

Authoring accessible media content on social networks

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ABSTRACT

User-generated content plays a key role in social networking, allowing a more active participation, socialisation, and collaboration among users. In particular, media content has been gaining a lot of ground, allowing users to express themselves through different types of formats such as images, GIFs and videos. The majority of this growing type of online visual content remains inaccessible to a part of the population, in particular for those who have a visual disability, despite available tools to mitigate this source of exclusion. We sought to understand how people are perceiving this type of online content in their networks and how support tools are being used. To do so, we conducted a user study, with 258 social network users through an online questionnaire, followed by interviews with 20 of them – 7 blind users and 13 sighted users. Results show how the different approaches being employed by major platforms may not be sufficient to address this issue properly. Our findings reveal that users are not always aware of the possibility and the benefits of adopting accessible practices. From the general perspectives of end-users experiencing accessible practices, concerning barriers encountered, and motivational factors, we also discuss further approaches to create more user engagement and awareness.

CCS CONCEPTS

• **Human-centered computing** → **Accessibility; Social media.**

KEYWORDS

accessibility, social media, visual content, user-generated content

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1 INTRODUCTION

Social networks have permeated every facet of modern society's daily life. Following the recent events of the COVID-19 pandemic, their usage is at record levels [33]. Facebook has reported an increase of approximately 6% users over the previous year reaching 1.93 billion daily active users in the third quarter of 2021 [10]. The possibility to engage with one another, while physically distant, is at the moment more relevant than it ever was. For people with disabilities, these platforms also play an important role in disability advocacy, as it provides a vehicle for meeting new contacts with disabilities, learning about issues and news related to it, and discussing accessibility challenges and solutions for improving social media inclusion [12, 36, 38].

Despite the contributions and improvements promoted by social networks in recent years [37], main platforms still present substantial accessibility barriers for users with disabilities. The complexity of their interfaces compared to many typical websites comes from the fact that they are primarily composed of user-generated content. As such, for these platforms to be truly accessible they have to go beyond ensuring the content they control and produce is accessible: they need to ensure the content their users produce is also accessible. This is especially relevant for people with visual impairments given the prevalence of user-generated content that is mostly visual (e.g., images, GIFs, videos). As observed by Voykinska et al. [36], in order to fully engage with visual content, blind users need to overcome several challenges, in particular, the frequent lack of alternative descriptions in photos, essential to provide them proper contextual information. Most of them rely on workarounds such as searching for meta-data (author, geo-localization and even comments posted by other users), or reaching out to a nearby friend or family member to assist them. Conversely, in a survey conducted by Mathur et al. [24], friends and family members of visually impaired users conveyed that writing alternative text is time consuming and requires more thought than inaccessible uploading practices.

Efforts have been undertaken by the social network's services themselves to improve the accessibility of visual content, such as automatic captions [9], or providing text inputs for alternative descriptions [35]. However, these approaches are not yet sufficient to provide sufficient contextual information, or to ensure that end-users are aware of these features and therefore they are not widely used. In addition, little is known about the barriers and motivations

impacting the creation of accessible content by most end-users, which is at the root of the problem. In this research, we sought to explore the current context of the accessibility of visual content in social networks. We provide further analysis on the factors hindering the creation of accessible content by end-users, considering people with and without a visual impairment, on major social media platforms. Furthermore, we also aimed to uncover what does or can motivate people to create accessible content. We set the following research questions:

- RQ1: What are the motivations for social network users to create accessible media content?
- RQ2: Which barriers social network users encounter to share and author accessible media content?
- RQ3: What are the requirements for social network users to create accessible media content?

To answer these questions, we conducted a two-step user study including an online survey and user interviews. Our findings suggest that users are interested in providing accessible content on their social networks, but most of them are not aware of the steps needed in order to improve their practices and the impact it could have. Our work leads to a better understanding of the current state of media accessibility, in particular, of accessibility awareness among social network users. The insights collected also highlight gaps and opportunities to enable a better interaction for blind people and more engagement in accessible practices by other end-users.

2 RELATED WORK

Our research is related to prior work on (1) existing accessibility approaches employed by major platforms and its impact on visually impaired users' media interpretation, (2) practices on accessible content sharing by end-users, and (3) current advances and gaps on image captioning.

2.1 Accessibility on social networks

Social networking services, such as Facebook, have a high adoption rate among blind users [39]. This also happens with Twitter, which evolved from a very simple text-based interface to one that is now filled with multimedia content [3]. The widespread usage of camera equipped mobile phones contributes to the growth in publications containing visual content. However, this user-generated content pushes social networks to become increasingly inaccessible [3].

Numerous efforts have been made to improve accessibility of visual content on social networks with some of these initiatives coming from the service providers themselves. For instance, in 2016, Twitter included a feature allowing users to compose their own alternative descriptions for their images. However, users claim that this initial feature had its drawbacks as it had to be enabled by the users themselves, was hard to find, and to understand [34]. Even though this changed in 2020 [35] – at the moment this resource is active and available by default – the impact of this measure has not yet been assessed nor discussed. Meanwhile, Facebook made a choice to use automatic descriptions by tagging each image uploaded using image detection and recognition algorithms and enabling the user to edit the automatically provided alternative description [9].

Despite these efforts, as described in the most recent studies on this context, blind and visually impaired users still encounter significant barriers in interpreting visual content [4, 11, 23, 28, 38].

2.2 Content sharing

Approaches to improving the accessibility of media content have been previously discussed in the literature. For instance, Morash et al. [26] investigated approaches for web workers to author descriptions of STEM (science, technology, engineering, and mathematics) images. Still on the context of guiding users on how to provide better descriptions, Mack et al. [22] proposed two types of prototype interfaces to facilitate authoring of alternative descriptions for images in Power Point presentations, as well as providing feedback for automatic alternative descriptions. In a similar direction, Gurari et al. [17] analyze a dataset of images and alternative descriptions focused on improving current machine generation approaches towards real end users needs. Another approach focused on online content is presented by Guinness et al. [15] which, using a fully automated approach, searches for possible descriptions already available on the web for a given image. This strategy addresses a current gap, since much content present on social networks is shared and widely disseminated on other pages – such as memes and GIFs. However, another type of content particular to social networks are personal images and photos – which are unlikely to be available on other pages. Considering this last aspect, one great challenge still remains, the engagement of users in providing accessible content. Through an analysis of a million images posted on Twitter, Gleason et al. [11] observed that only 0.1% contained an alternative text. Twitter itself may be accountable for this low number by not enabling by default the feature that allows the inclusion of the alternative description for many years. However, Gleason et al. [11] also observed that even users who enabled this feature to provide alternative text descriptions did not always write them. Visually impaired users engage in major photo-related activities as other users, considered by them as part of the social network experience. However, practices such as taking and editing photos, and providing an alternative text, often involve undertaking workarounds or getting help from trusted sighted people [1, 24, 36, 39].

