DESIGN SHOULD NOT BE BLIND TO THE NEEDS OF AN INCLUSIVE SOCIETY

Petra Černe Oven

We would like to thank Jade Kathryn Smith from Prior Tactile Learning, UK for allowing us to use their Prior Learning Font, which is designed for visually impaired and blind children with additional needs – more details at www.priortactilelearning.com.

This scientific monograph is one of the results of a project that has its roots in the past but also contains a number of bold ideas for the future, and because of the scope of its research, we have placed it in the Visual Literacy research programme[1]. It explores the ability to understand, interpret, and create visual representations, as well as the ability to make critical judgements and communicate effectively using visual elements (Arnheim 1969, Sonesson 1989, Mitchell 1994, Hall 2013). Just as reading literacy is key to comprehending text, visual literacy is key to interpreting and evaluating visual information and its components (Flusser 2022).

In today's world, driven by digital tools and media landscapes, the use of visual language has become a necessity for everyone (Goddard 2024). Sight, the visual, and everything related to visual perception has long been prevalent in the Western tradition. As Åhlberg explains, "In our language, a host of idioms and metaphors – both dead and alive – in every-day language as well as in philosophical parlance bears witness to the importance of sight and vision as a source of knowledge and experience: we speak of *seeing*, in the sense of understanding, we have views about this or that, poets and philosophers have formulated *visions* of reality, we can be *clear-sighted, far-sighted* or *short-sighted*, we can gain *insight* into things or we can be *blind* to certain things, we *visualize* things we have not seen, we sometimes *overlook* things, we sometimes *see through* the invalid reasoning of others, and we hope that our own reasoning is perceptive and perspicuous." (Åhlberg, 1996, 9)

The fact is that people are more used to "understanding something if we can see it, rather than something we hear. It is a socio-political hegemonic ocularcentrism or visualism [...]. But certain things are easier to understand if they are visualised in a different way, with the help of sensory modalities other than sight." (Kiefer & Schiller, 2018) Given that the Visual Literacy research programme is concerned with exploring the visual, it therefore

1 The book is the result of the research programme P5-0452, Visual Literacy at the University of Ljubljana, Academy of Fine Arts and Design, co-funded by the Slovenian Research and Innovation Agency (ARIS).

seems at first glance strange that the project focuses on people with various visual impairments for whom the visual is virtually out of reach. This very contradiction was the starting point in our reasoning that in order to understand the visual, it is necessary to explore what is "beyond the visual".

The book is also an echo of the international summer workshop project called Kaverljag. **Aleš Sedmak**'s article entitled **The Concept of Kaverljag Workshops and Their Impact on Society** presents their rich history and describes the phenomenon of the Kaverljag workshops, which took place from 1998 to 2012 in the small village bearing the same name, located near Grintovec in the vicinity of Šmarje nad Koprom. The programme was aimed at students from European academies who explored current topics such as ecology, product usability, and the integration of art and science through scientific illustration and the wider field of visual communication. In a creative workshop environment, students developed practical ideas that led to tangible products, which were invariably received with enthusiasm and often influenced political and historical developments in the thematic areas they addressed in their work. Already in 2009, these workshops, in collaboration with partners, focused on finding ways to bring individual organisms closer to the blind and partially sighted with the help of tactile content. The result was the highly acclaimed books *Touch a Bird* (2009) and *Insects Up Close* (2012). The project involved a wide range of experts from different fields, working together with blind and partially sighted people to develop tools for learning about the natural environment. The programme was developed in close cooperation between the Academy of Fine Arts and Design at the University of Ljubljana (UL AFAD) and the Kaverljag Association.

