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Information culture of persons with visual disabilities in typhlology and information science reflections

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The subject of this paper is the specificity of the information space of persons with visual disabilities as a component of their information culture, according to the concept proposed by M. Kisilowska.

Based on systematic analysis of documents and long years of participative observations, the deliberations focus on legal solutions governing the access of persons with visual disabilities to information, the navigation and cognition spheres of a blind information user and the specificity of providing information, in particular the Braille system, tactile graphics, audio description, alternative materials and augmentative technologies. The deliberations highlight obstacles in accessing information by persons with visual disabilities and suggest both practical solutions and research proposals for a complex analysis of the information culture of persons with visual disabilities in Poland.

KEY WORDS: information culture, person with visual disabilities, Braille system, tactile graphics, audio description, alternative materials, augmentative technologies

Foreword

An information society is characterised by advanced information and communication technologies that enable widespread use of information in production and service industries. It is assumed that an information society grants to its members access and possibilities to use information and communication technologies in order to broaden and update knowledge, work, enjoy culture, care for the health, entertain and use other services that affect the quality of life.[1]. One characteristic feature of this society is the cult of scientific knowledge and information and audiovisual culture, and common access to information and communication technologies and cyberspace. Unfortunately, the information society generates digitally excluded groups.

To quote D. Batorski, "*digital exclusion (e-exclusion) are the differences between those who have regular access to digital and information technologies and can actively use them, and those who do not have such access and abilities*"[2].

Digital exclusion is the cause and consequence of social exclusion understood as: "*a situation that prevents or significantly hinders an individual or group from performing their legal roles in accordance with the law, enjoying public goods and social infrastructure, collecting resources and earning income with dignity*"[3].

Among the socially and digitally excluded groups are, among others, persons with disabilities.

Even though new technologies generate and strengthen social inequalities for those persons, they may also serve to reduce those inequalities. In the case of persons with visual disabilities, they evi-

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[1] Główny Urząd Statystyczny, Społeczeństwo informacyjne w Polsce. Wyniki badań statystycznych z lat 2004-2006, Warszawa 2008, p. 7.

[2] D. Batorski, *Wykluczenie cyfrowe w Polsce,* „Studia Biura Analiz Sejmowych Kancelarii Sejmu" 2009, No. 3(19), p. 225-226.

[3] Ministerstwo Polityki Społecznej, Zespół Zadaniowy ds. Reintegracji Społecznej, *Narodowa Strategia Integracji Społecznej dla Polski,* Warszawa 2004, http://www.mpips.gov.pl/userfiles/File/mps/NSIS.pdf, p. 23 [accessed on: 15.11.2016].

dently broaden their access to information by "qualitatively" transforming their reading deficiency caused by sensory dysfunction. They introduce them to the information culture, understood, after M. Kisilowska, as: *"a way of conscious and active functioning of a person in the information space and the consequences thereof"*[4].

The crucial aspects of the development of information culture are: personal information competencies as the necessary condition for its development and the information environment as the space where said competencies are necessary to function.

Information competencies to a large extent determine a person's (also that with disabilities) position in the stratification of the information society: the proletariat, the cogitariat or the digitariat class[5].

In which of the above classes are positioned persons with visual disabilities? What is their information awareness and activity? What are the characteristics of information competencies? These questions inspire extensive information and typhlology research, which this paper forecasts, being only a short reflection on the specificity of information space of persons with visual disabilities.

The concept of "information space" means a "multidimensional, dynamic, open collection of content (data and information), media and users"[6] consisting of tangible information artefacts (media, devices) and intangible artefacts (language, behaviour – behavioural artefacts).

Based on an analysis of documents and participative observations, the deliberations focus on legal solutions governing the access of persons with visual disabilities to information, the conditions of navigation and cognition by a blind information user and the specificity of providing information, in particular the Braille system, tactile graphics, audio description, alternative materials and supporting technologies.

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[4] M. Kisilowska, *Kultura informacji, W*ydaw. SBP, Warszawa 2016, p. 42.

[5] R. Tadeusiewicz, *Społeczność Internetu,* Akademicka Oficyna Wydawnicza „Exit", Warszawa 2002, p. 285.

[6] M. Kisilowska, *Kultura informacji*, Wydaw. SBP, Warszawa 2016.

Legal regulations governing access to information and their execution

The access to information of persons with disabilities (including visual disabilities) is governed by numerous international and national legal regulations. Among the international regulations the most noteworthy is the United Nations Convention on the Rights of Persons with Disabilities adopted in 2006 and ratified in Poland in 2012.

