

In the pixel zone: Perception of digital design

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Abstract: Since the beginning of the millennium, the internet has undeniably influenced everyday life as well as the creative fields, in countless ways that have already been exhaustively discussed. In this paper, we discuss the term postdigital, which is relevant to anchoring the perception of digital design. Numerous theoretical works are dealing with the terminology of postdigital, with conceptualisations differing from one another. Post-digitality offers a set of speculative strategies with the intention of building a complex architecture for thinking and creating under contemporary conditions: how to critically consider, contextualize, and shift the perception of new technologies as part of the existing culture. Digital design has become an integral part of everyday reality: websites, mobile devices, tablets, but also products and services that use digital interfaces as interactive communication channels between a human and a machine. These interfaces require a specific approach to design. The term *digital design* covers the design of the entire range of digital products and services and is understood as a complex set of many disciplines: user interface, interaction design, information architecture, user experience design, visual design, web design, app design, or game design. The boundaries between the different areas of design are blurred and permeable, and although their mutual interaction can be beneficial, it is necessary to clearly differentiate between graphic and digital design. Digital design grows out of the principles of graphic (visual) design and introduces additional knowledge and very specific principles based on the nature of the digital medium and the transdisciplinary field of cognitive ergonomics.

Keywords: digital design, web design, postdigital, digital natives, communication design

INTRODUCTION

The perceived quality of content is often conditioned by visual presentation, which corresponds to the perception patterns of the youngest generations, where there are only a few seconds of time for infiltration of the mind. One of the most emblematic platforms of today, the web, offers the potential to address this shift in perception, making use of the principles of user interactivity. New rules and new ways of communicating content emerge on this transformative platform, exploring contemporary cognitive processes. The purpose of this paper is to provide insights into the currently forming discipline of digital design and its perception through the perspectives of postdigitality. The goal is to explore and discuss the term digital design in the context of its various applications and its positioning within the graphic design, from which it emerged. Specific focus will also be set on web design in order to enhance the understanding of one of the core areas of applied digital design.

IN THE PIXEL ZONE: ON THE CONCEPT OF THE TERM POST-DIGITAL

Since the beginning of the millennium, the internet has undeniably influenced everyday life, as well as the creative fields, in countless ways that have already been exhaustively discussed. In this section, we explore the term *postdigital*, which forms the base for anchoring the perception of digital design. There are numerous theoretical works dealing with the terminology of post-digital, with conceptualisations differing from one another. Thus, we do not attempt to find a universally valid definition of post-digitality or to list theoretical works and approaches devoted to it. We use the term postdigital in the context of theories that we find relevant to our work. We quote from the American art professor – Mel Alexenberg's *The Future of Art in a Postdigital Age* (2011), as well as from British authors – David M. Berry and Michael Dieter's *Postdigital Aesthetics* (Cramer, 2015). The notion of postdigitality is thoroughly explored on the online platform *Post Digital Culture*, which has been collecting articles and publications dealing with the phenomenon of postdigitality in a broad art-society context since 2013. Thus, we are supplementing our knowledge with other relevant sources.

"It is impossible to examine the world without examining the means by which we examine it." (Silverio, 2016, p. 112) The digitization of key aspects of our being is significantly shaping the ways we perceive and think through the things we are surrounded by (and saturated with). As Cascone notes in his essay on postdigital tendencies, "*The tendrils of digital technology have in some way touched everyone.*" (Cascone, 2000, pp. 12-18) The fact that digital media and new technologies have been significantly reshaping patterns of perception for several decades now naturally leads us to what can be described as a critical reflection on the digital age. Exploring the implications of the digital age and seeking to understand the phenomena associated with it is thus best captured by the term postdigital.

