

INTERACTIVE MEDIA AND THEIR EDUCATIONAL PROCESSES IN THE AGE OF DIGITAL COMMUNICATION

MÍDIAS INTERATIVAS E SEUS PROCESSOS EDUCATIVOS NA ERA DA COMUNICAÇÃO DIGITAL

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ABSTRACT

The article analyzes and systematizes and education the theoretical and practical basis for the design of visual communication signs in the context of the transformation of the graphic form of the sign, methods of their meaning formation, complication and increase in functional tasks. The process of interaction between a person and the interactive environment of electronic communication through the "user-computer" connection has been studied. The signs of the interactive environment of the graphical user interface are classified based on possible communication connections and areas of application. A comparative analysis of the avant-garde trends in fine art and design of the 20th century in European countries and the modern interactive environment of electronic communication in the context of the formation of their internationality was carried out. Models of the conceptual and semantic foundations of the interactive environment of electronic communication have been developed and factors influencing their graphics have been identified. Features of the design of Internet communication are revealed. Practical recommendations for the design of an interactive electronic communication environment have been developed. The prospects for using the interactive environment are determined.

Keywords: educational environment, management, control, information environment, digitalization, communications.

RESUMO

O artigo analisa e sistematiza a educação as bases teóricas e práticas para a concepção de signos de comunicação visual no contexto da transformação da forma gráfica do signo, métodos de formação de significado, complicação e aumento de tarefas funcionais. Foi estudado o processo de interação entre uma pessoa e o ambiente interativo da comunicação eletrônica por meio da conexão “usuário-computador”. Os sinais do ambiente interativo da interface gráfica do usuário são classificados com base nas possíveis conexões de comunicação e áreas de aplicação. Foi realizada uma análise comparativa das tendências vanguardistas das artes plásticas e do design do século XX nos países europeus e do moderno ambiente interativo da comunicação eletrônica no contexto da formação da sua internacionalidade. Foram desenvolvidos modelos dos fundamentos conceituais e semânticos do ambiente interativo da comunicação eletrônica e identificados os fatores que influenciam seus gráficos. São reveladas características do design da comunicação pela Internet. Foram desenvolvidas recomendações práticas para a concepção de um ambiente de comunicação eletrônica interativa. As perspectivas de utilização do ambiente interativo são determinadas.

Palavras-chave: ambiente educacional, gestão, controle, ambiente de informação, digitalização, comunicações.

Introduction

Evolutionary complexity, constant improvement and development of the communication space have always updated the problem of designing visual sign systems. Even in ancient times, people meaningfully recorded information in symbolic graphic signs for the purpose of its transmission, preservation and further use.

The 20th century formed the prerequisites for the emergence of the era of electronic communication and activated a unique communication space - an interactive environment of a virtual, intangible nature. Generally available devices have appeared that make it possible to functionally use the broad capabilities of working with information in an interactive environment, such as personal computers, smartphones, tablets, e-readers and other devices with artificial technical “intelligence.”

In the 21st century, there has been a synthesis of graphic design and interactive space, dictating new design conditions, a culture of presenting information and working with it primarily through graphic signs rather than text messages, which determines the relevance of the study - the massive need for the use of visual communication signs in an interactive environment, designed in based

on previously formed experience in the information generation of signs, their graphic conventional representation and new specific qualities determined by the wide communication capabilities of the new field of application.

In connection with the maximum concentration of communication signs in the interactive environment, problems of their design arise: aesthetic and functional, associated with semantic features, design of a visual image, its further identification and the possibility of highlighting; technical related to the characteristics of modern broadcast devices (screen size, interaction methods).

The evolutionary complication and expansion of the communication space leads to a layering of the functionality of signs, which quantitatively increases the situations of their use, and cultural and technical development shapes their graphic form of presentation.

A person, through graphical interfaces of devices used to display information on the screen and establish “user-computer” communication, interacts with the signs of the interactive environment, not only receiving information and deciding on its use, but also having an actual response, expressed by the visual transformation of objects or social activity. This statement characterizes the communication act as two-way, which speaks of the interactivity of signs - the ability to participate in a dialogue between the user and the interactive environment. In the interactive environment, issues of the capabilities of graphic signs are being updated: the age-old concept of a static sign is gradually being replaced by the design of dynamic signs; text information, due to its volume and complexity of perception, is transformed into graphic images; designing signs for your own visual “lexicon” becomes possible for any interested user.

