Measuring immersion in audio description with Polish blind and visually impaired audiences

Agnieszka Walczak
Universitat Autònoma de Barcelona
agnieszka.walczak@uab.cat

Abstract

This paper aims to explore the impact of Polish AD on the immersion of its target audiences – blind and visually impaired (B/VIP) users. To this end, two research studies were carried out: one focusing on AD style and the other on AD vocal delivery. The rationale behind selecting these parameters was related to the findings of previous research conducted in the field. Two main research objectives were set. The first one, concerning AD style, centred around studying the reception of two AD styles – standard and creative – by B/VIP users. The second one, linked to AD vocal delivery, involved studying the reception of two AD voice types – human and synthetic – by B/VIP users for two genres: fiction and documentary. The research tool used to gauge user experience was the Independent Television Commission Sense of Presence Inventory questionnaire, one of five canonical questionnaires used for measuring presence. As for AD style, the results show that creative AD, compared to standard AD, yielded higher levels of presence for all participants. When it comes to AD vocal delivery, AD narrated by a human, compared to AD delivered by a synthetic voice, prompted significantly higher levels of presence for fiction. Presence rates for documentary were similar, with no statistically significant differences in relation to AD voice type.

Keywords

Audiovisual translation, accessibility, audio description, presence, immersion.

1. INTRODUCTION

The notion of accessibility dates as far back as the times of ancient Sparta and Mesopotamia (Bachmeier, 2014), but it is today that it is receiving more attention, both at national and international levels. The concept of participation in social life on an equal basis for all was introduced in 2006 in the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, n.d.). It was the first time that an understanding of disability within the human rights framework was recognized in an international treaty. Since most countries have since signed and even ratified the treaty, various stakeholders are now showing an increased interest in the concept – from lawmakers, through broadcasters, to end users (European Accessibility Act, n.d.; KRRiT, 2015; Moledo, 2017; Szczygielska, 2017).

In the audiovisual media sector, access to culture can be achieved through the use of accessibility services that include, among others, audio description (AD). It is no longer seen as an exclusive service dedicated to a small fraction of individuals, but as an inclusive service, addressing not only the needs of people with sensory impairments, but also of other audiences, including the elderly, children or tourists. The demand for this service is likely to grow in the nearest future – for two reasons: the ageing of the population and the increase in accessibility regulations adopted at the legislative level (for example, see AVMSD, 2010). Different scenarios for achieving barrier-free media products have been receiving increasing attention, both in the academia and industry. Technology offers a wide array of possibilities to eliminate barriers and improve the quality of life of people at risk of social exclusion. Although a drive for quantity in terms of accessible audiovisual products can be observed on the market, the discussion on the quality of user experience should not be overlooked.

As an access service, AD has to fulfil various functions. On the one hand, it serves as an essential resource for its audience to help them fully understand the audiovisual content. On the other hand, it is a means that allows its users to immerse themselves in a story and fully enjoy it – after all, entertainment is what draws us to the cinema (Davis *et al*., 2015). As argued by Wilken and Kruger, a film's success can be based on its ability "to sweep the audience into the fictional world" (2016: 256). As a consequence, when creating films, producers try to make them absorbing and capable of immersing the viewers (Wissmath & Weibel, 2012). Immersion is a term used to describe the sensation of the audience being plunged into the story world, experiencing the mediated environment as if it was unmediated (Fryer, Pring & Freeman, 2013).

In view of the above, this paper explores the area of AD, aiming to investigate the impact of different AD parameters on users' experience, and specifically their immersion in the audiovisual content. It departs from the methodological approaches that have been applied in AD reception research until recently, which involved mostly comprehension and recall questions. This paper takes AD

research to another level. It aims to investigate the emotional impact of AD on its target audiences. Given the scarcity of research in this area, it was decided to explore this issue in more depth.

2.   Related work

The area of AD has attracted increased attention among scholars in recent years. Several researchers have measured users' comprehension after presenting them with audiovisual material with AD (Cabeza-Cáceres, 2013; Chmiel & Mazur, 2016; Schmeidler & Kirchner, 2001; Walczak & Rubaj, 2014), while others have studied user preferences related to the wording of AD (Chmiel & Mazur, 2012) or to different AD styles (Fryer & Freeman, 2012a; Szarkowska & Wasylczyk, 2014; Udo & Fels, 2009). There are also those who looked into the reception of vocal delivery of AD (Fernández-Torné & Matamala, 2015; Kobayashi *et al.*, 2010). Noticeably, a common characteristic of all of the above mentioned studies is their focus on elements that are specific to the AD itself. They do not explore the impact of AD on users' emotional response. One of the first researchers to investigate it were Ramos Caro and Rojo López (2014), and then Ramos Caro (2015, 2016). In their studies, they measured the emotional response of users to the audiovisual stimuli presented and analysed target emotions. Fryer and Freeman (2012b, 2013, 2014), on the other hand, focused in their research on the concept of presence – "the psychological sense of immersion in any mediated environment" (Fryer and Freeman, 2012b: 15) – that, instead of eliciting particular emotions, allowed the users' entire experience to be assessed. This research follows in the wake of their work, but it focuses on non-English blind and visually impaired (B/VIP) audiences. Its main aim is to explore how different AD parameters influence their immersion in audiovisual stimuli.

