BRIEF RECOMMENDATIONS FOR DESIGNING (TACTILE) ILLUSTRATIONS FOR PEOPLE WITH VISUAL IMPAIRMENTS

These recommendations are based on the experience gained from the Kaverljag workshops[1] and are compiled from years of experience of professionals working with blind and partially sighted people,[2] secondary sources, and research projects.

Blind and partially sighted people are an extremely heterogeneous group of readers. Each reader has their own experience, perception (and potentially additional special needs), and knowledge of the depicted topic, so it is impossible to provide an equally effective reading experience for everyone at the same time. The recommendations are guidelines on how to achieve the best possible result, but this should always be verified with the target audience through testing and iteration according to the context of each project.

In particular, you have to bear in mind that these recommendations focus on didactic material with popular science content for children (12+) and adults, with a focus on illustration, whereby only the most essential elements of the broader field of design are covered.

Editorial notes:

In this text, we refer to the user as "reader". In the context of this publication, the word "reading" covers all ways of identifying and perceiving content (listening to audio descriptions, touching, smelling). Blind and partially sighted people can use different media and a variety of aids and tools to access the desired content. Although the recommendations refer to tactile illustrations, they can also apply to reading contexts outside the medium of books (reading for orientation in space, reading for the use of aids, and other types of media and contexts).

In this document, the word "illustration" is used to describe any image, picture, graphic, or graphic sign, regardless of style, technique, or semantic message. The recommendations are intended for the use of tactile illustration in publications as well as for individual tactile illustrations in the context of exhibitions and didactic materials. The recommendations are aimed at clear and effective reading

1 We would like to thank Aleš Sedmak, Zdravko Papič (1953–2013), Ljubomir Daničič (Inter-Municipal Association of the Blind and Partially Sighted Koper), Hana Jesih, and Ajda Petrič for sharing their insights and experiences.

2 We would also like to thank Prof. Mateja Maljevac, PhD, and Prof. Aksinja Kermauner, PhD, for permission to include their findings in this monograph and for reviewing the material and advising us during the process of drafting these recommendations. One of the sources was a lecture by Prof. Mateja Maljevac entitled *Perception of People with Visual Impairments*, given at the International Summer School in Pliskovica on 23 July 2024.

of tactile illustrations in publications that address closed thematic clusters and are predominantly intended for education[3]. The recommendations do not address the spatial components that affect the safety and optimal movement of blind and partially sighted people in space, as this is outside the scope of the project.[4]

GENERAL FINDINGS

- → Insights that apply to different types of illustration and different uses of typography, or to graphic or information design in general, mostly also act as a basis for design for the blind and partially sighted (e.g.: if you are communicating scientific facts, use scientific illustration concepts; when illustrating children's fiction, use fiction illustration).
- → Not every illustration made in relief is a tactile illustration.
- → The recommendations apply to the blind and partially sighted (exceptions and adaptations are provided in the examples).
- → The content must be methodologically and didactically adapted to the target group of blind and partially sighted people for whom it is intended.
- → The most effective illustrations are those that combine visual and tactile images (e.g. if embossing is used which has convex elements, these parts are additionally printed in a contrasting colour to improve the visual experience for the partially sighted).
- → Text can be added to the illustration (especially in the context of publications), consisting of text in braille and text in a contrasting colour (to the background)[5].
- → When designing, we need to take into account that people with visual impairments need more time to take in the content by touch than sighted people.
- → For tactile content, it is important to remember that all elements (e.g. illustrations) should always be convex (like braille), not concave, for easier perception by touch.

3 For example, a book that focuses on a specific topic (e.g. geography, biology, marine organisms, etc.) and can be used to complement didactic activities.

4 For more examples of the relevance of accessible information, see also Wraber, p. 222.

5 More on colour below.

PRECISION AND CLARITY

- → Tactile illustration should be as clean as possible, but not to the detriment of the content it communicates.
- → The amount of secondary information is reduced for clarity.
- → Decorative elements are not included in the illustration (unless they are an essential or communicative part of the illustration).
- → If illustrations are produced in a series, consistency of visual language is also important (e.g. how details are unified).
- → Illustration is generalized and abstracted. Objects are typed and depicted with pictograms/signs, which increases recognition and understanding.
- → The presented object must not contain perspective.
- → The object is always facing upwards (e.g. the depicted animal's head is on the top).
- → The left and right sides of the subject—to facilitate the perception of the blind—are shown symmetrically.

