Taylor & Francis
Taylor & Francis Group

The rogue poster-children of universal design: closed captioning and audio description

J.P. Udo* and D.I. Fels

ITM/Centre for Learning Technologies, Ryerson University, 350 Victoria Street, Toronto, ON, Canada

To abide by the tenets of universal design theory, the design of a product or service needs not only to consider the inclusion of as many potential users and uses as possible but also to do so from conception. Control over the creation and adaptation of the design should, therefore, fall under the purview of the original designer. Closed captioning (CC) has always been touted as an excellent example of a design or electronic curb cut because it is a system designed for people who are deaf or hard of hearing, yet is used by many others for access to television in noisy environments such as gyms or pubs, or to learn a second language. Audio description is poised to have a similar image. In this paper, we will demonstrate how the processes and practices associated with CC and audio description, in their current form, violate some of the main principles of universal design and are thus not such good examples of it. In addition, we will introduce an alternative process and set of practices through which directors of television, film and live events are able to take control of CC and audio description by integrating them into the production process. In doing so, we will demonstrate that CC and audio description are worthy of directorial attention and creative input rather than being tacked on at the very end of the process, and usually only to meet regulatory or legislative mandates.

Keywords: accessible media; closed captioning; audio description; inclusive design; universal design

Introduction

Closed captioning (CC) is the verbatim translation of spoken dialogue from television and film that is typically presented as white text on a black background and overlaid or scrolling on the original video on the screen. It is designed for access to television and film for people who are deaf or hard of hearing. CC has always been touted as the 'electronic' poster-child of universal design because it is a system designed for people with disabilities, yet can be used by many others for access to television such as people in noisy gyms or pubs, or to learn a second language.

Audio description (AD) is a second audio track produced in conjunction with the original audio track, to provide descriptions of important visual elements of a film or television show for access by people who are blind or have low vision. It is also poised to be another 'good' example of universal design because it can be used by the larger population.

While CC and AD are used to make media and live events more accessible to deaf and hard of hearing, and blind and low vision communities, respectively, there has been little research reporting the nature of these strategies and the effects of these services. There is a lack of critical evaluation of these established processes and practices from a universal and engineering design standpoint.

To abide by the tenets of universal design theory, the design of a product or service needs not only to consider the inclusion of as many potential users and uses as possible but also to do so from conception. Control over the creation and adaptation of the design should, therefore, fall under the purview of the original designer. Within the context of this paper, the terms director and designer are used interchangeably to highlight the fact that in television and film, directors are designers of the entertainment experience presented. In this paper, we will demonstrate how the processes and practices associated with CC and AD in their current form adhere to some of the principles of universal design but also violate many some of them. In addition, we will introduce an alternative process and set of practices through which directors of television and film events are able to take control of CC and AD by considering them as an integral element in the communication of their creative vision. While CC and AD are used for live events, we will limit the scope of this paper to discussing pre-recorded material. In addition, much of the discussion here relates to CC and AD as applied to North American broadcast processes, procedures and standards. European standards are different: however, the general approaches to captioning and AD are remarkably similar.

CC and AD

CC is produced by recording the verbatim text of the dialogue and then synchronising the timing as closely as possible with the timecode of that dialogue. Phrasing and the number of lines that appear on the screen at any one time are governed by industry standards that have been developed to optimise readability by users. The two major global delivery standards consist of Line21 and teletext/subtitling; the standard analogue is Vertical Blanking Interval Line21, known as CC, for North America or NTSC systems as defined by EIA-608 (Abrahamian 2003); and teletext for European or PAL systems. In this paper, we will focus on CC.

Government legislation in many western countries specifies the quantity of captioning required for broadcast stations. For example, in Canada, the Canadian Radio–Television and Telecommunications Commission (CRTC) requires that all television broadcasters must offer CC for 100% of all programming (although this does not include advertising) (CRTC 2007).

In its current form, for analogue or digital television, the appearance of CC is limited to a small set of fonts, colours and graphics (Canadian Association of Broadcasters 2004). Initially, limitations in decoder technology of the 1970s and 1980s posed legibility problems so that captions were restricted to upper-case letters, using a white monospaced font and a black background (Canadian Association of Broadcasters 2004). Advancements in encoder and decoder technologies now allow for legible mixed-case letters, multiple fonts and colours and numerous symbols (Canadian Association of Broadcasters 2004). However, despite the new capabilities, the upper-case white text on black background (shown in Figure 1) is still the most common format recommended by the captioning standards and used for television captioning.

Audio description is a relatively new access technology compared with CC; however, people who are blind or have low vision have had the benefit of description for many, many years, in the form of descriptions of events happening around them provided by family and friends.

The formal version of audio description where procedures and processes were defined so that others could provide description for media and cultural events was originally formalised in the 1970s by G. Frazier (Snyder 2004). Most of the guidelines available recommend that descriptions be factual and purposely void of emotionally subjective interpretation. Descriptions should provide an audio account of the visual information important to the narrative (WGBH Educational

Figure 1.   Example of conventional closed captions.

Foundation n.d.b), including relevant visual action imparted by an actor's body language, unspo-ken acting, scene changes, facial expressions, costumes and other visual aspects and inserting them within the natural pauses in the dialogue (Wall 2002, National Center for Accessible Media 2003, CRTC 2004, WGBH Educational Foundation n.d.b). They are carefully timed so that they do not interfere with the dialogue or programme narration. The description track is then mixed with the main programme audio and broadcast on the secondary audio track (SAP).