This term does not refer to 'life after the digital', as its prefix might suggest, but expresses the digital age and confronts it with the present. In his book *The Future of Art in a Postdigital Age* Mel Alexenberg speaks in the context of the discourse of digital art practice about a kind of humanization of digital technologies, which, according to him, in our rapidly changing relationship to digital technologies and art forms are more concerned with the human rather than digital existence. He demonstrates this idea through the connection between humans and digital technologies: the exploitation of the potential of synaesthesia (haptic, kinesthetic, auditory media experiences), the interaction between digital, biological, cultural, and spiritual spheres, and the artworks produced by alternative media through participation, interaction, and collaboration, in which the role of the creator (digital designer) appears in a new context. (Alexenberg, 2011, p. 10)

In the optics of Florian Cramer, the term postdigital – in its elemental essence – describes the chaotic state of media, art and design after their digitalization. He sees digitalization as an expansive disruption of the analogue world when society had yet to get used to new forms of content. The new media are united by their fundamental characteristic – they are based on the digital encoding of data. (Macek, 2013) The postdigital situation is no longer perceived as disruptive; on the contrary, it becomes the counterpart of the new media. (Cramer, 2015) The terminology associated with and used in relation to media of such nature is somewhat variable: new media (a term established by consensus by the professional community) are also referred to as interactive, networked, or digital media, thanks to the increasing possibilities of interaction between the user and the medium. Postdigital is therefore not to be understood as a term that refers to the use of new (hitherto unknown) tools – media, but as a term that absorbs the ubiquity of the digital, reflecting new contexts and ways of thinking about the media: the postdigital balances the digital.

Postdigitality offers a set of speculative strategies with the intention of building a complex architecture for thinking and creating in contemporary conditions: how to critically consider, contextualize, and shift the perception of new technologies as part of the existing culture. The post-digital condition must then be seen not only through the prism of theory. The essential takes place at the level of creative practice. The online platform *Post Digital Culture* represents an imaginary breeding ground for the cultivation and expansion of the concept of postdigitality, which is seen in this discourse as a very useful means of critical reflection on ideas related to the digital sphere. According to the authors of this platform, postdigitality is a constantly forming concept that does not have an exact and fixed meaning (as phenomena that can be included under this term are still happening around us), and therefore its openness and dynamic nature correlates with the form of the web (virtual) platform. It is the web as a presentational medium of today and web design as a product of digital design that are central to demonstrating the context of the postdigital conditions of design practice, which we understand in terms of the theories outlined above.

BETWEEN THE PHYSICAL AND THE VIRTUAL: DIGITAL DESIGN

Digital media

There are several names for communication media based on digital signals which were originally developed exclusively for computational tasks but which, as the development of digital computers in the 1950s and 1960s showed, are capable of carrying *de facto* any type of content. The most frequently encountered term in professional discourse is *new media*, which, however, causes a certain degree of controversy by the nature of its temporal relativity. As Jakub Macek points out, the adjective digital seems to be the most appropriate label for these media. (Macek, 2013, p. 19) Terminologically, it correlates best with our prism of the issue. Lev Manovich outlines five basic principles that are the determinants of digital media: numerical representation, modularity, automation, variability, and cultural recoding. (Manovich, 2018, pp. 33-49) These correspond to the primary features of digital media: we can copy them, search them (read them contextually), compress them, use various devices to reflect the fluidity of their composition and interact with them.

Digital design

"It may seem that the electronic media have already completely absorbed us, and that the virtual world is imperceptibly intertwined with our lives beyond the scope of our 'display'," (Noga, 2014, p. 8) Pavel Noga writes in his *Design on the Road*. The phrase 'on the road' seems appropriate for the development and acceleration of graphic design in today's context. The plethora of technological possibilities and the reality of the close presence of forms of digital communication has given rise to a new, dynamically developing discipline – digital design. The past exploration of the meaning (and nature) of the word design and its definition has been the subject of countless texts reflecting contemporary conceptions of design and the evolution of and debates about its central categories. In recent years, the overuse of the term has also been the subject of debate among the professional community. We believe that the phenomenon of oversaturation of the term design is closely related to the boom of digital technologies and the rise of amateur users and creators. This issue is also addressed by Robert Špaček in *The Mythology of Design*. (Špaček, 2011, pp. 105-113)