Mathur et al. [24] observed that friends and family members of visually impaired users engage frequently in accessible practices. Also, according to Wu et al. [39], users with visual impairments are much more likely to have friends who are also visually impaired. These two factors seem to play a role in the increased accessibility of images that are accessed by visually impaired people (in comparison to those accessed by sighted people) [24]. However, users also report that writing alternative text is time consuming and requires more thought than inaccessible uploading practices, which explains – at least, in part – the low percentage of images with an alternative description [11].

Concerning users' engagement, previous works suggest that users who currently provide alternative descriptions on their images are mainly motivated by personal connections to someone with a disability or by a general matter of inclusion [11, 30]. These works also reinforce the need of educating users in providing alternative descriptions as well as investigate further approaches on using automated description techniques to improve descriptions provided

by authors. While these findings provide important insights into authoring and sharing practices for accessible content, they leave some unanswered questions around the perspective of end users who are not yet aware of current accessibility approaches and the specific needs of users with disabilities. In this paper, we focus on further exploring the challenges these users encounter when trying to engage in such activities for the first time and how to motivate them to create accessible media content.

2.3 Image captioning

The low user compliance in providing alternative text descriptions is a common web accessibility problem and therefore some alternative methods are usually employed to fill this gap. Stangl et al. [32] classified some of the existing approaches to generate image descriptions as human-powered approaches, automated image descriptions approaches and hybrid image description technologies. Human-powered are recognised by users for their accuracy and quality of responses. Techniques such as Crowdsourcing may have slow response times for real-time needs and a high financial cost. Friendsourcing may improve the quality and trustworthiness of the answers received, as friends would better understand the question asked, while also removing financial costs of the service [3]. However, the social costs of exposing one's problems and vulnerability are a serious concern for these users as they may appear or feel less independent [3]. As for automated approaches, unlike the previous technique, they are fast and cheap, allowing platforms to deploy them at scale [8, 21]. While there are significant efforts undertaken over the past years on image understanding and automated captioning, the accuracy of these captions is not yet sufficient. Caption and phrasing models have an important impact in scepticism as blind and visually impaired people may rely more on automatically generated captions than on their intuition, making decisions based on misinformation [23, 31]. Besides that, the adequacy of these systems used in the open world is still limited, especially when captioning the wide variety of images posted to social media [31]. In order to fill the gap in image captions, hybrid image description technologies propose a combination of automatic techniques and human intervention to investigate a trade-off between both techniques, as explored in [16, 21, 27, 31].

Despite prior efforts in evolving alternative interpretations for visual content, user-generated content still has a great impact on the accessibility of media content in social networks. For this research, we collected feedback from users about their difficulties and possible motivations in accessible authoring practices. From that, we provide insights into how this interaction flow can be improved to support their needs, as well as to better engage them in the authoring of accessible media content.

3 METHOD

In order to address our research questions, i.e., to better understand the barriers faced by end-users to author accessible media content and the motivational factors to engage in such practices, the study was structured into two different phases. Ethical approval to run the study was granted by our university's Ethics committee.

3.1 Online survey

An online survey was conducted to gather information about usage of social networks, motivations and barriers for authoring accessible media content, and awareness of accessible practices. The questionnaire used took about 15 minutes to complete, and it was built using Microsoft Forms in four different languages (English, French, Portuguese, and Spanish) in order to reach a diverse sample of participants. This questionnaire was divided in three sections: demographic questions; social networks usage - considering frequency, devices, and type of content of access, posting, and sharing activities; and social networks accessibility practices - considering current practices but also accessibility awareness and further motivations to engage in such practices.

Pilot study interviews to inform survey design: As a first step, we conducted pilot interviews to identify potential problems with, and improvements to, the questionnaire. Participants were recruited through the research team's network. The only inclusion criterion was to be a user of at least one social network. The pilot study included 7 social network users, including three people who are blind. Participants had a variety of occupations as well as different levels of accessibility awareness. Some of them were accessibility practitioners, but also high school teachers with no previous knowledge of digital accessibility. Sessions were remotely conducted, taking between 30 and 40 minutes. During the sessions, a preliminary version of the online questionnaire was used. Participants were encouraged to propose suggestions and improvements to enhance the overall understanding of the survey. At this stage, participants responses were not collected rather than their thoughts on the information contained on the questionnaire; i.e., their answers were not considered in the final analysis. Participants provided important feedback on the questionnaire, such as questions that were difficult to understand or suggestions for new response options to closed-ended questions. Based on their contributions, a new version of the questionnaire was built, including two new questions and some adjustments in the wording of other questions.

Questionnaires: In order to focus on social network users, we disseminated the questionnaire through different social media channels. The call for participation was shared by the research team, their university and research unit, and fellow organisations (such as disability-related ones). The questionnaire was online during 3 months and we gathered a total of 258 answers from participants aged from 17 to 73 years old (Mean=37.35, Median=31, IQR=23) with 64 (25%) of them self-reporting having some kind of disability, such as visual, hearing, motor and/or cognitive impairments. In particular, 34 participants were blind, 12 had low vision, and 1 was colourblind.

In addition to the specific questions concerning social media usage and accessible practices, participants were also invited to share additional thoughts. Through this questionnaire, participants also stated their availability to be contacted for the next phase of this research.

3.2 User interviews

In a first moment, participants stating their availability in the previous phase were contacted, and we followed up with semi-structured

interviews with 20 of them – all reported being frequent social network users in the questionnaire. From these participants, 7 self-reported being blind and 13 of them were sighted users without a disability. Furthermore, half of them stated not frequently undertaking accessible practices, as presented in Table 1.

Prior to scheduling the interview, we asked participants to post media content on their usual social networks in an accessible way. Participants were instructed to post, at least, three different media contents in order to familiarize themselves with the authoring processes (in case they were not). In addition, they were also asked to take notes reporting in detail the activities conducted and their opinions and difficulties encountered in this process. Participants were invited to conduct these activities over a two-week period. This time frame was intended to include accessible practices in their sharing and posting routine for two weeks, rather than asking for a specific task to create accessible content.

After two weeks of study (i.e., after the initial contact), the semi-structured interviews were conducted. We asked questions about their experience in accessible practices in social networks, further motivations for accessible content authoring, and potential suggestions or additional thoughts on how to improve this process and to more fully commit end-users to accessibility practices. These interviews were also an opportunity to further discuss the answers provided by participants in the questionnaire. All interviews were conducted remotely over the phone, Skype, or Zoom, lasted 20 to 30 minutes and were recorded with participants' prior consent.

