Am I Missing Something?

Experiences of Using Social Media by Blind and Partially Sighted Users

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Abstract. **People with a visual impairment are more likely to experience social isolation as an effect of their vision loss. Social media can particularly benefit these users, but it is of concern if it cannot be fully and successfully used. This study was instigated at the request of an advisory group of visual impaired users and experts. The aim of the study was to investigate potential accessibility issues visually impaired users could encounter when using social media. A major concern was over missing content embedded in images on social media sites. A subsequent evaluation of Facebook posts carried out by a group of student participants demonstrated that nearly half of images considered contained embedded text, which would be inaccessible to visually impaired users. Despite efforts by social media companies to improve accessibility, any text present in images is not presented in an accessible way to visually impaired users. This research demonstrated the inequality that can arise from partial accessibility and the requirement to consider accessibility at all stages of design and development.**

Keywords: accessibility, social media, blind and partially sighted

1. INTRODUCTION

This research was inspired by Heath and Heap [18] who looked at the accessibility of Facebook for people without visual perception. Their paper considered both the accessibility of images and the availability of alternative text descriptions for images, recommending tools to support the provision of accessible text to compliment embedded text. This is required because the text embedded in the image was not accessible to screen reader users and in some cases, also not accessible to screen magnifier users.

In 2010, Dresner [12] demonstrated why blind users might wish to make use of social media and also identified ways in which blind and visually impaired users could use it successfully. The motivation for blind and visually impaired users to use social media is the same as for the rest of the population. In the paper `So why do people use Facebook and Twitter?' [31] the following seven reasons were listed:

1. Social interaction
2. Information seeking
3. Pass time
4. Entertainment
5. Relaxation
6. Communicatory utility
7. Convenience utility.

For a user with a visual impairment these reasons can become more important than for a sighted individual. Coyle, Steinman and Chen [10] showed the way in which users with a sensory impairment were more likely to become socially isolated than for other members of the population. In addition the ability to connect with others and the "mental disposition of openness and willingness to connect with the world" [40] has been shown to mitigate the suffering mental impairments that can be caused by isolation.

This work was instigated at the request of four people, all proficient users of Facebook which they find both useful and entertaining. They are all experts in blindness and accessibility regulation. They wished to instigate this research to clarify the ways in which the use of social media can be both more time consuming and more difficult for users with a visual impairment than for fully sighted users. Furthermore, they were concerned that information might be missed by blind and partially sighted users due to being embedded in the text. These people therefore became the advisory group for the project ('the advisory group'). Three of the group are visually impaired users (two blind and one partially sighted) who had personal experience of issues when using social media such as awkward and time consuming navigation and also instances when they felt not fully convinced that they had accessed all the required content. The sighted member of the group had knowledge from his accessibility standardization work and from contact and communication with visually impaired friends.

2.BACKGROUND

The provision of textual information in an electronic format which can be easily accessed by blind and visually impaired computer users including smartphone users has revolutionized many lives. In 2016 in the UK, 88% of the visually impaired population had access to the Internet [28]. This figure is significantly lower than for the general population where the access figure is 94% with 73% making some use of social media [29]. Nevertheless, the figure for visually impaired adults does demonstrate a large amount of access which has increased dramatically over recent years. For visually impaired adults it should be noted that access to the Internet is not level across all social economic groups and ages, with the lowest take up being 55% for adults over the age of 65 in the socio economic group C2DE[30].

More than seven in ten (73%) internet users have a social media profile, unchanged since 2014. This is more likely to be on Facebook as more than nine in ten (95%) social media users say they use Facebook. Of these, 43% reported they only use Facebook and 84% saying their main profile in on Facebook [29].

