CLICKING AS PERCEIVING: AN ANALYSIS OF THE USABILITY OF MULTIMEDIA APPLICATIONS

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RESUMO

O presente artigo examina algumas condicionantes da comunicação digital na actualidade dentro do âmbito do nível de percepção e interpretação. Deste modo, recorre às conclusões de estudos semióticos de Yuri Lotman e segue a definição de usabilidade como avaliação heurística de Jakob Nielsen. A metodologia utilizada inclui uma análise de *websites* oficiais da New York Academy of Arts e da Yale University School of Art, centrando-se em fatores que produzem impacto na sua usabilidade e interpretação. As conclusões apontam para o facto de o processo cognitivo ser decisivo na definição da sua usabilidade.

PALAVRAS-CHAVE

Comunicação; Multimédia; Perceção; Usabilidade; Cognição

ABSTRACT

This paper discusses the constraints of present-day digital communication, linking it to the degree of perception and interpretation. Therefore, it uses the contributions of semioticians Yuri Lotman and Peirce and follows Jakob Nielsen's definition of usability as heuristic evaluation. Methodology includes an analysis of the official websites of the New York Academy of Arts and the Yale University School of Art, focusing on factors that produce impact on their usability and interpretation. Conclusions show that the cognitive process is decisive to define usability.

KEYWORDS

Communication; Multimedia; Perception; Usability; Cognition

1. **INTRODUCTION**

Human beings communicate through words, pictures, architecture, paintings, and sculptures, etc. Despite the fact that communication may be processed in manifold ways, its aim is the same: encoding and decoding messages clearly and unambiguously; in other words, getting a message through in such a way that targeted receivers perceive and interpret it straightforwardly and with as little effort as possible. Yuri Lotman's seminal study (2001) drew attention to the fact that the effectiveness of the process of communication is dependent on the participants' experience and cultural background. Intellectual creation results from the translation between different types of language; in other words, the individual perceives and translates outward information into the sign system based on his or her own experience.

The significance of present-day technology in the process of digital communication encouraged the authors to research the websites of universities. Their aim was to determine the extent to which perception and full understanding of academic websites is dependent on the compliance with factors that influence their usability, as defined by Jakob Nielsen (2005). Googling for information on universities and surfing websites to find out about academic applications, graduate programmes, exhibitions and various events is an experience common to a significant universe of individuals regardless of their cultural, social and political background. However, the experience of the idea of university differs, depending on the specifics of the individual's background. Consequently, an effective perception of messages is influenced by the skilful use of an array of technological applications that encode messages in such a way that they can be widely read and understood.

Websites are created all the time and their design is scrutinized by multimedia experts; an example is *Vincent Flander's Web Pages that suck*. This paper focuses on two university websites and aims to establish that the use of design has an impact upon information usability. The semiotic approach to design and, more particularly to usability, is a valuable contribution to show that factors that make websites usable lead to effective and straightforward communication. This study pinpoints that multimedia applications with highly elaborate and sophisticated design bear high rates of entropy that result in unclear messages. The cognitive process of message decoding is successful when sophistication in multimedia is all about encoding messages with a simple and appealing design, thus, raising the rate of redundancy in communication.

STATE OF THE ART

Technology has invaded the way individuals live and interact. Löwgren and Stolterman pointed out:

> We live in an artificial world. It is a world made up of environments, systems, processes, and things that are imagined, formed, and produced by humans. All these things have been designed, and all new things have to be designed. Someone has to decide their function, form, and structure, as well as their ethical and aesthetical qualities. In this artificial world created by humans, information technology is increasingly becoming not only a common but also a vital and fundamental part... To design digital artefacts is design people's lives (Löwgren and Stolterman, 2004:1)

Everyday routine shows us that nearly every apparatus has a technological component used directly and indirectly. Jed Kolko (2011) emphasized in his study that human computer interaction is accepted because the design of computerized systems helps individuals to carry out tasks and functions effectively:

> Interaction design is the creation of a dialogue between a person and a product, service or system. This dialogue is usually nearly invisible and found in the minutiae of daily life….To design for behavior requires an understanding of fluidity of natural dialogue, which is both reactionary and anticipatory at the same time.(Kolko, 2011:13)

Yet, this is often a difficult and sometimes impossible achievement without developing permanent and consistent dialogue between the user and the machine. This fact draws attention to the importance of interaction design. Human computer interaction is fundamentally focused on the achievement of function performance (task-oriented design), whereas interaction design is focused on the interactive process that makes it an efficient, safe and pleasing goal (user-oriented design).