Technologies are blurring the creative boundaries of faffic presentation of signs; the possibilities for their execution are extremely wide. It should be noted that the plurality of symbolic information in electronic communication determines the desire of their graphics for a minimalistic solution. The instantaneous response of the interaction between the sign and the user determines the high speed of the communication act.

The relevance of studying the nature of the formation of signs of electronic communication is justified by the continuity of their development: the use of methods of information generation of ancient pictographic and ideographic signs, characterized by international universality; possession of polysemy, a characteristic property of ancient writing systems; solving by signs of an interactive environment problems inherent to signs of environmental space - orientation, navigation and identification.

Literature review

The main place in the study was occupied by literary sources covering the issues of interactive design and design of graphical user interfaces of various directions (devices, programs, websites), the following foreign authors: (CASAS, J.P., 2020), (GARDNER, 2013) etc. More details on sign design issues in user interfaces are considered by such foreign authors as: (PRENSKY, 2010), which have lost some relevance due to the constant complication of the visual component of the interactive environment.

In connection with the need for a dissertation study of the analysis of the development of social communication, the works of the following authors were studied: (TAPSCOTT, 2010). From the perspective of the issue of interaction between the communication environment and graphic design, the works of (TURKLE, 2011), (MILLS, 2011) and others. The methodology of the graphic design language is traced in the works of (WARSCHAUER, 2004) and others. Consideration General issues of semiotics of signs required turning to the works of (LANKSHEAR & KNOBEL, 2008).

The most important basis for the research were the sources covering the evolution of the graphic form of signs, their semantics and design: on the issue of "signs on a plane" (ornamental signs, writing, font), the works as the foundation. (JENKINS, 2009), (ALKALI & AMICHAH-HAMBURGER, 2009) and others; on the issue of signs of 3D space and sign design of the 20th century - works by (ESTEVE-MON, CELA-RANILLA & GISBERT-CERVERA, 2016) and others. In the context of the

conceptual and graphic formation of the internationality of modern signs of the interactive environment, the author turned to sources containing aspects of the development of styles and trends in art and design works by (BAWDEN, 2001), (ESPINOSA, RUIZ & MERCADO, 2021), et al.

The purpose of the article is to develop practical and conceptual foundations for the design of electronic communication in an interactive environment, to determine the prospects for their development and use.

The object of the article is Internet communications, external and internal iconography of graphical interfaces.

The subject of the article is the interactive environment and practical design activities in the creation of electronic communication.

The article is based on materials on the historiography of ancient and font signs, the theory and practice of designing signs of communication in environmental space, methods of designing an interactive environment; is based on currently existing signs of the interactive environment; takes into account art history, cultural and sociological research on the modern information environment. The selection and structuring of the material is determined by the purpose and objectives of the study.

Research methods used in the article:

- historical analysis of signs of visual communication based on a synthesis of various theoretical and practical sources, scientific and journal articles, electronic resources devoted to graphic design, problems of orientation and navigation in the environment;

- system analysis, which makes it possible to carry out at different stages of research the classification of signs of an interactive environment, determine the design problems they solve and highlight their main characteristics;

- comparative and comparative analysis used at the stage of considering the formation of the internationality of signs in the interactive environment;

- analytical method and structural-functional analysis used to formulate practical recommendations for the design of interactive environment signs (conceptual models and graphic solutions);

-design synthesis, considered as a modern phenomenon in the field of design of communication signs.

Materials

In the process of the formation of written communication, the formation of graphic signs occurs - pictograms (schematic drawings, the aesthetic dignity of which gives way to a practical communicative function), and later - ideophammas (signs filled with abstract and abstract concepts). These signs have important advantages that allow their use in the era of globalization of the information environment - universality and the ability to understand without knowledge of verbal language.

The progressive process of abandoning the figurative nature of signs in writing has formed the most change-resistant, accurate and concretized system of signs in reading, which is still relevant today - the alphabet. With the invention of movable type, letter graphemes became a universal visual system of signs for conveying information accessible to a wide audience of users, which marked the next stage in the development of communication (CASAS, J.P., 2020).

The development of the spatial environment has expanded the scope of application of communicative signs and determined their intentional use for broadcasting information of a certain nature (cartography, meteorology, spatial orientation signs, road signs). It required the formation of an international sign language to establish "person-environment" communication.