Article 9 of the Convention obliges States Parties to take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, among other things by: providing in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms, ensuring live assistance and intermediaries, including guides and readers, promoting access to new information and communications technologies and systems, including the Internet.

Article 21, covering the freedom of expression and opinion, and access to information, recommends, among other things, to: provide information intended for the general public to persons with disabilities in accessible formats and technologies appropriate to different kinds of disabilities in a timely manner and without additional cost; accept and facilitate the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means, modes and formats of communication of their choice by persons with disabilities in official interactions; urge private entities that provide services to the general public, including through the Internet, to provide information and services in accessible and usable formats for persons with disabilities; encourage the mass media, including providers of information through the Internet, to make their services accessible to persons with disabilities.

Article 24 on the right to inclusive education, recommends, among other things to: facilitate the learning of Braille, alternative script, augmentative and alternative modes, means and formats of communication.

Article 30 speaks of participation in cultural life, enabled, among other things by: access to cultural materials in accessible formats; access to television programmes, films, theatre and other cultural activities, in accessible formats; ensuring that laws protecting intellectual property rights do not constitute an unreasonable or discriminatory barrier to access by persons with disabilities to cultural materials[7].

A chance for ensuring broad access to books, newspapers and magazines is the Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled developed by the World Intellectual Property Organization (UN agency), published in 2013 and signed by Poland in 2014. Its goal is to establish an international standard of use by persons with disabilities of published works that are available in print and are protected by law (permission to issue and distribute publications in an alternative format)[8].

The validity of the Treaty was confirmed by the provisions of the Resolution increasing the access of blind and visually impaired persons to printed publications, issued by the European Parliament Committee on Constitutional Affairs in 2017.[9].

The access of persons with disabilities to the Internet has been addressed since 1994 by the WORLD VIDE WEB CONSORTIUM – W3C – an association of more than four hundred organisations, companies, government agencies and universities from all over the

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[7] Konwencja Praw Osób Niepełnosprawnych, http://www.unic.un.org.pl/dokumenty/Konwencja_Praw_Osob_Niepelnosprawnych.pdf [accessed on: 14.12.2016].

[8] Traktat z Marrakeszu, http://www.prawoautorskie.gov.pl/.../Traktat_z_Marrakeszu_-_polska_wersja_jezykowa_finalna.pdf [dostęp: 05.05.2017].

[9] Rezolucja Komisji ds. konstytucyjnych (AFCO) Parlamentu Europejskiego, http://www.infor.pl/.../754032,Lepszy-dostep-do-ksiazek-i-prasy-dla-niewidomych-i-slabowidzacych.html [05.05.2017].

world. The Standards developed by the Consortium have become the basis for legal regulations in many countries, including Poland. In 2008, the Web Accessibility Initiative (WAI) developed the international standard WCAG 2.0 (Web Content Accessibility Guidelines), together with supporting documents: Understanding WCAG, Techniques for WCAG, which remain in force to date.[10].

In Poland, the process of standardising the accessibility of websites started in 2010 with the Act on the Digitisation of the Activity of Institutions Implementing Public Tasks. It provides for the obligation to determine the method of making content accessible to citizens with disabilities[11].

Relevant provisions are also included in the Regulation of the Council of Ministers of 12 April 2012 of the National Interoperability Framework, Minimum Requirements for Public Registers and Exchange of Electronic Information and Minimum Requirements for Information and Communication Systems[12]. The Regulation obliges all public institutions and institutions implementing public activities to guarantee by the end of 2015 accessibility of its websites on the AA level according to WCAG 2.0 Guidelines.

Alternative reports of NOGs[13], monitoring and audits of the member organisations of the Forum of Accessible Space (e.g. the

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[10] M. Gajda, WCAG 2.0 w skrócie – 25 najważniejszych zasad, http://dostepne strony.pl/artykul/753 [dostęp: 21.11.2016]; A. Marcinkowski, P. Marcinkowski, WCAG 2.0. Podręcznik dobrych praktyk, http://widzialni.org/wcag-20-podrecznik-dobrych-praktyk,m,mg,5,51 [accessed on: 01.12.2015].

[11] Ustawa o informatyzacji działalności podmiotów realizujących zadania publiczne, http://www.isap.sejm.gov.pl/Download?id=WDU20050640565&type=3 [accessed on: 05.05.2017].

[12] Rozporządzenie Rady Ministrów z dnia 12 kwietnia 2012 r. w sprawie Krajowych Ram Interoperacyjności, minimalnych wymagań dla rejestrów publicznych i wymiany informacji w postaci elektronicznej oraz minimalnych wymagań dla systemów teleinformatycznych, http://www.isap.sejm.gov.pl/DetailsServlet?id=WDU20120000526 [accessed on: 05.05.2017].