The use of social media is a good way for visually impaired people to stay in touch as the American Foundation for the Blind (AFB) [1] on their website states 'As a person who is visually impaired, you can fully access and contribute to Facebook, Twitter, and Linked in……to stay in touch and expand your social network'. The AFB's approach highlights how useful social media can be to visually impaired people to enable human contact to be maintained. In a literature search for the Thomas Pocklington Trust [19], the authors identified that the maintenance of social connections beyond the home was problematic for many visually impaired people leading to isolation. This demonstrated the need for connectivity to reinforce the person's happiness and confidence.

Although accessing social media is a good way for many visually impaired people to keep in touch and keep engaged, the access to these systems is not perfect. Back in 2007, Carey, when considering the impact of the digital world on blind users, observed that whilst the Internet provided opportunities for such users in respect of information searching and processing, it was then in a transitional state, moving from 'a largely textual to a largely multimedia carrier' which would present challenges for blind and visually impaired people [9]. Later Babu considered that as a consequence of Web 2.0 technologies, blind users could not take full advantage of the many benefits social media had to offer 'primarily because Web 2.0 technologies are sight-centred by design and lack the needed accessibility and usability'[3].

Progress has been made to ensure that social media is more accessible by visually impaired people, including work in creating and communicating the role of the Web Accessibility Initiative and also with special initiatives from the social media companies themselves. The use to which visually impaired people make of Facebook can be seen from research by Facebook itself, which found that 'for people who joined Facebook recently, vision impairment does not correlate with the number of friends they have on Facebook, thus they could potentially have the same rich experience interacting with friends just as everyone else does'[15]. However, social media companies are slow and reactive when dealing with accessibility issues, demonstrating that their accessibility processes fall at the lower end of the Accessibility Maturity Model [8]. For example, it has taken Facebook over a decade to address making its main content, photos, more accessible through the use of AI [27]. Also, new options/features still appear to be developed with little or no regard for accessibility. Any adjustments to increase accessibility are made clearly as an afterthought, such as Twitter's expansion of its character limit to 280 which, for the launch of version 7.11, was not screen reader compatible on certain platforms [14]. As England points out 'this oversight implies that Twitter values the content for blind users less highly than those of sighted users' [14].

As social media is now accessible via a range of applications, issues of usability have also been considered. Research by Wentz and Lazar [37] evaluated the usability of the Facebook desktop and mobile interfaces for screen reader users. They found the mobile version more usable, but also revealed that features were missing from the mobile interface and that it was less functional than the desktop version. These differences between the two interfaces raise concerns over continuing inequality and further research is required [6].

Investigations have shown that on line interaction by visually impaired and blind users can foster feelings of being less isolated and more socially connected, either with peers or their community in general [2, 32, 35, 36]. This user group consists of enthusiastic users of social media [2, 5, 11, 16, 30]. However, they can also encounter significant barriers when accessing web content in general [20]. There have been a number of recent studies, whose findings generally accord with the advisory group's observations and key concerns detailed above. A large scale study by Wu and Adamic [38] found visually impaired users appear to pursue all the main Facebook activities such as posting comments and status updates including some photo related activities. Volyinska et al. [36] highlighted barriers to accessibility resulting from an increased use of images in social network communications, including the pervasive use of photographs without sufficient text descriptions. This study identified strategies developed by visually impaired users to access content, in particular visual content, reaching the unsatisfactory conclusion that when approaches to overcome barriers failed and no assistance was to hand, these users had no alternative but to give up their desired activity. Also, as online content becomes increasingly visual- based, Twitter (until now considered the most accessible platform for blind and visually impaired users), is potentially becoming less accessible through the increase of embedded text in tweets, potentially 'degrading' the blind and visually impaired user experience [25].