Universal design

Universal design theory consists of two main goals: (1) a 'user population' and the 'potential uses' of designs must be very broadly defined and include a variety of users and user abilities inclusive of as many different people as possible including those with disabilities (Rose and Meyer 2002); and (2) designers must make these considerations at the conception and specification phases of design rather than as a retrofit after all else is completed (Stephanidis 2001). Designs which satisfy these two goals are often termed 'curb cuts' because the sidewalk curb cut is one of the best examples of universal design.

Perceived as costly and catering to the needs of very small and specific populations, universal design theory is often discounted as a viable and practical alternative to conventional design prac-tices (Stephanidis 2001). Standards, guidelines and legislation/regulations such as ADA section 508 (US Department of Justice 2003) and Accessibility for Ontarians with Disabilities Act, and W3C Web Accessibility Guidelines (2003) are thus in place to encourage consideration of a uni-versal design approach. However, the goals are often thwarted by designers who work to remain in compliance with only specific legislative requirements or guidelines because this often results in limited or incomplete designs and solutions.

In addition, if conventional design approaches are used, access for people with disabilities becomes an afterthought and an expensive retrofit. Emiliani and Stephanidis (2000) suggest that retrofitting is problematic because (1) adaptations can be incompatible with rapid technological change; (2) not all technology can be adapted without a loss of functionality in the original design and (3) adaptations can be programming-intensive, costly, and difficult to implement and maintain.

How do CC and AD adhere and stray from the principles of universal design?

Connell *et al.* (1997) outline seven principles of universal design: equitable use, flexibility in use, simple and intuitive to use, perceptible information, tolerance for error, low physical effort and

size and space for approach and use. We present these guidelines as a means of assessing the appropriateness and validity of CC and AD as prime examples of universal design.

Principle 1: equitable use

The design is useful and marketable to people with diverse abilities.

Connell *et al.* (1997, p. 34)

Guidelines for this principle suggest that whenever possible, all users should be given the same means to use a product or service. If this is not possible, users should be given an equivalent opportunity for use. No users should be stigmatised or segregated when compared with their peers, or have their safety, security or privacy compromised by inaccessible designs. Regardless of ability, all users should find the design appealing to use (Connell *et al.* 1997).

CC and AD abide by these guidelines in several important ways, as they are useful tools for individuals with and without disabilities. These tools provide individuals who are deaf, deafened, hard of hearing, blind or low-vision independent access to information and entertainment that would otherwise be inaccessible without the help of a sighted or hearing peer acting as an interpreter. Alone or with an able-bodied peer, individuals with disabilities or who are deaf have the option of using CC and AD to improve their understanding while, at the same time, doing so in a manner that does not detract from that of an able-bodied peer.

In addition, CC has proven to be beneficial to individuals who are learning a new language (Guillory 1998, Shea 2000, Stewart and Pertusa 2004), and it can improve reading skills (Goldman and Goldman 1988, Linebarger 2001). Hearing users can also benefit from captions if they are unable to access audio such as at a gym or bar, or where using audio may further pollute the sound environment, such as in an office. Similarly, AD is useful for sighted individuals who are unable to devote their complete visual attention to watching entertainment media because their visual attention is elsewhere (on tasks such as sewing or ironing) or they must constantly leave and re-enter a room that is within earshot (while doing the laundry, cooking). Studies have also shown the benefit of AD for individuals who are have learning disabilities or are elderly (Watkins and Charlson 2002). Researchers are also exploring how AD scripts (Turner and Colinet 2004) and CC text (Fleischman and Roy 2007) can be used to index video.

In much of the research carried out for AD and CC, entertainment and enjoyment are secondary factors to comprehension. For example, Pettitt *et al.* (1996) and Schmeidler and Kirchner (2001) compared participant enjoyment and performance measures with content containing AD and content without it. Peli and Fine (1996) examined participant comprehension through multiple choice questions with sighted and low-vision viewers after watching segments of two documentaries. Harkins *et al.* (1995) examined viewer preferences but again did not consider enjoyment factors for CC. Jensema (1998) assessed participant reading speed for CC but did not evaluate enjoyment. As the primary purpose of watching television and films is entertainment (Bordwell and Thompson 2001), measures of entertainment and enjoyment should be key factors in studying the impact of CC and AD on audiences.

The marketability of CC and AD is also problematic. Currently, CC and AD are considered 'cost' services which broadcasters must provide in order to comply with governmental and broadcast mandates (e.g. ITC 2000, CRTC 2004, FCC 2005, Media Access Australia 2007). In order to reduce costs, a constant concern of broadcasters, CC and AD are often farmed out to third party accessibility vendors who are responsible for creating CC and/or AD for a particular show and are often given little time or funding to do so. Some broadcasters and production studios create their own CC and AD in-house, yet similar constraints exist. In an effort to reduce the costs of AD, Vera (2006) has suggested that the translator or subtitler could also create AD, citing their familiarity with the content as a way to decrease turnover time and lower costs.

CC and AD are seldom created as part of the production process, let alone overseen by members of the original creative team. As such, third party vendors follow very specific guidelines (such as those provided by the Canadian Association of Broadcasters 2004) which dictate how and what is interpreted/translated, a formula that is applied with very little variation regardless of genre or audience. CC guidelines and standards dictate the type, size and case of font, as well as caption placement and timing (ITC 1999). Similarly, AD guidelines and standards emphasise the importance of prioritising information, anticipating action and relaying information objectively (ITC 2000).

Government and/or broadcasting mandates ensure that CC and AD exist as accessibility strategies so that hearing and vision impaired spectators are able to access entertainment media. As such, these accessibility strategies have not had to withstand the demands of the market, since adoption rates for these services are not linked to an increase or decrease in profits. Whereas ratings are indicative of the price point at which commercial advertisement space can be sold, the number of people who use CC and AD services does not increase or decrease financial revenue. Hence, there is no financial incentive to make current AD and CC services more desirable or increase their marketability because the current business model that exists considers them only as a cost and not as a potential revenue source. Innovation is, therefore, thwarted, since broadcasters are unlikely to contribute financially to a venture from which they will see no financial benefit.