[13] *Dostępność witryn internetowych instytucji publicznych dla osób niepełnosprawnych. Ocena zgodności z międzynarodowym standardem WCAG 2.0 oraz polskimi regulacjami prawnymi,* ed. M. Dziwisz, P. Witek, Kraków 2013; D. Paszkiewicz, J. Dębski,

"Widzialni" Foundation) as well as the author's experience suggest that the above regulations are little known to those who commission or create websites.

Thus, the information space of persons with visual disabilities in Poland is characterised by: non-compliance with the WCAG 2.0 standards in website creation, dominance of printed documents (flat print), low number of TV broadcasts and films with audio description, general schools poorly supplied with technologies supporting the education of students with visual disabilities, not enough school books adapted to the perceptive possibilities of students with visual disabilities, general school teachers not trained to work with students with visual disabilities using alternative publications and augmentative technologies, limited use of new technologies (e.g. tactile graphics, audio description) in culture, non-compliance of publishers with the recommendations concerning accessibility of publications in alternative formats.

Cognitive reception of information by persons with visual disabilities

The perception and reception of information by persons with visual disabilities is determined by information overload (infobesity), the cognitive behaviour processes of an information person[14] and the specificity of the navigation and cognition of a blind person.

Dostępność serwisów internetowych. Dobre praktyki w projektowaniu serwisów internetowych dostępnych dla osób z różnymi rodzajami niepełnosprawności, Warszawa 2013; *Wykorzystanie technologii informacyjno-komunikacyjnych w aktywizacji osób niepełnosprawnych*, ed. B. Mioduszewski, Fundacja „Aktywizacja", Warszawa 2013; *Społeczny Raport Alternatywny z realizacji Konwencji o prawach osób z niepełnosprawnościami w Polsce*, ed. J. Zadrożny, Fundacja KSK, Warszawa 2015.

[14] W. Babik, *O natłoku informacji i związanym z nim przeciążeniu informacyjnym,* http://www.ktime.up.krakow.pl/ref2010/babik.pdf [accessed on: 31.04.2015]; Z. Melosik, *Mass media, tożsamość i rekonstrukcje kultury współczesnej*, [in:] Media – Edukacja – Kultura, ed. W. Skrzydlewski, S. Dylak, Polskie Towarzystwo Technologii i Me-

The cognitive processes in those persons are characterised by: multisensory perception covering a number of senses: touch, hearing, smell, taste; cognitive compensation on the sensory and perceptive levels – explained by the theory of the development of structural dynamic systems within the 1st and 2nd signal systems[15]; touch and multisensory cognitive schemes; surrogate imaging; and cognitive and compensatory role of the language (speech).[16].

The basic "information channels" are the senses of touch and hearing.

However, it should be noted that touching is not so good as seeing at perceiving constant lines, as it is a sense of broken sensations. The touch perception of a surface is more difficult than of raised points. The scope of attention is limited: the number of straight elements perceived in a single perceptive act is limited to six. It is easier to perceive orderly than chaotic sensations. The touch perceives sensations: toughness, softness, smoothness, roughness. It helps recognise the size and shape (inaccurately). It is a sequential sense (of subsequent sensations). It is a sense of contact (short range), detective and sensed through the skin (the same as temperature and pain). It may be passive or active (a sense of touch and movement), which makes it possible to perceive the characteristics of an object: roughness or smoothness and elementary spatial parameters (length, width, height, direction) as well as the size and shape.

The touch has a defensive reaction to an "overdose" of tactile stimuli[17].

The sense of hearing is equally important for cognition: it helps locate a sound, stimulates the development of speech, is the source

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diów Edukacyjnych, Rzeszów-Poznań 2012, s. 32-49; I. Rotberg, *W morzu informacji*, http://www.psychologia-spoleczna.pl/porady/1506-w-morzu-informacji.html [accessed on: 01.15.2015].

[15] M. Grzegorzewska, *Wybór pism*, PWN, Warszawa 1964.

[16] T. Majewski, *Tyflopsychologia rozwojowa: Psychologia dzieci niewidomych i słabo widzących,* PZN, Warszawa 2002; M. Czerwińska, *Niewidomy, [in:] Encyklopedia pedagogiczna XXI wieku,* vol. 3: M-O, ed. T. Pilch, Wydaw. Akademickie „Żak", Warszawa 2004, p. 685-693.

[17] Ibid.

of verbal information (instructions) and provides information on the mood, character, personality and physical appearance of other persons[18]. It enables aesthetic experiences.