Possible ways of improving accessibility are being explored [2, 11]. Gröber and Köster [17] reported of the development of a prototype browser extension to Facebook's regular homepage designed to improve accessibility for blind screen reader users. This study also detailed the numerous accessibility challenges that could negatively impact the experience of blind and visually impaired users and screen reader users due to the complexity and cluttered nature of Facebook's home page design; these included redundancies (for example, the *Find Friends* menu is both a text and pictorial item), multiple and/or hidden submenus and confusing labelling of menu items where the same two items are labelled differently. Wu et al. [39] presented the results of prototyping an in-lab user testing of an automatic alt text (AAT) system. Here, the recommendation most suggested by testers was for an AI system to extract and recognize text embedded in images. The potential of using social networks as a means for answering visual questions for blind users has also been investigated [7]. However, participants of that study indicated a reluctance to this approach, citing a number of issues such as low response rates to questions, slow response times for real time needs, privacy issues and concerns about over seeming too dependent on others.

Bigham et al. [4] recently identified feelings of uncertainty blind web users can experience when encountering problems completing tasks on line. They were unable to identify the source of the problem due to an inability to distinguish between three possible scenarios; the problem exists because (1) the information is there and not accessible, (2) the information is simply difficult to access, (3) the information does not exist. Users are, therefore, unable to discern between 'what information is available, and what is available but inaccessible'. This state of uncertainty, labelled 'Not Knowing What You Don't Know' engendered feelings of frustration and time wasting and strongly echoes the feelings identified by the advisory group over missing content.

A large number of papers have considered how to measure Digital Literacy including how to measure the competencies of users when using social media. The research has considered both looking at how people carry out individual tasks and also at how competent they feel when carrying out these tasks [21]. Issues of confidence were considered with respect to both the level of confidence the user had in their abilities and also in the ability of the system to present the complete content of a post to them in a format that they could utilize.

For this research we were driven by the feedback from our advisory group. We categorized the issues with respect to whether the activity was concerned with either the selection of data or issues with reading multimedia messages.

Selection of data

Before accessing content, a user must choose or select what to read from the amount of information presented/curated from Facebook from their friends and contacts of friends. Identifying what they want to focus on is difficult enough for a sighted person due to the large amount of information available and the way in which the algorithms do or do not accurately match their interests. For a user using a screen reader the ease with which they can scroll through the messages and pick the one they want to will depend on the speed at which they are listening to the voice and their competence with the technology. The situation is more difficult with a screen magnification user as they may need to scroll horizontally to find the section that is important to them.

Issues with reading multimedia messages

Reading the detail of the message can be complicated. This is especially true when the message is presented as a multimedia message with parts of the content in different media. This can be a particular problem for screen reader users or screen magnifier users. Facebook has AI-powered automatic alt text which can describe the images to screen reader users [34]. However, this does not facilitate the reading of embedded text. Research was therefore required on the use of embedded text.

3. METHOD

The research involved the use of qualitative investigation with end users and with experts in accessibility. This was followed by a quantitative investigation to discover the proportion of images hidden in texts that would be unreadable by visually impaired end users. The two stages of the research were as described in the following.

A. Stage one

The project was carried out in a two stage process. Initial research took place with members of the advisory group who identified the uncertainty that blind users experienced when accessing posts which might contain embedded text (but which might not).

Demographically, this advisory group comprised all adult members, three male and one female. Three are working in paid employment and one is retired. Two use screen readers and one is a magnifier user. All were recruited for their expertise in that two members write Standards in accessibility of technology for visually impaired people and the other two members work as accessibility advisors at a major UK national charitable organization for the visually impaired.

The role of the advisory group was to oversee the project, as they were particularly concerned in the research being used to quantify the amount of text embedded in images which was not made additionally accessible to a visually impaired end user. The advisory group was also supportive of the way in which findings from these interviews were used to provide the student participants in stage two with information on the provision of accessible information within the university's online teaching materials and via the Internet.

This qualitative research considered both the practical and the psychological implications of missing part of the content of the communications. Each member of the advisory group was interviewed individually to discover their views. The interviews were semi-structured, to ensure that the process was both informative for the project and pleasant for the subject. The researcher made use of a list of probes to ensure that information was obtained uniformly from each member. The list of verbal probes was developed by the researcher following initial pre-interview discussions with the members of the advisory group. A number of verbal probes were used as prompts for the interviewees: use of social media, accessibility of social media, accessibility of Facebook (with its use of artificial intelligence to describe images), accessibility of Twitter (with its option to add alt text to images), and issues with embedded text in social media.

