# Immersive, Creative, Inclusive:
# Areas of cross-fertilization between accessible captions for D/deaf audiences for the stage and for the screen

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## Abstract

In a deliberate and valiant effort to adapt to the conditions created by the recent pandemic, many theatre companies across the globe shifted their activities from the stage to online video platforms. But in releasing large portions of their back-catalogues at speed, opportunities to make such shows accessible have been under-exploited. This migration has created an unprecedented opportunity to examine the way accessible practices are transferred from stage to screen and has brought into sharp focus the somewhat inadequate provision for accessibility of online video platforms. While the very practice of making these shows available online, often at no cost to the viewer, has made them more _socially_ accessible, practical accessibility for portions of the audience, such as the D/deaf community, has often been ignored or addressed in a low fidelity way. Through lack of time, lack of expertise or lack of resources, many companies have resorted to the use of auto-captioning tools, or the most basic of captions. Rarely do such captions come close to capturing the creativity of the shows they represent. This paper represents a call to arms for the development of bespoke tools to support better, more immersive and creative, retroactive captioning of stage productions presented as videos.

**Key words**: captions, subtitles, theatre, accessibility, technology, immersive, creativity, integration, audism.

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## 1. Introduction

"We were walking innocently into the future with no idea what was coming" reflects Nica Burns, chief executive of Nimax Theatres, London (Jones, 2021). While the long-term consequences of the Covid-19 pandemic on theatres are yet to be fully measured and processed, it is evident that venues and companies have been greatly affected in many different and occasionally unexpected ways, from putting staff on furlough to financial losses, followed by false starts before finally reopening with reduced capacity. This crisis has brought to the fore how reliant the entertainment industry is on people coming together in a venue, auditorium or playhouse. Something that was completely taken for granted is now the subject of much debate and anxiety in the sector at large: the economic impact of theatre closures was felt well beyond the confines of playhouses with the theatrical supply chain feeling the effects of the pandemic. Actors became unemployed and were occasionally excluded from government support, while suppliers of sound, lighting, video technology, wig and costume makers also experienced the full effect of the pandemic. The fragility of the industry was revealed even more starkly with the growing realization that "a lot of people who make up the industry are self-employed or freelance" (Jones, 2021). Both metropolitan and regional theatres – described by Tom Morris, the artistic director at Bristol Old Vic, as "a vital talent pipeline for the UK's […] creative sector" (Brown, 2020) – fell prey to these circumstances, with some going into administration and others essentially moving their entire activities online.

In an effort to adapt to the conditions created by the pandemic, keep activities going, stimulate production and make their presence felt in spite of these challenges, theatre companies – not just in the UK where our project is based – across the globe shifted their activities from the stage to online video platforms, particularly YouTube[1] and Facebook, while some companies were prompted to create their own online platforms. The material they released on these platforms typically represented portions of their back-catalogues, but opportunities to make such shows accessible were under-exploited. Members of the D/deaf community experienced further issues and highlighted that although there is "some semblance of access […] many times it is faulty or access isn't good enough" (Sanchez, 2021). Indeed, as a lot of the content put online is video based there are two key obstacles to overcome. First, there are issues with captioning *as a tool*: captioning is not readily available on all video platforms and whilst auto-captioning is becoming normalised, there are frequent complaints about its levels of accuracy. Second, there are issues with captioning *as an artistic practice*: captioning, still often an afterthought, does not necessarily reflect, mirror, capture or embody the artistic qualities of the performances brought online, even where the original performances themselves feature a more creative type of captioning. This article now examines existing creative captioning practices for the screen and stage in order to provide an insight into the creative possibilities and limitations for moving accessible and inclusive stage performances online in the form of videos.

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[1] See, for instance, the YouTube channel of our partner for this project, Red Earth Theatre, at https://www.youtube.com/user/RedEarthTheatre/videos.

The migration from the stage to online video platforms created an unprecedented opportunity to examine the way accessible practices were transferred from stage to screen and brought into focus the somewhat inadequate provision for accessibility of online video platforms, a problem to which this article responds. While the very practice of making these shows available online, often at no cost to the viewer, resulted in them being more available to the general public, for example allowing regional audiences to access London theatre performances, accessibility for members of the D/deaf community and for members of the audience with hearing loss was often ignored or addressed in a low fidelity way.[2] Either through lack of time, lack of expertise or lack of resources, many companies resorted to the use of auto-captioning tools, or the most basic of captions. Rarely do such captions come close to capturing the creativity of the shows they represent, some theatre companies having a history of, and building their identity around, pioneering work to embed accessibility into their creative processes. The transition from stage to screen presents the opportunity to look at the way accessibility for D/deaf audiences has translated onto the screen and to reflect on areas of cross-fertilization between accessibility techniques for the screen and the stage, as well as to explore where best practice for one can be implemented or adapted for the other.