The historical anchoring of the origins of design as such is a very complex issue. The starting point for exploring design in its broadest possible context can be seen as the prehistoric record of the life of a human ancestor who created the fist wedge, a (communication) tool that became a model for multiplication. According to Kolesár, this refers to one of the elementary meanings of the word design. (Kolesár, 2009, p. 7) In *Diverse Tasks of Design Studies*, Victor Mragolin notes that the term design refers to both the activity itself and the resulting product. (Mragolin, 2005, p. 119) This is consistent with its definition according to the Cambridge International Dictionary of English, where the word design is both a verb and a designation of substance. Ludovít Petránky defines graphic design as one of the most essential parts of visual communication, which in an inventive way expands the possibilities in creating the cultural identity of society and man in its context – he points to the significant depth of the ontological rootedness of graphic design in the context of other artistic expressions. Graphic design reflects the scientific knowledge about human beings, it deals with the psychology of perception of shapes, colours and fonts and the laws of communication. (Petránky, 1994, p. 39) It is an indisputable fact that digital technologies have fundamentally extended the range of action of graphic design. The question arises as to whether a digital designer can succeed merely with the knowledge of graphic

design principles and an understanding of the nature of the digital medium with which they are working (which is crucial for a digital designer).

It can be concluded that the boundaries between the different areas of design are blurred and permeable, and although their mutual interaction can be beneficial, it is necessary to clearly differentiate between graphic and digital design. Digital grows out of the principles of graphic (visual) design and adds to it specific knowledge as well as specific principles based on the nature of the digital medium. Digital design in the context of the postdigital age should thus be perceived from a broad perspective determined by the nature of the blurring of boundaries between individual disciplines and its understanding in contemporary discourse, crossing the territory of the digital and the physical, brought about by the internet in the last decade of the 20th century. This is evidenced by observing university studios focusing on digital production, but with heterogeneous names: Digital Design Studio at Tomas Bata University in Zlín, Graphic Design and New Media Studio at UMPRUM (Academy of Fine Arts, Architecture and Design in Prague), Visual Communication at Academy of Fine Arts and Design in Bratislava, etc.)

Our interest is focused on this emerging sphere of design, which originates from the nature of the new, a digital medium with a highly interdisciplinary nature: *“Design as culture is therefore related to disciplines that study human activity, for example sociology and anthropology, and to disciplines that deal with objects, e.g. art history or material culture.”* (Kesner, 2000, p. 111) The object of interest in the study of art history is visual artefacts of aesthetic value that are excluded from the sphere of practical everyday life. However, the essence of graphic design, which also represents a visual object, lies in being an integral part of the existing and functioning of the everyday. From this perspective, graphic design is a part of visual culture, which in recent years has defined a new field for the study of the cultural construction of the visual not only in art, but also in the media and everyday life. The perspective of visual studies is to view culture as a system of relations and to analyse the forms of the represented and their meanings with respect to different media and forms of communication. *“Visual culture studies conceive media and images in their complex relationship and seeks to create a new discipline that transcends the traditional narrow conception of visual culture.”* (Sturken, 2009, p. 464)

The changes in visual language brought about by the rapid emergence of digital media in everyday life are thus reflected in the professional discourse that speaks of the need to find new methods and approaches to presentation in virtual environments. Digital design has become an integral part of everyday reality: websites, mobile devices, tablets, but also products and services that use digital interfaces to communicate: *“It is always a dialogue between you and a machine that someone had to design.”* (Marvan, 2017, p. 9) The term digital design therefore entails the design of the entire range of digital products and services and is understood as a complex set of many disciplines: user interface, interaction design, information architecture, user experience design, visual design, web design, app design, or game design. For example, the authors of the 2007 *Design Dictionary* (Erlhoff, 2007) do not provide a comprehensive definition of digital design; under this term, the dictionary refers to interface design and web design. While each of these disciplines is specific in its focus, it is not limited to its problems – there is a high degree of co-existence and conditional connectivity between the disciplines. In his dissertation *Action in Design*, Bohuslav Stránský answers the question of whether to distinguish digital design from graphic design, aiming to prove that digital design is an autonomous discipline that has its own unmistakable specificities and brings new demands on the designer, linked to the nature of the digital medium.

Stránský considers the central theme of digital design to be the issue of human-machine interaction.