3.3 Data analysis

The first step of the data analysis consisted of a quantitative analysis of the answers to the closed-questions in the online questionnaire. A preliminary analysis was made to ensure that all answers provided were valid. For that, we searched for answers out of scope and found that all the answers provided by the participants were consistent with the corresponding question. In addition, all questions included in the questionnaire were optional, resulting in all entries being considered valid. In summary, all responses provided by all participants were considered in the data analysis. It is also important to highlight that several questions were multiple choice, allowing participants to choose one or multiple options from a list of possible answers.

Next, all conducted interviews were transcribed and, along with answers provided for the open-ended questions, analysed through an inductive coding approach [25]. First, two researchers reviewed independently a subset of this data, conceptualizing a set of codes based on this subset. The coders compared their initial set of codes and their categorisations in order to develop a unified list of codes. Then, the two coders reviewed a new subset of transcriptions taking into account the consolidated and revised codes in order to reach an agreement, identifying a total of 150 distinct codes, organized in two levels, 21 codes and 129 sub-codes. Following that, the coding of all data collected was performed. The codes and their sub-codes are available online¹.

¹The codebook is available at: https://osf.io/anmd7/?view_only=547d72f78553489498af9c1df7af1a58

4 FINDINGS

In this section, we first present key findings identified through the quantitative analysis of the data gathered through the questionnaire. Next, we present the findings obtained from the qualitative analysis of the information gathered during the user interviews. This information was divided by the following topics: (1) accessibility unawareness, (2) lack of know-how, (3) the cost of the additional effort, (4) complying with and without guidelines or features, (5) inaccessibility, (6) and accessibility motivations and concerns.

4.1 Online survey

This section provides detailed information obtained through the online survey, containing questions regarding authoring and sharing practices on social networks. The following data concerns the 258 total answers gathered.

4.1.1 Device access. We asked participants how often they interact with social networks, considering access and posting activities, according to device types.

In both groups – sighted and visually impaired participants – mobile devices were more popular for accessing and posting content on social networks. However, in both scenarios, visually impaired participants tend to carry these activities on desktop or laptop devices more than sighted participants, even though, the difference is more significant in posting activities, as presented in Figure 1.

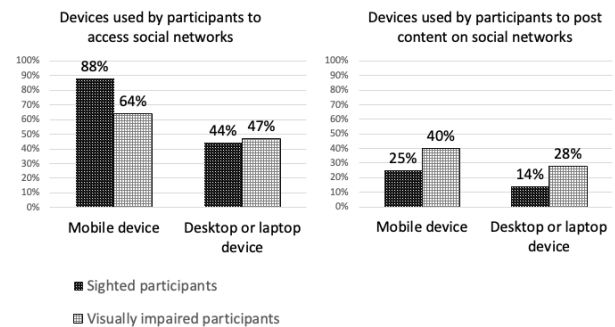


Figure 1: Devices used by participants to access and post content on social networks

4.1.2 Social networks used. Concerning the social networking platforms accessed by our questionnaire participants, Facebook was the first choice for the majority, followed by Twitter. Only 2% of visually impaired participants declared accessing Instagram, while 25% of sighted participants reported having Instagram as their main social network.

Sighted participants reported to post most of their content on Instagram followed by Facebook and Twitter. Regarding visually impaired participants, they declared to prefer to post their content on Facebook, followed by Twitter and a very low percentage of them declared using Instagram as their main social network to post content. This information is presented in Figure 2. It is important to highlight that other social networks were also mentioned by both

Table 1: Demographics of interviewees including age, most accessed social networks, social networks users most post their own content, and social networks users most share their content (i.e., post content created by others, for example, sharing on Facebook and retweeting on Twitter).

ID	Age	Accessible practices	Most accessed social network	Social networks users most post their content	Social networks users most share their content
Blind participants					
BP1	20	Yes	Facebook	Facebook	Facebook
BP2	63	Yes	Facebook	Facebook	Facebook
BP3	53	Yes	Twitter	Facebook	Facebook
BP4	52	Yes	Twitter	Twitter	Twitter
BP5	50	Yes	Twitter	Twitter	Twitter
BP6	21	No	WhatsApp	WhatsApp	WhatsApp
BP7	17	Yes	Twitter	Messenger	Twitter
Sighted participants					
SP1	73	Yes	Twitter	Twitter	Twitter
SP2	32	No	WhatsApp	WhatsApp	Instagram
SP3	30	No	Facebook	Facebook	Facebook
SP4	57	Yes	Twitter	Facebook	Twitter
SP5	30	No	WhatsApp	Instagram	Instagram
SP6	25	No	Instagram	Instagram	Instagram
SP7	30	No	Twitter	Messenger	Messenger
SP8	33	No	Facebook	Facebook	Facebook
SP9	41	No	Facebook	Facebook	-
SP10	27	Yes	Instagram	Instagram	Instagram
SP11	29	No	WhatsApp	WhatsApp	Instagram
SP12	34	Yes	Instagram	Instagram	Instagram
SP13	30	No	WhatsApp	WhatsApp	WhatsApp

groups, such as LinkedIn, WhatsApp, and Tiktok, however, with less expressive numbers.

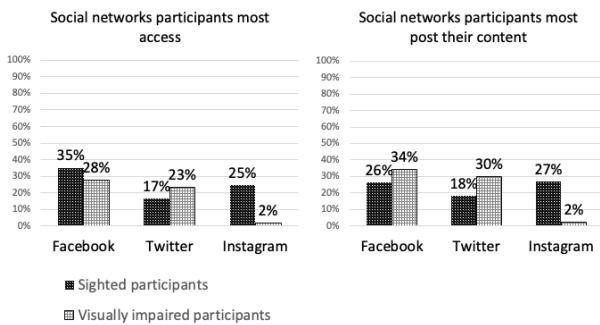


Figure 2: Social networks used by participants

4.1.3 Type of content. We also asked participants about the content they most post on social networks. Although the numbers obtained for text, audio, and video content do not show a significant difference, the same was not observed for visual-only content. Sighted participants reported posting 5% of image content, while this number is 2% for visually impaired participants. Even though users with a visual impairment edit and post photos on social media,

they still encounter several challenges using these apps [1], which may contribute to their low participation levels in image-centric social networks, such as Instagram. In particular, among other types of visual content, GIFs and Memes were highly unpopular among visually impaired participants, with all of them reporting never sharing this type of content. As explored in previous works, these kind of media represents a challenge for accessibility. Besides not being properly supported by major platforms [30], they carry some cultural context or hidden meaning related to an emotional tone or humorous aspect [13, 14], being heavily dependent on alternative descriptions provided by the authors themselves.

4.1.4 Accessible practices. The vast majority of visually impaired participants (70%) reported providing an alternative description for their last shared media content, while most of sighted participants (71%) declared not having provided it.

We also asked participants that did provide an alternative description for their last three posted media content how they did it. Most of them (25%) used the functionality provided by the social network, while 23% chose to integrate the description in the text of the post.