We place this discussion in the context of our recent research project entitled "Integrated Immersive Inclusiveness." This project was carried out in collaboration with Red Earth Theatre, a small touring theatre company based in the Midlands (United Kingdom) with an established track record and commitment to research in inclusive integrated communication for young audiences (with a focus on D/deaf audiences). It looked at creatively embedding access both on stage and on screen.[3] One part of the project was the development of paratextual video material to advertise the kind of inclusive practices that feature in Red Earth Theatre shows, a film that straddles the line between screen and stage, as will be discussed below. This film is largely a hybrid product in that it uses a stage set-up (the actors in the film are portrayed on a theatre stage in front of a piece of set used for one of Red Earth's shows), but also features creative captions of the kind found in some films.[4] The film prompted the researchers to reflect on the important areas of overlap in terms of captioning for the stage and for the screen – areas that are yet to be fully explored and developed. Those areas of

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[2] While the label "D/deaf" (or "d/Deaf") is one that is currently more and more challenged in various corners of academia and society for failing to capture the fluidity of identity and the changing levels of intersectionality within the deaf community, we use it in this article in line with other scholars in the field (Anglin-Jaffe, 2015; Zárate, 2021) for lack of a better or more widely accepted alternative, and on the understanding that the D/deaf community is one that is fluid and socially constructed.

[3] The project's website can be found at https://immersivetheatrecaptions.wordpress.com/. It includes the tools we developed as part of the project to further embed captions into artistic and technical processes, as well as a tentative set of guidelines for the creation of captions for the stage.

[4] We use the term "caption" to refer to the process of converting and presenting spoken word (as well as other information such as name of the character who is speaking or singing and descriptions of any sound effect or music) into text. The term "caption" can apply to both stage and screen. The captions used in the video we created with Red Earth would be described as "creative" by McClarty (2012, p. 140). They are captions that experiment with typeface, size, position, rhythm and effects that interact with or feed into the narrative and aesthetic qualities of the material. It is noteworthy that McClarty's concept takes its root in intralingual stage translation and emphasises their collaborative aspect – an aspect we also discuss below. The term "subtitle" is only used here in the context of screen products.

overlap between captioning for the screen and for the stage can help us navigate and reflect on the process through which stage performances may be moved to screens: indeed, the move to video format means that we can look productively at existing screen practices regarding (creative) captioning, and explore whether and how these can be relied upon for online (video) theatrical productions, with special reference to aspects related to typeface, size, position, effects and design, where greater understanding will enable more integrated and immersive captions.

This article first discusses the impact of the recent pandemic on the D/deaf community and explores what the move to online video platforms has meant for D/deaf audiences in terms of ease and comfort of access. With auto-captioning often proving inaccurate or inadequate in its low-level artistic and aesthetic integration, we consider the possibility of using a more creative presentation of captions. Although captions which display features that blend with the audiovisual features of the video content are not a new invention, we argue here that recent work in the area of Accessible Filmmaking opens up some interesting theoretical and practical approaches to the greater integration of creative captions into artistic productions in general, and more specifically here in the video rendering of theatrical productions. The article examines practices at the nexus of screen and stage and builds on work in other sectors of the audiovisual industry, including Accessible Filmmaking, for embedding accessibility more readily into creative processes. In the light of our project with Red Earth Theatre and the paratextual film we created with them, we provide an examination of the protagonists, tools and workflows for integrating captions into the video rendering of stage performances. This article then ends with a call to arms for the development of bespoke tools to support more immersive, creative, retroactive captioning of stage productions presented as videos.

## 2. Creative captioning for the screen: an old idea with a new twist

Most companies catering for film products will have a set of subtitling guidelines. These guidelines are often detailed, precise and thorough, and may indeed account for some aspects of a film's aesthetic presentation (particularly as far as the timing of subtitles in relation to shot changes is concerned). Be that as it may, these conventions are "often characterised by a somewhat utilitarian view" (Romero-Fresco, 2019, p. 129), because they try to cater not for specific, but for all possible situations. As a result, the impact of the presence of subtitles on the visual composition of a film is almost systematically overlooked (Romero-Fresco, 2019, p. 129). Whether on streaming platforms or on DVD/Blu-ray, the fact that the default setting for captions is usually "off" only adds to the sense of afterthought as a majority of viewers do not see them. They are an addition to the film, a separate system, and thus generally not subject to the aesthetics of the material. A recent study by the charity *Stagetext*,[5] however, suggests that this trend may be changing, and that four out of five young people use video captions "some or all of the time" (Youngs, 2021).

