**Adaptation to loss of visual function: Implications for rehabilitation on subtle nuances of communication**

# Introduction

Visual cues are vital features for social interaction; enabling us to pass intended messages, draw meanings from what is said by others, and to grasp salient subtleties of communication conveyed through body languages, facial expressions, or even the characteristics of our communicating partners (Bodsworth et al., 2011). Many people with vision impairment find it particularly difficult to make meaningful inferences from body language, facial expressions or gestures of their communicating partners. Such barriers to effective communication can have negative social and emotional consequences, withdrawal and ultimately, isolation (Bodsworth et al., 2011; Wang, & Boener, 2008). Communication with computers is fast becoming commonplace, and some aspects of communication with the computer technologies, however, occur without recourse to visual cues. Text-based Computer Mediated Communication (tbCMC) allows communication to occur with textual cues: which are literary devices such as phrases, sentence syntax, smileys, etc. in written text (Toma, 2010; Pariera, 2012; Picornell, 2013).

Older people (defined as adults aged 65 or older) are also not left out as computer use is increasingly becoming part of everyday routine of older people (Brophy, Blackler, & Popovic, 2015). There is, however, paucity of research on visually impaired older people’s perceived relevance of Computer Mediated Communication (CMC) to their lives; particularly on how they define its usefulness to their day-to-day communication and on how they strategically use it in overcoming challenges associated with communication. Research focus has been on the design of adaptive devices for blind persons (Gallagher, 2012; Zajicek, 2012), inclusive designs for people with vision impairment (Coleman et al., 2010; Biwas & Robinson, 2011), and encouraging adoption of computer use in order to bridge the digital divide (Choi & DiNitto, 2013; Czaja et al., 2006). Less attention has been given to the day-to-day use of CMC as a compensatory tool in coping with communication challenges. This study explores how visually impaired older adults engaged with others in face-to-face communication and explored how tbCMC could be relevant in helping people with sight loss to overcome these challenges. Data was obtained from semi-structured interviews conducted as part of a larger research on fostering social connections for visually impaired older people through tbCMC (Okonji et al. 2015). The preferences and opportunities presented to visually impaired adults when using computers to communicate are articulated from the lived experiences of 20 visually impaired older people. Using a qualitative discourse approach, issues relating to the affordances of tbCMC which enable them to compensate for such challenges are presented.

## Use and decision to adopt CMC among older people

As the use of social media becomes commonplace, concerns have been raised about Computer Mediated Communication (CMC) replacing face-to-face social relationships (Madden, 2010). This might possibly occur in situations where older people already face challenges with making face-to-face social contacts. In many studies, a common reason often cited as the cause of social isolation and/or loneliness among visually impaired older people is that, a loss of ability to perceive visual cues often caused social relationships to become exhausting (Lang, 2001; Wang & Boener, 2008). The inability to perceive visual cues could lead to passivity in communication for newly blind patients (Ryan, 2002; Wang & Boener, 2008). Due to these difficulties, some recently diagnosed visually impaired older adults might become selective in social relationships that they invest in, thereby shrinking their social networks and increasing the risk of being socially isolated (Wang & Boener, 2008). CMC, however, offers opportunities for social contacts and enhances communication for people with disabilities (Simpson, 2009), but the advantages and disadvantages vary depending on users' ‘dis’-abilities, personalities, and preference for CMC (Kuss & Griffiths, 2011).

Some attitudes among sighted older people have been identified as indicators of preference for CMC and a decision to adopt computer use. For example, within the Technology Acceptance Model (Bagozzi et al., 1992), *perceived usefulness* (a measure of the subjectively defined benefits of technology use) and *perceived ease-of-use* (a measure of the user’s degree of satisfaction with accessibility) have been argued to be strong determinants of older people’s rational intention to use ICTs (Ryu, Kim, & Lee, 2009). Davis (1989, p.320) defined “*perceived usefulness*” as “the degree to which a person believes that using a particular technology would enhance his or her job performance” and “*perceived ease-of-use*” as “the degree to which a person believes that using a particular system would be free from effort”. In essence, the perceived relevance and benefits of computer use is an important decisional factor among many older people (Selwyn et al., 2003; Sharit et al., 2004; Melenhorst et al.,2006). Research addressing the digital inclusion of older people has highlighted the importance of understanding the process by which older users establish the benefits (Melenhorst et al., 2001; Sharit et al., 2004; Melenhorst et al., 2006) and relevance (Selwyn et al., 2003; Richardson et al., 2005; Dickinson & Hill, 2007) of Information Communication Technologies (ICTs) for their day-to-day lives. This paper investigated these largely ignored aspects of the perceived usefulness of tbCMC among visually impaired older people in order to understand patterns of computer adoption and use among this group, as well as explore how it enabled them tackle challenges of communication, in that, in contrast to face-to-face communication, tbCMC does not require visual cues.