These cognitive conditions are the reason of problems with receiving, processing and effectively using information. Thus, they require the use of alternative materials and augmentative technologies.

The Braille system vs. digital technologies

Computer technologies help remove the shortcomings of the Braille system and also affect its morphology. In computer use, the Braille system has become a temporary representation of signs displayed on the screen. Computer technologies enable full text correction. They make it possible to read in Braille publications stored on digital media, which is particularly important in the case of multi-volume publications. With a Braille scanner and printer, it is possible to copy every "flat print" and Braille text. Sending Braille books via traditional mail has been replaced with electronic transmission[19].

The digital technologies affect the construction of the Braille system: its modern version is EUROBRAILLE or computer Braille. It is an eight-point system (two columns per four dots) and has the same numbering of the basic dots as the standard Braille. The dot combinations in the eight-point Braille give 256 different signs. The eight-point Braille makes it possible to create special signs to represent computer symbols and operate electronic Braille devices, e.g. screens or notebooks[20].

The Braille system, whatever its form is, is hugely important for the psychosocial functioning of the blind. It is the "key" to the skill

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[18] Ibid.

[19] M. Czerwińska, *System Braille'a – rewolucja medialna czy inkluzja społeczna osób z niepełnosprawnością wzroku?*, „Przegląd Biblioteczny" 2015, no. 3, p. 365-381.

[20] Ibid.

of independent reading and writing. It enables learning the spelling, punctuation and grammar. It helps check how the text is arranged on a page. Unlike audio texts, it enables the reader to focus on details and better understand the context.

It provides access to various sources of information: textual, mathematical, musical, informational, tactile graphics. It prevents secondary illiteracy. It increases independence in everyday life. It creates equal chances in education and work. It enables participation is social, academic, technological and cultural life[21].

It is estimated that only 10% of blind persons know and effectively use the Braille system in learning, working, communicating and accessing information. This means that a vast majority of the blind globally do not use any kind of print. Using only speech synthesis in written communication leads to linguistic, spelling and punctuation errors[22].

Thus, engaging in the discourse (especially by general school teachers): the Braille system or the new audio technologies – is substantiated. Education of the blind without using the Braille system leads to illiteracy. The Braille is the basis for not only the literacy of the blind but also the teaching of sciences. However, it should be noted that, with the development of information, communication and augmentative technologies, the Braille system should not be

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[21] M. Czerwińska, *System Braille'a – rewolucja medialna czy inkluzja społeczna osób z niepełnosprawnością wzroku?*, „Przegląd Biblioteczny" 2015, No. 3, p. 365-381; M. Czerwińska, *System Braille'a w edukacji i rehabilitacji dzieci z niepełnosprawnością wzroku – przyczynek do komunikacji i inkluzji społecznej,* [in:] Edukacyjne oblicza komunikacji. Dyskurs interdyscyplinarny, ed. J.J. Błeszyński, K.B. Kochan, Uniwersytet Zielonogórski, Zielona Góra 2016, p. 119-134.

[22] Quoted after: M. Paplińska, *Znaczenie czytania dotykowego i jego charakterystyka a bariery mentalne osób niewidomych i ociemniałych wobec pisma Braille'a,* [in:] Pismo Braille'a. Z tradycją w nowoczesność, ed. M. Paplińska, Fundacja Polskich Niewidomych i Słabowidzących „Trakt", Warszawa 2016, p. 89-100; E. Śmiechowska-Petrovskij, *Integrowanie technologii i technik brajlowskich w edukacji uczniów z niepełnosprawnością wzroku*, [in:] Pismo Braille'a. Z tradycją w nowoczesność, ed. M. Paplińska, Fundacja Polskich Niewidomych i Słabowidzących „Trakt", Warszawa 2016, p. 101-125.

regarded as the only means of communication, but instead, the blind should be educated to use diverse information and communication tools and systems.

Tactile graphics vs. access to information

To quote M. Jakubowski, tactile graphics should be understood as "*graphic representation of the reality, useful for a blind or visually impaired person, made in a convention and scale available to that person, edited in a way the enables and facilitates reading by touch and/or poor vision of the information conveyed in the graphics*"[23].

The informative value of graphics is determined by its correct adaptation, i.e. the process of converting flat presentation into a form suitable for a blind/visually impaired user. It involves: changing the convention – method of presentation (e.g. a blind person cannot understand the convergent perspective or oblique projection; change of scale (enlarging an image that is legible for sighted persons); changing the level of generalisation – providing more detail (abandoning less important content); dividing the content of an illustration into a number of presentations of the same object made in the same or different convention than the original (e.g. replacing the oblique projection of an object with a number of orthographic projections, splitting the content of a map into a number of maps in the same or different scales); replacing the lines, signs or colours of the original picture with diverse lines, surface structures and other, previously developed and tested, signage (tactile graphics); simplifying a picture to a presentation that can be read by touch and providing additional description[24].