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[5] Stagetext is a deaf-led charity that works on making the arts more accessible. While the company's founders originally worked on theatre captioning and now provide captions for over 3000 theatre shows each year, they have expanded their portfolio and now also do work on making museums, galleries, and also live and online (video) events more accessible.

And yet, for as long as captions for the screen have existed, in the form of intertitles or as more traditional subtitles usually displayed at the bottom of the screen or projection area, efforts have been made to integrate them artistically and aesthetically into films. From the choice of typeface in the intertitles of W. W. Young's *Alice in Wonderland* (1915) to more recent noteworthy efforts to further integrate captions (whether in the form of intertitles or subtitles) into a film's aesthetics such as the version of Timur Bekmambetov's *Night Watch* (2004) that was released in cinemas or the *John Wick* series, to mention but two examples from a growing body of work, the idea of "creative subtitling" (Foerster, 2010; McClarty, 2012) or "integrated titles" (Fox, 2018) is not an entirely new one. These subtitles may be added post-hoc, as in *Night Watch*, and created specifically for foreign-language audiences, or they may be a part of the original material, as in the *John Wick* series (with these subtitles then translated for foreign-language audiences). In either case, the film directors may take charge of the subtitling process, treating them as an integral part of the film's aesthetic: Bekmambetov collaborated with Fox Searchlight to release an international edit with the ambition of turning the subtitles into "another character in the film, another way to tell the story and to enhance the visual experience of the spectators" (Rawsthorn, 2007). Similarly, Stahelski commented on the reason for adding integrated titles: "I think it had to do with tone. Most people use subtitles to get across information or do what they were there for, translation. We needed hints with tone" (Graham, 2014).

What is crucial here is artistic control and the level of involvement of directors and producers in the creation of subtitles, an aspect we will return to below in the context of the stage-to-video ecosystem. This opens up the possibility, as our project with Red Earth does for stage performances, to reflect further on the integration of captioning into creative processes for accessibility purposes (whether for foreign-language or for D/deaf audiences, or indeed where these intersect), so that instead of being just tacked on to a film after production is completed, captions become a fully-fledged part of the creative workflow, interacting artistically and aesthetically with a film's other semiotic systems. With this approach, accessibility practices are integrated into a film's creative core: such practices are also more inclusive in that they do not target only a section of the audience, but rather are there for all members of the audience to experience and enjoy. The creative possibilities afforded by integrated captions are endless; indeed, we will see below that their open-ended nature may in fact provide one explanation why there is not more take-up of these practices in mainstream film and media, or indeed video rendering of stage performances. However, we argue here that creative subtitles should be considered "an integral part of [a film]" and are "one more option available for those filmmakers who would like to consider translation and accessibility as part of the (post-) production of their films" (Romero-Fresco, 2019, p. 131).

Screens are not the only medium for which accessibility and inclusiveness can be integrated into creative processes: developments for the stage provide a different yet closely related perspective on creative captioning. The differences in medium necessarily mean that the technologies used are different: subtitles (for the screen), whether "creative" or not, are designed to appear and disappear at fixed times, whereas captions (for the stage) usually need to be timed in such a way that they remain in synchrony with the live performances. As is the case for film, much work remains to be

done to further define and refine the integration of accessibility practices into creative processes for the stage, but the overlapping areas between integrative workflows for these different mediums illuminate key questions for both.

## 3. Areas of overlap between captions for the screen and the stage

We begin this section by acknowledging the epistemological difficulty of analysing creative captions. On the one hand, as noted above, it is necessary for most companies catering for film products to have a set of guidelines, or even hard-and-fast rules, for the creation of captions in order to be able to demonstrate some consistency across programmes and provide benchmarks to subtitlers. On the other hand, the "creative" nature of creative captioning means that it is impossible to describe, never mind prescribe, everything that creative captions might achieve on an artistic or aesthetic level. It is always possible that caption creators will come up with new ways to design and display captions, or to make them interact with the audio or visual channels of the material being captioned.[6] And yet this has not prevented some scholars from attempting to devise taxonomies to try and capture what creative captions actually are (McClarty, 2012; Romero-Fresco, 2019). Such taxonomies are first and foremost descriptive (rather than prescriptive) and provide us with a good overview of the state of play of what is currently being done in terms of creative captioning, usually by using more traditional captions (displayed at the bottom of the screen, with the same unchanging features, such as font, size and colour) as the point of reference. Beyond their descriptive and nomenclatural function, these taxonomies also provide a starting point for designing electronic tools that can allow for the creation of captions that display creative features, but also for framing our consideration of what is achievable or replicable in live performances. Conversely, they can also provide inspiration for stage performances moving online by defining the realm of what is possible.

