Tibor Koltay
Information Architecture, Information Overload, and the Literacies

Abstract

This paper places emphasis on the relationship between information architecture and information overload in the light of the benefits, offered by information literacy, digital literacy and other literacies, often named "new literacies". It argues that making use of information literacy and digital literacy strategies can eliminate a substantial part of unneeded information. This approach does not exclude efforts to make information findable by applying principles and tools of information architecture. Information architecture, information overload, information literacy and digital literacy are defined and characterized, not forgetting about the differences and commonalities between them. Information ecology as a useful framework for better understanding of the relationships between new media, new literacies and information architecture is also brought into picture.

Introduction

In this paper I am going to approach information architecture from the viewpoint of the information professional. Emphasis will be placed on the relationship between information architecture (IA) and information overload (IO), focusing on the benefits, offered by information literacy (IL), digital literacy (DLi) and other literacies, often pooled under the name of "new literacies", first of all on account of their orientation towards new informational and technological realities (Buschmann 2009). I also intend to contribute to the work of building a vocabulary around the topic of information overload (Davis 2012b).

Information Architecture

Instead of giving a comprehensive overview of information architecture's definitions, I will emphasize some of their elements. In doing this, the time when the definitions appeared, will be disregarded. Stressing that their definitions are not definitive, the Information Architecture Institute (2007)

defined information architecture as:

1. The structural design of shared information environments.

2. The art and science of organizing and labelling web sites, intranets, online communities and software to support usability and findability.

3. An emerging community of practice focused on bringing principles of design and architecture to the digital landscape.

Toub's definition (2000) focuses on "structuring and organizing information environments to help people effectively fulfil their information needs".

Morville and Rosenfeld (2006) add that the word "information" appears in the term to distinguish information architecture from data and knowledge management.

The broader context of this paper is identical with one of the functions of IA, described by Davis (2010). It is to explore ways to organize and create semantic and contextual informational relationships that accommodate user goals and behaviour.

Approaches towards IA can be both system-oriented and user-oriented. There is also a substantial difference between bottom-up and top-down information architecture. The former is based on the understanding of the content and the tools, used, while the latter is based on the understanding of the context of the content and the user needs (Hagedorn2000).

IA needs new paradigms and approaches and there are numerous and diverse players involved in it (Burford 2011). One of these players is Library and Information Science (LIS) and we can say that a number of information architecture's elements originate in this discipline (Campbell 2007). In addition to this, both IA and LIS can be labeled as "art and science". This is reflected in the above definition of IA by Morville and Rosenfeld (2006).

Information Overload

IO can cause delays in decision making. It is usually associated with a loss of control over the situation and with being overwhelmed. In some cases this can lead to a loss of job satisfaction and even damages to personal relationships or someone's health (Bawden & Robinson 2009).

The growing availability of professional, scholarly and everyday information in digital form is caused to a great extent by the appearance and widespread use of the World Wide Web and (more recently) Web 2.0. This information environment is characterized not only by greater amounts of information and greater variety of its formats and types available, but by a delivery through a limited number of interfaces (Bawden & Robinson 2009). Furthermore, a substantial part of information, we consume and have to manage, is becoming more and more volatile (Davis 2012b). These factors contribute to a growing complexity, which materializes in diverse and abundant information choices in almost all fields (Morville 2005). This paradox of choice (Bawden & Robinson 2009) is often coupled with people's general inefficiency in performing the tasks, that they have at hand (Davis 2012a).

The growing anxiety about information overload is a result of the above. Coupled with the feeling that there is too much information, it is perhaps the most familiar among recently articulated phenomena that can be called "information pathologies". These pathologies appear as our information environment changes, first of all under the influence of new technologies. They include, among others, information anxiety, loss of identity and authority, and the impermanence of information (Bawden & Robinson 2009).