Nonlinearity as emblematic language of digital media

The language used by traditional visual media is of linear nature. Alongside it, a nonlinear interactivity is developing, characteristic of new media, which is determined by the nature of the hypertextual organisation of text and image: hypertext is inherently based on the contextual reading of the content. In practice, this means that the user becomes a co-creator of the content, choosing his or her own paths of consumption. This creates a plethora of scenarios with no clear beginning or end. In the context of the issues raised, Catherine McCoy points to the need to take cognitive psychology into account to help understand the processes of perception and processing of newly organised (nonlinear) information. (Poynor, 1998, p. 52) The cognitive abilities and perceptions of contemporary humans have naturally changed as a result of embedding digital technologies in everyday life. The accelerating volume of visual material and the speed of perceptual change can be defined as a dominant and highly topical feature of the contemporary visual environment. *“The visual experience of an increasing proportion of the population is thus determined by a ‘digital logic’ that mixes different forms and elements of perception and information transmission, erasing, or at least challenging the traditional order and contrast of image and word, of image and word culture.”* (Kesner, 2000, p. 113)

As Ladislav Kesner observes, everyday consumption and the associated processing of visual information is increasingly displacing the vision of the static isolated image. Perception is fragmenting, turning into systematic cuts and ruptures, which entails a breakdown of observation skills, concentration, and attention. (Kesner, 2000, p. 111) Kesner also highlights the issue of perception of complex symbolic systems in the context of the influence of digital media on our perception and consumption of visual material. Design practice demands a new model of visual thinking, seeking new ways to shape and organize meaning in a digital interactive environment that offers the interpretation of meanings from multiple perspectives in parallel. Yet, new perceptual experiences and newly formed cognitive dispositions are transferred from the digital environment to everyday experience. Therefore, it would be appropriate to take these aspects into account in contemporary creative practice, as well as in mainstream promotion in virtual environments and standard public space. A new visual language should reflect the knowledge and experience of the new digital medium on the one hand, but on the other hand, it should accept and reflect by its nature the current cognitive abilities that can contribute to a more effective perception.

WEB DESIGN: LIVING ORGANISM AND PRESENTATION PLATFORM

On 30 April 1993, the World Wide Web opened to the public for the first time; all the software needed to run the server, along with the first browser, were made available for free. This day can be described as the imaginary cradle of the web as we know it today, but also as the cradle of web design. The World Wide Web has become an essential part of today – according to Siteefy statistics, 10,500 new websites are added to the internet every hour. (Huss, 2022) Although the coexistence of digital media with humans is constantly evolving, we are able to define the characteristics that, with new media, shape the unmistakable nature of digital (in this case, web) design. *“The digital image alerts us that its reality is necessarily artificial and absent. It is both here and not here.”* (Mirzoeff, 2012, p. 46) Among the specifics of web design, which we have defined on the basis of our own practice and knowledge of professional literature, are: the conditional control of designers over the designed digital products, because they can

only conditionally define how the individual elements of their design will be displayed on the user's screen. As mentioned above, the medium of the web platform is highly nonlinear by its nature. It opens up the issue of contextual reading of content and raises the question of the degree of surface perception of content. This is very closely related to the interactive nature of the web, which is undeniably an elementary property of digital media. No previous media has managed to offer such a degree of interaction between itself and the recipient. Understanding the interface as a common boundary at which a user who wants to accomplish a task meets the product or artifact that is supposed to perform that task has increased user involvement in the design process. (Erlhoff, 2007, p. 225)

A change in the standardized perception of composition must be considered a significant feature. On the one hand, no single format can be defined (as is the case with print media), which corresponds to the wide variability of digital devices. In this context, we speak of the so-called responsive layout. The final image, perceived by the user, is composed by scrolling, clicking, etc., and therefore has the nature of non-definiteness and variability: for each user, the final image is different and inherently incomplete, as the screen of the digital device does not display the content in its entirety, nor does it give explicit instructions from where to where the content must be read. The distinctive feature that differentiates the web from previous media also occurs in the question of time and mutability: information and modules or additional elements can be modified, appended (edited) on the web in response to the current users' needs. This opens up the question of the limited lifespan caused by the outdatedness or obsolescence of a website, which is often solved in practice by re-designing the existing website. The original design can no longer be found (only in the 'inanimate' designs of the designer), as opposed to a book or tangible design product. Therefore, the launched website is not a definitive (immutable) medium – on the contrary, it functions as a living organism.