Among those not providing alternative descriptions, when asked about the reasons for not engaging in such activity, most of them declared not knowing that it was possible, followed by those who declared not knowing where to write an alternative description (Figure 3).

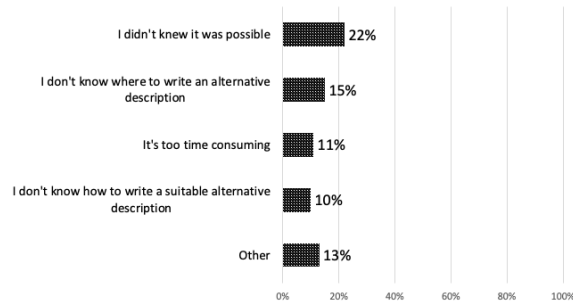


Figure 3: Reasons to not provide alternative description

We also observed through questionnaire responses a correlation between adopting accessible practices and the familiarity with the needs of people with disabilities. The majority of sighted participants (56%) had no idea about accessibility practices adopted by people around them, while more than half of visually impaired participant (51%) stated having friends or family members posting or sharing accessible content.

Figure 4 summarises participants' opinions on why social network users in general do not provide alternative text descriptions for media content they post or share. Most participants consider that other people don't know that this is possible, followed by those considering that other people don't think it has any impact.

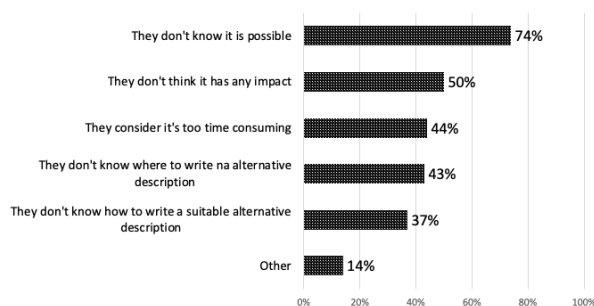


Figure 4: Reasons for others not providing alternative description

4.2 Interviews with Social Network Users

In this section, we present the information collected during the interviews conducted with 20 social network users. Participants were asked about their experience with accessible practices in social networks, further motivations for accessible content authoring, and potential suggestions or additional thoughts on how to improve this process.

4.2.1 Accessibility unawareness. Considering the data obtained, we observed an overall lack of awareness among sighted participants, but also, some **stigma associated with people with disabilities**

using technology, in particular, about blind people accessing visual content. Further investigation conducted through interviews allowed us to observe that most of them were not aware of the use of technology by blind people and how this content is being consumed by them, therefore becoming more difficult to understand what accessible content really means:

“I am describing this image, theoretically for a blind person, but then how will the platform use it? Does the person have the possibility to listen? Is there going to be a...? I don't know how this is used in the end, it seems silly, but how does it reach the person? How is it accessible in fact, at the end of the experience?” – SP13

A first layer of this unawareness is reflected by the **lack of knowledge about what they should do** to improve the accessibility of their content. Most sighted participants, although frequent users of social networks, only discovered this possibility during this study.

Some sighted participants also felt that it was **not necessary** to provide an alternative access for their content as they do not know anyone with a disability, underestimating the reach of authoring and sharing activities. However, while some sighted participants were used to privately sharing some family pictures and may follow this line of argument, this misjudgement about the impact and needs of accessibility may go further, reinforcing the stigma, by implying that visual content is not for blind users:

“I also share a bit of this stigma, which is that, if Instagram is highly visual, a blind person will use it? [...] I don't know if there is this motivation on the part of the blind people to use a tool that is so visual.” – SP5

Under the assumption that blind people are not interested or motivated in accessing visual content, the accessibility of this content is not taken into account. This is particularly evident in image-centric social networks such as Instagram. Consequently, blind participants reported being excluded from accessing this content and thus from using these platforms.

From the perspective of two blind interviewees, some people just do not care enough about the subject. Partly because many of them don't know someone with a disability, so they do not reflect about it, but also because some may be focused on just reaching out to as many people as possible, neglecting minority user groups:

“Other people don't care, no matter how much we tell them.” – BP5

4.2.2 Lack of know-how. During the interviews, participants who embed alternative descriptions in the content of their post evoked having discovered this practice through other users' publications, and, therefore, used it as a model example to complete this task. This behaviour was also observed by Gleason et al. [11] in a previous study. Although not ideal, it may increase the visibility of issues related to content accessibility. However, this choice was mainly driven by sighted interviewees not perceiving nor discovering the specific accessibility feature provided by the platform. Interviewees further described the difficulty to discover **where to write** an alternative text description as being related to the non user-friendly

and hard-to-find accessibility approaches currently employed by social network service providers:

“If they told me ‘Oh yes, you can make these things accessible, you just have to take a lot of very complicated steps to get it done’. Obviously, this will make it very difficult for people who are interested in doing it. Accessibility features are difficult to find and not very discoverable, they’re hidden.”- SP8

Furthermore, sighted interviewees also discussed their difficulty in not knowing **how to write** a suitable alternative description. While they convey it was a challenge to represent an image through text, they also stated finding no guidance or information on what is considered a good alternative description:

“My biggest difficulty was this: not knowing if there was any standard or not, what would be necessary to include or not, if I should put more information, less information, if I should be more specific, give more details...” – SP13

It was a consensus among all our interviewees that, as a first step, it is essential to create approaches to raise awareness about accessible practices and their benefits among social network users. Most of them suggest that one way to achieve equity in social media is by emphasising accessibility features as, currently, they do not draw enough attention of these users to this matter:

“They have to be more visible in the authoring process [...], even if they weren’t hidden, they could also be promoted, which they aren’t either.” – SP7

Besides, accessibility must be a part of the authoring process. Interviewees consider that an edit field for the alternative description should be provided within the authoring flow with a content warning not only to **make it mandatory** but, especially, to **get people used** to providing this information.

