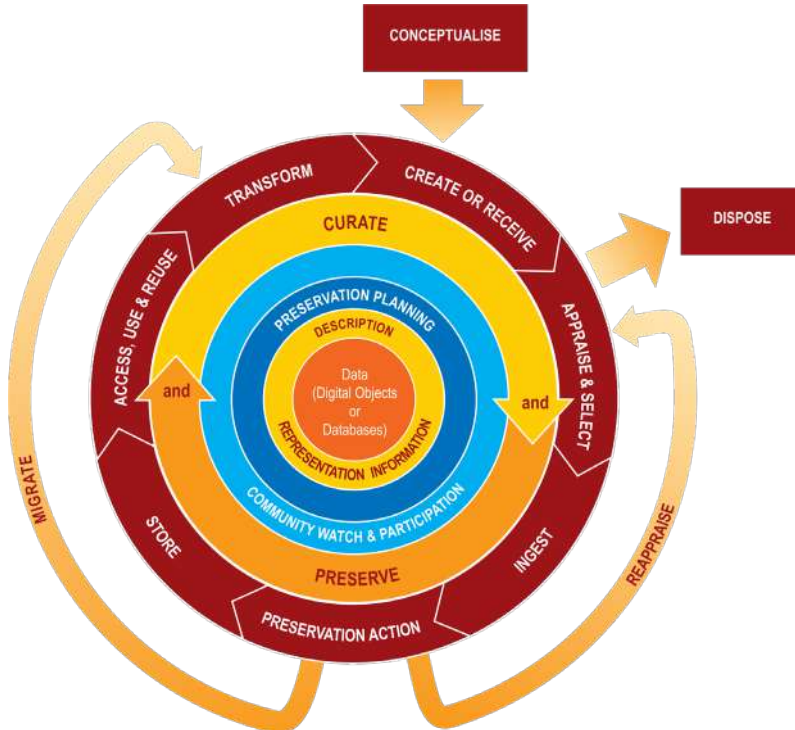
Source: Higgins (2008).

The presented model systematizes the curation actions that may or may not be applied in their entirety in digital object curation on information systems. The application of the actions in the model, however, involves the work of a multidisciplinary team as different expertise is required in the different stages that constitute it.

In the analysis of the model proposed by the DCC, there is a need for two interdisciplinary teams involved in the process. A team focused on the core of curation, highlighted in orange and blue, that is, information description and representation, in addition to the data and metadata definition in the organization, preservation and planning systems. At this stage, the contribution of knowledge produced within the scope of archival science and library science is relevant.

The second team is directed to the preservation steps (ingest, preserve and store) and curation (access, use, reuse, transform, create and receive, appraise and select). Although the literature on Digital Curation in Brazil is focused on preservation issues (Sayão, 2010; Sayão & Sales, 2012, 2013; Grácio, 2012, 2013; Grácio & Arellano, 2020), this study proposes a greater emphasis on the stages of information access and sharing as the frequency of occurrence of these phenomena consequently implies a demand for improving their preservation.

In this context, the purpose of this study is to demonstrate the relevance of the resources offered by Information Design and Experience Design for optimizing the access and sharing phases (named use and reuse by the DCC) of the Digital Curation lifecycle model represented in red in Figure 1.

2 INFORMATION DESIGN AND EXPERIENCE DESIGN: Strategies for information access and sharing for digital environment curation

Design and especially Information Design (ID) play a relevant role for developing projects and actions addressing the challenges related to the availability, knowledge and information access and sharing objectified in physical, digital and hybrid environments.

According to the Brazilian Society for Information Design (SBDI, 2020), ID - area that brings together researchers, teachers and professionals working in analog and digital Information and Communication Systems - copes with information management and production focusing on optimizing management processes, interaction and appropriation of visual information.

In general terms, the theoretical foundations of ID are simultaneously based on the various disciplines from which information systems technology practices are derived - Information Science, Computer Science, Design, Cognitive Science, ICTs and intelligent systems. The concept of ID, used to describe this new idea, reflects its multiple origins, diverse motivations and novelty.

For Frascara (2016), ID enables and optimizes information access in a simplified and appropriate way to the content the netizen

is looking for, which makes interaction with information reliable, complete, concise, relevant and quickly understandable. For the author, proper ID planning minimizes problems and solves issues to reduce fatigue (cognitive overload), minimize errors in information processing, accelerate the achievement of goals in carrying out a task and make the information suitable for the context in which it is presented.

When dealing with issues of content, human and technical factors, the focus is in the potential of languages on the environments designed through ICTs and also in issues of information system interoperability and convergence. Interoperability allows multiple systems, identical or radically different, to communicate seamlessly. To take advantage of interoperability between properly connected systems, skills are needed to interpret the complexity of the information derived from each system, a matter for specialists who, in multidisciplinary teams, deal directly with: Design structures; metadata; computer-specific programming languages, among other convergences.