The interviews were not recorded, instead notes were taken. At the end of the interview the notes were read back to the subject and a list of statements were agreed, to ensure that the true feelings and experiences of the interviewee had been recorded.

B. Stage two

Following interviews with the Advisory Group, research was undertaken to evaluate Facebook posts and the type of content including text, images and text embedded with images. The aim of this research was to identify and interpret the amount of information potentially lost to visually impaired users of social media by the inability of the social media platform to present embedded text within images in a method that they could access. To identify the extent of the issue, qualitative research was carried out with foundation year students at Middlesex University, London, UK, in November 2016. This research consisted of an evaluation of the students' recently received Facebook posts and the type of content including text, images and text embedded with images. It was used to identify the number of instances where embedded text within an image was used and the context of its use.

The research was carried out as an educational exercise in four lectures with different groups of students. The students were in their Foundation year at Middlesex University (the year before the first year). The Foundation year courses are designed to prepare UK and International students for degree level study. These courses aim to build confidence and provide the necessary transferable skills to enable students to progress onto an undergraduate degree. The Foundation Year is taken by students who do not have the right qualifications for a full degree or who need some help to get up to speed with the demands of learning before embarking on a degree. The students were taking the Foundation year in order to progress to degree level study in Biology, Biomedical Sciences, Environmental and Public Health, Business, Computing and Engineering, Law and Social Sciences, Media and Psychology. All participants taking part were young adults with a typical age range between 18 to 22 and a wide range of cultural backgrounds, reflecting the general diverse student demographic of Middlesex University which recruits students from 140 countries. The students were chosen for this study on the basis that they would be more likely to use social networks regularly and would therefore be familiar with interface features. No particular specialist knowledge was required for these tasks, only an ability to evaluate what constituted an image with embedded text.

Whilst Facebook users are not fully representative of the UK population it has been shown that 'On average social media users are younger and better educated than non-users' [22]. It was therefore felt relevant for this project to analyze the posts of students as they would be more likely to fit this general profile. The use of students was considered as a limitation of the research, as they may not be sufficiently diverse in their use of social media.

The Foundation year students were chosen as they are a slightly less homogenous group with a wider range of previous life experiences in particular, students attend the Foundation year because they are 'returning to study and feel you need some help to get up to speed with the demands of learning before embarking on a degree' [24].

During the lectures the students were introduced to four relevant topics before being asked to carry out the task: Firstly, the use of assistive technology including screen readers to enable visually impaired people to access and use computers including mobile devices; secondly, the use of social media by visually impaired people; third, the design of and use of questionnaires to collect qualitative information and fourth the ethical framework of Middlesex University and their right to refuse to take part [23].

Within the cohort of students in the lectures there was one student who did use screen magnification; however none were screen reader users. The questionnaire was produced in appropriately sized large print for this student.

The students were shown a range of images including ones with embedded text so that they knew what they were looking for. In class the students were given out print questionnaires and asked to take part using their smartphones to access Facebook. The students were asked to record the number of images and details of the content of those images for the last 20 posts they had received.

The research was designed to identify the number of images with embedded text which were not accessible to visually impaired people. The research had to both maximize the number images analyzed whilst ensuring that the task was not too arduous for the student volunteers. Pre-trial work identified that representative students could each categorize 20 posts in less than 15 minutes. The students were asked to analyze all of the last 20 posts they received whether or not they would normally choose to read them. The 20 posts were therefore representative of the posts that they received though not necessarily of the ones they would choose to read. These posts consisted of ones from friends of the student and also from commercial and similar sources (fake friends) that the student was in contact with.