ILLUSTRATION FORMATS

- → The size of the illustration must be equal to (and no larger than) two adult hands placed on the surface (i.e. no larger than A4 horizontal).
- → If designing for children, the size of the format should be adapted accordingly.
- → When depicting real objects, try to keep natural proportions where possible and reasonable.
- → Where this is not possible (e.g. because life-size objects are larger), apply a clearly indicated scale.

SIZE OF ELEMENTS WITHIN THE ILLUSTRATION: LINES AND AREAS

- → The standardized braille dot is the basis for the sizes of the individual elements (lines, dots) in the illustrations. (Figure 1)
- → Since braille is the basis, the thickness of the thinnest line is limited by the thickness of the standard dot (Marburg Medium 1.3–1.6 mm, Marburg Large 1.5–1.8 mm).
- → When determining the minimum distance between the lines, the spacing between the braille dots is taken into account (the horizontal distance between the braille dots is 2.5–2.7 mm).
- → We try (as far as possible) to keep the thickness of the lines uniform in the illustrations, as varying the thickness often impedes perception (this does not apply to the highlighting of elements, see below).
- → All lines belonging to a shape are therefore of the same thickness.

HIGHLIGHTED ELEMENTS IN THE ILLUSTRATION

- → The outer lines of the subject (contours) are thicker for improved visibility and clarity, and are used to emphasize the difference between the subject and the background.
- → Surfaces can be marked with specific textures instead of colour coding (coding identical surfaces with a uniform texture).

PAGE LAYOUT AND TYPOGRAPHY

- → It is important to unify the illustration (e.g. an animal illustration is preferably depicted life-size in a square frame, the enlarged version is shown in a round frame).
- → There should be at least 10 mm of space between the frame and the motif.
- → The object shall be positioned centrally in the frame.
- → The spacing shall be consistent on all sides.
- → All other information included must also be uniform: page numbering system (e.g. page number in print top right, page number in braille bottom right), additional symbols, etc., so as not to confuse the reader.
- → If the illustration contains a textual description, the description and the corresponding illustration should be on the same page. If this is not possible, they should at least be clearly linked.
- → Keep in mind that braille requires much more space than the letters of the Latin alphabet.
- → If Latin script is used, medium bold/heavy monoline fonts without serifs (sans serifs) should be used and should not be in italics. We do not use underlining. Capital letters (majuscules) should only be used for headings.[6] Letters must not have contrasts.
- → The appropriate font sizes for the blind and partially sighted are considered to be between 16 and 20 points[7], with Verdana and Arial in bold being the most commonly used fonts.[8] Other monoline fonts without serifs, which are not tapered and have a large x-height, are also suitable. Letters can be positioned with slightly increased letter spacing.

6 EBU clear print guidelines https://www.euroblind.org/sites/default/files/media/ebu-media/Guidelines-for-producing-clear-print.pdf (17 December 2024).

7 For more information on legibility, see also the paper by Černe Oven, p. XX.

8 In addition to Helvetica, these two are recommended by the European Blind Union. See: EBU clear print guidelines https://www.euroblind.org/sites/default/files/media/ebu-media/Guidelines-for-producing-clear-print.pdf (17 December 2024).

COLOURS

- To improve the functionality of the illustration and to assist the visually impaired, a contrasting colour (e.g. black on a white background) should also be printed on the relief of the tactile illustration.
- If a combination of black and white is not used, use the highest light contrast (yellow – dark blue; yellow – black).
- When colour coding realistic information (e.g. geographical relief), we need to be consistent in the use of colour (e.g. dark colour is always expressed with a higher relief, light with a lower one, or depending on the system, which is clearly explained in the corresponding legend for ease of understanding).
- Complementary colours (e.g. red – green, yellow – purple) may only be used if there is sufficient tonal contrast between them, otherwise they are inappropriate. They are better avoided as they are also inappropriate for certain types of colour blindness. For people with colour vision impairments, colours can be replaced by hatching.