Creative captions on screen are generally categorised in terms of the ways that their "font, size, position, rhythm and other specific effects" (Romero-Fresco, 2019, p. 129), particularly those that support the narrative's aesthetics, contribute to the aesthetic identity of the material they caption. After examining the creative possibilities for each of these features, we will discuss their transferability to the stage.

On the topic of typefaces, Romero-Fresco calls for stakeholders in the film industry to be more adventurous, "[o]therwise, the subtitling font will be yet another factor contributing to the increasing gap between the original and the translated/accessible version" (2019, p. 142). Whilst there is an overwhelming tendency to use sans serif typefaces such as Arial or Helvetica for their legibility, spacing and general sense of simplicity, the two main concerns, which are intimately related, are

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[6] Our experience working with Red Earth demonstrates that integrating captions to stage performances is likely to yield more positive results if it is approached collaboratively so that technical capabilities can match artistic ambitions. Whilst workflows can be markedly different across different production companies, our project with Red Earth involved working in close collaboration with the artistic directors (to define and negotiate the captions' aesthetic role), the set designer (since projection areas were needed and since the captions would essentially blend in with the set), and technicians (to integrate cues into the workflow of live performances).

aesthetics and readability. Digital technology has made changing font an extremely easy process. Romero-Fresco (2019, p. 131) points out that little research has been conducted on either the readability of fonts or on their meaning-making capabilities, but anecdotal evidence of the type discussed in Romero-Fresco (2019, p. 133) and Hyndman (2016) suggests that the choice of font can influence the way audience members interpret material.[7] These points apply to stage captions as well, with font choices potentially feeding directly into characterization. Our work with Red Earth Theatre also demonstrated the potential of using analogue, hand-drawn captions projected onto parts of the set as an integral element of the show's aesthetics. As such, we concur with Romero-Fresco that neutral captions can accentuate the gap between the show and the audience, a gap that becomes wider again if the captions' size and position on the stage are not conducive to immersion.

With regard to stage captioning, touring theatre productions face the challenge that not all venues are the same size and width. If captions are to fulfil their purpose, then it is essential that all members of the audience, wherever they are placed in a venue, are able to access them. On the other hand, "the distance across which the audience's gaze has to travel between the captions and the action can be controlled, and indeed even used as a framing device" (Mével, 2020, p. 209). Size is therefore a fairly essential property of captions for legibility, but variations in size can also be used for effect to visually represent how loud a sound/line is for D/deaf members of the audience (larger for characters speaking louder, and so on).[8] It is also important to factor in the show's lighting design and any adaptations required for other venues when touring, in order to make decisions regarding contrast so that the captions stand out regardless of the background they are displayed on.

The position of captions presents interesting differences between screen and stage. On the screen, for most languages, subtitles (by definition) are usually shown at the bottom of the screen. However, advocates of creative subtitles for the screen are pushing for greater exploration of placement within the frame, believing that this can "lead to a better processing and experience than the traditional placement could offer" (Fox, 2018, p. 121), and in general, that one can "find a placement that can offer the viewers the best possible cognitive and aesthetic experience" (Romero-Fresco, 2019, p. 152). Fox (2018, p. 133) identifies six objectives for positioning text on the screen:

1. Short distance between the title and the main focus area, which should allow extra time to explore the image and trigger a similar viewing behaviour to that of the viewers of the original version.
2. No coverage of primary areas.
3. Indication of speaker and speaking direction.
4. Legibility, which is normally achieved through contrast with the background.
5. Individual aesthetic and/or typographic concepts, which normally support the tone, atmosphere and image composition of the film.

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[7] These are largely corroborated by the findings of our project with Red Earth Theatre and which are discussed below.

[8] Changing the size of subtitles is not dissimilar in spirit to using capital letters to express loudness, as is relatively customary in SDH subtitles. For an extensive discussion of orthotypographical conventions and the way they are used in captioning for D/deaf audiences, see Zárate (2021, pp. 51-52).

6. Accessibility, which may be achieved not only through character identification but also information about sound description or mood.