Still, we have to be aware that complaints about information overload itself are hardly new. A selection of the historical examples, presented by Bawden and Robinson (2009) shows this clearly. As they pointed out, the complaints about the difficulty to keep up with the amount of information available began early. Nonetheless, information, contained in the printed book, the scholarly journal and the computer have been often named as the sources of IO. Information overload was generally accepted as a problem in the late 1950s and early 1960s. The exponential expansion in the number of publications, particularly in science, technology and medicine, was regarded to be the cause. By the 1990s references to information overload began to appear in the business world, as well.

Despite of this, it is extremely difficult to get a grip on information overload and we can say that the only thing we know about it that we do not know enough (Davis 2012a). This is true, even if we have a few definitions. Our point of departure is the definition by Bawden & Robinson (2009), according to which IO is an impediment to efficiently using information, due to the amount of relevant and potentially useful information available. They also asserted IO to be a major problem that affects all spheres of our life, and that it represents one of the most important disturbances to the business world, academia and the professions.

It was also Bawden and Robinson (2009), who pointed out that in many cases too much information is identified as the major contributing factor of IO. This view is supported by statistics. However, the quantitative growth of information is not only a continuation of the often experienced and lamented growth of earlier times. It is also present due to the ease of publishing and storing information, while we are not motivated to remove our production (Brown 2010; Davis 2012b).

The already mentioned increase in the diversity of information can also lead to overload. Varying perspectives make the intellectual processing of information difficult and diversity may occur in the formats used, as well. A typical business user has to deal with print material, e-mails, voicemail messages, etc., not speaking about such Web 2.0 applications as blogs or wikis.

There are two levels of IO: the macro level and the micro level. The first one is related to the limits of physical storage and processing capacities that present an obstacle to information access. Its nature is technological and quantitative. In simple words we can say that systems can become physically overloaded with information.

IO at the micro level is essentially a failure to filter information (Davis 2011). It means that the abundance of information obstructs a user's ability to complete a transaction as intended. Micro level information overload is thus a qualitative burden, and it is the proper subject or my arguments, as it raises questions that call for response from information architecture. I believe that IO at the micro level is caused by the extensive use of Web 2.0 tools (Koltay 2011).

The New Media Environment

This environment consists of Web 2.0 and new media itself. These two concepts are closely connected. In fact, the presence of Web 2.0 software, which enables mass participation in social activities, is a prerequisite of the existence of new media.

Web 2.0 does not have a clearly accepted definition. Nonetheless, it is generally taken to encompass a variety of sites and tools for shared information creation and updating, as well as social networking and communication (Bawden & Robinson 2009). It is a Janus-faced phenomenon. On the one hand, we cannot deny its existence and influence on the daily life of many. On the other hand, it is laden with uncertainty, as Web 2.0 is a shorthand term for many things that are not compatible with

each other. It is about ideas, behaviours, technologies and ideals, all at the same time.

Consequently, many current Internet developments, activities and applications can be understood as examples of Web 2.0. Still they do not themselves constitute it, but represent a conceptual frame that enables us to make sense of many diverse phenomena. Web 2.0 is also a successful business model. Web 2.0 takes shape in services and activities that contribute to the creation of a new kind of media consumers (Allen 2008).

New media is characterized by the fact that users and their interests are represented in mediated spaces, which allow an easy input and manipulative control over data (Jarrett 2008). The typical characteristics of new media, such as its uncontrolled nature, the ease of producing information and the expectation of constant novelty cause information overload. It is not difficult to see that novelty is achieved easily as Web 2.0 tools enable and encourage rapid updating and posting of new material. The final result of these activities is a multitude of ephemeral artefacts, and we witness the frequent re-use of existing material (Bawden & Robinson 2009). This contributes to an enormous growth in the quantity of information, not speaking about the often questionable value of information, produced with the help of these tools.