For example, practices and processes associated with CC have not changed within the past 30 years. The purpose of upper-case lettering was related to the inability of North American Line21 television technology in the 1970s to display descending characters such as 'g' and 'y' However, television technology has made considerable advances since that time so that descending characters can be accurately displayed while captioning practices remain essentially the same even though, for example, there is ample evidence (reference) showing that the mixed case fonts are easier to read.

Principle 2: flexibility in use

The design accommodates a wide range of individual preference and abilities.

Connell *et al*. (1997, p. 34)

Guidelines stress the importance of giving users choice as to how they access a product or service. In addition, users should be able to precisely and accurately use a product by adjusting its many adaptable features to suit their needs, including the ability to work at their own pace (Connell *et al*. 1997). The service or product should not require any additional adaptation to be useable (Erlandson 2007).

Individuals who are disabled or those who are deaf are often cited as the primary users of CC and AD. However, we argue that the primary user is actually much more covert: the broadcaster and media producer, who use these services as a means of placating governmental requirements. Broadcasters and producers have one very specific need and preference: to provide CC and AD and to do so incurring little cost. This need and preference are given priority over all others, since broadcasters and producers control the amount of funding and length of time that accessibility service vendors are given to create CC and AD. In addition, there is immense pressure on service vendors to offer the fastest turnaround for the lowest price. Quality is, therefore, sacrificed in order to meet the needs and preferences of the financer of the service, not the individual who uses the service to enjoy entertainment media.

Satisfying the needs and preferences of the secondary user, the individual who is vision- or hearing-impaired, is much more complicated and difficult to address. For CC, research on viewer attitudes towards current caption quality does exist (Harkins *et al*. 1995, Jordan *et al*. 2003).

For AD, significantly less academic literature exists on spectator preferences (Packer and Kirchner 1997). Regardless of what viewers have said, they are unable to customise the CC and AD offered in any way.

The process for making a television and film accessible varies depending upon the user population being considered. For CC and AD, it begins with the broadcaster sending a copy of the master tape to a third party accessibility vendor or to its in-house service. For AD, a team of individuals, often consisting of a describer and an audio production expert, creates a description script, records and edits the description track balancing for volume levels and timing, mixes it with the main programme audio and then submits it to the production studio or broadcaster (WGBH Educational Foundation n.d.b). For CC, often an electronic script is available to the captionist who is responsible for adding, subtracting and adapting information so that viewers understand what is occurring onscreen. The caption data is then encoded onto the programme's video (WGBH Educational Foundation n.d.a) and returned to the broadcaster or production studio. Most AD and CC service providers have some quality control mechanism in place. Although several studios create and produce their own CC and AD, captionists and describers seldom interact with, or receive any form of guidance from, the director.

Strategies for the incorporation of CC and AD into the actual production are extremely rare. Accessibility is not built into the overall production of entertainment media, for directors do not oversee or even approve of CC and AD. We believe that the absence of the director within this process demonstrates perhaps the most egregious departure from universal design theory.

Principle 3: simple and intuitive use

Use of design is easy to understand, regardless of user's experience, knowledge, language skills, or current concentration level.

Connell *et al.* (1997, p. 34)

Guidelines recommend that designs align with the expectations and intuition of users, information should be arranged by importance, accommodate individuals with low literacy and language skills as well as prompt the user before the task and provide feedback before and after the task is completed (Connell *et al.* 1997). Knowledge should be built into designs to reduce complexity (Erlandson 2007).

Once activated, AD and CC are relatively easy to use. However, many of the steps leading to activation and the subsequent deactivation of these services are problematic. The acquisition of entertainment media or attendance at entertainment experiences is often the first and largest barrier encountered. This barrier is made up of many logistical and technical 'curbs' that have yet to be 'cut'. For example, logistical curbs include finding a cinema that is playing a movie with AD and/or CC, while technical curbs encompass activation, use and deactivation. We have outlined the many technical and logistic curbs which face CC and AD users when attending the cinema (Table 1) and watching entertainment media at home (Table 2). While several solutions currently exist, many are difficult or inconvenient to use.

Principle 4: perceptible information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Connell *et al.* (1997, p. 34)

Guidelines include the requirement that the designer should use different modes to disseminate essential information redundantly and legibly. Design should ensure compatibility with devices and processes meant to be used by people with disabilities.

Table 1. Issues with simple and intuitive use at the cinema.

Curb/issue	Group effected	Solution(s)	Problems with solution
Locate a cinema playing desired movie with accessibility service	Blind or low vision	Ask friend/family member to check newspaper	Dependence on others
		Call talking movie listing service (e.g. movie phone)	Information may not be included
		Call theatre directly, speak to theatre staff	Theatre staff may be untrained and unaware of accessible services offered by theatre
	Hard of hearing or deaf	Search online	Information not always available, accurate or updated
		Use newspaper or internet	Information not always available, accurate or updated
Ensure that the theatre actually owns the necessary equipment and that it is clean and functional	Hard of hearing or deaf	Use TTY or relay service to call theatre directly, speak to theatre staff	Theatre staff may be untrained and inexperienced with TTY or TTY is not available
	Blind or low vision and hard of hearing or deaf	Call theatre directly, talk to staff using appropriate assistive technology (e.g. TTY or relay service)	Theatre staff may assume that if a service is advertised it must be available, functional and clean
		Attend movie	Potential disappointment. Service may not be offered or the equipment necessary may be unavailable, inoperable or unclean

Table 2. Issues with simple and intuitive at home.