Interaction implies communication between individuals and/or individuals and systems. The twentieth-century has shown us that the Internet has offered us numerous possibilities of expanding, deepening and reinventing communication. Within flashes of seconds, processes of communication are carried out across the world, involving senders and receivers coming from various demographic, geographic and psychographic backgrounds. The dramatic change the Internet has imposed on human communication and on message representation makes us look into

Iuri Lotman's seminal study on the semiosphere. Lotman defined it as 'the semiotic space necessary for the existence and functioning of languages' (Lotman, 1990: 23). Lotman pointed out that cultural encounters are explosive, dialoguing, and capable of generating new linguistic signs. He added that processes of communication cannot exist outside the semiosphere, in view of the fact that it produces new linguistic codes and signs. The Internet and multimedia systems are generators of new linguistic signs and are privileged sites for encounters of various cultural spheres. Discussing the impact of the Internet on the processes of communication among a population characterized by different demographic and psychographic variables (including, sex, age, social status, region and cultural background) is particularly productive when we approach it within the framework of semiotic concepts.

The design and improvement of Internet sites and multimedia applications show the extent to which access to information has been democratized nowadays. Clicking icons is all that it takes to learn about upcoming academic activities at a Faculty in your area or in any distant country. However, despite multimedia applications becoming very appealing, they can also pose problems of interpretation and representation. In other words, are multimedia layouts perceived similarly regardless of the receiver's cultural background? Are the chosen colours and fonts facilitators enhancing the user-oriented design? As far as technological systems are concerned, the success of processes and functions is dependent on the communication illustrated by the interface which should boost the process of sharing information.

Two semiotic concepts – Entropy and Redundancy - are worth taking into consideration because they measure the predictability of information and, hence, the potentiality of its access and accurate understanding. Entropy and redundancy were first introduced by Shannon and Weaver (1965) and are helpful in the understanding of this topic. Redundancy is a concept closely related to information. As Shannon and Weaver put it, Redundancy conveys what is conventional and predictable in information. Its opposite is Entropy, which is a term borrowed from thermodynamics. Redundancy is the result of high predictability, and therefore, yielding low information, whereas Entropy conveys the principle of unpredictability of semantic content, thus, yielding high information. A significant degree of Redundancy is essential to effective communication because it secures accurate interpretation and eschews misunderstandings and potential deficiencies of channels of communication. Redundancy is linked to highly motivated linguistic signs because they show a significant degree of similitude to reality. Conventions make message decoding an easy and improved task. Adopting the right language register and using emoticons to

represent the level of satisfaction may enhance message effectiveness due to being highly motivated signs. As Fiske put it:

> Broadly, we may say that encoders, whether artists, preachers or politicians, who build redundancy into their messages are audience-centred. Those who do not are more concerned about subject matter or (if they are artists) form. (Fiske, 1990: 13)

Interactivity between the user and the machine/system is the key to the success of the ICT: the friendlier the interface, the bigger acceptance is. Interaction design is the concept this bidirectional relationship relies on. In order to achieve such a goal, each technical routine must consider the needs of the function and the requirements and expectations of the user. A user-centred approach stimulates and sustains the accomplishment of the function and the performance of a system.

The way individuals comprehend the message depends on a response being at once sensorial, cognitive and emotional: Sensorial because they depend on their senses (sight, hearing and haptic) and the capacity of signs to wake the stimulus up; Cognitive because it is the cognitive process that allows us to process the information delivered by the senses. Cognition is also described by a set of processes such as attention; perception and recognition; memory; learning; reading, speaking and listening; problem solving, planning, reasoning, and decision-making. Several of these cognitive processes are interconnected and are part of a unique human action (Rogers, 2007); Emotional responses can be motivated by the use of elements that stimulates human senses and images (such as, icons, emoticons and drawings) identifiable with human feelings which can produce the feelings of ease, comfort and happiness, among others. An interface that particularly communicates through images can foster attractive and pleasant practices (Mullet, 1995). The manipulative nature of the interface is also highlighted by Kolko:

> (...) this dialogue is both physical and emotional in nature and is manifested in the interplay between form, function, and technology as experienced over time...to understand and alter the things people do, the way they feel, and the things they think. It sounds manipulative and it is. (Kolko, 2011:16)

The choice of linguistic signs determines response to message decoding. C. Sanders Peirce (1974) identified three categories of linguistic signs – the Icon, the Index and the Symbol. Each one has, as he pointed out, a particular relation to reality.