We can explain these phenomena is among others with the constructed nature of media. A medium shapes content in ways that are advantageous to the biases of that medium (Walczyk & Kovacev 2009). Supposing that all media have biases, we can assume that these biases influence not only the content, but also the experience of the user. According to Walczyk and Kovacev (2009) reacting to the biases requires refined perceptions in the IA design process, because the reactions to these biases are usually unconscious. Even though new media represent multiple types of media, they show common biases that characterize them as a whole. The peculiarity of these biases is that they are not so much inherent, than constructed. This is in accordance with the view that media are constructed and they construct reality (Aufderheide 1992). The biases of new media can be appreciated if we recognize and understand that new media favours quantity against quality.

The prevalence of new media has also contributed to a growth of attention towards the idea of "personal". The most notable example of this is Personal Information Management (PIM), which refers to the practice and the study of the activities, performed in order to acquire, organize, maintain and retrieve information for everyday use, in the right form and quality (Jones & Maier 2003). PIM allows users to organize information, to store it for future use with the help of their own systems. PIM tools offer solutions that can help

in decreasing fragmentation in our information environment, caused by the diversity of formats, applications and tools (Franganillo 2009). As mentioned earlier, diversity is one of the sources of information overload, thus the surge of interest towards PIM shows that it is one of the necessary reactions to it.

Alleviating the Symptoms of Information Overload

In approaching IO, the question is not if it hampers the discovery, identification and proper use of information. It is clearly and undoubtedly an obstacle that we have to overcome. We have to find out instead, which measures and tools are the most efficient in combating it.

As Bawden and Robinson (2009) pointed out, the causes of information overload are multiple and complex, thus there is no single cure to IO. They added that we are not appropriately equipped to deal with certain forms of information; consequently IO can be regarded to be a natural and inevitable condition. Information overload can be found everywhere: We can encounter it in visual design, text, and interaction design.

Sound reasoning dictates that information architecture should play an important role in helping people and organizations to combat information overload (Davis 2012a). One aspect of this is the proper design of information systems. To achieve it, we have to have a deep understanding of our users and their social context.

Wrong models of users and their information-seeking behaviour result in failed design, and we cannot assume that people will want our information; even if we know that they need that information (Morville 2005). One of the related main issues is modelling users, knowing that different people have differing motivations and mental models for handling information. This is an issue that has to be acknowledged by IA (Brown 2010). The elimination of IO is namely not imaginable without providing proper design.

I also believe that the basis of recognizing proper design requires an understanding of the differences between professionals and amateurs to a considerable extent. The reason for this is that a substantial part of Web 2.0 users can be qualified as amateurs of our era, who can be defined as persons, who love to be engaged in a particular activity. They may be knowledgeable or not, but usually they lack of credentials (Keen 2007). Amateur settings are in many cases different from professional environments.

The latter foster both scientific inquiry and information use by members of a given profession. Amateur users, who act as creators, concentrate on their

own immediate needs, and do not have a precise idea of other users' needs or the necessity of meeting these needs (Huvila 2011). In addition to this, we can say that for amateurs it is not always indispensable to compete for attention. They may not be aware of the fact that there could be competition, similar to the one, experienced by their counterparts, who work in the corporate sector and especially those, who provide Web 2.0 services.

Even though it may seem that in the age of participatory web every information creator is an expert in producing information (Huvila 2011), it is not so. Professional forms of using and producing information require expert structuring. On the other hand, we know that well formed structures alone are not enough and professional forms are far from being exempt from IO. Professional purposes also require conscious critical selection of information, which seems to be essential in actions against information overload.

As Hinton (2009) put it, some argue that there is no need for IA, as users can do themselves what the experts used to do for them. I believe that such arguments are false. In fact, nothing can exist without architecture. Even when users build their own structures, there is a need for some kind of architecture. More so, if it is meant to be professional.

As Davis (2012a) pointed it out, the information architectures that evolve, when we let users manage information for themselves, may be less than optimal. He also added that these users may have limited awareness of knowledge organization for the web. Thus, we should acknowledge that amateur and professional contents are far not identical in their goals and quality (Koltay 2011).