Issue/curb	Group effected	Solution(s) available	Problems with solution
Television or video on demand schedule inaccessible	Blind and low vision	Use screen reader to access internet-based listings	Requires computer and internet access. Lack of choice
		Ask family or friend to find selected media or read schedule aloud	Inconvenient for all. Dependence on others. Lack of choice
Activating/ deactivating service	Blind and low vision	Ask family or friend to assist	Information unavailable or hard to find. Takes time and effort dependence on others
		Trial and error	Takes time and effort.
		Remember layout of remote and where SAP button/menu is located and what buttons to press to activate it	User does not receive feedback until task is completed. User has to remember visual cues and his/her response
	Hard of hearing and deaf	Remember and go through a series of steps to access captions	Takes time, not intuitive
Using DVD, PVR and VHS menus	Blind and low vision	Ask family or friend to control DVD, PVR or VHS	Inconvenient for all. Dependence on others. Lack of choice
		Remember layout of menu and remote	Non-intuitive, requires concentration
		Use specially adapted remote	Expensive and specialised device

Director's understanding of effective communication

When creating a feature film or television programme, a director needs to realise the advantages and disadvantages of his/her medium and modify his/her message to reflect this awareness. He/She controls the creation of an entertainment experience, responsible for layering and juxtaposing the use of cinematic conventions (such as costumes, lighting, and acting style) in an

effort to manipulate viewer response (Branigan 1984, Bordwell and Thompson 2001). He/She is responsible for ensuring the film, as a whole, accurately and effectively communicates his/her vision, as he/she is the designer of the experience. As such, the director must consider how her target demographic will respond to the stimuli he/she presents and decide whether he/she wishes to play towards or against these expectations. The audience may or may not understand or appreciate the director's intended meaning and, even if they do, may not find it enjoyable. This factors into enjoyment of the entertainment experience, not the effectiveness of the director's communication.

Effectively communicating an entertainment experience means that each of the parts come together to form the whole, an experience greater than any one piece. While members of the audience may not realise the effect that each piece has on their overall experience, the director considers how each of these cinematic conventions can be used to manipulate spectators to experience a specific emotional response (Bordwell and Thompson 2001). For example dialogue, music, sound effects, pitch, tone and speech prosody are combined to communicate some of the meaning and emotion of the content through sound while images and graphics are used to convey meaning and emotion that balance or counterbalance the sound.

Captionist and describer's understanding of effective communication

Captionists focus on the verbatim translation of dialogue, occasionally supplying abbreviated information about music and sound effects. However, directors use music and non-dialogue sound to communicate as well and the absence of this sound stimuli represents an incomplete communication process (Ribrant 1999, Goldberg 2000).

Audio Description Associates (n.d.) and the National Center for Accessible Media (2003) provide a very thorough description of the guidelines and conventions for AD for live and post-production content. The Independent Television Commission (ITC 2000) defines the criteria that are used to assess quality for AD: 'There are three golden rules to description: describe what is there, do not give a personal version of what is there and never talk over dialogue or commentary' (p. 9). When AD is assessed, the 'golden rules' are rarely questioned, nor the focus on the creation of an equal experience rather than an entertaining one. Interestingly, many of these guidelines highlight the complexity of the narrative presentation and the intended effect that the director, as the original designer, has worked to create (Vera 2006, Braun 2007). Yet, few recognise how the describer, as an outsider with little knowledge of the directors intentions, is unequipped to accurately reflect and represent these ideas and effects.

Audio describers realise that it is impossible to describe everything regardless of its importance and that they are creating an interpretation based on their understanding and some abstract guidelines. Captioning is mostly verbatim dialogue and there is little recognition that other audio stimuli are important for the effective communication of the director's vision. Regardless, more attention must be paid to how CC and AD alter and influence the messages of the original designer.

Principle 5: tolerance for error

> The design minimizes hazards and the adverse consequences of accidental or unintended actions.
>
> Connell *et al*. (1997, p. 35)

Connell *et al*. (1997) suggest that fail-safe features and warnings of hazards or errors should be provided in order to assist in meeting this principle. In the context of CC and AD, minimising adverse consequences or unintended actions relates to issues resulting from miscommunication and error contained in the CC or AD. Adverse consequences of errors in CC or AD could range from misunderstanding or misinterpretation of the content, so that an individual might be embarrassed about participating in group discussions, to poor performance in an educational context that

depends on learning information presented in video content, to missing or misunderstanding emergency information delivered through television media with catastrophic consequences for the viewer.

During broadcast it is difficult to provide immediate remediation for errors or inaccuracies in CC or AD. There is also little opportunity for viewers to provide feedback and have that feedback acknowledged by the broadcaster to make corrections in future broadcasts. As the third party service providers are often providing the CC or AD, the director and broadcaster (or cinema) must rely on the quality control mechanisms put in place by those providers. If the director does not view the AD or CC work, then not only is a step missing from the quality control process but also, the work is published without the director's consent.

In countries that depend on legislation or regulation for CC or AD, viewers must often take legal action in order to effect change. Not only is this a costly approach that is out of the reach of most viewers, but also, it cannot be carried out in a timely fashion, often taking years to resolve.

Determining which service or individual provided the CC or AD can also be difficult as it is not always available as part of the credits or content. Fail-safe mechanisms in the production and delivery of CC and AD must rely on quality control mechanisms put in place by broadcasters and service providers who do not necessarily have the time or funds to do so.

One mechanism that is available to ensure that CC and AD are broadcast at the broadcaster site is a constant monitoring of all feeds including CC and AD tracks. In addition, there are backup copies on digital servers and redundancy in the broadcaster's system so that, if there is a broadcast error, a backup copy can be immediately mounted.