Whereas the Icon shows a close resemblance to the object, the Index has relation of proximity to the object. The connection between the Symbol and the object is merely determined by convention and arbitrariness. In other words, effective understanding is, in this case, determined by the result of the experience of the user and constraints are imposed by social convention, social and psychological differences between users/interpreters. Therefore, as far as the use of multimedia interface is concerned, the more iconic signs are chosen, the more effective communication becomes. Simultaneously, the more redundant signs are, the lesser effort is spent in decoding them and, hence, the more effectively they are understood by the vast majority of receivers. An example is the difference in use between the words 'pleasure' and 'sadness' and their correspondent emoticons. Emoticons would get quicker and prompter responses from a wide diversity of users whereas the understanding of words would be constrained by language proficiency and psychological condition.

Donald Norman (2005) states that the perception of a product depends on: Affection, Motivation, Cognition and Behaviour. Affection corresponds to the feeling constructed by the user while using it; positive feelings such as excitement, pleasure, friendliness, comfort, and relaxation can enhance the determination to continue the experience. Motivation corresponds to the aim of fulfilling the users' requirements and expectations; it is the energy that drives the individuals' action, and it is based on emotions and achievement-related goals. Cognition is what the user thinks about the process to carry out the task, what the user knows and believes is required to complete the routines properly. The behaviour is what the user does with the system.

Usability is the emerging concept from the comprehension of the message expressed on a digital document, particularly a website. Usability aims to reach the widest range of individuals regardless of age, sex, religion, physical, sensorial, cultural and social attributes. This concept was explored by Jacob Nielsen (2005) through the development of ten rules which illustrate the awareness to the graphic and alphanumeric information to transmit the message, the readiness to understand, orient and navigate on the interface and its compatibility among various computer formats and expectations of hardware, software and peripherals. Those rules, which underlie the analysis of the two websites below, are as follows: visibility of system status; match between system and the real world; user control and freedom; consistency and standards; error prevention; recognition rather than recall; flexibility and efficiency of use; aesthetic and minimalist design; help users recognize, diagnose, and recover from errors; help and documentation. However, their

implementation must value the aesthetical importance of the document to consolidate design, construction, updating and use. Usability is the user-oriented design which includes the participation of the user throughout the whole process. The design process centred on the creativity that combines the aesthetics of the form and the use of the function is redirected to the design based on the experience and the interactivity between the user and the product. The application of rules ought to be based on common sense and wisdom because applications should take inclusiveness into consideration. This means that, accessibility should not exclude alternative solutions to particular individuals – such as disabled users and those with some kind of impairment, and not simply include them in the vast majority.

Usability can be experimented and tested through prototypes to involve the user (given his/her heterogeneity) towards a qualified final solution. These prototypes are essential to define patterns of use according to time functional performance and common errors.

Despite the advantages brought by prototyping and the application of the usability rules, reality illustrates the disavowal of this knowledge. Nielsen (2005) points out seven reasons based on information quality, objective frequently asked questions, inadequate discourse, and consistency and by net convention violation.

Usability is much more than a set of rules to apply; it is a tool that encourages qualified human interaction between user and ICT and most of all, usability is the concept that democratizes information and knowledge access by every individual regardless of his or her characteristics.

As far as the user is concerned, experiencing an application system is a continuous process (Sears and Jacko, 2009). The communication between the user and the device is experienced by the action required by the user and the system's feedback. Broadly speaking, users carry out holistic evaluations. The ergonomic features of devices, such as form, dimension, and texture should induce the physical contact without significant human effort. The logic management of its routines and the options to reach the intermediate steps encourage completing the task. The interface which supports the interaction of the user and the function (and consequently the application) is crucial to reducing the time to complete routines as well as the time to acquire the required ability. The availability / mobility to optional platforms can be a factor of preference, too.

2. **CASE STUDY**

The New York Academy of Art is an institution that aims to develop the technical skills of those who pursue graduation in various artistic fields. The mission statement of this academy stands for education based upon key cornerstones of visual art and this determination is shown in the academy's website (http://nyaa.edu/nyaa/home.html).