Some participants have also reported that having a support feature to suggest alternative descriptions would help them, first by providing an example of what is considered an appropriate alternative description, and second by providing the opportunity for them to improve machine generated descriptions:

“This could become standard [...] show the description and say: “Do you think this is a good description for this image?” because in this case, it [Facebook] simply decides the description itself and also, if it is not correct, I have no way of indicating it.” – SP8

4.2.3 The cost of the additional effort. The third most popular reason mentioned by questionnaire participants for not providing an alternative description for their media content was the time it takes to do it. While further exploring this subject during the interviews, some sighted interviewees also declared that accessible practices are currently not integrated into their current publishing interaction flow. Providing an alternative description for their images adds a new task that would involve considerable time for reflection and make their activities much more **time-consuming**, especially given the spontaneous nature of social media content sharing for personal usage:

“Depending on the elements that are in the picture [it] can be a bit exhausting, especially if you have

many people and I have to be describing each person ...” – SP5

Blind participants shared the **additional burden** of often having to be the activist in their social circles, bringing awareness and recalling others to ensure they start producing accessible content. This leads some to the feeling of being obnoxious for having to constantly remind their acquaintances they are not able to fully understand the content shared:

“When we have a disability and we’re faced with it, we’re tired of saying ‘hey, don’t forget, publish something accessible’.” – BP5

As reported by our blind interviewees and more broadly discussed in previous works [23, 27, 32, 36, 38, 40], alternative descriptions currently provided by major platforms are not providing enough contextual information for visually impaired users to properly interpret media content. Therefore, they reinforced the importance of **promoting user engagement** to convey this additional context and the users’ own intentions and purposes in publishing this content through human description:

“When it comes to being accessible, you can’t take it out of somebody’s hands [...] Let them decide what they want to say, [...] how they want to describe it, whatever they were thinking of, why they were posting, that image should be what they’re posting.” – BP4

4.2.4 Lack of standardisation. Major platforms are employing different approaches to support accessible media authoring. This lack of standardisation requires users to identify and learn how to use each of the accessible features provided by every platform used. In Facebook, only two participants publishing accessible content for the first time were able to discover this feature, and, as stated by one of them, after a thorough research.

“On Facebook, I really, really had to go search, I tried a lot, I tried and eventually I had to search what Facebook had for accessibility because I could not find it.” – SP7

They also reported **not finding this feature** available in the native app, only being able to edit the automatically generated description on their desktop through the web interface. One participant also shared that, even though being blind and a frequent Facebook user, he was not aware of the possibility of editing these descriptions.

As for Twitter, the feature enabling the user to provide an alternative description for their own images was considered the best approach by one blind user. However, as described by other participants, its effective use is jeopardised by **not being part of the standard Twitter authoring process**:

“Twitter’s way of making a field for people to put in the alt text is the best way to do it, but I can’t tell you how many people can find it.” – BP4

Only one sighted participant tried to explore the accessibility feature provided by Instagram during this study, and also mentioned the **difficulty in finding it**:

“In Instagram, the first thing I think I had heard about is the alternative text, but I tried to figure it out and I found it out, but with some difficulty, because it was in some advanced settings in the post, it’s not very visible.” – SP7

During the interviews, Facebook, Twitter, and Instagram were the most cited social networks among participants. Each of these platforms adopted a different approach for providing alternative descriptions for user-generated content. Twitter provides an input field for users, while Facebook and Instagram rely on machine-generated descriptions. As observed by Sacramento et al. [30], major **social networks are not consistent** also when it comes to providing accessibility features and compliance among different platforms, such as mobile/desktop interfaces or iOS/Android mobile applications. However, the non-user-friendly interface is a common ground between them.

Therefore, concerning the roles of different stakeholders involved in the accessibility context, most interviewees consider that these platforms have the largest influence and, currently, they are not fully engaged in promoting accessibility:

“The platform is responsible for ensuring a good user experience and they have a good percentage of users who have these specific needs, and they are the ones who have to ensure this experience also applies to them.” – SP7

Some interviewees also considered this responsibility should go further and shared with the users themselves. As they play an essential role in this process, they have to be more committed to accessible practices.

Governments’ actions and the legal context of digital media regulation was also mentioned during the interviews as a possible way forward. Two participants also believe it involves providing better public policies for social inclusion in general. For instance, one participant made a comparison with current accessibility legislation for physical structures, such as ramps and handrails.

4.2.5 Inaccessibility. The inaccessibility of accessibility features is a paradox currently encountered in these services. Just like sighted participants, blind interviewees also reported having **difficulties identifying the proper feature** provided by major platforms even though they were familiar with its availability. This difficulty is further reinforced by the constant updates of these systems, requiring the acquisition of new knowledge about the structure of these new interfaces, as also pointed out by Voykinska et al. [36].

Furthermore, while most blind questionnaire participants declared creating accessible content on their social networks, in the interviews it was possible to observe that this practice is not necessarily being enabled by accessible features provided by platforms. During the interviews, they mentioned asking others for help in order to confirm the elements contained in the media to be published, **making them dependent of sighted friends or family members**. Moreover, one of them stated only sharing content already accessible. Therefore, these users declared missing a feature to assist them in creating their own descriptions for their images:

“In this case [for this study], I had to ask my brother how the photos were like for me to describe them.” – BP6

This lack of support for blind content authors reinforces the social cost, also observed by Brady et al. [3], and their sense of exclusion as they are unable to fully experience this aspect of social networks:

“I don’t think it’s because we’re blind or have any other type of disability that we lose the right to express ourselves, or to send any kind of joke, let’s say, those little stickers... when talking, we who are blind, are excluded from doing it.” – BP1

As mentioned by a blind participant, the constant arising of new media content such as GIFs, Stickers, Memes, and images with embedded text or screenshots enabled by major platforms pushes these social networks to be less and less accessible for them. This diversity also comprises stories, a new format that has become quite popular on major platforms. This format supports a mix of images, videos, text, and even stickers. This type of content raises another challenge for users as, once more, they don’t know how to provide accessibility for this type of content. Another issue raised by participants was concerning links that, when posted on social networks, often generate a preview of the website and often do not contain any information about it. This diverse range of content often fails to match the accessibility features available, which allows us to better understand why none of the questionnaire participants reported posting this type of content.

4.2.6 Accessibility motivations & concerns. Participants currently publishing accessible content are mostly driven by having a disability themselves or having acquaintances with disabilities. Two sighted participants, not used to share accessible content, declared that they would be more engaged in these practices if they had a personal connection to someone with a disability.

Sighted participants declaring publishing accessible content agreed the main reason for them to engage in these practices is because **it is the right thing to do**. Sighted interviewees not used to share accessible content shared their interest in contributing to the **inclusion** of people with disabilities and to make information reach as many people as possible.

Most interviewees also convey that **providing platform support** is an important factor to create more user engagement. One blind participant, who first discovered accessibility features during the study, stated that now that he is aware of it, he has already included alternative descriptions for all his previously posted pictures and intends to adopt this practice in the future. Nevertheless, the difficulty encountered may discourage some users, causing the opposite effect on people who, at first, are more likely to give it a try.

It was also possible to observe that some sighted interviewees may consider **accessibility approaches as creating setbacks** to their experience, reinforcing the unawareness about accessible practices – in particular the behaviour of screen readers and alternative descriptions.