   Since the first publications on AD, certain methodological developments have taken place with regard to reception studies (Chmiel & Mazur, 2012). Currently, data may be collected from respondents using various tools, for instance, one-on-one interviews (Figiel, 2014; Rai, 2009; Szarkowska & Jankowska, 2012), focus groups (ITC, 2000; Walczak, 2017c), on-line surveys (Mączyńska, 2011) eye-tracking (Di Giovanni, 2014; Krejtz *et al.*, 2012; Orero & Vilaró, 2012) or heart rate measurements (Ramos Caro, 2015, 2016). However, the most widely-applied research instrument appears to be questionnaires (Cabeza-Cáceres, 2013; Chmiel & Mazur, 2012, 2014, 2016; Fresno, 2014; Jankowska, 2015; Peli *et al.*, 1996; Romero-Fresco & Fryer, 2013; Schmeidler & Kirchner, 2001; Wilken & Kruger, 2016). This paper also uses questionnaires for data collection. Compared to previous studies, they do not include comprehension or recall questions, but rather questions that aim to measure participants' immersion in the presented material.

3.   Research parameters and objectives

There are a number of AD parameters that may have an impact on users' experience and therefore merit insightful research. However, the parameters under investigation were narrowed down to the following:

1. *AD style*
2. *AD vocal delivery*

The rationale behind choosing the first parameter is related to previous studies which show that B/VIP audiences tend to value descriptions with filmic elements (for example, Fryer & Freeman, 2012a) or non-standard linguistic expressions (for example, Fels *et al.*, 2006). My aim was to verify this by proposing a new type of AD – creative description – using not only *mise-en-shot* elements (Wilken & Kruger, 2016), but also intensified vocabulary to give the target audience a more engaging and entertaining experience (for details see Walczak, 2017b; Walczak & Fryer, 2017).

The motivation behind selecting the second parameter relates to the findings of Kobayashi *et al.* (2009, 2010) and Fryer and Freeman (2014), who suggest that human-narrated ADs are recommended for emotive content, for example drama, whereas ADs delivered by text-to-speech (TTS) technologies may be more suitable for informative genres, such as documentaries. This paper investigates this issue across genres (for details see Walczak & Fryer, 2018).

Based on the above, this research has two main objectives:

1. to measure user experience in relation to AD style in order to establish which AD style – standard or creative – leads to greater immersion;
2. to measure user experience in relation to AD vocal delivery for two genres, fiction and documentary, in order to verify which AD voice – human or synthetic – leads to greater immersion depending on the genre.

4.   Methodology

The aim of this research is to investigate the impact of AD parameters on user experience. The research tool that facilitates the achievement of this goal and the gauging of user response is the Independent Television Commission Sense of Presence Inventory (ITC-SOPI) questionnaire (Lessiter *et al.*, 2001). It is one of five canonical questionnaires used for measuring presence (Rosakranse & Oh, 2014), a psychological construct defined as "the experience of being engaged by the representations of a virtual world" (Jacobson, 2002: 1). As a cross-media questionnaire, it can be used for both virtual realities and other types of media systems (Rosakranse & Oh, 2014). Using a 5-point Likert scale (1=strongly disagree; 5=strongly agree), it measures four facets of a media experience: Spatial

Presence (for example, 'I felt I was visiting the places in the scenes'), Engagement (for example, 'I felt myself being drawn in'), Ecological Validity (for example, 'The scenes seemed natural') and Negative Effects (for example, 'I experienced sensations such as dizziness, disorientation, nausea, a headache, or tiredness'). It has been used before with sighted audiences (Lessiter *et al.*, 2001), but several studies have also been carried out with B/VIP people (Fryer & Freeman, 2012b, 2013, 2014). However, in the latter case, all the participants were English language speakers. This paper follows Fryer's and Freeman's methodology, but the empirical studies are conducted with B/VIP users in a non-English language context.

With the above in mind, the hypotheses for the experimental studies were formulated:

H1:   users will report higher levels of presence for the film with creative AD style;

H2:   users will report higher levels of presence for human-narrated AD for fiction, but similar levels of presence for human-narrated and TTS AD for documentary.

4.1. Sample

This research was set in Poland, a European country with a population of almost 40 million people (GUS, 2015), of whom over 1.5 million are B/VIPs (Sadowska, 2014). Under the inclusive concept of accessibility, all Polish citizens could be considered as potential AD users. This research, however, focuses its attention only on the primary target audience of AD, i.e. B/VIP people, as it is potentially the largest group to benefit from the service (cf. Walczak, 2017a).