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[23] M. Jakubowski, *Tyflografika – historia i współczesność, metody i technologie*, „Tyfloświat" 2009, No. 1(3), p. 36–40, http://www.firr.org.pl/uploads/PUB/Tyfloswiat-01_2009.pdf [accessed on: 05.05.2017].

[24] E.Więckowska, *Zasady redagowania tyflografiki*, „Tyfloświat" 2009, No. 3(5), p. 7–13, http://www.firr.org.pl/uploads/PUB/Tyfloswiat-03_2009.pdf [accessed on: 05.05.2017].

Tactile graphics plays an important role in the information space of a person with visual disabilities.

It INFORMS: about spatial concepts (geometrical and directional concepts), about the shapes of objects (view, projection, cross section) and about spatial relations between objects (plan, map).

It HELPS: get to know and understand, and represent spatial concepts and physical reality, and convey information about objects and phenomena that cannot be perceived by touching (are too small, too delicate, too large, dangerous or moving)[25].

Audio description in the information space of persons with visual disabilities

According to M. Hopfinger, audiovisuality: *"is becoming, for the people of the 21st century, the dominant way of understanding culture. This is not, however, about the primacy of an image over text, which would mean departing from the culture of writing (print, book). The contemporary culture integrates into the audiovisual syndrome verbal and non-verbal, visual and audial information, words and images.* [...] *The audiovisual culture not only does not resign from the natural language but also it is unthinkable without a language as by all means the main code of the culture"*[26].

Audio description (AD) fully reflects this opinion. It attracts the interest of not only educators for the blind but also linguists, film experts, museum workers or culture animators. Accordingly, it has acquired a number of definitions. In the Radio and Television Act (1992), it is defined as: *"a verbal, audial description of an image and*

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[25] M. Jakubowski, *Tyflografika – historia i współczesność, metody i technologie,* „Tyfloświat" 2009, No. 1(3), p. 36–40, http://www.firr.org.pl/uploads/PUB/Tyfloswiat-01_2009.pdf [accessed on: 06.05.2017]; E. Więckowska, *Tyflografika – konieczność czasu,* [in:] Środowisko Lasek w perspektywie historii i chrześcijańskiej myśli pedagogicznej, ed. J. Placha, Wydaw. UKSW, Warszawa 2011, p. 283-291.

[26] *Nowe media w komunikacji społecznej XX w.* Antologia, ed. M. Hopfinger, Oficyna Naukowa, Warszawa 2005, p.9-10.

visual content of an audiovisual broadcast for persons disabled because of visual dysfunctions, contained in the broadcast or disseminated together with the broadcast" [27].

The creators of audio description in Poland, founders of the Bialystok Foundation "Audiodeskrypcja" – B. Szymańska and T. Strzymiński, understand audio description as the translation of an image into words. A verbal description of the visual layer of theatrical performances, audiovisual productions, graphic arts or scenic events makes them available to the blind and visually impaired[28].

According to Anna Jankowska[29] and Agnieszka Szarkowska[30], it is a special form of audiovisual translation that enables persons with vision deficits access the content that sighted persons normally perceive using the sense of seeing. Thus, audio description is a narration, an audiovisual translation, an intersemiotic translation, an intralingual translation.

As a result of intensive research and practice, a number of basic types of audio description have been developed:

- Audio description in visual arts – used in museums and art galleries, usually in the form of audio files attached to audio guides – describes paintings, sculptures, photographs or installations; is used to describe the architecture or natural terrain;
- Audio description for the screen (films, television broadcasts) – as an additional soundtrack between dialogues, describing visual elements (the playing of actors, costumes, colours, lights, scenography);

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[27] Ustawa z dnia 29 grudnia 1992 r. o radiofonii i telewizji, http://www.isap.sejm.gov.pl/DetailsServlet?id=WDU19930070034 [accessed on: 05.05.2017].

[28] B. Szymańska, T. Strzymiński, *Audiodeskrypcja. Obraz słowem malowany. Standardy tworzenia audiodeskrypcji do produkcji audiowizualnych*, Fundacja „Audiodeskrypcja", Białystok 2010.

[29] A. Jankowska, *Audiodeskrypcja –wzniosły cel w tłumaczeniu,* „Między oryginałem a przekładem" 2009, R. XIV, p 225-246.