The two decades of its evolution have also had a significant impact on the role of the designer, who should reflect all the specificities that the digital medium brings and accept its evolution: *"The incredible technological possibilities and the virtually unlimited impact of all digital forms of communication today give every graphic designer the opportunity to influence public opinion. Then it's just a matter of not being afraid to take advantage of it, but at the same time not to abuse the design..."* (Noga, 2015, p. 22) So there is no doubt that the use of media in any branch of design changes the nature of the work. The field of digital design in general, as well as the process of designing the digital product is described in *Digital Design: Looking Beyond the Pixels* (Marvan, 2017). Concurrently, a traveling exhibition under the same title was created under the auspices of CZECHDESIGN and the UX Association, with a view to educate people about digital design. In the same year, the dissertation of the head of the Digital Design Studio at Tomas Bata University in Zlín, Bohuslav Stránský, entitled *Action in Design*, was defended. The thesis defines digital design as an emerging autonomous discipline, which differs in its specificities from the graphic design of printed media. From the point of view of narrative and contextual reading of a digital product, the thesis *Storytelling in the Digital Age*, authored by Paweł Ratajczyk (2018), deals with the issue of narrative and contextual reading.

DIGITAL NATIVES

Marc Prensky introduced this concept in his essay *Digital Natives, Digital Immigrants*, by defining generational differences in the perception of digital media. In the essay, he elaborates on the concept of 'digital natives', i.e. young people who have been surrounded by the world of digital technology since birth.

Computers and the internet are a natural part of their lives, they have no direct comparison with analogue experience, and this creates new patterns of thinking and perception: *"Today's students are native speakers of a digital language."* (Prensky, 2001, p. 1) The authors of *The New Digital Natives* (Dingli, 2015) then elaborated the term in more detail and enriched it with the classification of 'digital natives' and the characteristic specifics associated with this generation. In Prensky's essay, we also encounter the term *digital immigrants*, which Prensky uses to refer to a group of people who were not born into a world pulsating with digital technologies, but only learned about its influence later in life.

COGNITIVE ERGONOMICS AND DIGITAL DESIGN

Cognition is a mental process that forms the basis of our abilities to perceive the world, remember, talk about our experiences, learn from them, and modify our behaviour based on them. Thus, every cognitive process serves to transform, reduce, elaborate, store, retrieve, and use sensory input. The subject of ergonomics is the relationship between technology and human behaviour. The etymology of ergonomics is based on two Greek words: *ergon* – work, and *nomos* – laws. In a nutshell, ergonomics is concerned with making technology work for people. The term cognitive ergonomics is a transdisciplinary field that deals with the degree of responsibility and suitability of a product to the cognitive abilities of its users. Thus, a wide range of design fields (e.g. user experience design, interaction design, emotional product design, visual communication design, etc.) can draw on insights from this field to ensure more effective usability. (Sougata, 2021)

Digital design in service of education

The importance of understanding cognitive ergonomics and implementing its principles through digital design for the purpose of improving the perception of educational content can be exemplified by awarded projects from this specific field of design. In the context of competitions and awards, a gradual increase in the autonomy of digital design can also be observed in the last few years in the domestic (Czech and Slovak) environment, such as *Národní cena za komunikačný dizajn* [*The National Award for Communication Design*], awarded biannually, and the annual *Best in Design* competition with the *Communication Design* category. The *Národní cena za dizajn* award [*The National Design Award*] had no specific category for digital design until 2020. A new category called 'Digital' appeared for communication design works in the 17th edition of the competition. This category is designed for projects whose primary purpose is visual communication and interaction in digital media. The first winner of the 'Digital' category was a website with educational videos that brought art closer to its youngest recipients – *Podivuhodné dejiny umenia s profesorom Škrečkom* [*Strange Art History with Professor Hamster*] by Ondřej Horák and David Kalik (2019). Although the *Best in Design* competition does not have a specific category for digital design (digital products are categorised here under *Communication Design*), in the last three years the winning projects in this area have been dominated by digital design products: *Znakověda* [*Signology*] by Silvia Klúčovská (2020), *Česká vlajka.online* [*Czech Flag.Online*] by Julie Dítěťová and Jáchym Moravec (2021), *Bud' Digitál* [*Be Digital*] by Adam Komůrka (2021) and this year's web platform *Listovatel* [*Scroller*] by Karla Gondeková and Karolína Matušková (2022).