The previously mentioned strategy of embedding an alternative description text in the post’s content, while it may be perceived

by some as an example of a good practice, was mentioned by one participant as a downside of accessibility, as it makes a post very long and somehow redundant for those not using a screen reader. For that, she considers that this information should be embedded in a way that is only perceived by screen reader users. Loading and scroll speed was also considered as a setback by other sighted interviewees, as accessible practices concerns including additional information to be loaded by apps and websites:

“It occurred to me, people could describe just like I did, or record a short audio to be heard by these people, but this will take a lot out of the dynamism that people have gotten used to in Instagram. [...] it would be great for them, but I think it represents a setback for non-visually impaired people.” – SP5

5 DISCUSSION

In what follows, we first discuss how these findings can be used to answer our research questions followed by further contributions provided by this work.

5.1 Research questions

RQ1: What are the motivations for social network users to create accessible media content? Our participants were mainly motivated by **doing the right thing** and **promoting inclusion** for people with disabilities. Although some of them are used to share media content only for a private audience, such as family and close friends, many of them are interested in enabling access to information for other people as well.

Considering the willingness to include people with different abilities and cultural contexts shown by interviewees, some strategies may be applied in order to motivate more users to create accessible media content. Participants tended to be more aware when in contact with a person with a disability, but as well when confronted with current accessibility approaches. They showed curiosity and interest in knowing more about the subject and they are motivated to understand how their content is being consumed by blind users. One major challenge identified among interviewees was the unawareness of how and why blind people use social networks. **Making end-users part of this process**, integrating accessibility features more prominently on platforms authoring flow, **educating them about accessible practices and alternative access**, and providing tutorials or scenarios of people with disabilities using the Web, for instance, may increase awareness and thus encourage them to become more frequently engaged in such practices. From that, we reinforce the conclusions reached by previous studies [11, 30] on the need of additional tooling and training for social network users on all major platforms.

RQ2: Which barriers social network users encounter to share and author accessible media content? First, it is important to highlight that the barriers encountered and reported by participants are strongly related to their familiarity with people with disabilities, assistive technologies, and accessibility features in general. For this reason, it is extremely important to educate people about accessibility, including how different disabilities affect the way people interact with technology, their challenges, and how users can publish accessible, inclusive digital content. While the society at large should

be responsible for seeking and providing such education, social networking sites may leverage their platform to educate users and enable more inclusive sharing practices. Instead, accessible practices and features remain unknown to most users. Most sighted participants were **not aware** of the steps they can take to make their content more accessible and they found **no guidance on major platforms** to assist them in this process. In addition, even when they actively search for guidance, they report difficulty in learning about or in finding accessibility features. Given this context, accessibility practices are being perceived by many sighted users as an activity that **requires a significant additional effort** on their part.

We also identified that some sighted users still have a certain **stigma associated with accessibility**, arguing that accessibility should be employed only when necessary or, even worse, that accessibility compliance may compromise their current experience on social media. Platforms not making this a requirement, or not providing a proper prompt warning, may also be contributing to this first line of thought. On the other hand, there is still a **lack of support for blind users** to create accessible media content as they find no features to assist them in this activity. Even though they recognise the latest advances promoted by major platforms, accessibility issues have been present in these services for a long time [5, 6] and blind users are still highly dependent on other people to participate in social networks, reinforcing the social cost constantly experienced by them.

RQ3: What are the requirements for social network users to create accessible media content? As a first step, major platforms must provide a more **user-friendly and accessible interface** in order to **make accessibility features more noticeable and easier to use**. Another critical issue identified concerns the different approaches adopted by these platforms to provide accessibility features, making it difficult for users to identify and learn how to use each one of these resources. For that, we suggest that **accessible approaches should be standardised among platforms** in order to create an **easily recognised pattern** towards an accessible posting and sharing inherent routine. Moreover, machine-generated descriptions introduced by some platforms often do not provide blind users with enough information or context, so they properly understand the corresponding media content, as also observed in previous works [23, 27, 32, 36, 38, 40]. One promising avenue is investing in **hybrid solutions**: exploring the balance of the benefits of technological advances in automatic image recognition and machine-generated descriptions, and involving users to fill the gap concerning context details and, in particular, their own intention and purpose in posting a certain media content. This approach also harnesses automatic descriptions to guide and support users in creating their own description, reducing the work and time cost perceived by some of them. Furthermore, blind users authoring accessible content will also benefit from it, reducing the social cost previously discussed.

5.2 Perspectives on accessible social media content authoring

While this study was not intended to be a comprehensive study on the accessibility features or barriers of social networks as a whole,

the different user perspectives on accessible practices in social networks gathered in our study allowed us to identify potential avenues for future research in accessible media content authoring.

Although machine-generated descriptions are not currently providing sufficient contextual information of visual content, their main advantage is that they can potentially be deployed at a large scale. For that, research on text alternatives best practices and users preferences [29, 31, 32] may be used to further improve these descriptions so that their quality becomes acceptable. From a hybrid perspective, providing suggestions of appropriate alternative descriptions may be useful to educate users and, therefore, to create more engagement on accessible practices.

Another opportunity suggested by some of our sighted interviewees is providing users with different ways of including alternative descriptions, such as audio descriptions. Previous studies [7, 20] identified that human narration – besides being faster – allows better image comprehension by blind users and it helps to establish a connection between user and content author. Marques et al. [7] also suggest a scenario where blind users could send a request to the author of an image so that he would record an audio description. While this solution possibly reinforces the existing burden imposed on blind people, collaborative approaches on alternative descriptions are also an interesting aspect to be further explored. As suggested by Sacramento et al. [30], providing users the possibility of including alternative descriptions for visual content they encounter may be employed by sighted users who are already motivated and currently engaged in accessible practices. This approach could be also a complementary action to create more awareness among social media users.

Moreover, this research is not intended to scrutinize any particular social network. The findings and discussions presented relied solely on the data collected, in which Facebook, Twitter, and Instagram were the social networks most used by study participants, corroborating earlier studies on similar areas of research [1, 3, 13, 32, 36, 39]. Further research with participants using other social networks to create accessible content, in particular those involving different forms of interaction, such as instant messengers, would yield important insights into this context. Another interesting perspective to be further investigated and discussed is the current status of compliance of these platforms with the current guidelines, in particular with the WCAG (Web Content Accessibility Guidelines) and ATAG (Authoring Tools Accessibility Guidelines) – which are often overlooked but might also be very fitting to this context. Considering, for instance, the case of Facebook and Instagram that, even though they provide an alternative description for each image, as discussed earlier, it does not necessarily entail accessible content. This context is especially challenging since these companies are not currently required by law to comply with any of these guidelines, leaving each of these platforms to decide the level of commitment they are willing to assume.

Finally, even though this work focused on visual disabilities, accessibility in media content also has an impact on the interaction of people with other disabilities, for instance, video captions for users with hearing impairments [2] or alternative descriptions for other screen reader users, such as people with cognitive impairments [18, 19]. Therefore, most topics discussed in our research

questions also apply to different kinds of impairments, in particular concerning accessibility awareness and motivational strategies.