A total of 72 participants (58% female, 42% male), aged 18-69 years (M = 37.5; SD = 12.72), took part in two experimental studies presented in this paper (36 participants per test). They were recruited through Polish organizations and foundations that support people with sight loss, and through personal contacts. All participants were officially registered as visually impaired. They stated whether the sight loss was congenital (67%) or acquired (33%). They were also asked to identify themselves as having mild (6%), considerable (33%) or complete (61%) sight loss. Table 1 shows a detailed distribution of the participants based on sex and sight loss.

Sight loss	Women	Men	Total
Mild	2	4	6 (8%)
Considerable	16	6	22 (31%)
Complete	24	20	44 (61%)
TOTAL	42 (58%)	30 (42%)	72 (100%)

Table 1. Participants' distribution based on sex and sight loss.

As for the use of text-to-speech software, 66 participants (92%) stated that they used it regularly, two people sometimes and four never. To the statement 'I am used to listening to AD', 44 participants (61%) agreed or strongly agreed, 16 (22%) were undecided, and 12 (17%) disagreed.

The studies were carried out in accordance with ethical procedures. Ethical approval was given by the Universitat Autònoma de Barcelona, Spain. All participants had an Information Sheet read out to them before each test and gave their written consent before taking part.

4.2.   Stimuli

What follows is a brief presentation of the stimuli employed in two experimental studies presented in this paper (for details see Walczak, 2017b; Walczak & Fryer, 2017; 2018). The common motivation behind selecting the clips for both studies was that they had to present independent stories so that they could be played interchangeably, without the users having to watch the whole films in order to understand them. The clips had to be similar in nature and the density of dialogue vs. AD had to be balanced.

4.2.1.   Study 1: AD style

The research material for the study on AD style constituted two clips, each lasting approximately 10 minutes, from *The Mighty Angel* (2014, dir. Wojciech Smarzowski). It is a Polish production belonging to a film genre that has not yet been explored before in scientific research on AD – naturalistic drama (Styan, 2002). Its aim is to present reality as faithfully as possible and to show the dark side of human existence. The film tells the story of Jerzy, an alcoholic who after going to detox wards and rehabilitation centres, eventually ends up in his local bar, the Mighty Angel. "This film is about drinking, about alcoholism as an illness, and starting anew", the director comments (Jazowska, 2013). In the case of this film, *what*[1] is presented on the screen is no less important than *how* it is presented, i.e. how filmic techniques are applied to transfer the meaning. The effect that the inclusion of such elements in AD, further intensified by vivid vocabulary, could have on the audience was to be determined empirically. The following extract shows examples of standard and creative AD side by side (Table 2). For the purposes of this article, they have been translated from Polish into English.

---

1   Emphasis made by the author.

Standard AD	Creative AD
Jerzy kupuje butelkę alkoholu.	Jerzy kupuje flaszkę.
[Jerzy buys a bottle of alcohol.]	[Jerzy buys a bottle of booze.]
Terrorysta uderza szefa butelką w głowę, potem bije go telefonem.	Terrorysta zdziela szefa butelką w łeb, okłada go telefonem.
[Terrorist hits the boss over the head with a bottle and then starts to beat him with the phone.]	[Terrorist bangs the boss over the head with a bottle and then starts to clobber him with the phone.]
Park szpitalny. Jerzy próbuje odpędzić od siebie Anioła. Katarzyna obserwuje sytuację przez okno. Anioła nie widzi. Patrzy, jak Jerzy wymachuje rękami.	Ujęcie z różnych perspektyw. Park szpitalny. Jerzy próbuje odpędzić od siebie Anioła. Katarzyna obserwuje sytuację przez okno. Anioła nie widzi. Patrzy, jak Jerzy wymachuje rękami.
[Park near the hospital. Jerzy is trying to drive the Angel away. Katarzyna is observing the situation through the window. She doesn't see the Angel. She watches Jerzy waving his hands.]	[Shot from different viewpoints. Park near the hospital. Jerzy is trying to drive the Angel away. Katarzyna is observing the situation through the window. She doesn't see the Angel. She watches Jerzy waving his hands.]

Table 2. An extract from the AD script for *The Mighty Angel* with standard and creative AD styles.