These objectives are particularly interesting in the context of live performances on a stage. By and large, the standard practice when captioning for accessibility has been to present captions either at the top of the stage (surtitles) or displayed on a screen on one or both sides of the stage, usually a safe distance away from the action. This has led to complaints from members of the audience about excessive head-swivelling to go back and forth between the stage and the captions (or when British Sign Language[9] (BSL) access is provided, the BSL interpreter at the side of the stage) (Wilmington, 2017, p. 32). This "Wimbledon effect" further accentuates the disconnect between the show and those members of the audience who are more reliant on captions. It is at best anti-immersive and at worst a deterrent against going to the theatre at all.

Fox's first point eloquently makes the case that the distance between the various elements that contribute to the creation of meaning (including, of course, captions) should be kept to a minimum to reduce the cognitive load and facilitate immersion. This creates a conundrum for live performances with regard to how and in which areas captions are to be displayed and raises the question of what constitutes the "primary area" (Fox's second objective). If an area away from the stage is not to be used, then the stage itself is left as the primary space where captions can be displayed, like a 3D screen of sorts. Such positioning also allows an interplay with depth,[10] with the possibility that the captions will obscure part of the set momentarily. Writing about stage captioning for accessibility, Zárate notes that a caption should normally be "positioned so that it can be seen by everyone and as close as possible to the actors' head height" (2021, p. 86). Integrating creative captioning into the process of production from the outset means that blocking of actors can take into account the spaces available for displaying captions: the positioning of captions should make it clear who the speaker is and to whom they are speaking, though this can be relatively easily achieved through the proximity of a caption with its speaker. Fox's next points (4 and 5) also apply to stage production and can be addressed via a choice of typeface that reinforces the narrative whilst making sure that legibility is high on the agenda. For the final point (6), in a way that is very similar to subtitling on screens, character identification on the stage can often be expressed through positioning or the use of colour or typefaces specific to each character, while sound description or mood can be complemented in live environments with other sensory features such as vibration (particularly through the use of bass frequencies) or lighting.

The visual aspect of captions – and the use that is made of the space available on the screen and the stage respectively – thus share significant areas of overlap, to which we return below when we examine how stage footage can effectively be presented on screens. The most important difference

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[9] British Sign Language is a visual means of communicating using gestures, facial expression, and body language. It is used predominantly in the United Kingdom. British Sign Language is a systematic language with its own grammar and a unique vocabulary and follows rules which are inherently different from that of spoken English.

[10] Note that depth can also be used on screens, as detailed by Romero-Fresco (2019, p. 160).

between stage and screen comes from the temporal aspects of the presentation of captions, which closely relates to workflows: the preferred way of creating captions for entertainment programmes on screen is for them to be "pre-prepared," that is, they are created before the material is played for the audience and they are "spotted" or "cued" in such a way that they will appear on the screen in synchrony with the line being spoken. Cueing for live performances is equally crucial for immersion and to enable audiences to follow the narrative; here the process is largely conditioned by what technology is available. Captions for the theatre are still, by and large, reactive. Whilst the text and its aesthetic presentation are both prepared ahead of the performance, in most cases a technician has to press a key at the right time during the performance to make the captions appear synchronous with the spoken dialogue.[11] Ideally, such captions are cued in and then cued off to prevent the undesirable effects of attention splitting,[12] although this may not always be technically possible.

The final area of overlap between stage and screen captioning that we identify here covers effects and the way captions interact with their environment. Here again, there are significant similarities: through a creative use of the aspects discussed above (typeface, size, position, temporal dimension), as well as the way that these captions appear and disappear (fade, blur, etc.), the captions can "add a third dimension to the normally two-dimensional subtitles, providing a visual depth that matches the complexity […] of the acoustic landscape" (Romero-Fresco, 2019, p. 169). These effects are context-sensitive and depend largely on what is to be achieved on aesthetic and narrative level, but also on the possibilities and limitations of the technology available to create and achieve these effects.

With these existing areas of significant overlap with regard to creative captioning for the screen and for the stage in mind, we can now turn our attention to the recent move of theatrical performances online in the form of video. Here we examine to what extent and how creative captioning can be applied to the video rendering of stage performances.