Since the summer schools were discontinued in 2012, the former participants (now educators, many of whom also participated in the new edition) decided to re-launch the workshops in 2024, again with interdisciplinary participation of students from different fields of art, design, and biology. The project *Marine Organisms for the Blind and Partially Sighted*, led by UL AFAD in col-

laboration with several European institutions, once again brought together experts from the fields of biology, sustainability, didactics, typhlopedagogy, and art and design, as well as mentors and educators from five countries. This time we focused on creating tactile representations of marine organisms, as the sea is an area that is particularly inaccessible to the blind and partially sighted. The whole project was more ambitious, had a longer time frame, was organized in phases and has the potential for further development. In addition to analogue solutions, we wanted from the outset to take advantage of new technologies to improve the usability and accessibility of information on marine organisms for the blind and partially sighted. We also wanted to put more emphasis on methods that would give new insights for illustrators and designers who would like to venture into the specific field of design for the blind and partially sighted, in addition to concrete solutions. The aim was to develop a systematized process for the production of 3D printed tactile illustrations that would improve the accessibility of learning content for people with visual impairments.

In the book, this part of the process is described in detail in the article by **Zoja Čepin** and **Leon Rojk Štupar**, entitled **Kaverljag International Summer School from Students' Perspective**, where they describe in detail a system for creating 3D printed representations of organisms. The process of creating a tactile representation of organisms using 3D printing involves several key stages that ensure the accessibility, perceivability, and quality of the final product. The first phase is the research of the selected organism, which includes scientific illustration and analysis of anatomical features. Based on this, the illustration is stylized and reduced, maintaining biological accuracy while adapting the shape for tactile perception. The next step is to vectorize a simplified illustration following standardized criteria adapted for optimal touch perception. The authors present the transfer of vectors into 3D modelling software, the conversion into 3D form, and the technical specificities that contribute to a better tactile experience. As the project involved not only a basic illustration, but also a detail of

the organism—e.g. a specific texture or body part that allows for a deeper understanding of the structure—different 3D printing technologies and materials were used to produce high-quality results. The authors present the final product in a structured way, combining all the elements into a tactile kit: the name of the organism in braille, a basic illustration, and an elaborate 3D detail. The article also describes the design of the presentations themselves in the gallery space, where the descriptions and sound clips have been adapted to further foster understanding. The project was tested and showcased at exhibitions, where users tested and confirmed the effectiveness of the method.

In her article **Scientific Illustration as a Pedagogical Tool in Interdisciplinary Projects**, **Marija Nabernik** describes how we can create the conditions to start exploring abstractions and making technological adaptations for 3D technologies. She approaches scientific illustration as an illustrator, but also as an educator, as scientific illustration is part of the curriculum at UL AFAD and—as detailed in this book—the students learn more about it through selected topics at workshops and summer schools. In the article, she discusses how the visual arts and science interact and how they can work together to help memorize content and create learning content and tools. Scientific illustration plays a key role in the education and understanding of scientific content. Most people have been exposed to it in books and textbooks since childhood, as it aids memorization and learning by visually conveying information, and it can be found in a wide range of fields in scientific and technical publications, medical manuals, natural history books, and a variety of textbooks and learning materials. Nabernik defines the differences between fiction and non-fiction illustration; explains its forms and expressive techniques; and touches upon various specific codes and conventions that allow for a common understanding, such as colour coding in medical illustrations or schematic geological maps. But the article also offers an outside perspective: it looks at pedagogical approaches to teaching scientific illustration, outlines how drawing can help

improve understanding and observation, and how illustration can be used as a method to pursue a learning outcome. She also elaborates the process of working on the Marine Organisms for the Blind and Partially Sighted project, where many other expressive techniques were added to the process of producing tactile illustrations, which, because of their inherent qualities, offered a way to achieve the final results. Nabernik sees the project as a gateway to further possibilities for the wider use of scientific illustration in personalized education, in particular through the development of 3D printing, which enables the quick and easy production of personalized learning tools.