The study was designed not to distract the students for their educational focus by causing them to become engaged with their social media. Research has indicated that the average person in the 18–24-year-old age group has 282 friends [13] including a range of people whose posts that they would not choose to read. The use of 20 messages was identified as a small sample of the available posts for each student. This number of friends takes into account the drift of young people away from Facebook [34] and does not take into account the number of postings they could be reading on alternative social media.

Most students choose to take part, although between a quarter and a third said they did not have a Facebook account or could not or did not want to access it at that time. A number of students stated that they only used Facebook for communicating with their family and did not want to access it in front of fellow students. The questionnaire asked the students to analyze their last 20 posts on Facebook and to state for each of the 20 posts:

- Number of Images in Post;
- Number of Images in Post with embedded Text;
- Kind of embedded Test;
- Is the embedded text also included in the post in a non-embedded form (Y/N);

- Is perceiving and understanding the embedded text necessary to understand the post (Y/N).

Three kinds of embedded text were considered, these were images that consisted of almost entirely of embedded text, images that consisted of photographs of text that are similar to posters and images of text where the position matters e.g. labels on diagrams, humorous cartoons with speech bubbles.

The students recorded their answers by ticking boxes on a grid. No personal information was collected from the students (in line with the university's ethical framework).

In total 56 fully completed questionnaires were submitted to be analyzed and 19 incomplete questionnaires were rejected at this stage. For each of those 56, the students reported the number of images in 20 posts, giving a total of 1120 posts to be analyzed.

As the students had been shown pictures of images and of a variety of images with embedded text before undertaking the research, the results on the straightforward counting exercise are assumed to be correct. The students had to exercise their own judgement and their own knowledge of the message stream when deciding whether or not perceiving and understanding the embedded text was necessary to understand the contents of the post. Additional help was available in the class if students required advice on judging the content of the posts and this was carried out in a way so as not to compromise any student's privacy.

A small number of the students were really interested in the topic and asked for additional information on accessibility. The research was linked to their activity on `digital natives' so it was very relevant to them. Unfortunately, one computer science student said he thought it was `possibly OK for blind people to be allowed to use Facebook' but he could not see how they could (he could not or would not understand how a screen reader is used in spite of an additional explanation offered to him). It will be unfortunate if his future career affects negatively on the accessibility of future technology.

4. RESULTS

A. Stage one

The interviews carried out in stage one identified a number of issues encountered when using social media, common to all of the advisory group members, set in the table below.

Table 1: Issues encountered by advisory group when using social media

Issues encountered by advisory group
Differences in accessibility of different types of social media
Content selection and difficulties browsing
Assumptions of Posters
Infographics
Lack of control due to volume of adverts
Missed content

Differences in accessibility of different types of social media meant that the advisory group could not always follow where their

friends went. This was perceived to be a particular difficulty with Instagram. They also encountered difficulties with content selection and during browsing. When trying to relax with social media, members of the advisory group found it difficult and time consuming to navigate away from adverts and from content that was not of interest to them. This was particularly true of the user of screen magnification. In addition, they felt a lack of control whilst trying to select content as a result of being bombarded by adverts and irrelevant content.

The advisory group furthermore reported that certain types of content created barriers to accessibility. They were particularly annoyed when concert and club venues hid information in embedded text in images of posters. This made the information inaccessible to both users of screen magnification and screen readers. One of the advisory group used this type of unreadable post as a trigger for her to phone the venue and to get them to tell her over the phone who would be performing over the coming season. Similarly, the use of infographics had a negative impact on the members' usage of social media. Infographics, particularly those with moving images, are difficult and/or impossible to access by users with a visual impairment. When accessed using screen magnification, they can be particularly annoying as the content is `nearly accessible'. This was described as the most frustrating situation. Lastly, all advisory group members reported a feeling of missing content. Due to the extra time taken when using screen magnification, there was less desire to be speculative and to look at posts from unknown people. This lead to a feeling of potentially missing things out.