The free web platform *Listovatel* [*Scroller*] provides access to well-crafted worksheets for children. (Fig. 1) It was created to develop children's creativity and sensitivity to the world around them. *"We want to present the digital world as a useful medium, but one that children should learn to regulate so that the virtual world does not completely engulf them."* (Matušková, 2021) On the

contrary, the awarded *Podivuhodné dejiny umenia s profesorom Škrečkom* [Strange Art History with Professor Hamster] remains, by its nature, in the digital environment. It speaks to child percipients through educational animated videos accompanied by the character of Professor Hamster. The childlike playfulness here is supported by the web design itself, which includes an unobtrusive web animation of two hamsters playing ping-pong, whose game always continues with page scrolling. (Fig. 2) The website *Znakověda* [Signology] serves as an educational synesthetic aid that combines visual and haptic sensation, allowing the user to follow the movements exactly as instructed, with immediate

correction. Therefore, it replaces the functionality of the course tutor. (Fig. 3) The website *Česká vlajka.online* [Czech Flag.Online] accumulates comprehensive rules for the use of the Czech national flag. It thus functions as the only comprehensible and comprehensive aid, dealing with the flag and explaining its correct use. We consider the above-mentioned projects to be appropriate demonstrators of the phenomenon of the humanisation of digital technologies, which reflect contemporary needs and exploit the potential of interaction between the digital, cognitive-ergonomic, and cultural spheres.