In face-to-face communication, people interact via multiple cues such as eye contact, facial expressions and gesture. Conversely, text-based CMC exhibit little emotional or social presence appeal as it lacks visual cues (Mehra, 2012). In literature of vision rehabilitation practice, there is limited focus on interventions to enable blind people make adjustments in-order to cope with non-verbal signals in communication. Within the practice of vision rehabilitation, survival tasks are given top priority. Survival tasks are activities of daily living that are related to physiological needs such as eating, toileting, personal hygiene, mobility, and safety (Silverstone, 2000). Although effective communication is central to social well-being, and as such could be argued to be a composite ingredient within the scope of survival tasks, practitioners’ preoccupation with adjustments for independent living remains a major barrier in rehabilitation for effective communication and socialisation.

Many visually impaired individuals depend on vocal tone to decipher the emotional disposition of conversation as intonation, and other voice qualities are as important as visual cues for ascertaining interpersonal affect (Tiwari, 2016). The reactions of speakers during social interaction might depend on their judgement of the meanings of utterances as expressed by tone qualities, pitch, loudness and other vocal qualities (Pickering, 2009). Affective reactions such as anger and dissatisfaction are usually expressed through intonation, interjections, intensification of voice, and by facial expressions. In some situations, however, verbal and vocal information may be more influential than visual information (Koppensteiner, Stephan, & Jaschke, 2015; Telfer, 1994). Fichten (1991) examined the communication cues used in daily conversations by people who were visually impaired and sighted. They found more similarities than differences among their subjects, but those who were visually impaired reported greater use of auditory cues. When people with vision impairments converse with one another, they compensate for absent visual cues by asking for the missing information and by attending to the emotional nature of auditory cues. Fitshen et al, also observed that though persons who are visually impaired infer affect from vocal cues, their biases often interfere with the accuracy of their perceptions.

Visually impaired persons vary in their reliance on and abilities to make accurate judgements of perceptions of vocal tone for evaluation of conversational partners’ intentions, mood, sincerity, and state of mind. Aspects of this diversity with auditory cuing that could inform special areas of rehabilitation needs, remains an aspect of communication that deserves more research attention. This paper explores the research question:

1. How does the lack of visual cues affect communication and communication needs for the visually impaired older adult population?
2. What strategies are employed by visually impaired older adults for navigating through challenges of communication in textbased computer mediated communication and what lessons can be inferred for interventions addressing their communication needs?

The objective of this study is to reveal aspects of misunderstandings that arise in conversations with people with sight, and challenges with online versus face-to-face communication. In addition, the study also aims to highlight difficulties that visually impaired persons perceive when sighted individuals rely more on visual cues than verbal or auditory cues that they would normally in non-face-to-face encounters.

# Methods

The study employed a qualitative approach in order to explore participants’ interpretations of how the characteristics of CMC affect their usage of it (Garcia et al., 2009; Ronko, 2010). It draws from the wealth of a larger ethnographic research (Okonji et al., 2015) that embraced a naturalistic observation approach with semi-structured interviews. More specifically, this study reports, as a Case study, how visually impaired older people perceive face-to-face communication and CMC dichotomy. Conclusions were drawn based upon the data obtained from qualitative interviews with participants. Interviews were topic guided and conducted in a separate room located within an internet cafe for visually impaired older people. The interviews were semi-structured allowing for prompts and were particularly iterative - giving opportunities to explore additional information when required. Each participant was interviewed twice. The interval between interviews enabled participants to reflect more on what they said, thus enabling a more reflective interview in the second phase. Eligibility to take part was limited to visually impaired older people who were aged 60 years and over, and accessed the internet. 20 people aged between 60 and 87 years participated in the study. They were recruited from a drop by surf centre – a voluntary organisation providing computer and internet facilities for the blind in Newcastle upon Tyne, UK. All participants used Screen readers (Dolphine-Supernova, ZoomText and JAWS). The sample included 11 females and 9 males. All participants were registered visually impaired members of the organisation. However, the cause of sight loss varied. Six of the participants had glaucoma, 12 of them had Age-Related Macular Degeneration (ARMD) and two participants had cornea dystrophies. Their skills and experiences of computer use also varied. The number of years of computer use ranged from two to eight years.