[30] A. Szarkowska, *Przekład audiowizualny w Polsce – perspektywy i wyzwania*, Przekładaniec 2009, No. 1(20), p. 8-25.

- Audio description in live performances – in the theatre – read life between actors' dialogues; in the opera, at concerts, dance (ballet) performances;
- Audio description of sport events – differs from radio commentary by providing a detailed description of where the players are located or what is happening on the stands;
- Audio description in the newspapers and magazines (description of illustrations) – used in the electronic versions of newspapers and magazines;
- Audio description in teaching materials – used e.g. in multimedia teaching materials[31].

The informative value of audio description depends on its professional preparation according to the standards: thorough knowledge of the work/object to be described; the description should answer the following questions: Who?, What?, How?, Where?, When?; the description should move from general to detail; it should stimulate the imagination (using extensive vocabulary, comparisons, metaphors, epithets); it should be objective (no valuation, comments, interpretations or censoring); the description should be coherent and informed, and it should respond to the recipient's needs; it should be tailored to a specific user group, e.g. the children; the text of audio description should be proofread and reviewed by another editor/consultant; the recording/text reading quality should be very good[32].

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[31] M. Ciborowski, *Znaczenie audiodeskrypcji dla niewidomych w Polsce*, „Przekładaniec" 2009, No. 20, p. 136-138; A. Walczak, M. Rubaj, *Audiodeskrypcja na lekcji historii, biologii i fizyki w klasie uczniów z dysfunkcją wzroku,* „Przekładaniec" 2014, No. 28, p. 63-79; K. Krejtz, I. Krejtz, A. Szarkowska, A. Kopacz, *Multimedia w edukacji. Potencjał audiodeskrypcji w kierowaniu uwagą wzrokową ucznia*, „Przekładaniec" 2014, No. 28, p. 80-92; A. Sadowska, *Audiodeskrypcja do ilustracji w prasie – wskazówki dla trenerów szkolących audiodeskryptorów,* „Przekładaniec" 2014, No. 28 p. 140-152; I. Michalewicz, *Audiodeskrypcja po Euro 2012 – zawrotne tempo akcji czy para w gwizdek?*, „Przekładaniec" 2014, No. 28, p. 153-162; M. Kalbarczyk, J. Mirowski, *Świat opisywany dźwiękiem*, Fundacja „Szansa dla Niewidomych", Warszawa 2015.

[32] Ustawa z dnia 25 marca 2011 r. o zmianie ustawy o radiofonii i telewizji oraz niektórych innych ustaw, http://www.isap.sejm.gov.pl/DetailsServlet?id=WDU20

Accordingly, a correct audio description should be concise (dense), objective and neutral.

Audio description prepared in line with the above standards is of vital importance for the psychosocial functioning of persons with visual disabilities. It enables access to visual and audiovisual culture. It makes educational audiovisual materials (multimedia) accessible. It provides descriptions of objects and phenomena that cannot be touched. It helps comprehend the specialist terminology of various fields of science – development of language skills. It stimulates the development of the navigation and cognition (e.g. the cognitive attention, memory, imagination). It enables blind and visually impaired persons to independently, actively and competently participate in the social and cultural life. It inspires aesthetic impressions and enables experiencing the beauty.

An example of professional audio descriptions are the products of the Fundacja "Audiodeskrypcja" Foundation[33], the "Katarynka" Foundation – the "Adapter" project[34], the Mazowieckie Stowarzyszenia Pracy dla Niepełnosprawnych "De Facto" – projects: "E-kiosk" and "Niewidzialna Galeria Sztuki" (The Invisible Art Gallery)[35].

Publications and augmentative technologies for persons with visual disabilities

Physical information artefacts are the media and devices adapted for use and operation according to the cognitive specificity of persons with visual disabilities.

The contemporary repertoire of publications in alternative formats includes: Braille publications, multisensory publications (e.g. tactile picture books, books in Braille and print), tactile graphics:

110850459; M. Kalbarczyk, J. Mirowski, *Świat opisywany dźwiękiem*, Fundacja „Szansa dla Niewidomych", Warszawa 2015.

[33] http://www.audiodeskrypcja.org.pl/ [accessed on: 05.07.2017].

[34] http://www. fundacjakatarynka.pl/ [accessed on: 07. 05.2017].

[35] http://www.defacto.org.pl/ [accessed on: 05.07.2017].

illustrated books, maps, plans, models, W. Moon publications, audio publications (analogue talking books, digital talking books, talking books, audio books), audio description for films, documentaries, art audio description, enlarged print, magnified graphics, digital files (TXT, RTF, DOC, PDF), graphic files (DJVU), digital audio and text publications (DAISY – Digital Accessible Information System).