Additional observations from stage one interviews

Not all the feedback given by advisory group members was negative.

One of the screen reader users was full of praise for the use of artificial intelligence by Facebook to describe pictures. He also wanted this to go further to cover embedded text. The use of alt tag on Twitter to provide alternative text for images was considered to be potentially useful though none of the advisory group members had experienced it.

All advisory group members reported that not all the embedded text is important to the blind user. Text in adverts can often be ignored (as often it is of no interest) and friends could be contacted to ask if they had sent information in that way and asked to send the information in a different way. However, information from concert venues and similar sites can often be presented in this way using the photographs as a pictorial background to the text.

B. Stage two

The research exercise with the students produced 56 completed questionnaires. In each of these questionnaires the student had successfully categorized the content of the last 20 posts they had received. This resulted in over a thousand posts to analyze, as indicated in Table 2.

Table 2: Total number Facebook posts analyzed

Description	Number
Total number of Facebook posts analyzed	1120
Total number of images counted in Facebook posts	1806
Number of images in Facebook posts with embedded text	871

Table 3 provides further information of the images in posts with embedded text.

Table 3: Analysis of images in posts with embedded text

Interpretation of image	Percentage
Perceiving and understanding the embedded text was considered necessary to understand the post (n=421)	37.6%
The image consisted almost entirely of embedded text (n=212)	18.9 %
The image consisted of photographs of text that are similar to posters (n=209)	18.7 %
The position of the embedded text within the image mattered e.g. labels on diagrams, humorous cartoons with speech bubbles (n=180)	16.1%

The kinds of embedded text in the still images described by the students included:

- Advertising copy;
- Clothing containing text;
- Poem with suitable background;
- Signposts;
- Snapchat caption;
- Speech bubbles (cartoons and photographs);
- Subtitles;
- Watermark text.

5. DISCUSSION

A total of 1806 images were counted in the 1120 posts, producing an average of 1.6 images for each post (1120/1806). The number of images in each post ranged from 0 to 49 and all of the students had received at least one post containing an image with embedded text. Images with embedded text totalled 871 (48%). It can therefore be seen that embedded text featured in nearly half of all posts. The results lead to the conclusion that the majority of posts contained images with embedded text (0.48 * 1.6 = 76.8%). Thus, on average, any message sent had a chance of 76.8% of containing an image with embedded text.

Analysis of the number of images in a post and the percentage of those containing embedded text provided limited quantifiable results in view of the limited sample size of student participants. It can also be noted that the 20 posts represented a small sample of their likely daily potential reading. However, these findings did give an indication of the types of embedded images Facebook users could receive in any given post. Organizations who posted regularly tended to adopt house styles that were uniform and could contain embedded text. The use of images was driven by the information to be transmitted or the stylistic requirements of the author. Discussions held with the students identified no desire to either reject or open posts depending on the number of images. The primary reasons for choosing a post to read depended on who had sent the post and what the content was expected to be. This could indicate that students considered images and text to be both valid ways of communicating information.

It is possible that the results would have been different, had the students been directed to analyze the posts that they would have chosen to read rather than their last 20 posts. The results therefore demonstrate the number of inaccessible images present in a sample which was not pre-edited. The posts were representative of those received by the students which were `live' on Facebook at that time. We cannot assume there would be a direct match between those posts and the posts that would be received by an older group of visually impaired people. The percentage of posts in which embedded text is available is therefore indicative of what is likely. To carry out this research with a sufficiently large group of visually impaired people would be practically difficult and would only result in an analysis of the posts they received during the task. It would not be possible to analyze the posts from contacts that they would seek out if all posts were equally accessible.

Nearly a fifth of all posts comprised entirely embedded text and nearly 40 % of posts contained embedded text that was considered crucial to the understanding of the message conveyed by the post, for example, an image of a person wearing a T shirt containing a humorous message or slogan to be read by the recipient (without any alternative text explanation). The embedded text that the students identified included text in video and still images.