Participants for the one-to-one interviews were accessed through contacts made during participant observation and, in some instances, through recommendations by the Manager of the Centre. All interviews were conducted in a separate, comfortable room at the Café. Although participants were encouraged to suggest an alternative location of their choice (if they were not pleased with the venue that was provided), they all expressed satisfaction with the privacy and comfort of the venue. Questions asked include experience with computer use, years of vision impairment, communication in online and face-to-face contexts, perceived ease of both media, support gained from Computer Mediated Communication (CMC) or through face-to-face communication, personal concerns with tbCMC and face-to-face communication. Interview questions also focused on comparisons between ease of participating in online activities and face-to-face activities, knowledge of available options and applications, and perceived challenges with communication in both media. Participants’ names were changed to preserve anonymity. The study gained ethical approval from Northumbria University.

***Qualitative validity***

Qualitative validity refers to the integrity of the methods applied and the precision in which the findings accurately reflect the data (Anney, 2014). It includes methodological strategies applied to establish rigour in a qualitative research (Noble & Smith, 2015). One of the ways to ensure qualitative validity is via critical representation of different perspectives by making comparisons that show similarities and differences across accounts (Morse et al., 2002, Slevin, 2002). Participant phrasing and vocabulary were used in analysing the interviews in order to increase the chances of tapping into their views and decrease chances of misinterpretation of participants’ comments. Verbatim extracts of participants’ accounts were used to support reported findings in this study. Another reason why verbatim extracts from participants interview comments were used was in order to assists the reader in making judgements about whether the final themes are true to participants’ accounts. Respondent validation, which includes inviting participants to comment on the interview transcript and whether the interpretation of data truly reflected their accounts, is a strategy for enhancing credibility of qualitative research (Noble & Smith, 2015). During the iterative process of the interviews, analysed preliminary paraphrased data was read to the participants. They were asked to make critical commentary on the report to confirm that the interpretation represented their views

The data analysis section of the paper also provides detailed outline of how the open and axial coding of data analysis process led to derivation of subthemes as well as and the final themes. This was also in order to adequately reflect how participants’ perspectives were categorized into final results that are consistent, transparent and demonstrate clarity with thought processes of data interpretation. Throughout the coding process, discussions were held with research team members who had qualitative research expertise in order to provide a platform where assumptions and interpretations could be challenged and consensus reached. In principle, acknowledging biases in sampling and critical reflection of methods adopted are approaches to ensure qualitative rigour and relevance of collected data and analysis (Long & Johnson, 2000). In this study, sampling biases are stated (See discussion section). Overall, a detailed description of the research process from background, through the development of the methods and reporting of findings is presented in this paper to make the study transparent and build a transferable paper trail so that other studies can conduct a similar investigation while recognising the uniqueness in each social world.

***Data Analysis***

The process of data analysis started by searching for patterns of meaning that was relevant to the study. A “verbatim” account of all verbal and non-verbal conversation was documented in text format and imported into qualitative data analysis software- Nvivo. Familiarisation with the data was achieved by reading them repeatedly (Attride – Stirling, 2001) in order to gain comprehension with the depth and breadth of its content (Braun & Clarke, 2006). After familiarization with data, initial categories of meanings and codes were developed. This process was not linear but recursive, involving a back and forth movement throughout the data (Attride – Stirling, 2001). During initial open coding, different categories of meanings were identified across all collected data (One-to-one interviews and Observational data). 24 identified codes were sorted into 12 subthemes and 4 broader levels of themes. Relevant coded data extracts were collated within the identified themes. This was conducted by linking related codes.

# Results

Three themes were identified through the analyses. These were: ease of initiating interaction; ease of use of emails; and forming impressions of others. The themes were discussed in particular reference to how participants’ online experiences differed from face-to-face context due to inability to perceive visual cues and how such experiences underscore their desired adjustment for effective communication.

## 3.1 Ease of initiating interaction

Participants noted that although it was sometimes difficult for them to initiate social interaction in face-to-face environments because they were unable to visually assess whether others were available for a conversation or not, they found ways to circumvent such challenges. Amanda, a participant with Age Related Macular Degeneration (ARMD) commented:

*Well, I can’t see and I can’t write. It’s much easier for me to email others and communicate online with them. It’s a big help.*

A newly visually impaired participant, Alfred, pointed out that when interacting offline, being aware of the social presence of others could be challenging particularly when they did not signal their presence. This made socialisation difficult because it was not easy initiating a conversation without being aware of the presence of the other person unless the person announced his or her presence. This was illustrated in Alfred’s comment when he said:

*People who are blind are at a disadvantage in face-to-face social groups. If there’s a group of people sitting around, and they are chatting away, who are they actually chatting to? And if you’ve got no eye contact, and you don’t know, it’s another mystery call...isn’t it? That’s why I sometimes don’t feel comfortable sitting with groups who don’t understand you are visually impaired*.