Augmentative/assisting technologies include: speech synthesisers, modules (programmes): voice, Braille, voice and Braille systems, magnifying, magnifying and voice systems, reader devices and programmes, Braille monitors, Braille notebooks (with speech synthesis and Braille monitor), interactive tablets with sound and touch modules, Braille computer keyboards, Braille printers, 3D printers, tactile graphics printers, magnifiers and magnifying glasses (electronic), ORC, OGR and reader programmes, user programmes: e.g. for Braille editing and computer printing, music note translation to Braille music notation, Braille typewriters (mechanic and electronic), talking electronic dictionaries, digital book players, digital recorders, organisers, voice programmes for mobile phones (smartphones).

The above publications and augmentative technologies enable the education and work of persons with visual disabilities, increase their communication possibilities (including intermediate communication) and access to information.

Conclusion

Alternative publications, the computer, augmentative technologies, the Internet are all extremely important for the information culture of persons with visual disabilities. With them, those persons may use information and education resources, make contacts, develop social competencies, be professionally active and entertain.

Many years of the author's experience as well as participative observations, supported by standardised research[36] have revealed

[36] Np. http://www.kulturaslepych.farbb.com/ [accessed on: 07.05.2017]; *Wykorzystanie technologii informacyjno-komunikacyjnych w aktywizacji osób niepełnospraw-*

numerous limitations in the information space of persons with visual disabilities. They concern among other things: access to websites (that do not comply with the standards established by the W3C Consortium), production and dissemination of publications in alternative formats, screen readers for graphic files and multimedia publications (e.g. dictionaries and encyclopaedias), national funding for education institutions, libraries and individuals for information technologies for the blind or production of tactile graphic publications and audio description (e.g. television broadcasts, documentaries, visual art).

The above limitations result in practical postulates. They highlight, among other things, the need for: coordinated efforts to prepare in alternative formats science and popular science literature, adapting school books to the Braille system and enlarged print (especially for foreign language and science teaching), introducing uniform standards for editing and adapting graphics to read by blind persons, introducing a national web catalogue of tactile graphic materials available in Poland, close cooperation between libraries, publishers, NGOs and education institutions for the availability and high level of library and information services, creating a central catalogue (database) of library materials in alternative formats, awareness among international and domestic authors of digital libraries, the specificity of reader programmes, popular teaching and use of the Braille system and Braille abbreviations, teaching to read tactile graphics (raised images) and using them in the education process, professional production of tactile graphics and audio description, systematic, long-term teaching of technological literacy to students with visual disabilities, based on integrated teaching of the Braille system (including its digital form) and information and communication technologies.

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nych, ed. B. Mioduszewski, Fundacja „Aktywizacja", Warszawa 2013; *Społeczny Raport Alternatywny z realizacji Konwencji o prawach osób z niepełnosprawnościami w Polsce,* ed. J. Zadrożny, Fundacja KSK, Warszawa 2015.

Sample academic research and case studies in the area of the education for the blind[37] and pilot studies[38] – do not exhaust the research needs in the area of the information and reading culture of persons with visual disabilities. They confirm the dangerous trends that are already known from observations and personal experience. The worrying phenomena are, for example, low competencies of teachers to teach blind students (not only in general schools) in terms of using Braille techniques, tactile graphics, audio description and augmentative technologies in the education process, which affects information competencies (information and reading culture of students with visual disabilities.

Young persons with visual disabilities tend to be more competent in using new technologies – than in basic skills: being able to move around independently, being self-sufficient, reading fluently and writing correctly, effective use of tactile graphics.

Also, persons with visual disabilities know quite well how to effectively use new technologies, but, as these skills improve, reading and writing skills deteriorate[39].

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[37] E. Śmiechowska-Petrovskij, *Integrowanie technik brajlowskich i z zakresu technologii w edukacji uczniów z niepełnosprawnością wzroku,* [in:] Pismo Braille'a. Z tradycją w nowoczesność, ed. M. Paplińska, Fundacja Polskich Niewidomych i Słabowidzących „Trakt", Warszawa 2016, p. 101-125.

[38] M. Paplińska, *Pismo Braille'a wobec wyzwań współczesnej komunikacji osób niewidomych – komunikat z badań*, [in:] Pismo Braille'a. Z tradycji w nowoczesność, ed. M. Paplińska, Fundacja Polskich Niewidomych i Słabowidzących „Trakt", Warszawa 2016, p. 126-137.