6 CONCLUSIONS

In this study, we presented an overview of the usage and the accessible practices employed by 258 inquired social network users. These findings suggest that people with disabilities are interacting in social networks as much as users without disabilities. However, our blind participants showed being more frequently engaged with non-visual content, such as text and audio, than with visual-only content, such as images, in particular GIFs and memes. This may be partly explained by another finding: most sighted participants are not sharing accessible media content because, as reported by most of them, they were not aware of this possibility until participating in this study.

Following that, we conducted interviews with 20 of these participants in order to better explore their experiences, challenges and motivations concerning accessibility and visual content in social networks. While sighted interviewees were interested in being more engaged in accessible practices, most of them did not find proper assistance or support on major platforms to guide them to enhance the accessibility of their content. At the same time, blind users are not being provided with proper alternative descriptions whether by authors or by the machine-generated descriptions provided by some major platforms. Moreover, the burden of educating others and promoting the authoring and sharing of accessible content falls, unfairly, upon their ability to compel others to act.

This research does not aim to provide a thorough analysis of current accessibility features rather than provide insights into the current status of accessibility awareness among social networks users, and potential future directions. Our work complements previous research on visual content in social networks by providing insights on how sighted users are experiencing accessible practices, but also brings up the importance of employing hybrid solutions to fill the current gap. Platforms must go beyond just deploying accessibility features and must be more invested in approaches that create user awareness, engaging more people in adopting accessible practices in their daily posting routine.

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REFERENCES

- [1] Cynthia L. Bennett, Jane E. Martez E. Mott, Edward Cutrell, and Meredith Ringel Morris. 2018. How Teens with Visual Impairments Take, Edit, and Share Photos on Social Media. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, Vol. 2018-April. ACM Press, New York, New York, USA, 1–12. <https://doi.org/10.1145/3173574.3173650>
- [2] Larwan Berke, Matthew Seita, and Matt Huenerfauth. 2020. Deaf and hard-of-hearing users' prioritization of genres of online video content requiring accurate captions. In *Proceedings of the 17th International Web for All Conference, W4A 2020*. <https://doi.org/10.1145/3371300.3383337>
- [3] Erin Brady, Yu Zhong, Meredith Ringel Morris, and Jeffrey P. Bigham. 2013. Investigating the appropriateness of social network question asking as a resource for blind users. *Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW* (2013), 1225–1236. <https://doi.org/10.1145/2441776.2441915>