Principle 6: low physical effort

> The design can be used efficiently and comfortably, with a minimum of fatigue.
>
> Connell *et al*. (1997, p 35)

This principle applies to the physical ergonomic principle of maintaining an appropriate body posture and reducing the sustained force or repetitive actions required to accomplish a task or interact with a design. This reduces the strain on the physical system that can cause fatigue and injury.

From a physical perspective, this principle does not apply to the consumption of accessible media. There are many different types of physical setups and displays that can be used for viewing and interacting with media, including televisions and computer monitors: the principle would apply to the design and setup of these devices within a viewer's physical environment.

The cognitive effort required to use the design efficiently, comfortably and with a minimum of fatigue could be considered as an addendum to this principle. We suggest that cognitive effort is exerted when the AD or CC contains errors such as spelling or timing errors, inaccurate or incorrect information, is incomplete or believed to be untruthful. Hewes *et al*. (1989) suggest that cognitive effort increases as people expend effort in deriving meaning from information. The more credible the source, the less effort is expended: the less veracious the information is believed to be, the more cognitive effort is spent on gathering additional information to validate the accuracy of it. Brosius *et al*. (1996) found that viewers are able to learn and comprehend news information when the news text (in verbal or written form) corresponds directly with the visual images, compared with images that are either divergent from the story or not relevant but still related to the story. Where there is either divergence between the text and image or where the images are simply standard news images that relate to the story but do not correspond directly to it, viewers do not perform as well on recall and comprehension measures as when the text and images are complementary. Brosius *et al*. suggest that several possible

information and cognitive processes may influence this effect: (1) when images and text do not correspond, it is a distraction and people cannot focus on what is important; (2) when text and images correspond, they trigger cognitive retrieval mechanisms that are complementary (corresponding images act as retrieval cues for stored text data) and (3) images which do not add any relevant information to the text are ignored but when images add information they are attended to and can thus make it easier to remember/process in the cognitive system. Unfortunately, there are very few studies which examine these issues with non-news programming such as drama or mysteries or with individuals who use CC relying mostly on visual information or who use AD where content presentation is mostly audio. We can speculate that when redundancy is limited because of the reduction in the types of media used, as is the case for CC and AD, the information processing requirements on the audience is higher. Introducing errors or ways in which the assistive technology does not correspond to the original image or audio track, such as missed words, timing errors, etc., will result in misunderstandings and reduced comprehension – inefficiencies increasing cognitive load potentially resulting in fatigue and decreased enjoyment.

Principle 7: size and space for approach and use

> Appropriate size and space for approach, reach, manipulation, and use regardless of body size, posture or mobility.
> Connell *et al.* (1997, p 35)

Like principle 6, principle 7 is aimed at accommodating physical differences and different body sizes and positions so as not to cause injury to the human physical system. This includes line of sight in a seated or standing position, keeping controls and displays within an arms-length reach, torso bending positions and hand or grip size for a general population (Helander 2005) and for specialised populations such as people with disabilities (Kroemer 2006).

Again, this does not specifically apply to CC or AD because they are not physical entities. For the physical setting in which viewers consume media (e.g. theatre, at home and in public settings), this principle would apply directly. CC occupies a physical space on a screen. Standards such as the Canadian Association of Broadcasters (2004), *Closed captioning standards and protocol for Canadian English Language Broadcasters*, address positioning issues of captions within the video document. With respect to physical on-screen location, the Canadian Association of Broadcasters (2004) standard recommends:

1. Use one- or two-line captions placed just above or below the essential visual element.
2. Move the captions to the top or bottom of the screen if there is no essential visual element there.
3. Pop-on captions may be moved to any location on the screen, using three lines if necessary. They should be centre justified or left justified, never right justified.
4. If spoken words or lyrics are different from a textual graphic (for example, when there is talking over end credits), full captions must be included and moved using one of the techniques, pop-on or rollup (sic), so as to interfere as little as possible with the essential visual elements.
5. In the case of an extreme close-up of a person, do not cover the person's mouth with captions because many caption consumers speech read along with reading the captions. (p. 5)

AD is an audio signal that has no physical spatial component. However, we could extend this principle to include quality control settings such as volume levels, and pace. Viewers should be able customise these settings to their own comfort level and preferences.

A new strategy

A director considers how every aspect of a production factors into an audience's enjoyment of an entertainment experience, often making several minor variations between takes to ensure that his/her vision is captured on film. He/She works with his/her creative team to strategically use cinematic conventions to articulate this vision. The result is a collaboration which is unified through directorial control (Benedetti 1985). For example, the costume designer would not be asked to develop, create and execute costume design independently without the supervision and guidance of the director. If he did, the costume designs would be the interpretation of the designer and might not fit with the director's vision of them. At best, it would be a reasonable approximation; at worst, it would be totally unacceptable. This is a clear example of how the director must oversee all aspects of the interpretation to ensure there is a cohesive implementation of his/her vision. The addition of CC and AD affects an audience's interpretation of this vision. Hence, we ask: why is it deemed acceptable for a third party, such as a describer or captionist, to independently attempt to convey a director's vision or interpretation of a piece of content?

It is the role of a director to present a coherent vision to his audience; he/she designs the entertainment experience (Ball 1984). We suggest that CC and AD are two of the many creative components that comprise the whole entertainment package and are not separate entities. As such, the director and his/her creative team should determine how CC and AD can best be used to create an entertaining and enjoyable entertainment experience for viewers. The creative team knows best what aspects of their production are essential to the attainment of an entertainment experience that is rewarding and enjoyable. This means giving the director the artistic freedom to implement a CC or AD strategy that fits his/her overall vision. We suggest that this fits better with the principles of universal design because it abides by its two main tenets: (1) designed at the beginning of the process rather than 'after-the-fact' and (2) the designer of the product is involved and actually drives the process.