4.2.2. STUDY 2: AD VOCAL DELIVERY

Since the aim of the study on AD vocal delivery was to check the impact of AD delivered with different voices across genre, two genres had to be represented: fiction and documentary. The goal was to find fragments from foreign films with AD that were available on the Polish market at the moment of setting up the tests. Bearing in mind the constraints for clip selection provided at the beginning of this section and the limited number of films with Polish AD, the possibilities were narrowed down to the following choice: *Charlie and the Chocolate Factory* (2005, dir. Tim Burton) as a fiction film, and *Encounters at the End of the World* (2007, dir. Werner Herzog) as a documentary. Two clips from each film were selected. Each of the clips lasted approximately 10 minutes and contained three audio tracks: original (English), voice-over (Polish), and AD (Polish). Voice-over and AD scripts were recorded and mixed in a professional studio (for more on synchronising foreign language dialogue with AD see Szarkowska & Jankowska, 2012, 2015a, 2015b). Table 3 shows voice distribution for each clip by genre.

Film Genre	Clips	Voice-over	AD
Fiction	Clip 1	Male Human	Female Human
			Female Synthetic
	Clip 2	Male Human	Female Human
			Female Synthetic
Documentary	Clip 1	Male Human	Female Human
			Female Synthetic
	Clip 2	Male Human	Female Human
			Female Synthetic

Table 3. Voice distribution for each clip by genre.

4.3. Procedure

The procedure adopted for both studies was identical. It included the following steps:

1. Presentation of the Information Sheet and Informed Consent Form
2. Administration of the demographic questionnaire
3. Testing procedure
    a. Screening: clip 1
    b. Measures taken: presence questionnaire
    c. Screening: clip 2
    d. Measures taken: presence questionnaire

In both studies, the order of clip presentation was counterbalanced across the sample. Each clip combination was shown equally often to ensure that the same number of participants received a given condition order. There was one difference in the procedure. It was related to the duration of the studies. Study 1 was carried out with two clips, and therefore lasted approximately 30 minutes, whereas for Study 2 as many as four clips were used, which extended the time of the test to approximately 60 minutes.

5.   RESULTS AND DISCUSSION

For the sake of clarity, the results for items measuring presence are presented separately for Study 1 on AD style and for Study 2 on AD vocal delivery.

5.1.   STUDY 1: AD STYLE

Participants reported higher mean levels on all presence subscales, except Negative Effects, for the creative AD style compared with the standard AD style. These differences were significantly higher for Spatial Presence (p <.01). Mean scores for presence measures are shown in Table 4.

Presence Subscale	Mean scores: Standard AD	Mean scores: Creative AD
Spatial Presence	3.46	3.79
Engagement	3.90	4.12
Ecological Validity	4.52	4.65
Negative Effects	1.03	1.00

Table 4. Mean scores for presence comparing standard and creative AD.

A one-way ANOVA comparing levels of presence between groups of different sight ability showed significant differences between groups for levels of Spatial Presence (F (2, 36) = 3.629, p = .038) and Ecological Validity for the creative AD (F (2, 36) = 4.887, p = .014). Levels of Spatial Presence were significantly lower for people with complete sight loss (M = 2.93) compared to those with mild or considerable sight loss (M = 3.83). Similarly, for Ecological Validity, participants with complete sight loss reported lower levels (M = 4.36) than those with mild or considerable sight loss (M = 4.97). A possible explanation is that the creative AD, through the use of accurate language expressions and precise cinematic terminology, allowed for more effective use of residual vision, which in turn led to greater immersion in the presented material. Although there was no significant difference in levels of any of the presence measures between participants with congenital or acquired sight loss, the mean levels for all three positive presence subscales were higher for creative AD compared to standard AD (Table 5). Perhaps, as shown in previous studies (Fryer & Freeman, 2012a, Ramos Caro & Rojo López, 2014; Szarkowska & Wasylczyk, 2014), using in AD emotive vocabulary and elements of camerawork pointing to visual details of the scenes can contribute to participants having a more engaging experience.

Presence Subscales	Sight Loss	Standard AD	Creative AD
Spatial Presence	Congenital	3.02	3.46
	Acquired	3.64	3.99
Engagement	Congenital	3.73	3.91
	Acquired	4.13	4.39
Ecological Validity	Congenital	4.34	4.62
	Acquired	4.46	4.71

Table 5. Mean scores for presence by sight loss characteristics and AD style.

4.2.2. STUDY 2: AD VOCAL DELIVERY

For fiction with human-narrated AD, the mean levels for the three positive presence subscales: Engagement, Spatial Presence and Ecological Validity were higher compared to fiction with TTS AD (Table 6). Paired sample t-tests showed that fiction with human-narrated AD gave a significantly stronger feeling of being 'surrounded by the scenes' ($t = 10.396, p < .001$), was more engaging ($t = 8.96, p < .001$), and seemed more 'believable' and 'natural' ($t = 2.85, p < .001$) than the same fragment with TTS AD.

Presence Subscale	Mean scores: Human Voice	Mean scores: Synthetic Voice
Spatial Presence	3.53	2.65
Engagement	4.04	3.20
Ecological Validity	3.50	2.90
Negative Effects	1.00	1.06

Table 6. Mean scores for presence for fiction by AD voice type.