Amateur production is not efficient in combating IO, either. Findability is one of the examples of this. As known, findability can be defined as the quality of being locatable or navigable. It also includes the degree, to which a particular object is easy to discover or locate and the degree, to which a system or environment supports navigation and retrieval (Morville 2005). It is difficult to achieve findability, thus the efforts made in order to attain it, are much more reasonable, if our goals are professional ones.

On a more general level, we can speak about the differences between the targeted audiences. Professionals as an audience are characterized by needs that can be determined much more clearly than the ones of the general public and the amateurs. Professionals' needs are defined by clear-cut professional communities.

As information overload is mainly a social condition, propagated by people (Davis 2011), it can be combated by offering appropriate education.

Education can contribute to the acquisition of skills, which are necessary for being able to take control of one's information environment, to take measures towards organizing information better, to cultivate a rational personal information management style. All this goes hand in hand with critical thinking (Bawden & Robinson 2009). The lack of this critical thinking and the lack of adequate filters to information or failure to apply them appropriately, results in IO (Davis 2011).

Filling the Literacy Gap

The consequences of the literacy gap can lead to information overload (Davis 2012a).

Literacy (in singular) involves the integration of listening, speaking, reading, writing, and numeracy. It can be defined as an individual's ability to understand printed text and to communicate through print. Closely tied to it is functional literacy, which most commonly denotes the ability to read and use information, essential for everyday life (Bawden 2001).

As Morville (2005) noted, functioning in modern society requires that we master the skills of written communication. Thus, reading literacy remains important. Nonetheless, it has to be supplemented with multiple literacies that react to technological change, first of all to the existence of the Word Wide Web and partially to the emergence of Web 2.0. The difference between being knowledgeable with the body of writing of aesthetic merit and the stage of being able to cope with the socio-technological changes and challenges brought by the convergence between media, telecommunication, as well as information and communication technologies (ICTs) is considerable (Livingstone, van Couvering & Thumin 2008).

The complexities of the current information environment require complex and broad forms of literacies (in plural) that are not restricted to any particular technology and foster understanding, meaning and context (Bawden 2001). Different literacies depend on their varying social contexts and are influenced by the varying social conditions of reading and writing. Consequently, they change in time, according to purposes and circumstances and to the people and tools involved (Lankshear & Knobel 2004). Among the changing circumstances, the rapid development of ICTs is one of the most decisive ones.

Linking new literacies to IA means two things. By default, information architects themselves should posses some form of the above new literacies. Furthermore, the users of information have to be aware of the importance of

structures and architecture. This can be achieved by educating them to IA principles as a part of education to new literacies.

Even IA, applied to "traditional" professional subjects, requires the presence of new literacies, because both of them emphasize consciousness and critical approaches towards information. The central value of new literacies is being critical towards information. This raises awareness of information quality, which is also one of the critical aspects of IA (Martina et al 2010).

With the apparent loss of gatekeepers, like reviewers, editors and librarians, readers themselves are required to decide on quality and select appropriate scholarly information (Badke 2004). We believe that this loss may prove to be partial and temporal. Nonetheless, the partial loss of gatekeepers causes IO and requires the application of new literacy skills, because there is a multitude of options, which makes decision more difficult by requiring more cognitive effort and possibly causing higher levels of anxiety (Brown 2010).

New literacies are required to link external reality of the information world to users' internal, more subjective reality (Ward 2006). This relates them to the individual aspect of IO.

The existing literacy gap can be eliminated by raising awareness of such "new literacies" as information literacy and digital literacy. The attitudes, skills and abilities that can be acquired if someone adapts these literacies, can be beneficial for both information architects and the users of the systems, developed by these architects.

Information Literacy

IL education emphasizes critical thinking and the necessity to recognize message quality. Despite the existence of a huge body of journal literature and declarations on information literacy, it is continuously discussed, whether it has been defined clearly and adequately (Owusu-Ansah 2003).

On a basic level of definitions, information literacy can refer to:

- the use of ICTs to retrieve and disseminate information,

- the competences to find and use information in information (re)sources,

- the process of recognising information need, finding, evaluating,

and using information to acquire or extend knowledge.