The director produces creative content with the goal of stimulating his/her audience to achieve a specific and often pre-indentified emotional reaction. For example, an individual who rents a horror film, whether blind, sighted, or deaf, does so with the express intention of being entertained. Within the context of a horror film, entertainment may be defined by the degree to which spectators are scared by what is presented or, in some cases, amused by the director's attempts to manipulate audience experience to achieve this reaction. We believe that CC and AD practices misinterpret the principle of equitable use by defining what is presented by the director as information rather than stimuli.

Current CC and AD practices hold that equal access to the aural and visual information makes for equitable use. However, when a director plays eerie music as a character veers from the group to explore a dungeon on his own, he/she does so with the goal of stimulating his/her audience, not informing them. The CC user is given access to extremely basic information (♪Eerie music♪) so that the audio stimuli can be translated into text. Clearly, there is a large difference between knowing that eerie music is playing and experiencing the eerie music. By giving content creators control over the implementation of CC and AD, access to an alternative stimulus that allows for an equivalent emotional response to that of a sighted or hearing user may be possible. Some directors have already experimented with this approach in CC implementations, using static emoticons (Fels *et al*. 2005a) and animated captions (Lee *et al*. 2007, Rashid *et al*. 2007); and using first person AD (Fels *et al*. 2005b). Other directors may choose different strategies to realise their vision. For example, decisions in AD could include determining whether the AD is open or closed, neutral or subjective, highly stylised or conventional. For CC, decisions might include whether or not to vary font type, size and colour or include animation.

Much like any other aspect of a television or film production, the director needs to have an overview of each area he/she supervises, but not an in-depth understanding of its inner workings

(Benedetti 1985). This role is left to the director of that area. For example, the director works with the lighting director to develop a lighting strategy that fits his/her overall vision of a scene. The director needs to understand the basics of how lighting is technically achieved as well as its constraints, yet relies mostly on the ingenuity of the lighting director to assess the feasibility of his/her requests as well as to provide alternatives. We assert that audio describers and captionists should operate under a similar system, reporting to or, at least, consulting with, a director of accessibility services. This team would then meet with the production's director to develop an accessibility strategy that re-interprets the 'look and feel' of the production. The captioning and description team would then work together to develop prototypes that would, in turn, be approved by the director before being produced. The final product should receive similar attention.

While user feedback from cast, crew, describer and audience is essential to understanding how the accessibility features affect the enjoyment of performances, we believe that content creators should have the opportunity to creatively challenge viewers. Presenting the director with stringent guidelines or rules that must be obeyed for fear of displeasing the spectator infringes upon his/her right as an artist. Directors have the artistic license to create an end product which represents their own unique vision and, we believe this should extend to the creation of CC and AD. It is up to these individuals to determine what aspects of their production need to be communicated and how best to communicate these aspects to individuals who use CC and AD. Whether or not an individual is actually entertained by what is presented is dependent on the individual's preference for style, story, and method of presentation. Hence, directors should have the opportunity to make an informed decision as to whether their CC and AD will stray from conventions, much like any other aspect under directorial control. It may be more appropriate to offer guidance in the form of suggestions rather than the 'golden rules', an approach which Pfanstiehl & Pfanstiehl advocate (Uncredited 1985). This process would give directors the flexibility of use that principle 2 advocates by allowing them to make creative choices that do not sacrifice the dissemination of their intended message.

Some research has been carried out to support the premise of director involvement. Fels *et al.* (2005a), Rashid *et al.* (2007) and Lee *et al.* (2007) worked with members of the television broadcast industries to create CC strategies that were reflective of the creative team's intent. Researchers facilitated the creation of CC strategies by providing members of the content creation team with an introduction and overview of current research on CC as well as the basic principles of universal design theory. Together, they decided that the director and script writer should oversee and participate in the development, creation and execution of the CC, ensuring that the captions not only translated dialogue but the emotions which were apparent in the way it was delivered. In working with these content creators, they found that some of the artistic choices made by the directors tended to go against our initial assessment of the director's intent. For example, the captionist(s) thought that the director was trying to convey a character's sadness in a song when, in fact, it was fear. We posit that the adoption of this alternative process may enable AD and CC to better adhere to principle 5 by reducing the amount of errors made by captionists and describers.

Fels *et al.* (2005b, 2006) used a similar creation process for an alternative AD strategy for an animated adult sitcom called 'Odd Job Jack' which is shown on the Comedy Network. The scriptwriter, director and sound team were involved in creating and producing the AD. The creative team decided that a first-person narrative approach would be the best way to convey the visual comedy that was presented onscreen. Researchers found that blind and low-vision users find the alternative approach less informative, yet more entertaining. Further research could indicate a need to redefine equitable use within the context of the entertainment experience.

Using similar content, Konstantinidis *et al.*'s (2008) market study assessed the feasibility of offering downloadable audio-only episodes of television shows which included AD created by the production team. Many participants agreed that they would use the service and be willing to pay $1/episode. Participants were less enthusiastic about the idea of downloading the conventional

AD track by itself. They agreed that listening to audio only versions of television shows created by the content creation team was more entertaining. We suggest that the findings of this study seem to indicate a potential source of revenue for broadcasters while simultaneously serving as a means to better the quality of AD for television and film viewers. In addition, it would allow the AD process to become more equitable (principle 1), as it would create an additional revenue stream for broadcasters while boosting quality and engaging more users. The marketability of AD would also provide broadcasters with more incentive to make their products simpler and more intuitive to use (principle 3) by adding talking menus (Greening and Rolph 2007) and other features to their products and, in doing so, further increase product desirability.