For documentary, both with human-narrated AD and TTS AD, mean presence levels were similar (Table 7). Although a bit higher for the clip with human-narrated AD, the differences were not significant for any of the three positive presence subscales: Spatial Presence ($t = 2.403, p = .022$), Engagement ($t = 1.011, p = .319$), Ecological Validity ($t = 1.06, p = .297$).

Presence Subscale	Mean scores: Human Voice	Mean scores: Synthetic Voice
Spatial Presence	3.83	3.66
Engagement	4.05	3.98
Ecological Validity	4.75	4.70
Negative Effects	1.00	1.00

Table 7. Mean scores for presence for documentary by AD voice type.

For all clips, regardless of condition, Negative Effects did not differ much: were extremely low. The results held, regardless of participants' sight loss characteristics: congenital or acquired. Bivariate correlations and paired sample t-tests showed no significant associations between any of the presence measures and age, self-reported sight loss (mild, considerable, complete), and familiarity with AD or TTS software.

The above results for both conditions concur with the findings of other studies conducted by Kobayashi *et al.* (2009, 2010) and Fryer and Freeman (2014), who found that human-narrated AD is a better solution for fiction, whereas TTS AD is suitable for non-emotive content. This seems to be true also in the Polish-language context.

Conclusions

The experimental studies discussed in this paper aimed to investigate the links between an AD product and AD target users' experience. The novel aspect of this work was that the experimental studies were not aimed at reporting users' opinions, but took the analysis one step further and focused on measuring their immersion in a stimuli presented. The design for the experiments was drawn from Fryer's and Freeman's work on AD and presence (2012b, 2013, 2014), but it was transferred to the Polish context. The parameters under investigation included the following: (1) AD style and (2) AD vocal delivery.

The results of the study on AD style show a positive response to the creative AD among B/VIPs. Compared to standard AD, creative AD yielded higher levels of presence for all participants, thus supporting the first research hypothesis. The findings of the study on AD vocal delivery show that AD read by a human prompted significantly higher levels of presence for fiction. Presence rates for documentary, on the other hand, were similar, with no statistically significant differences in relation to AD voice type. On the basis of the above, the second research hypothesis was regarded as validated.

The rationale behind these studies was to show that not only AD scripts, creative or standard, but also AD delivery voices have a direct effect on the reception

of the film, and therefore on users' experience. The findings suggest that when properly delivered, both in terms of style and voices, AD may increase the chances of B/VIP audiences having a more engaging viewing experience. These tests follow previous studies on AD with regard to style and vocal delivery, but, to the best of my knowledge, they are the first attempts at measuring the immersion of non-English users with visual impairment in the presented stimuli.

As part of this research, a measurement tool for evaluating users' experience, specifically the levels of presence, was proposed and tested. Although it proved to be successful, which is in line with the results of the previous research conducted in the field (Fryer & Freeman, 2012b, 2013, 2014), it is a self-report questionnaire that gathers users' subjective ratings for media experience. In the future, it would be advisable to combine it with objective measures, such as comprehension questions, already used by a number of AD scholars (for example, Cabeza-Cáceres, 2013; Chmiel & Mazur, 2012, 2016; Walczak & Rubaj, 2014), or physiological measures, such as heart variability (Appelhans & Luecken, 2006), galvanic skin response (Ward et al., 2002) or cortisol secretion (Sgoifo et al., 2003). This would allow a clearer picture of the phenomena under investigation to be obtained.

As with any post-hoc measures, presence questionnaires are subject to societal expectations or demands of social desirability (Crano, Brewer, & Lac, 2015). When asked to provide an oral response to a given question, participants might be tempted to respond in a way that is 'socially desirable'. This could be overcome by carrying out on-line surveys (for example, Mączyńska, 2011), which B/VIP people could access using a screen-reader, but such a solution also has its limitations, the necessary familiarity with modern technologies being one of them.

What also has to be noted is that existing presence questionnaires were developed for virtual reality environments, characterised by a high level of immersiveness. The audiovisual content currently offered to B/VIP users can be categorised as rather low-immersive on the scale of environment interactivity (Fryer & Freeman, 2013). Nevertheless, the stimuli employed in the experimental studies in question demonstrated a potential to trigger the feeling of presence in B/VIP participants, as shown in the results.

Another limitation to be acknowledged before closing the paper is the user sample size in each of the experimental studies. As argued by Chmiel and Mazur (2016), assessing a substantial number of users is one of the challenges in AD reception research to make the results valid. As many as 72 B/VIPs, 36 participants per test, took part in the two experimental studies presented in this paper. Although this may be seen as a limitation, it was a relatively large study of B/VIP people. Of the 43 studies analysed by Cattaneo and Vecchi (2011) only one reached a higher B/VIP participant number: 48 (Afonso et al., 2010).