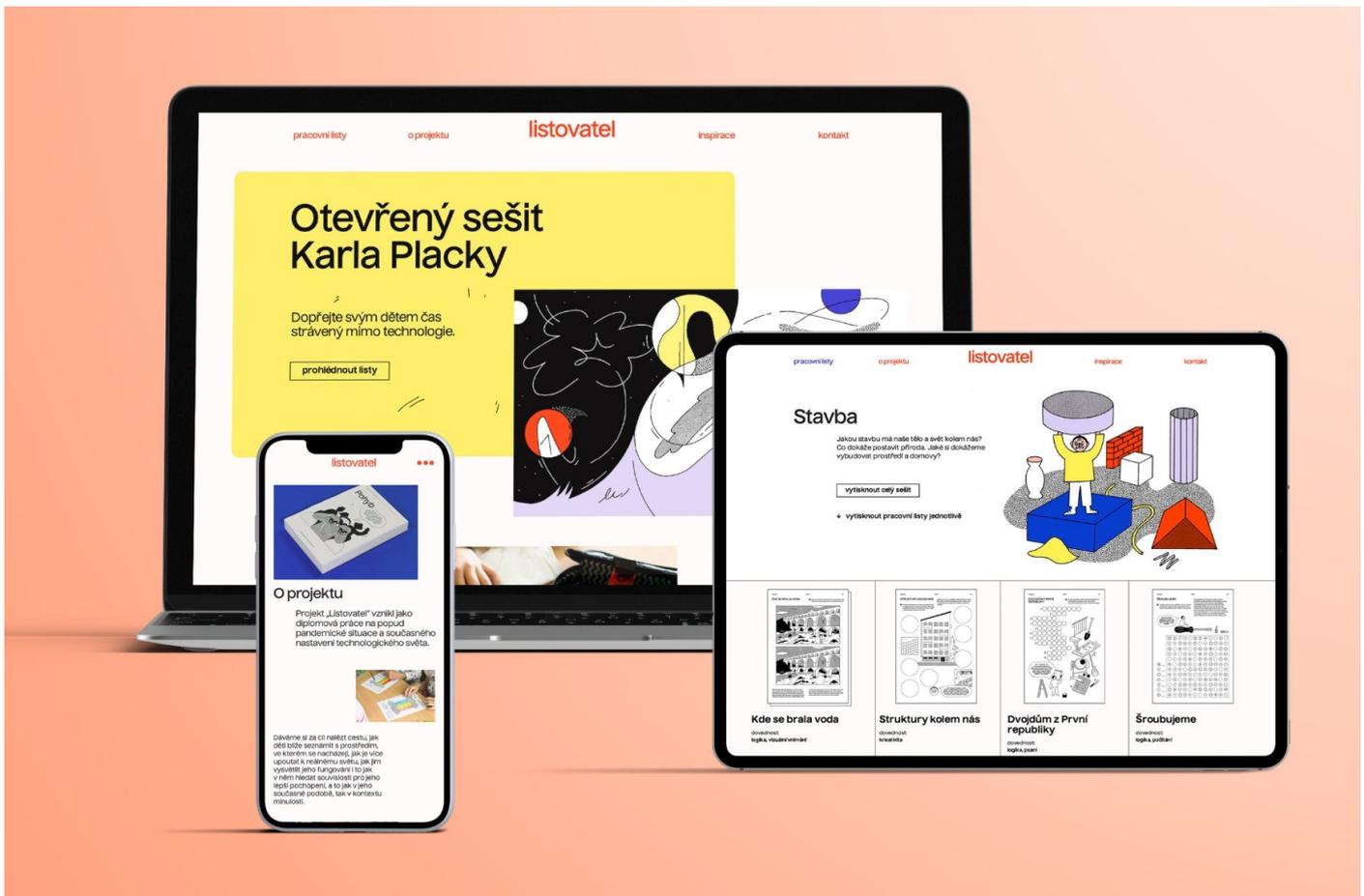


Fig. 1. 2022 Best in Design competition, winning web platform *Listovatel* [Scroller]. (Source: UMPRUM, 2022)



Fig. 2. Snapshot of the awarded website *Podivuhodné dejiny umenia s profesorom Škrečkom* [Strange Art History with Professor Hamster]. (Source: Koller, 2019)

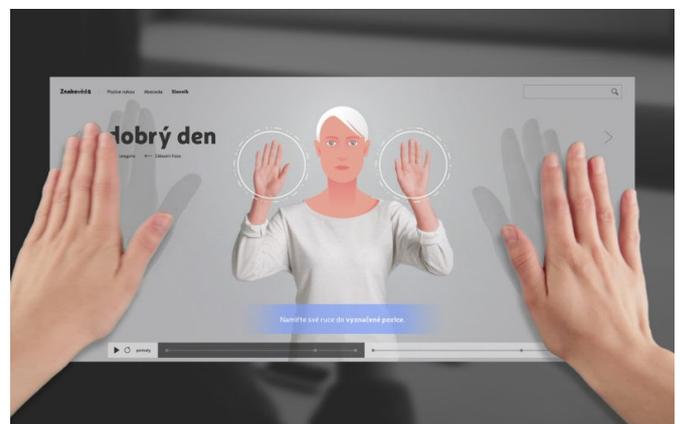


Fig. 3. Design of the award-winning project *Znakověda* [Signology]. (Source: Tomas Bata University in Zlín, Czech Republic, 2022)

CONCLUSION

The web as a work of digital design represents the most emblematic platform of today and definitely is one of the most freely composed, flexible, creative and interactive platforms the humankind has developed so far. It offers a versatile and multidisciplinary ground for exploration of forms for communication of various contents. It utilises and further redefines the principles of cognitive ergonomics. In its very nature, it can support the principles of democracy and also enables the demands of universal design to be satisfied. The flexibility and interactivity of the web has also great potential in the sphere of education and awareness building within diverse fields, which is also demonstrated by the number of awarded projects within digital design competitions. Contrary to other forms of graphic design or arts, both web design and digital design *per se* are unlimited in form, have a fluid composition and can be perceived very individually. New rules and new ways of communicating content emerge on this transformative platform, exploring contemporary cognitive processes.

Digital design reacts to the way of thinking of the so-called digital natives – young people who have been surrounded by the world of digital technology since birth. Computers and the internet are a natural part of their lives, they have no direct comparison with analogue experience, and this creates new patterns of thinking and perception. Digital design offers little limitation from the perspective of affordability and accessibility. At the same time, these are in fact also endangering, as incompetent designers have the same possibilities as those being competent – resulting in degradation of quality and increasing misuse for spreading of disinformation and deception. Such design benefitting particular social groups can be referred to as to *unpleasant design*. If we do not improve the awareness of the power of this media and do not educate the new generations about the need to critically filter information and regulate one's immersion into the digital world, it can affect the healthy development of the society. The digital world, which we created (and are still creating) might get too tempting by its lightness and carelessness in comparison to the reality of the physical world we are evolutionary destined for.

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