The range of still images identified was diverse and some types of embedded text could be categorized as containing information which was potentially critical to a visually impaired or blind recipient for navigation (for example, signposts) or the interpretation of content (captions, subtitles and watermark text) and if inaccessible, would result in the recipient missing content. The issue could be further complicated by the recipient not knowing that they had missed information in the first place [4] and therefore would not be in a position to seek help to interpret embedded text, if they so wished.

In 2016, when Facebook launched automatic alternative text to describe the photos posted on its site, it was reported that a spokesperson stated "We want to build technology that helps the blind community experience Facebook the same way others enjoy it." [26]. The members of the advisory group for this project requested that this research be carried out because they want blind and partially sighted users to have the same user experience as sighted users. This research identified and quantified one way in which their experience is different.

The Web Accessibility Initiative (WAI) on their web page Introduction to Web Accessibility (Web Accessibility Initiative (WAI), 2018) make use of the following quote by Tim Berners-Lee, W3C Director and inventor of the World Wide Web: "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect". That universality becomes compromised if levels of access to information are different. The power of the Web to enable equality then becomes diluted.

The use of social media is an everyday occurrence for blind and partially sighted people. It is a very important tool for this user group to help them with tasks such as information seeking and social interaction for leisure and work purposes and to feel connected with society. However, barriers to full accessibility to online content can also result in negative feelings for visually impaired users, such as frustration, time wasting and uncertainty over content which may have been missed. The practical research undertaken for this paper showed that in the 1120 Facebook posts analyzed, there were 1806 images of which 871 had embedded text (in other words, nearly half the images had embedded text). Furthermore, nearly a fifth of the posts comprised entirely embedded text and over a third (nearly 40%) contained embedded text considered to be critical to the understanding of the message conveyed. Whilst the research was very small-scale, its findings

provided an indication of the possible volume of embedded text any one user may receive in a small sample of Facebook posts and the implications for blind and vision impaired users are clear. The results of this work were fed back to the advisory group who considered that they showed sufficient evidence to identify a real problem for blind and partially sighted people.

To be able to use social media fully, visually impaired people will need to be able to access a wide range of content from both people who know them and from commercial organizations. Screen reader users cannot currently access the embedded text unless it is presented in an additional way. Screen magnifier users may be able to access embedded text depending on the font and colour scheme, though access will not be straightforward. As a result, many visually impaired users will only have access to partial information and will not be aware of content that is hidden from them.

Facebook has carried out a lot of work to ensure accessibility for this user group. However, the issue of text embedded in images needs to be fully addressed by all providers of social media. Social networking companies need to demonstrate a greater commitment to accessibility by ensuring it is embedded into every stage of their design processes and testing, so that their consideration of blind and visually impaired users is not an afterthought. It is simply not acceptable or equitable that the social media platforms which connect people can also make certain users feel isolated by engendering feelings that they are missing content and therefore do not have the same access to content other users without impairments have.

6. CONCLUSION

The impact of the research presented was to confirm the fears of the advisory group that visually impaired users were missing some content of messages. It demonstrated how the current operation of Facebook results in blind and partially sighted users both missing relevant information and also failing to be able to identify when there is information hidden from them. The practical research with the students identified the quantity of embedded text in messages, the range of methods by which the text was embedded and the type of content embedded. This research determined that the missed content cannot be easily identified due to the wide variety of types of messages that can be sent. The research also benefited the Foundation Year students by introducing them to process of academic research including methodologies and ethics procedures.

A comparative study involving visually impaired and sighted users could be carried out to establish what content visually impaired users have missed due to the use of embedded text. It is not possible to carry out research to predict what content visually impaired persons may miss in the future. In addition a quantitative exploration could be undertaken to identify what content and information a visually impaired person would like to have access to, if all information was equally accessible.

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