An important contribution of the research presented in this paper is that the results of the experimental studies can be of benefit not only to academia, but also to professional audio describers and to the Audiovisual Translation industry. Although the studies were conducted in Poland, the findings may also be applica-

ble to other countries. Creative AD scripts could also be appreciated by non-Polish speaking audiences, resulting in them having a more enjoyable film experience. When it comes to AD vocal delivery, the results suggest that AD reproduced with a synthetic voice is an effective and viable solution for voicing informative content. It may guarantee the time- and cost-effectiveness of AD production, which, in turn, could lead to a higher number of audiovisual products accessible to B/VIP users. The studies presented here could be replicated on a larger scale, not only in Poland, but also in other countries across Europe. This could serve as a way of verifying the results in other language combinations and further validate the tools used for measuring users' experience.

Bibliography

Afonso A., Blum A., Katz B. F., Tarroux P., Borst G. & Denis M. (2010) "Structural properties of spatial representations in blind people: Scanning images constructed from haptic exploration or from locomotion in a 3-D audio virtual environment", *Memory & Cognition*, 38:5, pp. 591-604.

Appelhans B. M. & Luecken L. J. (2006) "Heart rate variability as an index of regulated emotional responding", *Review of General Psychology*, 10: 3, pp. 229-240.

AVMSD (2010) "Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive)", http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32010L0013 (last accessed 05/07/2015).

Bachmeier C. (2014) "Barrier-free access to audiovisual content – a fundamental human right", *IRIS plus*, Strasbourg, 3, pp. 7-22.

Cabeza-Cáceres C. (2013) "Audiodescripció i recepció. Efecte de la velocitat de narració, l'entonació i l'explicitació en la comprensió fílmica" [Audio description and reception. The effect of speed of narration, intonation and explicitation in film comprehension], Unpublished doctoral dissertation, Universitat Autònoma de Barcelona, Spain.

Cattaneo Z. & Vecchi T. (2011) *Blind vision: the neuroscience of visual impairment*, Cambridge Massachussets, MIT Press.

Chmiel A. & Mazur I. (2012) "AD reception research: Some methodological considerations", in *Emerging topics in translation: Audio description*. Ed. by E. Perego, Trieste: EUT (Edizioni Università di Trieste), pp. 57-80.

Chmiel A. & Mazur I. (2014) *Audiodeskrypcja* [Audio description], Poznań, Wydział Anglistyki UAM.

Chmiel A. & Mazur I. (2016) "Researching Preferences of Audio Description Users – Limitations and Solutions", *Across Languages and Cultures*, 17:2, pp. 271-288.

Crano W. D., Brewer M. B. & Lac A. (2015) *Principles and Methods of Social Research*, Routledge, New York, N.Y.

Davis G., Dickinson K., Patti L. & Villarejo A. (2015) *Film Studies: A Global Introduction*, London, Routledge.

Di Giovanni E. (2014) "Visual and narrative priorities of the blind and non-blind: Eye-tracking and audio description", *Perspectives: Studies in Translatology*, 22:1, pp. 136-153.

European Accessibility Act (n.d.) "European Accessibility Act: Improving the Accessibility of Products and Services in the Single Market", http://ec.europa.eu/social/ main.jsp?catId=1202 (last accessed 01/05/2017).

Fels D., Udo J. P., Diamond J. E. & Diamond J. I. (2006) "A comparison of alternative narrative approaches to video description for animated comedy", *Journal of Visual Impairment and Blindness*, 100:5, pp. 295–305.

Fernández-Torné A. & Matamala A. (2015) "Text-to-speech versus human voiced audio description: a reception study in films dubbed into Catalan", *The Journal of Specialised Translation*, 24, pp. 61-88.

Figiel W. (2014) "Percepcja audiodeskrypcji wśród nauczycieli szkół specjalnych" [Perception of Audio Description among Teachers of Special Schools (in Poland)], *Przekładaniec*, 28, pp. 93-108.

Fresno N. (2014) "La (re) construcción de los personajes fílmicos en la audiodescripción. Efectos de la cantidad de información y de su segmentación en el recuerdo de los receptores", Unpublished doctoral dissertation, Universitat Autònoma de Barcelona, Spain.

Fryer L. & Freeman J. (2012a) "Cinematic language and the description of film: Keeping AD users in the frame", *Perspectives: Studies in Translatology*, 21:3, pp. 412-426.

Fryer L. & Freeman J. (2012b) "Presence in those with and without sight: implications for virtual reality and audio description", *Journal of Cybertherapy and Rehabilitation*, 5:1, pp. 15-23.

Fryer L. & Freeman J. (2013) "Visual impairment and presence: measuring the effect of audio description", *Proceedings of the 2013 Inputs-Outputs Conference: An Interdisciplinary Conference on Engagement in HCI and Performance* (article 4), New York, USA: ACM.