The result of the technical revolution of the 20th century was the emergence of a new type of social communication - electronic communication, the main quality of which was interactivity, characterized by increased control over the communication process on the part of both the sender of the message and the recipient. The computer (mobile device, tablet, smartphone), as the main representative of modern electronic communication, has the ability to conduct an interactive meaningful dialogue through the "human-computer" connection based on artificial intelligence (ALKALI & AMICHAH-HAMBURGER, 2009). The

communication channel through which the computer transmits information to the user, visualizing it on the monitor, is the graphical user interface (GUI) - a user interface model in which elements are executed in the form of physical images. Any GUI is interactive, since the device, having received commands from the user and executed them, provides information to the user using the means available to it.

The visual language of the GUI determined the formation of the next stage in the development of graphic communication signs, through which semantic dialogue is carried out, endowing them with a new property of interactivity and determining their existence in a new virtual environment.

Modern operating systems have abandoned the definition of such an area of GUI sign design as “design of computer icons”, replacing it with the broader concept of “iconography”. For the name of a single sign, the term “icon” is used - an image that fills the interface controls; icon for application, software product, file, device.

Analysis of the visual characteristics of GUI signs showed that the visual image of the sign for a long time depended on the improvement of computer technology, which allowed it to move from a bit-by-bit black and white schematic image to a full-fledged illustration, and, having reached a graphic maximum, transform into the most functional interactive and conceptual sign. The creation of a new global information resource and means of communication also required a “new aesthetics” for structuring and navigating the communicative space; design of universal and international user signs (MILLS, 2011).

A comparative analysis of GUI signs and design trends of the second half of the century showed:

- modern iconography uses the characteristic features of the Swiss style: simplicity, both in composition and in color; functionality; the presence of free profanity in the background; modular grids for the layout and office of signs; photos fonts; adheres to the concept of a universal language understandable to any world culture;

- artistic stylization is universally used in signs as a method of graphic representation. Specific objects, objects or abstract actions that determine the content of the future sign acquire a laconic, cleared of details, flattened visual image,

made in bright color combinations, which helps to increase competition, allows you to focus the viewer's attention, increases the speed of perception and memorability.

Based on the methodological and practical results of the study, practical recommendations have been developed for the design of communication signs of an interactive environment - external iconography, internal iconography, iconography of Internet communication. A classification of signs is carried out based on their communicative features, functional tasks, and design specifics. Based on the analysis of existing signs of the interactive environment, models of their conceptual and semantic foundations are developed. Options for the physical design of signs are offered, taking into account current trends in design, conceptual content and technical design conditions. The relationship between graphic signs and text information in the context of the formation of a modern visual graphic language is substantiated. Practical testing of the research results is being carried out. The design potential of the signs of external and internal iconography, the iconography of Internet communication and the prospects for their use are determined.

The external iconography of the GUI should be understood as a group of signs representing the visualization of certain professional products, applications, files, services; the functionality of the iconography sign is determined by the aesthetic component - the presentation of a unique graphic sign, different from the competitive one, characterizing the purpose and affiliation of the product (PRENSKY, 2010). External iconography as a separate group of signs is distinguished from other groups of signs by the following factors: the uniqueness of the iconographic sign, the lack of action functionality, the possibility of identifying the product, and a wide range of iconographic representation of signs.

Based on the methodological and practical results of the study of signs of external iconography, the following practical recommendations were developed to optimize the design process:

1. At the stage of researching the design problem:
 - a) determine the main feature of the signs of external iconography - the uniqueness of the graphic sign;

b) identify the functional purpose and design objectives of signs of various groups of external iconography: signs (icons) of applications, software products.

operating systems, Internet browsers; symbols for identifying documents of various professional products; website signs - favicons.

2. At the stage of searching for a conceptual basis for the sign of external iconography:

a) use a model of the conceptual and semantic foundations of the artistic and visual image of the signs of external iconography. Often several semantic bases can be synthesized in one sign; the most popular combination is “brand +”;

b) use the capabilities of the interactive environment and, if necessary, consider the concept of the dynamism of the sign.