The third option is the most comprehensive and most useful one, as it includes both the use of ICTs and the information (re)sources concept (Boekhorst 2003).

According to the presumably best known definition of IL, information literate people are able to recognize, when information is needed. They are also equipped with skills to identify, locate, evaluate, and use information in order to solve a particular problem (ALA 1998). These definitions show to a certain extent that originally information literacy was dominated by questions of access, because it has been dealing with media that have been far from accessible (Livingstone, van Couvering & Thumin 2008).

This situation has radically changed, among others with the appearance of Web 2.0, thus many aspects of IL had to be adjusted to the properties of the digital environment (Å piranec & Banek Zorica 2008).

IL has strong positions among literacies. However, this concept has always seemed to be of more importance to information professionals, than to any other players of the information arena (Bawden & Robinson 2009).

Digital Literacy

As outlined by Bawden (2008), the concept of digital literacy, as the term is now generally used, was introduced by Paul Gilster. Gilster himself did not define how to become digitally literate. Rather, he explained it quite generally, as an ability to understand and to use information from a variety of digital sources.

Digital literacy's core lies in the awareness, attitudes and abilities of individuals, needed for using digital tools and facilities appropriately, in order to be able to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources and communicate through media expressions with others (Martin 2006).

In DLi traditional tools (often known from IL) continue to play an important role, while it reflects that ordinary people became not only receivers, but senders of messages (Bawden 2001). Davis (2012a) describes digital literacy as the users' ability to responsibly curate their own user-generated knowledge, when we give them the tools to do so. I have to add that this is only a part of a bigger task. Users also interact with information, produced by other people and institutions.

Common Features of New Literacies

Having outlined the context and a number of features of information literacy and digital literacy, I tend to agree with Bawden (2001), who stated that it is of lesser importance, whether literacies of the information age are called information literacy or digital literacy.

Any kind of literacy is cultural knowledge, which enables us to recognize and use language, appropriate to different social situations (Campbell 1990). This means that there are plausible arguments for IL and DLi to go beyond caring for the abilities of finding information and concentrating on reading. New literacies have to include the creation of information, mainly, but not exclusively, in the form of writing (Huvila 2011).

We already mentioned findability, which is an inherently interdisciplinary concept that occupies an important position in IA. It encompasses two central issues of information architecture: organization and representation (Morville 2005). If findability is the art and science of making content findable (Morville 2005), we can say that this is true for new literacies, especially, when they stress the importance of finding information. This dictates that users' awareness of structures and architecture has to be raised by educating them to IA as part of DLi education.

Information architecture is just one facet in the complex of interactions that contribute to the user's overall experience with an information resource (Morville 2005). That is one of the reasons, why we can say that IA and new literacies represent the two sides of the same coin. IA activities and efforts, directed towards achieving findability serve the user, but are not performed by the user. Consequently, they are more system oriented, compared to new literacies' skills and abilities that have to be possessed and performed by the user, though initiated and directed by information professionals.

A comparison with the approach, taken by Krug (2006), also illustrates this difference. Reducing the noise level of a webpage makes the useful content more prominent. However, the decision about its usefulness is in the hand of the users. If these users are equipped with substantial and appropriate literacy skills, this decision falls easier.

A wider context of information overload and literacies is given by the difficulty to differentiate information from knowledge (Miller 2002). We know that the phenomenon of information has been studied by many disciplines, including communications theory, library and information science, information systems, cognitive science and linguistics. Nevertheless,

information is a least understood concepts, though it is widely used, be it a mundane and technical concept or an object of scholarly investigation. As a consequence, there is no consensus on the meaning of the word itself (Rowley 2007).