This implies the need to equate cognitive capacities in the communication process as a whole. In ID, the priority is to find the most appropriate structure for the type of presented information. Therefore, one must have a broader focus, which encompasses not only graphics, texts and illustrations, or merely aesthetic issues, but also the goals of the subjects that interact with the system, with the content of the communicated message and with all the actors (human or not) of the communication process; and the objectives of performing the task, to make the interaction with the digital object and with the interface satisfactory.

ID also addresses the design of clear and understandable communications, by supporting the treatment of the structure, context and presentation of data and information (Portugal, 2020). For Carliner (2000), ID is the preparation of communication products so that they achieve performance objectives previously established in the project requirements. According to the author (Carliner, 2000, p. 4) the ID process involves:

> 1. Analyzing communication problems; 2. Establishing performance objectives that, when achieved, address and those problems; 3. Developing a blueprint for a communication effort to achieve those objectives;

4. Developing the components of the planned communication effort solution; 5. Evaluating the ultimate effectiveness of the effort.

In this definition, the performance objectives (item 2) are observable and measurable tasks that individuals must be able to perform, the conditions to perform these tasks and the acceptable level of work in their accomplishment (Mager, 1997); the plan (item 3), in turn, deals with the organization of the environment project, which indicates the content to be presented, the extension and format of its presentation (Kostur, 1999).

Design, understood as a large area encompasses several specialized disciplines, such as Interface Design, Infographics, Visual Communication, Information Visualization, Information Design and Experience Design. The focus of Design, convergent to all its disciplines and methodologies, is the human being; moreover, the disciplines are not just human-centered, they are human, that is, they are based on our ability to be intuitive, to recognize patterns, to construct ideas with emotional meaning, to express ourselves. In this sense, it is important to consider aspects beyond the purely rational and analytical of the problems, from the incorporation of emotional perspectives (Brown, 2009).

The emotions felt by the netizen while interacting with digital environments can be positive or negative, as the experiences these environments provide provoke emotions in the same proportion and intensity as the physical environments. They are pleasant, cozy and/or inviting, with feelings of well-being and positive as a result; or they are unpleasant, cold and repulsive, with feelings of discomfort and, consequently, reduced time spent in the environment, that is, a negative experience. This assessment process, these feelings and emotions, are prior to consciousness and rationalization.

Thus, emotions bring an inherent assessment: positive or negative, essential to determine future actions. For example, if the emotions or experiences felt in a digital environment were positive, the individual will probably stay longer in the environment and will return to that site when he/she needs information there; however, if the emotions or experiences were negative, he/she is unlikely to return

to that environment. According to Hassenzahl (2010), experiences are closely linked to actions:

> An experience is an episode, a chunk of time that I went through and I am going to remember. It was sights and sounds, feelings and thoughts, motives and actions, all closely knitted together and stored in memory, labeled, relived and communicated to others. Experiencing is the stream of feelings and thoughts we have while being conscious – a continuous commentary on the current state of affairs. (p. 8).

Also according to Hassenzahl (2013), in the West, our actions have been transformed due to our experiences. We experience a shift from the material to the experimental. The author mentions studies that conclude greater satisfaction with valuing situations that provide experiences; therefore, people prefer to invest their money in concerts, plays and trips than in acquiring material objects of similar value, such as clothes or jewelry. On the other hand, artifacts, things, are not opposed to experiences: for example, traveling presupposes means of transport; a musical show presupposes instruments and a place – these technological artifacts, in turn, shape, mediate and guarantee a good experience. From this new behavior recognized by the designers, the User Experience (UX) discipline stands out, whose central objective is the creation of interactive (digital or physical) products or services that function as creators, facilitators or mediators of the experience. Currently, the User Experience (UX) discipline is based on the literature in the area, however, in this study, we use the term Experience Design as a synonym for UX as a way of maintaining consistency in the choice of terms. In the same line, we prefer access and sharing over use and reuse; netizen instead of user; create rather than develop. These products (or digital environments, in the case of our study) shape the way people feel, think, act and, inevitably, influence the experience positively or negatively (Hassenzahl, 2010). A good experience on a digital environment cannot be guaranteed, but the application of Information Design and Experience Design strategies and principles offer the support for creating a positive experience.

Hassenzahl (2010) developed a three-level conceptual model with the objective of guiding Experience Design through an interaction

object: the levels of *Why*?, *What*?, and *How*? When the designer wonders why? of a product or service, the answer will guide the following levels (What? and How?). The answer must include people's real motives, needs and emotions. The designer must try to discover the needs and emotions involved in the activity, the meaning, the experience. The What? level understands the features of the product, for example, making a call or listening to music. And the How? understands how these functions will be performed through the object and its context of use, for example, navigated menus, clicked buttons, etc., that is, the way appropriate way of putting the functionality to work.

The How? is the environment where the designer is especially involved. He must ensure that the functionality (What?) will occur in an aesthetically pleasing way. The action of making a call (What?), for example, requires the following actions: choosing the person to call, making and ending the call. How this call will be made includes the cell phone and the specific interaction mode previously defined by the designer. These two levels are the ones typically considered by product designers.