3. At the stage of sketching and computer visualization of the sign of external iconography:

a) take into account technical features: screen size and the way the user interacts with the sign (click, touch); requirements of guidelines for designing interfaces of various operating systems for graphical representation of signs of external iconography;

b) select a graphic solution for the final artistic and visual image of the sign of external iconography:

- take into account that the modern trend in designing signs of external iconography is aimed at using “flat” design graphics (2B graphics);

-use SV graphics when designing a sign for entertainment applications;

- when choosing a photographic image as the basis for the graphic representation of a sign, use cropping and macro photography, photographs with a pronounced perspective image, silhouette and black and white photographs, and special photographic filters.

c) analyze the features of textual information and its font design in the sign of external iconography:

-use text and font as the basis for creating a visual image of a sign, and not as a means of transmitting information;

- take into account that the textual information in the sign is significant at the initial stage of mastering the interface; further use is based on its physical image;
- use the fonts specified in the design manuals in the design of the sign;
- to realize the main task of the font in the design of signs of external iconography - to be invisible if the user does not need it.

Internal iconography should be understood as faphic signs that fill the interface of software products, applications, browsers, websites, which are control elements (or content), user interaction with which leads to various communication actions, transformations and transformations of certain objects, and information about the progress of a task. The design of the signs of the internal iconography is based on the transformation of the verbal form of a communication action or command to the program into an accurate and simplified image - a faphic sign that carries the same meaning and functional purpose. The main difference between the design of the internal iconography of the GUI lies in the design of not unique and one-of-a-kind faphic signs, but in the creation of the most functional, memorable, recognizable signs.

Based on the methodological and practical results of the study of internal iconography signs for professional user interfaces, the following practical recommendations were developed to optimize the design process:

1. At the research stage of the design problem:
 - a) determine the main characteristic of the signs of the internal iconography - functionality.
 - b) identify the functional purpose and design features of signs of various groups of internal iconography: signs of control elements, dynamic indication signs, process status signs, application and website content signs.

2. At the stage of searching for a conceptual basis for the sign of internal iconography: a) evaluate the presentation of signs of related functions in other GUIs and take into account

In further design, "standard" images of signs familiar to the user from previous experience. The sign of the internal iconography must be recognizable, so

it is possible to use an established image of the sign, the visual solution of which will depend on the general visual language of the interface;

b) to develop a new sign, use a model of the conceptual and semantic foundations of an artistic and visual image. Combine various semantic bases in a sign, for example, specific objects and metaphors, which will facilitate understanding of the sign and connect the object and the action directed towards it;

b) take into account the modern trend - the use in software interfaces mainly of signs based on graphic images, rather than text messages, which allows:

- save useful space, which makes it possible to fill the GUI with a large amount of visible functionality;

- quickly find a sign on the screen, due to such characteristics as shape and color;

- enter the software into the international market, since the language of graphic images does not depend on the characteristics of verbal communication;

c) in combined signs (image + text), use text as an accompanying element.

3. At the stage of sketching and computer visualization of the internal iconography sign:

a) take into account the minimum size of the sign representation, justified by the size of the control element and the saving of useful GUI space, dictating the graphic convention of the sign;

b) use predominantly 2B graphics ("flat" design) for the graphic solution of the final artistic and visual image of the sign of internal iconography, since:

- solving the sign in a "flat" design allows you to create a calm working visual environment in which the iconic elements are accompanying and do not distract attention to their appearance, characterized by a minimalistic graphic presentation;

- due to their simplicity and symbolism, signs made according to the principles of "flat" design are legible when significantly reduced;

- relationships are maintained according to the "function - form" principle;

c) in the case of using 3D faffics in the design of signs of internal iconography, maintain the legibility of the sign in a small size, the useful space of the GUI;

d) use in signs the features of the general visual language of the GUI - position, size, thickness of lines and general style, differing only in what emphasizes their meaning.

The iconography of Internet communication is a group of signs that have maximum interactivity, allowing communication between users through the GUI of social networks and mobile messaging applications. The main difference between this group of signs is expanded interactivity, which consists in the implementation of a communicative act between users of the social network.

Signs of internal iconography are presented in the GUI of a social Internet resource, but here they have an important semantic difference - an expression of social activity, which allows them to be identified as a separate group. In addition, the iconography of Internet communication has formed a unique group of signs - "modern visual writing", which are compact images that visualize emotions, facial expressions, gestures, household items, used by the user in "one click", thereby determining the possibility of increasing the speed of communication and ignoring text typing (LANKSHEAR & KNOBEL, 2008). Modern visual writing includes emoticons, emoji keyboard, stickers. Such writing combines the qualities of oral speech (instantness, emotionality, conversational form) and retains the properties of writing (preservation in space, the ability to be transmitted to a large number of addressees), and is a product of globalization. For a more informative presentation, in some cases, images are animated.