## 4. Immersive integrated inclusiveness: the Red Earth Project

The maker-user gap, defined by Greco (2013) as the "multifaceted gap that can exist between those who make and those who use an artifact," has been productively applied to the field of media accessibility and audiovisual translation (Branson, 2018; Romero-Fresco, 2019) to demonstrate that there is often a disconnect between media creators (film but also potentially stage directors) and the people who provide accessible versions of the media, who may or may not be able to interact directly with the creators. This initial maker-user gap means that creators can have limited capacity to influence the way their work is received by D/deaf members of the audience, by members of the

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[11] There are currently many new developments and experiments taking place, involving voice recognition technology to trigger the appearance of captions or using pre-timed captions (particularly for musicals). Zárate also discusses current initiatives to use artificial intelligence technology to trigger automated captioning, "for which the live captioner is no longer required" (2021, p. 88). This technology is in its infancy and it remains to be seen whether this kind of automation can be rolled out to small- to mid-size theatre companies, as the affordability of technology is also crucial to using it universally for accessibility purposes.
[12] The effects of attention splitting are discussed by Wilmington (2017, pp. 32-35).

audience with other sensory impairments, or by audience members who speak a different language. But there is also a maker-user gap or disconnect between accessibility providers and the audience, as D/deaf members of the public "are normally not involved in the production or testing of accessible versions" (Romero-Fresco, 2019, p. 5). We contend that Romero-Fresco and Branson's reading of Greco's maker-user gap can also be productively applied to the theatre, calling for stage directors, designers and producers to play a proactive role in the creation of captions for their performances, and in the way these performances are rendered in video format. We have mentioned above that it has been possible for some film directors to intervene directly in the subtitling process. The same is true of stage productions, where artistic directors (such as those of Red Earth) are very actively involved in the design of the technology and of the stage captions themselves.

Figure 1.

*Greco's maker-expert-user gap, adapted to stage productions*
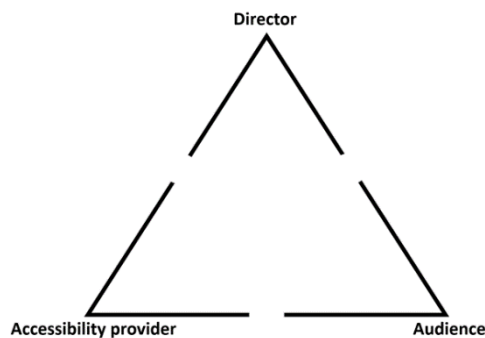


Source: Greco, 2013.

Indeed, the trend of dealing with inclusiveness post hoc, which we described above in the context of films, appears to be changing, certainly as far as stage productions are concerned.[13] One such initiative to integrate accessibility into the creative process, working in collaboration with members of the D/deaf community, was central to the "integrated immersive inclusiveness" research project funded by the Arts and Humanities Research Council and by the Engineering and Physical Sciences Research Council (United Kingdom), part of which is the subject of this article. The aim of Red Earth Theatre and of the interdisciplinary team of researchers was to explore, design and use technological solutions for those audiences for whom, up until now, immersion in performance has been hindered by modes of accessibility that divide and distract attention. The work carried out by the project involved scoping, creating, adapting, and, to an extent, advertising to potential members of the audience, an affordable and practicable technology that could be integrated into Red Earth's workflows and provide a solution for displaying creative captions for Red Earth Theatre's work. The tools and learning developed through the project were applied in the creation of Red Earth's production of Russell Hoban's *Soonchild*, which toured the UK in the autumn of 2019.

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[13] See, for instance, Davis-Fisch (2018), Johnson (2018), Johnston (2016), and Whitfield & Fels (2013), among others, but also projects currently being carried out by Deafinitely Theatre and Graeae Theatre Company.

Whilst a direct transition of Red Earth Theatre's *Soonchild* from stage to screen was not envisaged at the time – the production started in the pre-pandemic era – a lot of effort went into making audiences aware of the type of inclusive techniques being developed to overcome the "informational […] barriers" (Wilmington, 2017, p. iv) faced by members of the D/deaf community. Drawing on the experience and knowledge of Red Earth Theatre's artistic directors, Amanda Wilde and Wendy Rouse, and collaborating with members of local (Nottinghamshire Deaf Society) and national (National Deaf Children's Society) societies for the D/deaf, the team worked towards developing affordable, transferable solutions that could enable the projection of live creative captions directly onto parts of the set, with an explicit focus on small-scale production and low touring set-up times. These captions, rather than being tacked onto the play at the end of the creative process, were developed in such a way that they were aesthetically integrated into the show. Given the "perceived reluctance on the part of many D/deaf people to attend theatres or art centres, apparently based on a belief that the programme is not for them/not in their language" (Wilmington, 2017, p. iv), one key aim was to improve awareness of creative captions within these so-called hard-to-reach sections of the audience. In order to foster interest but more pertinently to increase awareness of the particular type of inclusive and creative captioning techniques presented in Red Earth's *Soonchild*, a short promotional film, featuring two of the show's main actors and showcasing creative captions of the type used in the show (as seen in figure 2 below), was developed and widely distributed on social media platforms via institutional networks at the University of Nottingham, through links with local and national D/deaf societies and at academic events. The film is also available on Red Earth's YouTube channel.[14] The preparation and making of this film[15] naturally gave rise to considerations on areas of overlap between stage and screen as far as creative captions are concerned. Given the aims of the project, it was important that the captions featured in the film (which also utilises BSL, as does the stage play) were a fair reflection of the captions that could be seen in the stage performance (figure 3).