However, according to Hassenzahl (2010), the most important level that should guide the way the interaction will take place is the level of *why*? We must imagine the real reason for the call: finding out about the health of a loved one, a way to pass the time, ordering a pizza, a good night wish for separated lovers, etc. So, Experience Design should start with *why*? to clarify the needs and emotions surrounding an activity, the experience. Only then will the functionality be able to provide the experience (what?) and the appropriate way to put the functionality into action (how?). The harmony between the three levels will result in products that are sensitive to the peculiarities of the human experience. This design model proposed by Hassenzahl (2010) aims to create products, in this case digital environments, that consider the peculiarities of human experience.

Therefore, to design experiences that involve interactions in digital informational environments, one must consider the occurrence of complex events. Figure 2 illustrates the elements of Experience Design in their complexity.

Figure 2: Elements of Experience Design
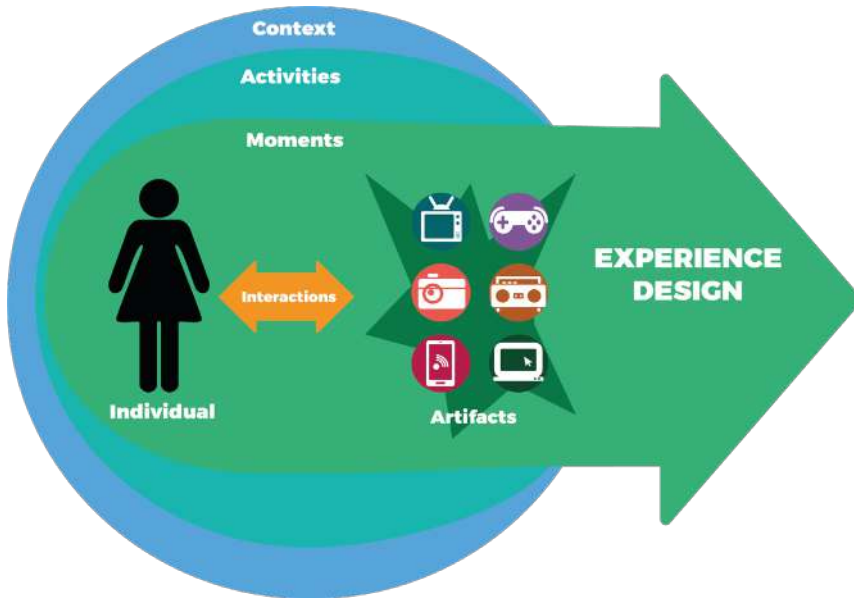
Source: Padua (2014).

Figure 2 illustrates the elements that should be considered when creating an experience. The first element to be considered is the context in which the interaction takes place (How?). The activities, in turn, should be thought of as the tasks that the netizen will perform in the interaction (What?). The moment configures the instant in which the interaction takes place (When?). At the center of these elements, we have the netizen (Why?), and the interactions (Why? What? When? and How?) that mediate the experience with the artifacts.

In this context, Experience Design corresponds to the consideration of an individual's satisfaction at the time of interaction with a particular product, service or system. Therefore, understanding each of the elements and the context that make up the netizen's experiences, making it possible to produce the desired results is fundamental.

3 CONSIDERATIONS

Considering the Digital Curation life cycle, Information Design and the principles and strategies of Experience Design applied to the access and sharing phase of an information system, stakeholders must be the center of the creation processes of a digital environment. Furthermore, improving access and sharing based on such principles and strategies favor information preservation on digital environments.

This study considers that information preservation initiatives are significant, shape the stakeholders and are shaped by it when information retrieval is a reality on digital environments, that is, when netizens/visitors who interact with environments have a positive experience at the time of interaction, and therefore knowledge construction is facilitated by the environment.

In the access and sharing stages (or use and reuse), netizens recognize a gap in their knowledge, that is, an informational need is identified. The subject then decides on an artifact to mediate the information search, and, at the time of the information search, interaction takes place on the digital environment. The environment must comprehend the principles of ID and Experience Design so that information retrieval occurs without causing unnecessary cognitive load and the netizen/visitor is positively impacted by the environment design and remains on it, and also decides to return in the future. In the experience created by information professionals in a satisfactory and positive way, knowledge construction can be facilitated.

To make communication on digital environment interfaces transparent, that is, in such a way it does not cause cognitive overload on the visitor, ID resources (planned in the Digital Curation) must orchestrate the material, informational aspects of the digital environment, as well as the sensorial, cognitive and humanistic aspects of the subjects that interact with the environment, considering that the improvement of digital environment effectiveness is not merely technical, resolved solely by one area. Professionals in the field of IS and ID should work together so that the environments are meaningful to stakeholders for which they were intended.

Once ID and Experience Design are incorporated into the digital environment curation planning, the system is expected to

favor convergences to reach spheres of culture and the daily lives of individuals, becoming transparent and universal to society.

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