Conclusion

CC and AD provide television and film audiences with alternative means to access information, as audio stimuli substitute for video and vice versa. However, the original designer, the director, does not conceptualise, develop, create or even assess the effectiveness of the CC and AD that later becomes attached to his/her work. Whereas every other aspect is shaped to form parts of an inextricable and greater whole, the CC and AD exist on the outside, noticeably different parts that do not fit, as they have not been created by the same person with the same vision. Not only should the creation of CC and AD be left to the director, we hold that the criteria through which these assessments are made as well as the assessment itself should fall under directorial control.

While CC and AD were established as means to ensure equal access to entertainment, we believe that the current method by which this is achieved represents a less-than-ideal realisation of this goal, especially considered in the light of universal design and engineering theory. In effect, the current model for CC and AD kicks the original designer to the very curb he is best equipped to cut. The process that we have advocated here seeks to remedy some of these problems by giving television and film directors the opportunity to develop, supervise and execute their own accessibility strategies through the creation of CC and AD that fits their unique vision.

Acknowledgements

References

Abrahamian, S., 2003. *EIA-608 and EIA-708 closed captioning* [online]. Available from: http://www.evertz.com/resources/eia_608_708_cc.pdf [Accessed 21 September 2009].

Audio Description Associates, n.d. *Audio description: the visual made verbal* [online]. Available from: http://www.audiodescribe.com/article1.html [Accessed 9 April 2007].

Ball, W., 1984. *A sense of direction*. New York: Quite Drama Book.

Benedetti, R.L., 1985. *The director at work*. Englewood Cliffs, NJ: Prentice Hall.

Bordwell, D. and Thompson, K., 2001. *Film art: an introduction*. 6th ed. New York: McGraw Hill.

Branigan, E., 1984. *Point of view in the cinema*. Berlin, Germany: Mouton.

Braun, S., 2007. Audio description from a discourse perspective: a socially relevant framework for research and training. *Linguistica Antverpiensia* [online], 6, 1–13. Available from: http://epubs.surrey.ac.uk/translation/1 [Accessed 8 August 2008].

Brosius, H.B., Donsbach, W., and Birk, M., 1996. How do text-picture relations effect the information effectiveness of television newscasts. *Journal of Broadcasting and Electronic Media*, 40 (2), 180–195.

Canadian Association of Broadcasters, 2004. *Closed captioning standards and protocol for Canadian English Language Broadcasters* [online]. Available from: http://www.cabacr.ca/english/social/captioning/captioning.pdf [Accessed 12 January 2006].

Connell, B.R., *et al*., 1997. The principles of universal design. *In*: M.F. Story, J.L. Mueller, and R.L. Mace, eds. *The universal design file*. New York: State University Press, 34–35.

CRTC (Canadian Radio–Television and Telecommunications Commission), 2004. *Broadcasting public notice CRTC 2004-2* [online]. Available from: http://www.crtc.gc.ca/archive/ENG/Notices/2004/pb2004-2.html [Accessed 7 February 2007].

CRTC (Canadian Radio-television and Telecommunications Commission), 2007. *Broadcasting public notice CRTC 2007-54* [online]. Available from: http://www.crtc.gc.ca/Eng/archive/2007/pb2007-54.htm [Accessed 21 September 2009].

Emiliani, P.L. and Stephanidis, C., 2000. From adaptations to user interfaces for all. *Paper presented at the 6th ERCIM workshop CNR-IROE*, Florence, Italy.

Erlandson, R.F., 2007. *Universal and accessible design for products, services and processes*. New York: CRC Press.

FCC, 2005. *Rules and regulations - 47 C.F.R. §79.1* [online]. Available from: http://www.fcc.gov/cgb/dro/captioning_regs.html [Accessed 21 September 2009].

Fels, D.I., *et al*., 2005a. Emotive captioning and access to television. *Proceedings of the eleventh Americas conference on information systems (AMCIS)*, Omaha, 2330–2337.

Fels, D.I., *et al*., 2005b. Odd Job Jack described – a first person narrative approach to described video. *Journal of Universal Access in the Information Society*, 5 (1), 73–81.

Fels, D.I., *et al*., 2006. A comparison of alternative narrative approaches to audio description for animated comedy. *Journal of Visual Impairment and Blindness*, 100 (5), 295–305.

Fleischman, M. and Roy, D., 2007. Situated models of meaning for sports video retrieval. *Proceedings of NAACL HLT 2007*, Companion Volume, Rochester, 37–40.

Goldberg, M., 2000. *Some suggestions on "how to read a film"* [online]. Available from: http://faculty.washington.edu/mlg/students/readafilm.htm [Accessed 21 September 2009].

Goldman, M. and Goldman, S., 1988. Reading with closed captioned TV. *Journal of Reading*, 31 (5), 458–461.

Greening, J. and Rolph, D., 2007. Accessibility: raising awareness of audio description in the UK. *In*: J.D. Cintas, P. Orero, A. Remael, eds. *Media for all: subtitles for the deaf, audio description and sign language*. New York: Rodophi Press, 127–138.

Guillory, H.G., 1998. The effects of keyword captions to authentic French video on learner comprehension. *CALICO Journal*, 15 (1–3), 89–108.

Harkins, J.E., *et al*., 1995. *Non-speech information in captioned video: a consumer opinion study with guidelines for the captioning industry*. Washington, DC: Gallaudet Research Institute. Available from: http://gri.gallaudet.edu/Publications/

Helander, M., 2005. *A guide to human factors and ergonomics*. 2nd ed. Boca Raton, FL: CRC Press.

Hewes, D.E., *et al*., 1989. Cognition and social information-gathering strategies. *Human Communication Research*, 16 (2), 297–321.