[39] J. Faherty, *Proponents say the decline in braille instruction is leading to illiteracy*, "Braille Monitor" 2006, No. 9, p. 14-17; M. Paplińska, *Niewidomy czytelnik – cyfrowy tubylec czy brajlowski analfabeta?* O kryzysie umiejętności czytania dotykowego, [in:] *Tyflopedagogika wobec współczesnej przestrzeni edukacyjno-rehabilitacyjnej,* ed. K. Czerwińska, M. Paplińska, M. Walkiewicz-Krutak, APS, Warszawa 2015, p. 179-195; M. Paplińska, *Młode pokolenie osób z niepełnosprawnością wzroku w paradoksie informacyjno-komunikacyjnym,* [in:] *Tyflopedagogika wobec współczesnej przestrzeni edukacyjno-rehabilitacyjnej,* ed. K. Czerwińska, M. Paplińska, M. Walkiewicz-Krutak, APS, Warszawa 2015, p. 136-155.

It seems that broad research into the information culture of persons with visual disabilities is needed, focusing on the research categories proposed by M. Kisilowska[40].

In the category of "information awareness" (realising the importance of information, the size and complexity of its manifestations and the processes it is subjected to, the ability of the mind to reflect the information space in its diversity and dynamics), the important issues are, for example: access to education, new information technologies, products and services, individual borders of discovering information space (quantitative and qualitative).

In the category of "information activity" (the information behaviours of an individual or legal entity, their diversity and intensity), what matters is, for example, the border between information activity and passivity or information competencies.

The category "Information space" includes three research areas. Tangible information artefacts (objects of information space) include the media (alternative publications) and devices that serve the purpose of creating, storing and disseminating information (information and communication technologies as well as augmentative/assisting technologies).

An important issue here is the accessibility of potentially tangible artefacts to persons with visual disabilities: e.g. texts, various types of images, audio and video recordings, databases (bibliographies, full texts, statistics, etc.), library catalogues, the news, web portals and websites.

Among intangible artefacts, the most important is the language. Accordingly, the research in this area should focus on, e.g.: new vocabulary created to name new products, services or tools developed in association with the management of the information space of persons with visual disabilities, changes in the forms and conventions resulting from transformations in the broad social and cultural contexts (increasingly brief messages, decreasing significance of the

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[40] M. Kisilowska, *Kultura informacji*, Wydaw. SBP, Warszawa 2016.

correctness of messages, using emoticons, democratisation of relations on the level of written communication).

In this research concept, of particular importance are behavioural artefacts that take into account, among other things, such behaviours of disabled information users, as: searching for information (level of awareness, engagement of emotions, intensity of activities, selection, etc.), creating information (publishing personal information using 2.0 tools, distributing (publishing) information via various channels, on specific media, to specific audiences or anonymously, e.g. blogs, increasingly frequent use of various information sources to check the "latest" news – so-called information imperative, personal information management for personal or professional purposes – so-called PIM, reaction to information that reaches the recipient unintended, aesthetics and visualisation or information, or behaviours associated with the visual value of the presented content, e.g. iconographics.

One should be aware that behavioural artefacts stimulate changes in social and private life, such as: changed patterns of behaviour in a group (family, peers – individualisation, isolation, mobile and electronic communication), certain daily activities (electronic banking, online shopping) and the structure of culture products. Here, the focus should be on the principles governing the functioning of persons with visual disabilities in the information space, and at the same time their information culture, i.e. the values respected and observed by them, the standards governing their behaviour as well as traditions, customs and lifestyle.

Considering the above, interdisciplinary research into the information culture of persons with visual disabilities on the level of civic, educational, translative and aesthetic discourses is postulated[41], according to the opinion expressed by Umberto Eco: "*Today,*

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[41] E. Śmiechowska-Petrovskij, *Kultura haptyczno-werbalna. Osoby niewidzące a sztuki wizualne – między doświadczeniem poznawczym i estetycznym*, [in:] K. Krawiecka, E. Śmiechowska-Petrovskij, M. Żelazkowska, Sztuka/twórczość dostępna. Osoby z niepełnosprawnościami i chorobą psychiczną w kręgu recepcji i ekspresji sztuki, Wydaw. UKSW, Warszawa 2016, p. 57-126.

a person of culture is required to be familiar not only with books but also with new forms of writing and collecting information. This is the only way of guaranteeing democratic use of the new media without denying anyone access to new information resources, this is the only way of teaching everyone how to select and assess the information they receive [...]"[42].

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[42] Quotation after: K. Blak, *Internet a przyszłość książki. Rozważania z perspektywy cyfrowego tubylca*, http://www.ktime.up.krakow.pl/symp2011/referaty2011/blak-l.pdf, s. 14 (accessed on: 31.04.2015).

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