This problem can be exemplified, if we examine one of the possible approaches to knowledge. Knowledge may be defined as information, combined with understanding that links it expressly with the human mind, perception skills, training, common sense and experience. It helps us to draw meaningful conclusions and comes into existence with a synthesis of multiple sources of information over time. Before being internalized new insights are put into relationship with existing (prior) knowledge (Rowley 2007). In other words, knowledge is what we know. The mental processes of comprehension and learning, related to knowledge go on in the mind, and only in the mind. When we are involved in interactions with the outside world and we wish to express, what we know, we produce utterances.

However, these utterances do not carry knowledge. Rather they constitute information, which may be assimilated, comprehended and incorporated into someone's own knowledge structures (Wilson 2002). In one word, information has no intrinsic meaning. It becomes knowledge at the moment of its human interpretation. Information alerts us to the need and opportunity to interpret anything that is relevant enough to attach meaning to it (Miller 2002).

Information Ecologies

Information ecology (IE) offers a framework for a better understanding of the relationships between new media, new literacies and information architecture. If we understand a medium as a technology, within which a culture grows, ecology is the interaction among the components of that environment (Postman 2000). IE can be defined thus as an information space, a network of relationships between the content, the tools, the context of the content and the users, who access that content (Hagedorn2000).

According to a different definition media ecology is "an environment created by media, the interaction between the media and the content within that environment, and the corresponding effects of these configurations on that environment" (Walczyk & Kovacev 200: 50). Media ecology provides a flexible and human-centred perceptual framework for understanding and designing emerging new media. Media ecologies can be categorized as big, small and "in between".

The information age is an example of big media ecologies; a graphical user interface represents the category of small ones. The intermediate (in between) category is represented by a city (Walczyk & Kovacev 2009). The interfaces among IA, DLi and Web 2.0 pertain consequently to the latter, intermediate category as they do not reach the magnitude of the information society as a whole, even though they are close to it.

The relationship between new literacies and IA can be demonstrated by the case of foksonomies. Many online users need and want to control the representation of their own documents, thus it would not be wise to impede the use of folksonomies (Neal 2007). Still, aligning user motivations with the goals of a given site is necessary and information architects could make use of folksonomies themselves (Morrison 2007). Even traditional (library) cataloguing and the use of controlled approaches to document representation can coexist with folksonomies, especially if both systems are being refined to relieve some of their inherent shortcomings (Peterson 2008).

However, it is important to distinguish between differing goals and uses. The use of folksonomies in personal information management, in social bookmarking and other social applications is undoubtedly purposeful (Neal 2007). Professional goals, nonetheless, would most probably go beyond unsophisticated tools. Classification and subject indexing that employ classification schemes, top-down hierarchical taxonomies, thesauri, etc. are needed or at least would have to be taken into consideration to a greater extent.

On the one hand, folksonomies undoubtedly serve as a representation of the collective knowledge of the users (Neal 2007). On the other hand, folksonomies can be successful, if the goals of a given website or information system intersect with the goals and motivations of users (Morrison 2007). The question is, however, if users themselves are qualified to achieve this.

Conclusions

There is an ever widening gap between information that is usable and information that is available to us (Davis 2012a). This cries for theoretical and practical solutions. In this paper we offered some insight into this issue from a rather theoretical viewpoint.

Even though written in 2007, the thoughts of Bridges and Watts are valid. They stated that it is too early to assess the impact of the information society, the supporting technologies of which may not represent a radical innovation in social practice, to disrupt earlier epistemological assumptions. This remains

true also in the 2010s.

We know obviously â€" as Bridges and Watts also added â€" that the above possibility remains open, because the Web fulfils the aggregation of existing information and opinion more effectively than any other instrument. However, the development of knowledge requires more than mere aggregation (Bridges & Watts 2007). Bringing IL and DLi closer to information architecture will cover at least a part of the gap that exist between information that is available and information, that is findable and usable.

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Tibor Koltay

Eszterházy Károly University (retired)

A former professor at Eszterházy Károly University (retired) and one of the best cited Hungarian researchers, Tibor Koltay is now Principal Researcher of the Information Society Research Team at the University of Nyíregyháza working on information literacy, data literacy, and information overload.