Navigating this website is an example of compliance with the rules of usability as structured by Nielsen (2005). The core design challenges for this website are centered upon the use of information and visuals facilitate message decoding, particularly as far as reaching the full potential of linguistic signs arranged in the various web pages. Simplicity in layout and a sober type of lettering (Century Gothic and Verdana fonts, size 13) contribute to an aesthetic and minimalist design. The design ensures that users know exactly where they are and what to look for. Hence, the access is efficient and flexible enough to move back and forth. Global navigation bar is placed at the bottom of the webpage, whereas content and history trail navigation bar is structured on the left. Users are helped to tailor their search for information, recover from potential errors and, still, retain the control of their search. There is no language navigation bar, however. This is a drawback as it narrows the universe of potential users, despite the worldwide significance of the English language. The graphic elements on the web pages are chosen to illustrate the content described on a verbal (alphanumeric) expression. Words and actions are the same and follow the platform conventions. Two examples are: the action for "Contacts", "Support" and "Location and Transportation", made available on any page of the website, are common to the various pages of this website; and the action of clicking on the institution's logo to return to the homepage. The fact that images are static enhances the user's attention.

There are two kinds of visuals that establish different meaningful relationships with the user. There are a video and various photographs illustrating the sections related to the real world, such as 'library', 'admissions', 'alumni', 'faculty' and 'residences'. They show the faculty's premises, exhibitions, lectures, and instances of hands-on approach to various materials. The video adds testimonies of undergraduates speaking of their aspirations and goals. Message representation is strengthened through the introduction of pictures that refer to the various art fields taught at the academy: figurative art, painting and sculpture. The chosen pictures are linguistic signs who redundancy enhances the effectiveness of the message; in other wor-

ds, education as mastering those art fields. Such redundancy contributes to a wider understanding of the message, regardless of the user's background. Furthermore, the iconic nature of the pictures (as classical art due to resemblance to depicted objects) strengthens message and facilitates decoding. The two dimensions – 'faculty as real world' and 'faculty as fulfillment of dreams' – are combined and follow the sequence of stepping into a new life stage (from the outer world (streets, faculty door) to the inner world (progressing from classrooms to the finished work of art as expression of individual talent and education). The sequence resembles the life path of an undergraduate. As far as applications are concerned, the sequence follows the same logic: for example, 'Graduate Program' is sub-categorized into 'admissions' and on to 'student work'.

In view of the fact that all the pictures and the logo of the academy share similar colours – mainly orange, black and grey, this suggests that colour is used as a message facilitator: sober warm colours convey the concept of lightness and, ultimately, the path to education; on the other hand, the fact that orange and grey prevail in most pictures, the message of graduation based on solid principles is enhanced. Furthermore, the fact that the same web layout is applied to all documents available encourages recognition of the corporative image on each page. This enhances consistency as defined by Nielsen (2005).

The non-existence of accessible alternative to the viewed information is minimized by the access to the social channels *YouTube* and *Vimeo* where users can watch and listen to videos to learn what happens at the academy and which are the performance-oriented activities stimulated by the academy. Social networking platforms, such as the email, *Facebook*, *Flickr*, *Twitter*, and *Blogspot* strengthen effective interaction between the public at large and the academy. Their logos, as arbitrary symbols, maximize the full understanding of potential interaction. This is helpful to provide access to information by individuals with different sensorial or functional aptitudes, those coming from different cultural backgrounds and different skills, thus having the opportunity to decide on their preferences to access particular information.

The Yale University School of Art is an institution that bases admission on highly selected criteria and competitive basis. Communication with applications is fundamentally carried out on the Internet. The website of Yale University School of Art (http://art.yale.edu/) is a wiki. Wikis are applications whose contents users may add, modify and delete via a web browser, using a simplified mark-up language or a rich-text editor. This facility permits control over various functions; in other wor-

ds, levels of access, and, hence, it enables establishing communication with a wide community of users.

The Yale School of Art aims to develop technical skills of those students who pursue graduation in visual arts media, within the framework of Liberal Arts University. This university defends experience as a method of learning and expression and that is well illustrated on its website. The Yale School of Arts website is a dynamic document, regularly updated (by students, academy, and staff), including its background image whilst the written contents are maintained according to the official information of the institution as well as the planned agenda events. This possibility of constant updating is shown on the website home page with the statement that the final result is the consequence of student action from various background interventions.