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[14] See RedEarthTheatre (2019a) https://www.youtube.com/watch?v=MjEo3UL_Zl4&t=2s.
[15] For a detailed description of how the video was made and its paratextual relationship to Red Earth Theatre's 2019 adaptation of Soonchild, see Mével (2020).

Figure 2.

*Example of creative captioning used in the promotional film*



Source: RedEarthTheatre, 2019a.

Figure 3.

*Screenshot from Youtube video featuring standard subtitles and creative captioning projected on the set in Red Earth Theatre's Soonchild*



Source: RedEarthTheatre, 2019a.

The technical tools used to make creative captions for the screen and for the stage are of course very different, largely because of two crucial aspects: timing and delivery, and processes of design. For the screen, captions are (usually) integrated digitally into the material and are timed in such a way that they are displayed alongside the material without further human interaction. For the stage, captions (whether they are aesthetically integrated or not) are (again, usually) projected onto parts of the set, and need to be timed to match the performance. This involves integrating them into the production workflow, with a technician available to ensure they appear and disappear at the right moment on any given night in response to the pace of the live performance. For the screen, while most traditional subtitling software provides some flexibility with some of the visual aspects of captioning (typeface, size, and to an extent positioning), more advanced visual effects require the use of video compositing and animation software. The latter can prove expensive and time-consuming and requires a high level of specialization and knowledge of the possibilities offered by the software in order to both design and create the captions. For the stage, captions can be designed digitally or analogically so that they complement the performance's design. They can be projected onto any part of the set where they can be accessed, i.e., displayed in such a way as to be legible for all members of the audience regardless of where they are seated in the auditorium and regardless of the size of the venue. The human intervention required to keep captions in synchrony with the performance also has design implications in that the captions should appear when triggered, usually

by pressing a key on a keyboard. While these areas of difference are crucial in creating and implementing creative captions for the stage and the screen, there are also important areas of overlap with respect to captions' aesthetic features and the kind of effects and affects captions should convey to the audience.

Videography is a further challenge that emerges when converting captions from the stage to the screen, as had to be done during the Covid pandemic in order to sustain artistic production. Typically, filmed performances are not delivered from an audience perspective, but rather involve close-ups, cuts, wide shots, etc. While there are obvious artistic benefits to this more directed style of capture, the trade-off is that the wider physical context is lost. This may result in creative captions that appear directly on the stage (e.g., the text in figure 3) being lost, occluded or obscured when transferred to video. Even in wide shots, the legibility of the text may be lost as the number of pixels available to show them is reduced. Depending on the medium, this may be a significant reduction, and even further compounded by streaming efficiency savings. Text that may be perfectly legible on a stage may become illegible in a video of that stage or lost altogether because the camera is focused on a specific character. Simply delivering the captions on stage, and then providing a film of the stage production is thus not necessarily a solution for productions aiming to move from stage to screen.

## 5. Call to arms: technology, D/deaf engagement, thresholds for access for stage performances on screen

Although theatre buildings are now opening up to audiences once more, it is clear that theatre companies will continue to share, adapt and curate their material on video streaming platforms, not least because of the widening of access in both social and disability terms that this makes possible. Thus, there is an immediate and greater-than-ever need to consider questions around accessibility and inclusion when stage performances are transferred to the screen. It is crucial to set up the right infrastructure to allow for the development of creative captioning across media in a way that fosters inclusion and reduces the communication gap rather than the other way around.

Looking back at figure 1 above, we can examine the different ways in which the user-expert-maker gap can be narrowed as well as explore what kinds of tools need to be developed to help bring the directors' artistic vision closer to the audience through the implementation of credible accessibility solutions. Such solutions involve bespoke technological tools *and* active expert engagement with members of the D/deaf community.

It is evident that the pandemic has magnified a systemic failure to involve D/deaf members of the audience in the design and implementation of accessible solutions. The disconnect between the accessible solutions that are readily available and the lack of involvement in their design of the very people they are supposed to serve is, to say the least, problematic. Autocaptioning tools only seem to broaden the gap further. The fact that they are free and immediately available is offset by their "catch-all" nature, which does justice neither to the performances nor to their audiences. These tools

are easy enough to access and utilise, but they do not always provide accurate transcriptions of the dialogue and their positioning by default can lead to undesirable consequences for a show's aesthetic presentation. Whilst progress with regard to transcription accuracy has been ongoing, and some productions do take the time to correct the speech-recognition errors, there are perennial issues with positioning, presentation, and the more specific aspects of captioning for D/deaf audiences such as the absence of sound descriptions, speaker identification and paralinguistic features, which essentially make them inadequate.