ITC (Independent Television Commission), 1999. *ITC guidance on standards for subtitling* [online]. Available from: http://www.itc.org.uk/codes_guidelines/broadcasting/tv/sub_sign_audio/subtitling_stnds/?a=87101 [Accessed 8 August 2008].

ITC, 2000. *ITC guidance on standards for audio description* [online]. Available from: http://www.itc.org.uk/codes_guidelines/broadcasting/tv/sub_sign_audio/audio_description_stnds/?a=87101 [Accessed 8 August 2008].

Jensema, C.J., 1998. Viewer reaction to different television captioning speeds. *American Annals of the Deaf*, 143 (4), 318–324.

Jordan, A.B., *et al*., 2003. *The state of closed captioning services in the United States*. National Captioning Institute Foundation, 1–47. Available from: http://www.dcmp.org/caai/nadh136.pdf [Accessed 23 September 2009].

Konstantinidis, B., *et al*., 2008. Described video information and animation: a case study of Odd Job Jack. *Journal of Social and Humanistic Computing*, 1 (1), 108–122.

Kroemer, J.H., 2006. *Extra-ordinary ergonomics: how to accommodate small and big persons, the disabled and elderly, expectant mothers, and children*. Boca Raton, FL: CRC Press.

Lee, D.G., Udo, J.P., and Fels, D.I., 2007. Enhanced captions. *Computers and Entertainment* [online], 5 (2). Available from: http://portal.acm.org/citation.cfm?id=1279540.1279551&coll=GUIDE&dl=ACM&idx=J912&part=magazine&WantType=Magazines&title=CIE [Accessed 3 September 2008].

Linebarger, D.L., 2001. Learning to read from television: the effects of using captions and narration. *Journal of Educational Psychology*, 93 (2), 288–298.

Media Access Australia, 2007. *Audio description* [online]. Available from: http://www.mediaaccess.org.au/audiodescription/c.aspx?id=35 [Accessed 12 April 2007].

National Center for Accessible Media, 2003. *Rich media accessibility* [online]. Available from: http://ncam.wgbh.org/richmedia/strategies/XAD.php [Accessed 19 October 2004].

Packer, J. & Kirchner, C., 1997. *Who's watching?* [online]. American Foundation for the Blind. Available from: http://www.empowermentzone.com/watching.txt [Accessed 15 November 2007].

Peli, E. and Fine, E.M., 1996. Evaluating visual information provided by AD. *Journal of Visual Impairment and Blindness*, 90 (5), 378–385.

Pettitt, B., Sharpe, K., and Cooper, S., 1996. AUDETEL: enhancing television for visually impaired people. *British Journal of Visual Impairment*, 14 (2), 48–52.

Rashid, R., *et al*., 2007. Dancing with words. *Proceedings of the 6th ACM SIGCHI conference on creativity & cognition* [online]. Available from: http://portal.acm.org/citation.cfm?id=1254960.1255007&jmp=cit&coll=GUIDE&dl=ACM&CFID=1553729&CFTOKEN=67805998#CIT [Accessed 3 September 2008].

Ribrant, G., 1999. *Style parameters in film sound* [online]. Available from: http://filmsound.org/bibliography/stylepara.pdf [Accessed 21 September 2009].

Rose, D.H. and Meyer, A., 2002. *Teaching every student in the digital age*. Alexandria, VA: Association for Supervision and Curriculum Development.

Schmeidler, E. and Kirchner, C., 2001. Adding audio description: does it make a difference. *Journal of Visual Impairment and Blindness*, 95 (4) 198–212.

Shea, P., 2000. Leveling the playing field: a study of captioned interactive video for second language learning. *Journal of Educational Computing Research*, 22 (3), 243–263.

Snyder, J., 2004. *Audio description: the visual made verbal* [online]. Available from: http://www.audiodescribe.com/article1.html [Accessed 25 November 2004].

Stephanidis, C., 2001. Adaptive techniques for universal access. *User Modeling and User-Adapted Interaction, 11* (1–2), 159–179.

Stewart, M.A. and Pertusa, I., 2004. Gains to language learners from viewing target language closed-captioned films. *Foreign Language Annals*, 37 (1), 438–447.

Turner, J.M. and Colinet, E., 2004. Using audio description for indexing moving images. *Knowledge Organization*, 31 (4), 222–230.

Uncredited, 1985. The play's the thing. *British Journal of Visual Impairment*, 3 (3), 91–92.

US Department of Justice, 2003. *ADA home page* [online]. Available from: http://www.usdoj.gov/crt/ada/adahom1.htm [Accessed 3 October 2003].

Vera, J.F., 2006. Translating audio description scripts: the way forward? Tentative first stage project results. *MuTra 2006 Audio Visual Translation Scenarios: Conference proceedings,* Copenhagen. 148–181.

Wall, J.S., 2002. TV broadcasting for all. *Paper presented at the open workshop on standarization in the field of subtitling*, Seville, Spain.

W3C Web Accessibility Guidelines, 2003. *Web content accessibility guidelines 1.0* [online]. Available from: http://www.w3c.org/WAI/ [Accessed 3 October 2003].

Watkins, M. and Charlson, K., 2002. Accessible video services for people who are blind or visually impaired. *In*: G.P. Handman, ed. *Video collection development in multi-type libraries*. 2nd ed. Westport, CT: Greenwood Press.

WGBH Educational Foundation, n.d.a. *Captioning: frequently asked questions* [online]. Available from: http://main.wgbh.org/wgbh/pages/mag/services/captioning/faq [Accessed 21 September 2009].

WGBH Educational Foundation, n.d.b. *Descriptive video service: frequently asked questions* [online]. Available from: http://main.wgbh.org/wgbh/pages/mag/services/description/dvs-faq.html [Accessed 21 September 2009].