The website does not offer a friendly navigation and goes against the basic concept of usability. The non-existence of a corporate logo shown on the web pages undermines the corporate communication of the Yale School of Arts. In fact, the website is very oriented to the community, in other words, students and staff of this school. Therefore, it constrains the access of other external users who may experience difficulty in getting through information.

Furthermore, the layout design deters access of those individuals with special requirements, such as low vision or colour blindness. Over sophistication in design implies overlooking access of potential users with different needs. The type of lettering (Arial 9 and 10) facilitates the inclusion of extensive body text but it interferes with an effective delivery of message. In addition, background colours flicker and are too strong and diversified, conveying lack of consistency among various elements and topics. Dynamism of interaction can be learned as an advantage but, in this case, the array of digital applications overwhelms the basic goal digital communication: getting the message through. Thus, it interferes with the potential use of applications being at one time flexible and efficient and, consequently, message decoding becomes a burden for the user. The diversity of icons unrelated to topics strengthens the entropy of this communicative process and, thus, complicates message decoding.

Error prevention is also overlooked. Navigating across the website depends on scrolling full pages and there is no other way to go the top of the page to choose another subject to read. Flicking pages, with background motion images, difficult the understanding of where the user is. Therefore, action, in particular recognizing and diagnosing, to recover from errors is hampered by obstacles. An example can be found in the section about the faculty and staff. Once the user clicks it, there are four sub-sections to choose from. Whenever the user chooses a particular member

of staff, there is no 'back' option to return to the previous page. Another example worthy of mention is the exhibitions shown. Choosing one implies not being given the chance to choose the other without returning to previous pages.

Organization and hierarchy of topics is almost non-existent, as shown in the content navigation bar. 'Home' is the last section, and navigating the content bar does not follow an unambiguous sequence: 'Admissions' is followed by 'Alums' and 'Undergraduates' are after 'Summer Programs'. Content is set up on a text basis and any visuals do not support it as complementary aids. In fact, their use is hardly redundant in the process of communication. Their function is decorative and is not potentially identifiable to any work produced by students. This, for example, could be used as enhancement to the value attributed to the work of art produced at the institution. In addition, there are no images of the faculty that strengthen its meaning and positioning as a real institution, operating in the world of art and education.

There is no connection to social networks such as *Facebook* or *Twitter*. The non-existence of platform conventions adds difficulty to interaction. The address and telephone of the institution is in a small font (Arial, size 8,5), orange typed on a red background with repetitive patterns. Therefore, the user easily misses it or finds it difficult to read. As far as this website is concerned, the process of communication is not developed according to a particular structure or reassuring path. The non-compliance with the rules of usability impairs the attention of users and makes the signal-to-noise ratio fall into a waste of useful information.

3. **CONCLUSIONS**

The last decades have brought new information and knowledge support which can be accessed by different platforms despite time and the geographical location of the user. The novelty of such technical performance raises the question of how being capable and being successful at the same time (among such complex and diverse alternatives of communication) to transmit the message straightforwardly and clearly. Technology has brought the illusion that improvement - dynamic and interactivity information – is enough to grant success; most of the time it is otherwise!

The design of digital documents demands interactivity between the interface and the user as a requirement to take advantage from the ICT advantages. The access to information/knowledge encouraged by the availability of contents in an ar-

ray of document formats raise the importance of the ICT as a significant revolution in the process of communication.

The importance of breaking geographical and time barriers is surpassed by the opportunity that this technology can raise to respect the human heterogeneity with special emphasis on people with special requirements such as sensorial, functional, cognition, cultural and social. However this advantage can only be achieved if the idea, construction and maintenance of the document are supported by the concept of user-oriented design. Media designs ought to pay a particular attention to the variety of the individuals' ways to consult diverse documents.

Such ambitious goal legitimises the question "how to communicate a message successfully?" Does the use of new technologies emphasise or minimise this awareness? Based on the literature and on the case studies the authors hold that the challenge that digital devices face as facilitators of the communicative process relies on two aspects: creativity and usability. Creativity should be associated to simple layouts; in other words, the quality of the contents and the friendly use of language – regardless of its graphic, written and iconic nature – are key factors for the straightforward reading and prompt understanding, regardless of the individual characteristics of the user. Complicated and over-sophisticated layouts entangle the cognitive process and obstruct communication. This is and will continue being the key.

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