- [4] Julian Brinkley and Nasseh Tabrizi. 2017. A Desktop Usability Evaluation of the Facebook Mobile Interface using the JAWS Screen Reader with Blind Users. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 61, 1 (sep 2017), 828–832. <https://doi.org/10.1177/1541931213601699>
- [5] Maria Claudia Buzzi, Marina Buzzi, and Barbara Leporini. 2011. Web 2.0: Twitter and the blind. In *Proceedings of the 9th ACM SIGCHI Italian Chapter International Conference on Computer-Human Interaction: Facing Complexity*. 151–156.
- [6] Maria Claudia Buzzi, Marina Buzzi, Barbara Leporini, and Fahim Akhter. 2010. Is Facebook really "open" to all?. In *2010 IEEE International Symposium on Technology and Society*. IEEE, 327–336.
- [7] João Marcelo dos Santos Marques, Luiz Fernando Gopi Valente, Simone Bacellar Leal Ferreira, Claudia Cappelli, and Luciana Salgado. 2017. Audio Description on Instagram: Evaluating and Comparing Two Ways of Describing Images for Visually Impaired. In *Proceedings of the 19th International Conference on Enterprise Information Systems*. SCITEPRESS - Science and Technology Publications, 29–40. <https://doi.org/10.5220/0006282500290040>
- [8] Carlos Duarte, Carlos M. Duarte, and Luís Carriço. 2019. Combining Semantic Tools for Automatic Evaluation of Alternative Texts. In *Proceedings of the 16th Web For All 2019 Personalization - Personalizing the Web*. ACM, New York, NY, USA, 1–4. <https://doi.org/10.1145/3315002.3317558>
- [9] Facebook. 2020. How do I edit the alternative text for a photo on Facebook? <https://www.facebook.com/help/214124458607871>
- [10] Facebook. 2021. Facebook Reports Third Quarter 2021 Results. <https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Third-Quarter-2021-Results/default.aspx>
- [11] Cole Gleason, Patrick Carrington, Cameron Cassidy, Meredith Ringel Morris, Kris M Kitani, and Jeffrey P Bigham. 2019. "It's almost like they're trying to hide it": How User-Provided Image Descriptions Have Failed to Make Twitter Accessible. In *The World Wide Web Conference on - WWW '19*. ACM Press, New York, New York, USA, 549–559. <https://doi.org/10.1145/3308558.3313605>
- [12] Cole Gleason, Patrick Carrington, Lydia B. Chilton, Benjamin Gorman, Hernisa Kacorri, Andrés Monroy-Hernández, Meredith Ringel Morris, Garreth Tigwell, and Shaomei Wu. 2020. Future research directions for accessible social media. *ACM SIGACCESS Accessibility and Computing* 127 (jul 2020), 1–12. <https://doi.org/10.1145/3412836.3412839>
- [13] Cole Gleason, Amy Pavel, Himalini Gururaj, Kris Kitani, and Jeffrey Bigham. 2020. Making GIFs Accessible. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility*. ACM, New York, NY, USA, 1–10. <https://doi.org/10.1145/3373625.3417027>
- [14] Cole Gleason, Amy Pavel, Xingyu Liu, Patrick Carrington, Lydia B. Chilton, and Jeffrey P. Bigham. 2019. Making memes accessible. *ASSETS 2019 - 21st International ACM SIGACCESS Conference on Computers and Accessibility* (2019), 367–376. <https://doi.org/10.1145/3308561.3353792>
- [15] Darren Guinness, Edward Cutrell, and Meredith Ringel Morris. 2018. Caption Crawler: Enabling Reusable Alternative Text Descriptions Using Reverse Image Search. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) (*CHI '18*). Association for Computing Machinery, New York, NY, USA, 1–11. <https://doi.org/10.1145/3173574.3174092>
- [16] Darren Guinness, Edward Cutrell, and Meredith Ringel Morris. 2018. Caption Crawler: Enabling Reusable Alternative Text Descriptions using Reverse Image Search. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, Vol. 2018-April. ACM Press, New York, New York, USA, 1–11. <https://doi.org/10.1145/3173574.3174092>
- [17] Danna Gurari, Yinan Zhao, Meng Zhang, and Nilavra Bhattacharya. 2020. Captioning Images Taken by People Who Are Blind. In *Computer Vision - ECCV 2020*, Andrea Vedaldi, Horst Bischof, Thomas Brox, and Jan-Michael Frahm (Eds.). Springer International Publishing, Cham, 417–434. https://doi.org/10.1007/978-3-030-58520-4_25
- [18] Bronwyn Hemsley, Stephen Dann, Stuart Palmer, Meredith Allan, and Susan Balandin. 2015. "We definitely need an audience": Experiences of Twitter, Twitter networks and tweet content in adults with severe communication disabilities who use augmentative and alternative communication (AAC). *Disability and Rehabilitation* 37, 17 (2015), 1531–1542. <https://doi.org/10.3109/09638288.2015.1045990>
- [19] Amanda Hynan, Juliet Goldbart, and Janice Murray. 2015. A grounded theory of Internet and social media use by young people who use augmentative and alternative communication (AAC). *Disability and Rehabilitation* 37, 17 (2015), 1559–1575. <https://doi.org/10.3109/09638288.2015.1056387>
- [20] Lawrence H Kim, Abena Boadi-Agyemang, Alexa Fay Siu, and John Tang. 2020. When to Add Human Narration to Photo-Sharing Social Media. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility*. ACM, New York, NY, USA, 1–3. <https://doi.org/10.1145/3373625.3418013>
- [21] Christina Low, Emma McCamey, Cole Gleason, Patrick Carrington, Jeffrey P. Bigham, and Amy Pavel. 2019. Twitter A11y: A Browser Extension to Describe Images. In *The 21st International ACM SIGACCESS Conference on Computers and Accessibility - ASSETS '19*. ACM Press, New York, New York, USA, 551–553. <https://doi.org/10.1145/3308561.3354629>
- [22] Kelly Mack, Edward Cutrell, Bongshin Lee, and Meredith Ringel Morris. 2021. Designing Tools for High-Quality Alt Text Authoring. *The 23rd International ACM SIGACCESS Conference on Computers and Accessibility*, 1–14. <https://doi.org/10.1145/3441852.3471207>
- [23] Haley MacLeod, Cynthia L. Bennett, Meredith Ringel Morris, and Edward Cutrell. 2017. Understanding blind people's experiences with computer-generated captions of social media images. *Conference on Human Factors in Computing Systems - Proceedings 2017-May* (2017), 5988–5999. <https://doi.org/10.1145/3025453.3025814>
- [24] Reeti Mathur and Erin Brady. 2018. Mixed-Ability Collaboration for Accessible Photo Sharing. In *Proceedings of the 20th International ACM SIGACCESS Conference on Computers and Accessibility - ASSETS '18*. ACM Press, New York, New York, USA, 370–372. <https://doi.org/10.1145/3234695.3240994>
- [25] Nora McDonald, Sarita Schoenbeck, and Andrea Forte. 2019. Reliability and inter-rater reliability in qualitative research: Norms and guidelines for CSCW and HCI practice. *Proceedings of the ACM on Human-Computer Interaction* 3 (2019). Issue CSCW. <https://doi.org/10.1145/3359174>
- [26] Valerie S. Morash, Yue-Ting Siu, Joshua A. Miele, Lucia Hasty, and Steven Landau. 2015. Guiding Novice Web Workers in Making Image Descriptions Using Templates. *ACM Trans. Access. Comput.* 7, 4, Article 12 (nov 2015), 21 pages. <https://doi.org/10.1145/2764916>
- [27] Meredith Ringel Morris, Jazette Johnson, Cynthia L. Bennett, and Edward Cutrell. 2018. Rich representations of visual content for Screen reader users. *Conference on Human Factors in Computing Systems - Proceedings 2018-April* (2018), 1–11. <https://doi.org/10.1145/3173574.3173633>
- [28] Meredith Ringel Morris, Annuska Zolymoi, Catherine Yao, Sina Bahram, Jeffrey P. Bigham, and Shaun K. Kane. 2016. "With most of it being pictures now, I rarely use it": Understanding Twitter's Evolving Accessibility to Blind Users. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. ACM, New York, NY, USA, 5506–5516. <https://doi.org/10.1145/2858036.2858116>
- [29] Helen Petrie, Chandra Harrison, and Sundeep Dev. 2005. Describing images on the web: a survey of current practice and prospects for the future. In *Proceedings of the Human Computer Interaction International (HCI)*, Vol. 71.
- [30] Carolina Sacramento, Leonardo Nardi, Simone Bacellar Leal Ferreira, and João Marcelo dos Santos Marques. 2020. #PraCegoVer: Investigating the description of visual content in Brazilian online social media Carolina. In *Proceedings of the 19th Brazilian Symposium on Human Factors in Computing Systems*. ACM, New York, NY, USA, 1–10. <https://doi.org/10.1145/3424953.3426489>
- [31] Elliot Salisbury, Ece Kamar, and Meredith Ringel Morris. 2017. Toward Scalable Social Alt Text: Conversational Crowdsourcing as a Tool for Refining Vision-to-Language Technology for the Blind. *Aaai Hcomp 17 Hcomp* (2017), 147–156.
- [32] Abigale Stangl, Meredith Ringel Morris, and Danna Gurari. 2020. "Person, Shoes, Tree. Is the Person Naked?" What People with Vision Impairments Want in Image Descriptions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. ACM, New York, NY, USA, 1–13. <https://doi.org/10.1145/3313831.3376404>
- [33] The New York Times. 2020. The Coronavirus Revives Facebook as News Powerhouse. <https://www.nytimes.com/2020/03/23/technology/coronavirus-facebook-news.html> Accessed: 2020-08-12.
- [34] Twitter. 2016. Accessible images for everyone. https://blog.twitter.com/en_us/a/2016/accessible-images-for-everyone.html
- [35] Twitter. 2020. Twitter Accessibility. <https://twitter.com/TwitterA11y/status/1265689579371323392>
- [36] Violeta Voykiska, Shiri Azenkot, Shaomei Wu, and Gilly Leshed. 2016. How Blind People Interact with Visual Content on Social Networking Services. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW '16*, Vol. 1. ACM Press, New York, New York, USA, 1582–1593. <https://doi.org/10.1145/2818048.2820013>
- [37] WebAIM. 2017. Screen Reader User Survey. <https://webaim.org/projects/screenreadersurvey7/>
- [38] Gill Whitney and Irena Kolar. 2020. Am I missing something? *Universal Access in the Information Society* 19, 2 (jun 2020), 461–469. <https://doi.org/10.1007/s10209-019-00648-z>
- [39] Shaomei Wu and Lada A. Adamic. 2014. Visually impaired users on an online social network. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*. ACM Press, New York, New York, USA, 3133–3142. <https://doi.org/10.1145/2556288.2557415>
- [40] Yuhang Zhao, Shaomei Wu, Lindsay Reynolds, and Shiri Azenkot. 2017. The effect of computer-generated descriptions on photo-sharing experiences of people with visual impairments. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–22. <https://doi.org/10.1145/3134756>