Fryer L. & Freeman J. (2014) "Can you feel what I'm saying? The impact of verbal information on emotion elicitation and presence in people with a visual impairment", in *Challenging Presence: Proceedings of the 15th International Conference on Presence*. Ed. by A. Felnhofer & O. D. Kothgassner, Wien: facultas.wuv, pp. 99-107.

Fryer L., Pring L. & Freeman J. (2013) "Audio drama and the imagination. The influence of sound effects on presence in people with and without sight" *Journal of Media Psychology*, 25, pp. 65–71.

GUS, Główny Urząd Statystyczny (2015) "Ludność. Stan i struktura ludności oraz ruch naturalny w przekroju terytorialnym. Stan w dniu 31 XII 2014 roku",

http://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-stan-i-struktura-ludnosci-oraz-ruch-naturalny-w-przekroju-terytorialnym-stan-w-dniu-31-xii-2014-r-,6,17.html (last accessed 05/07/2015).

ITC (2000) "ITC Guidance on standards for audio description", http://www.ofcom.org.uk/static/archive/itc/itc__publications/codes__guidance/audio__description/index.asp.html (last accessed 01/12/2016).

Jacobson D. (2002) "On theorizing presence", *Journal of Virtual Environments*, 6, p. 1.

Jankowska A. (2015) *Translating audio description scripts: translation as a new strategy of creating audio description*, Peter Lang, Frankfurt am Main, Berlin, Bern, Bruxelles, Oxford, Wien.

Jazowska M. (2013) "Wojciech Smarzowski", http://culture.pl/en/artist/wojciech-smarzowski (last accessed 01/04/2016).

Kobayashi M., Fukuda K., Takagi H. & Asakawa C. (2009) "Providing synthesized audio description for online videos", *ASSETS '09: Proceedings of the 11th International ACM SIGACCESS Conference on Computers and Accessibility*, New York, USA, ACM, pp. 249-250.

Kobayashi M., O'Connell T., Gould B., Takagi H. & Asakawa C. (2010) "Are Synthesized Video Descriptions Acceptable?", *ASSETS'10: Proceedings of the 12th International ACM SIGACCESS Conference on Computers and Accessibility*, New York, USA, ACM, pp. 163-170.

Krejtz I., Szarkowska A., Krejtz K., Walczak A. & Duchowski A. (2012) "Audio description as an aural guide of children's visual attention: evidence from an eye-tracking study", *Proceedings of the ACM Symposium on Eye Tracking Research and Applications Conference*,

New York, ACM, pp. 99-106.

KRRiT (2015) "Stanowisko Krajowej Rady Radiofonii i Telewizji z dnia 7 lipca 2015 roku w sprawie sposobu realizacji i jakości audiodeskrypcji w utworach audiowizualnych", http://www.krrit.gov.pl/Data/Files/__public/Portals/0/konsultacje/2015/audiodeskrypcja/stanowisko__audiodeskrypcja-f.pdf (last accessed 01/05/2017).

Lessiter J., Freeman J., Keogh E. & Davidoff J. (2001) "A cross-media presence questionnaire: The ITC Sense of Presence Inventory", *Presence: Teleoperators and Virtual Environments*, 10:3, pp. 282-297.

Mączyńska M. (2011) "TTS AD with audio subtitling to a non-fiction film. A case study based on La Soufriere by Werner Herzog", Unpublished MA thesis, University of Warsaw, Poland.

Moledo A. (2017) "Users' perspective on a converged media environment", paper presented at the Advanced Research Seminar on Audio Description, Universitat Autònoma de Barcelona, 16-17 March 2017.

Orero P. & Vilaró A. (2012) "Eye Tracking Analysis of Minor Details in Films for Audio Description", *MonTi*, 4, pp. 295-319.

Peli E., Fine E. & Labianca A. (1996) "Evaluating Visual Information Provided by Audio Description", *Journal of Visual Impairment & Blindness*, 90:5, pp. 378-385.

Rai S. (2009) "Bollywood for all", http://www.rnib.org.uk/aboutus/Research/reports/accessibility/Documents/2009__09__Bollywood__AD__report.pdf (last accessed 05/07/2015).

Ramos Caro M. (2015) "The emotional experience of films: does Audio Description make a difference?", *The Translator*, 21:1, pp. 68-94.

Ramos Caro M. (2016) "Testing audio narration: the emotional impact of language in audio description", *Perspectives: Studies in Translatology*, 24, pp. 1-29.

Ramos Caro M. & Rojo López M. (2014) "'Feeling' Audio Description: Exploring the Impact of AD on Emotional Response", *Translation Spaces*, 3, pp. 133-150.

Romero-Fresco P. & Fryer L. (2013) "Could audio described films benefit from audio introductions? An audience response study", *Journal of Visual Impairment and Blindness*, 107:4, pp. 287-285.