As the project was designed in an interdisciplinary way, it was crucial to gain knowledge and insights from other fields as well. In **What I Don't See, Doesn't Exist. Scientific Illustration as a Synergy Between Science and Art**, **Tim Prezelj** highlights research in cognitive science in recent years that has contributed significantly to the understanding of artistic creation. He points out that the development of science has guided art from the very beginning, especially scientific illustration, which is particularly important in fields such as chemistry and biology, where without visual models (e.g. the structure of atoms and molecules), specific processes cannot be explained, represented, and understood. This article introduces the different principles in the natural sciences, and the relationships between the visual models developed and the understanding of fundamental concepts in the natural sciences. However, since certain abstract concepts do not have a visual representation in themselves, their visual representation can therefore only be a model or depiction that guides understanding. Due to the nature of visual perception, this can also be misleading. Prezelj points out that in this sense we are all "blind" to certain aspects of reality, but that this manifests itself in different ways. The article then focuses on imparting knowledge to the blind and partially sighted, especially those with congenital difficulties who have more difficulty forming normatively accepted mental representations of abstract concepts. This is a major challenge, but the

author stresses that the development of visualizations for the blind and partially sighted is therefore crucial, as it is they who can shed light on new aspects of scientific concepts that sighted people may overlook.

In her article **Perception of People with Visual Impairments**, typhlopedagogue **Mateja Maljevac**, who opened the door to the world of the blind and partially sighted through her participation in the project, presents the complex challenges posed by blindness, partial sight, and visual impairment. To begin with, the article notes that it is already difficult to define these challenges uniformly across disciplines. In the Slovenian school system, the pedagogical definition is oriented towards the specific visual abilities of children, which allows for the adaptation of the educational process and creates an inclusive environment, as children with visual impairments need content to replace visual information in order to actively participate in society. The author describes the importance of developing tactile perception, as this plays a key role in the holistic development of children as they learn about the world around them through play and interaction. Extended curriculum activities should promote concrete and language-rich experiences, as this enables the understanding of fundamental concepts. This article presents effective strategies for working with children with visual impairments, including tactile modelling and audio-description, enabling children to explore and interpret information. Audio-description increases the accessibility of cultural resources and tactile content promotes fine motor development. Only in sum do all these elements create a supportive framework that fosters children's independence and success and, in the author's view, only the conscious design of learning content and the adaptation of teaching methods can significantly contribute to the successful integration of children with visual impairments into the modern education system.

To work with blind and partially sighted people, a designer needs to develop not only expertise but also empathy, which has been recognized as an important element in design theory for at

least 50 years (Stephan, 2023), as it can significantly help designers in making decisions. In this book, we demonstrate the above with a hugely successful project for the blind and partially sighted, presented by **Lech Kolasiński** in his paper **From Empathy in Design to Social Inclusion**. The article deals with the social inclusion of people with disabilities using universal design. It focuses on the fourth principle of universal design – information perception. The author first explains the role and importance of empathy in the design process, as well as in the comprehensive education of designers. The second part of the article entails a case study of tactile information design for the University of Krakow botanical garden, describing both the design process and the associated challenges and decisions that led to a socially inclusive design solution. The article introduces us to the importance of multisensory experience in the memorization process of the blind and partially sighted and the role of intersemiotic translation in the design of tactile graphics. The design solution proves the thesis of combining visual communication with tactile graphics as a real and noteworthy design compromise.

In her article **Inclusive Design and the Importance of Visual Literacy for Designers Creating for the Blind or Partially Sighted**, **Petra Černe Oven** discusses inclusive design and the theoretical approaches behind the Kaverljag International Summer School 2024. Although there have been design projects for the blind and partially sighted in Slovenia for quite some time, she points out that research in this field is scarce. The reasons for this are the small number of projects in general; the fact that design for the blind and partially sighted is not predominantly process-driven; the frequent absence of designers in projects; and the lack of interdisciplinary cooperation between disciplines. The article therefore introduces the main themes related to the field of design for the blind: inclusive design, the role of empathy in design, legibility and readability, and starts to map the basic guidelines in the field of visual communication design for the blind and partially sighted. The article also aims to contribute to the establishment of a theoretical basis for the development of an interdisciplinary