An analysis of modern pictorial writing has shown its relationship with ancient logographic writing, expressed in the use of the same methods of meaning formation, the similarity of graphic images of signs and their polysemantic nature.

Just like GUI iconography, emoticons, stickers and emoji can be presented in 2B and 3V graphics, the peculiarity of the graphics in this case is its cartoon nature: most of the characters, objects, actions and symbols are represented by positive images. Another feature of GUI iconography is the animation of their graphics, which is aimed at creating more emotional and meaningful images (ESTEVE-MON, CELA-RANILLA & GISBERT-CERVERA, 2016).

Today, modern visual writing is actively used in marketing, various social projects, the media industry, as well as in book printing. It first of all solves the issues of presenting content, being a means of conveying content, and only then represents an element of graphic design. The prospects for the development of this letter are ensured by the presence of a vast, constantly growing target audience - users of the global Internet.

Thus:

1. Analysis of the design of visual communication signs in the context of the evolution of the communicative space showed the continuity of the development of signs in the interactive environment. Through ornamental signs and ancient writing, the methods of modern infographics were laid down. From the signs of environmental space, the signs of electronic communication adopted the solution of functional problems: orientation, navigation, identification. The main quality of electronic communication signs has become their interactivity.

2. The process of interaction between a person and the interactive environment of electronic communication via the “user-computer” connection is carried out by signs of the graphical user interface - the main communication channel, which serves to display information on the screen in the form of physical images. The interactive environment of electronic communication has significantly increased the number of signs and situations of human interaction with them, enabled users to independently design “individual” sets of signs, and increased the range of graphic means of expression and artistic content of signs.

3. Based on a comprehensive classification, three main groups of signs are identified: external iconography, the determining factor in the development of which is the graphic uniqueness of the sign; internal iconography, where the main characteristic of a sign is its functionality; iconophathy of Internet communication, characterized by expanded interactivity.

4. A comparative analysis of the communication signs of the interactive environment and the fine arts and design of European countries determined the international character of modern iconography and showed the continuity of the use

of their form-building methods and conceptual foundations in the process of designing modern signs.

5. The peculiarity of designing signs for the interactive environment of electronic communication in Japan and South Korea is the use of a basis for a text message sign - a hieroglyph, which complicates the international use of information and denies the historically established fact of searching for a replacement for complex hieroglyphic writing with various forms of information transmission - the visual culture of manga, invention and application of voice data entry, use of digital codes, invention of emoji keyboards.

6. Features of the iconography of Internet communication signs have been identified: the cartoon nature of the graphics, animation, variability of images. The functional tasks of these signs include: expression of the user's social activity; increasing the speed of the communicative act and the number of potential recipients of information; clarification of the emotional component of the message; replacement of written and oral communication; creation of international dialogue. The relationship between the design of modern visual writing of Internet communication and the signs of ancient logographic writing is determined, which is expressed in the use of the same methods of meaning formation, the similarity of graphic images of signs, the important role of the context of the message, and the polysemantic nature of signs.

Conclusions

A historical analysis of the evolution of communication signs has been carried out from the points of view of the transformation of the physical image, methods of information generation, complication and increase in their functional tasks, proving the continuity of the design of signs of an interactive environment with historical analogues and signs of environmental space.

For the first time, a classification of signs in a modern interactive environment has been proposed, based on an integrated approach, taking into account the communication realized by signs, the area of use, as well as the

functional tasks of sign design (external iconography, internal iconography, iconography of Internet communication).

A comparative analysis of the signs of communication in the interactive environment and the experience of the avant-garde movements of fine art and design of the 20th century in European countries was carried out, proving their international character and the continuity of design methods.

For the first time, the process of designing signs for an interactive environment has been systematized. Conceptual and semantic models have been developed for the design of each group of signs, possible graphic solutions for signs have been identified taking into account modern trends in design, relationships with text and font design have been identified. Practical recommendations have been developed and practical testing of the research results has been carried out, which consists of designing signs of various groups.

The design potential of sign design is determined based on the capabilities of the interactive environment and the prospects for their use.

Theoretical and practical significance of the research

The scientific and practical significance of the study lies in determining the principles for designing modern communication signs in an interactive environment that maximize their potential, which determines the organic and productive interaction of humans and virtual space. The results of the study can have practical application in the work of designers designing: graphical interfaces of various types (programs, web resources, mobile applications); signs of mobile applications and modern visual writing; visual communication systems; identity.

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