Rosakranse C. & Oh S. Y. (2014) "Measuring Presence: The Use Trends of Five Canonical Presence Questionnaires from 1998-2012", in *Challenging Presence: Proceedings of the 15th International Conference on Presence*. Ed. by A. Felnhofer & O. D. Kothgassner, Wien: facultas. wuv, pp. 25-30.

Sadowska A. (2014) "Audiodeskrypcja do ilustracji w prasie – wskazówki dla trenerów szkolących audiodeskryptorów", *Przekładaniec*, 28, pp. 124–139.

Schmeidler E. & Kirchner C. (2001) "Adding Audio Description: Does It Make a Difference?", *Journal of Visual Impairment and Blindness*, 95:4, pp. 198-212.

Sgoifo A., Braglia F., Costoli T., Musso E., Meerlo P., Ceresini G. & Troisi A. (2003) "Cardiac autonomic reactivity and salivary cortisol in men and women exposed to social stressors: Relationship with individual ethological profile", *Neuroscience and Biobehavioural Reviews*, 27, pp. 179-188.

Styan J. L. (2002) *Modern drama in theory and practice: Volume 1, realism and naturalism*, Cambridge, Cambridge University Press.

Szarkowska A. & Jankowska A. (2012) "Text-to-speech Audio Description of Voiced-Over Films. A Case Study of Audio Described Volver in Polish", in *Emerging Topics in Translation: Audio Description*. Ed. by E. Perego, Trieste: EUT (Edizioni Università di Trieste), pp. 81-94.

Szarkowska A. & Jankowska A. (2015a) "Audio describing foreign films", *The Journal of Specialised Translation*, 23, pp. 243-269.

Szarkowska A. & Jankowska A. (2015b) "Audio subtitling multilingual films in Poland: Early developments, current practices and future challenges", in *New points of view on audiovisual translation and media accessibility*. Ed. by A. Jankowska & A. Szarkowska, Oxford, Peter Lang, pp. 191–217.

Szarkowska A. & Wasylczyk P. (2014) "Audiodeskrypcja autorska" ["Auteur description"], *Przekładaniec*, 28, pp. 48-62.

Szczygielska M. (2017) "Idą zmiany w dostępności mediów" ["Changes in media accessibility"]. http://informaton.pl/artykuly/ida-zmiany-w-dostepnosci-mediow/ (last accessed 01/05/2017).

Udo J. P. & Fels D. I. (2009) "'Suit the Action to the Word, the Word to the Action': An Unconventional Approach to Describing Shakespeare's Hamlet", *Journal of Visual Impairment and Blindness*, 103:3, pp. 178-183.

UNCRPD (n.d.) "United Nations Convention on the Rights of Persons with Disabilities", http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf (last accessed 05/07/2015).

Walczak A. (2017a) "Audio description in Poland: a 2015 snapshot", in *Przekuć obraz w słowo. Wokół historii i współczesnych zastosowań audiodeskrypcji* [*The Visual Made Verbal: A Comprehensive Training Manual and Guide to the History and Applications of Audio Description*], San Diego: Academic Publishing, pp. 163-191.

Walczak A. (2017b) "Creative Description: Audio Describing Artistic Films for Individuals with Visual Impairments", *Journal of Visual Impairment & Blindness*, 11:4.

Walczak A. (2017c) "Audio description on smartphones: Making cinema accessible for visually impaired audiences", *Universal Access in the Information Society*, https://doi.org/10.1007/s10209-017-0568-2

Walczak A. & Fryer L. (2017) "Creative description: The impact of audio description style on presence in visually impaired audiences", *British Journal of Visual Impairment*, 35:1, pp. 6-17.

Walczak A. & Fryer L. (2018) "Vocal delivery of audio description by genre: measuring users' presence", *Perspectives. Studies in Translatology*, 26:1, pp. 69-83

Walczak A. & Rubaj M. (2014) "Audiodeskrypcja na lekcji historii, biologii i fizyki w klasie uczniów z dysfunkcją wzroku" ["Audio Description in History, Biology and Physics Classes for Visually Impaired Learners"], *Przekładaniec*, 28, pp. 63-79.

Ward R. D., Marsden P. H., Cahill B. & Johnson C. (2002) "Physiological responses to well-designed and poorly designed interfaces", *Proceedings of CHI 2002 workshop on physiological computing*, Minneapolis, MN, USA.

Wilken N. & Kruger J. L. (2016) "Putting the audience in the picture: *mise-en-shot* and psychological immersion in audio described film", *Across Languages and Cultures*, 17:2, pp. 251-270.

Wissmath B. & Weibel D. (2012) "Translating Movies and the Sensation of 'Being There'", in *Eye Tracking in Audiovisual Translation*. Ed. by E. Perego, Roma, Aracne Editrice, pp. 281-298.