HEIGHT OF EMBOSSING

- The illustration must have tactile functionality.
- The height of the relief must correspond to the height of the braille (the height of the braille dot is proportional to the diameter, between 0.5 and 0.8 mm), but may be higher. (Table 1)

COVER OF A BOOK OR OBJECT

- As with other design projects, the cover of a publication for the blind and partially sighted—as well as all other products—must semantically communicate the content.
- It must enable the object to be recognizable and highly memorable (e.g. by including the illustration, the title in so-called enlarged print (font size!) and in braille).
- For tactile books for children, it is preferable for motoric reasons that the covers of the book are either made of a different type of paper or are larger in format than the inner pages.
- As in all design projects, it is important to keep in mind the sustainability aspects of the production of objects and to make decisions based on synergistic didactic effects.

MATERIAL

- → If possible, the material should resemble the real materials of the depicted objects or at least retain some essential characteristics (cold materials – cold colours).
- → If the technology does not allow a choice of material, it is more important that the illustrations are functional in terms of message than to abandon the technology because of an unrealistic link between the illustration and the material (e.g. use of 3D printing).
- → Cardboard, various structured papers, plastics, or any other material are welcome in tactile experiences to arouse interest and offer variety (especially for younger readers).
- → Base the choice on the age of the reader and the content you are communicating.
- → For reading materials, always use matte paper, not glossy paper.
- → The material should be of a suitable thickness to avoid the content bleeding through to the other side of the page.
- → For publications, keep in mind that the shape of the braille print requires a higher paper weight for a good quality print, and the paper must be wood-free and long-fibred.

SAFETY

- → The materials and production technique must be safe to touch and handle (e.g. book, framed illustration, model, etc.), paying particular attention to details (edges, sharpness) to avoid damage to the reader's finger pads.

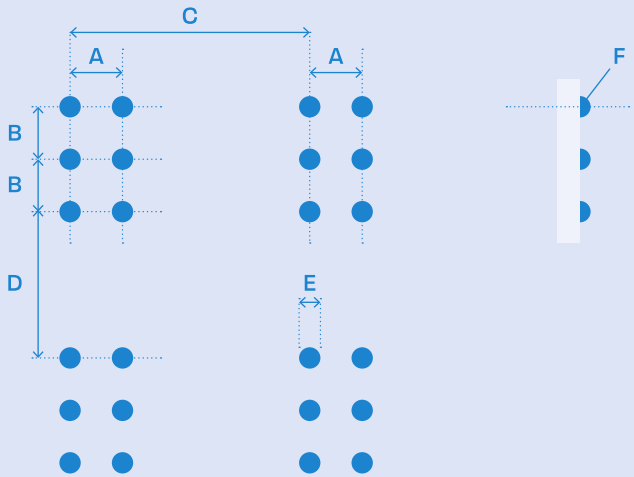

Figure 1: *Example of the Size of Braille Writing* (Gregorc et al., 2016, 8)

	Marburg Medium	**Marburg Large**
A – horizontal distance between braille dots within a braille cell (from the centre of the first braille dot to the centre of the second braille dot)	2.5 mm	2.7 mm
B – vertical distance between braille dots within a braille cell (from the centre of the first braille dot to the centre of the second braille dot)	2.5 mm	2.7 mm
C – distance between braille cells (from the centre of the first dot in the first braille cell to the centre of the first dot in the second braille cell)	6.0 mm	6.6 mm
D – distances between lines (from the centre of the first dot of the first braille cell in the first line to the centre of the first dot of the first braille cell in the second line)	10.0 mm	10.8 mm
E – diameter of a braille dot	1.3–1.6 mm	1.5–1.8 mm
F – height of a braille dot	proportional to the diameter of the braille dot, from 0.5 to 0.8 mm	

Table 1: *Description of Braille Standards* (Gregorc et al., 2016, 8)