The captioning of online videos of accessible shows such as Red Earth Theatre's *Soonchild*, which features some creative and traditional captions as well as integrated BSL, needs to be approached following the principles highlighted in the previous section. With multiple semiotic systems (the visual performance, the dialogue, the music and sound effects, BSL and the original captions from the show) all interacting to create and shape meaning in different ways for different members of the audience, it is crucial first and foremost to recognise when screen captions are necessary for access. Once a need is identified, the captions can be integrated in such a way that they do not negatively interfere with the other sign systems, either visually by being superimposed on top of the BSL signing, for instance, or by unnecessarily adding to the cognitive load. The greater integration of captions is only possible through the development of bespoke tools, which will take time and resources. One of the aims of the project conducted with Red Earth Theatre was to make accessibility accessible, so that whatever technological solutions were developed, they would be affordable to most if not all theatre companies rather than to only a few select ones. We have therefore run workshops for local and national companies to provide more details about solutions developed for stage productions and have also made the equipment acquired as part of the project available for loan. The technology is based on projection mapping, a technique where a 3D space (in this case a stage) can be projected onto by one or more projectors with the image warped to make the projections appear correct on the physical objects.[16] Any developments regarding the video rendering of stage performances on screen need to follow the same principles and can only be achieved through a synergistic combination of creative impetus, tools that are accessible and affordable so that their use can be democratised, and workflows that are user-friendly and inclusive. On the purely cosmetic and aesthetic level, the taxonomies discussed above are helpful in providing a roadmap of sorts and in focussing efforts on "tone" (to use both Stahelski and Fox's terminology) and inclusiveness, by allowing greater flexibility and possibilities with typeface, size, position and effects, particularly with regard to interplay between captions shown on stage and included in the footage.

Currently, creative captions for video media are produced with video compositing or animation software such as Adobe After Effects or Blackmagic's Fusion 16. While these tools are very versatile, they can be expensive and require steep learning curves. Since they are not bespoke captioning

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[16] The projection map is created based on the white-card or computer model of the set. The key innovations in our project were about making this fit within a normal small-scale theatre tech workflow: setting up the mapping for a new stage takes only a few minutes; only a single projector and a computer with average specifications are required; and it can be cued from standard theatrical cuing software (e.g., QLab) alongside sound and lighting.

software, creating captions with them is a very time-consuming process. The industry is caught between high-end and potentially expensive solutions of the kind highlighted by initiatives such as Creative Captioning[17] (supported by Deafinitely Theatre), while free software is currently synonymous with limited technical possibilities. At various points in her recent book, Zárate berates the limitations of more traditional dedicated subtitling and captioning software (2021, p. 79, 99). In other words, there is a dire need for open-source or at least openly available tools that specialise in caption creation and that use the taxonomies discussed above to help provide affordable, accessible solutions for the creation of creative captions on the fly or at least in an efficient way. This is true of tools for captioning for the stage, but also and more pertinently of tools for video media, including the video rendering of stage performances. As yet, unexploited possibilities exist in the increasing availability of depth-aware cameras, like Microsoft's Azure Kinect,[18] which may allow exploitation of the 3D characteristics of the stage to be used for screen captioning as well.

In conclusion, we also highlight that the profile of an accessibility provider (figure 1) is fluid and still largely undefined. This role is currently often assumed by a combination of stage professionals, including artistic directors, whose level of familiarity with and understanding of deafness and hearing impairments may vary. At the end of his monograph *Accessible Filmmaking*, Romero-Fresco argues in favour of a new post which he calls "director of accessibility and translation" (2019, p. 241), defined as "a new professional figure that can help to liaise between filmmakers, [Media Accessibility] professionals and foreign and sensory-impaired viewers" (2019, p. 212). While it is abundantly clear that such a post is equally desirable in the context of stage productions, it is vital that this should be underpinned not just by greater awareness of the needs of different types of audience communities, but also of the optimum tools required to produce integrated and inclusive creative captions efficiently, and that these tools should be affordable, to prevent access from becoming inaccessible.

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[17] https://creativecaptioning.com/resources/software/

[18] https://azure.microsoft.com/en-gb/services/kinect-dk/

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