curriculum for visual communication designers and students in other fields of study, emphasizing inclusion and mainstreaming vulnerable groups. In conclusion, the article lays out the possibilities for further expanding research in the field of visual literacy in combination with the field of design for the blind and partially sighted. The way we perceive our world is strongly influenced by the sensory constructs that surround us, especially visual ones, and these often lead us to believe that what they reflect is social reality. (O'Shea, 2024) In the absence of an environment adapted to people with needs different from the statistical majority, their undeniable presence and even right to be present can be quickly dismissed.

It is precisely the connection with users, codesigning with them, and seeking an in-depth understanding of their needs that can be a challenge for many projects, whether the design is embedded in an academic or economic milieu. This can also be the point at which projects either succeed or fail to deliver quality solutions. With this in mind, the book also presents insights from the users' perspective. In his article **Our View on the Collaboration Between Blind and Partially Sighted People and Designers and What We Can Achieve Together**, **Tomaž Wraber** shares his personal experience of partial sight and blindness in an engaging tone and systematically demonstrates the importance of accessible design through his experience of being on a number of national and international bodies. His story begins with the early diagnosis of his partial sight, and his parents who made it possible for him to attend a mainstream school. This gave him a broad cultural and intellectual base that helped him cope with his sight loss later in life. He points out that rehabilitation is crucial for people with sight loss, but also attaches equal importance to the role of society in ensuring accessibility. The author looks in detail at various aspects of accessibility, from architectural adaptations to the design of digital content, and is critical of the lack of inclusive design. He pays particular attention to the design of visual communication, signs, and typography, pointing out that designers should also take visually impaired users into account when designing. Using a number of

examples (tactile communication in space and on products, adapted keyboards, and audio-descriptions), the article demonstrates how well-thought-out design can improve the lives of blind and partially sighted people. In conclusion, the author shares the view that designing accessible environments is not just a technical issue, but a reflection of society's empathy and willingness to include all people equally in private and public life.

In addition to the scientific contributions and a detailed description of the processes and methods of preparing tactile illustrations, the book also offers a visual flowchart of the **Steps of the Visualization Process for the Blind and Partially Sighted in the Case of the Kaverljag International Summer School 2024**, where we summarize the most important stages of the process for ease of understanding. In the article **Testing and Proposed Improvements to the Tactile Illustration System**, we briefly describe the results obtained from testing the materials with blind, partially sighted, and deafblind users, and touch on possible future improvements of the methods. One of the important articles in the book is certainly the one entitled **Brief Recommendations for Designing (Tactile) Illustrations for People with Visual Impairments**, where, based on the interdisciplinary collaboration of a number of authors and the past experiences of individuals and the Kaverljag workshops, we have highlighted the key elements that influence the design of tactile illustrations. Thus, this scientific monograph is not only aimed at professionals and students in the fields covered, but also at professionals and lay people in other fields (therapists, personal care attendants, educators, special needs professionals, etc.) who work with blind and partially sighted people and want to know more about design for the blind and partially sighted, and thus encourage others to take up such projects in the future. We hope that the book will help to improve the accessibility of educational content, while at the same time (re)emphasizing the importance of interdisciplinary and international cooperation in tackling societal challenges that can only be solved with expertise, empathy, and much-needed social responsibility.

Postscript

The language in which we communicate has several layers and different tones to address the reader. Professionals in the field sometimes use different terms to convey the same thing. Because of the interdisciplinary nature of the project that was the focal point of this book, we have chosen to keep the original terminology used by the individual authors, who come from different fields of expertise and have different experiences of the subject, or in other words: we have not homogenized some of the terms used by the authors in the book. Instead, the terms used in the articles have been chosen according to the context of the article, with the aim of providing the reader with a positive reading experience and the best possible flow of the information contained in the article.

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