Another participant, Harold, who lost his sight to glaucoma, made a similar comment:

*Well you see, when I’m in a group like this and there are many people talking, sometimes, I don’t hear what is said and I don’t see. So this socialising thing means to me that I go, and sometimes I think I’m done with it. This computer thing is the only way that I keep in touch.*

Verbal cues such as tone of voice in face-face interaction may reveal intention and motives of a communicating partner, and also provide information about when and how to respond (Thompson, 2001). Sharon, who had been visually impaired for 3 years due to cornea dystrophy, said that she often misinterpreted what was said in face-to-face interaction:

*When you are in a room and then there’s a lot of people there...people that you may know…it looks as if you lose your communication skills...although you can hear tone, you can’t see people’s expressions on their faces and sometimes, you don’t know whether what is said is a friendly comment or a hostile comment. You don’t know whether they might be saying something that to them it’s a joke or they are saying it sternly because you can’t see the smile or their facial expression.*

These comments suggested that some issues can arise for blind people, but despite such constraints in many aspects of communication within face-to-face environments, they sought ways of circumventing the challenges.

## 3.2 Ease of use of emails

Some participants reported that reading in enlarged format sometimes make visual tracking of content and screen navigation difficult. As such, it was not usually very convenient for many partially sighted participants to use screen magnifiers, and they seemed to prefer using screen readers to text magnification. Both totally blind and partially sighted participants mainly used screen readers. In trying to explore other potential avenues through which participants built and maintained social relationships, their comments suggested that applications that mainly supported socialisation, such as social networking sites, did not meet their expectations and visual demands. Internet social media were mainly considered as not being user friendly. Although many participants were aware of the existence of a number of social network sites such as Facebook and Twitter, the difficulty with using them presented many barriers to their ability to socialise through these means. Jenifer and Rosaline, both of whom had ARMD, complained about the website lay-out of Facebook and Twitter. They felt that the lay-out was confusing because the fonts were not tailored to support usability by visually impaired people:

*I can’t do Facebook, I can’t do Twitter because I can’t read their screens. If you can’t read the screen on Facebook, you don’t know where to go. (Jenifer)*

*I tried using Facebook but I can’t. I can bring the screen up and make the font as big as possible but it’s still difficult to see. There are little things everywhere. I miss the things going on because it’s not visible. Sideways you’ve got all those advertisements. (Rosaline)*

Samantha, a participant with cornea dystrophy and complicated cataract, considered some interface designs as not being fair to visually impaired people and criticised them as not being “inclusive designs” because visually impaired people had not been duly considered:

*They don’t use the right colours for people who are partially sighted. I feel very sorry for people who have colour blindness. The sites must be horrendous for them to use. You know when you’ve got sight impairment, you can’t see, there’s a lot of colours you’ve got to lose. If the backgrounds are on colours, you can’t see the writings at all.*

Many of them were comfortable using emails and many other comments appeared to address a universal advantage of email and online forums (as text-based communication medium) rather than tbCMC as a specific adaptation for blind users as illustrated in Sharon’s comment:

*You walk into an office and because you can’t see somebody, you are not sure who to see or who to talk to or who actually works here. It might be the wrong person you are asking. If you are doing it through the internet, you’ll get straight to the person you want to talk with*

Some of the participants believed that he text based media of the internet enabled them to communicate effectively with others, without confusion caused by inability to see facial expressions. Vivian, a participant with glaucoma, socialised on online forums. She pointed out that she was able to communicate with different people across geographic boundaries and cultural backgrounds:

*In online forums, you can communicate with the entire world! Anywhere in the world...Australia, Africa, or European Countries, America and all the different…Some forums are just like a club like local strew of local clubs here...Scottish clubs, Irish clubs. You can make friends all over the world on the forums.*

Despite different cultural backgrounds, Vivian believed that forum members found a common point of reference to supersede differences on which to base their social interaction. Her explanations during the interviews suggested that it could be more difficult for a visually impaired person to communicate with others who had a strong foreign accent in face-to-face contexts because of an inability to lip read. She believed that text-based CMC obviated tone of voice and that message tone could be inferred from texts. Her illustrations highlighted how users could deduce the mood of the sender based on their own interpretation and assumptions of the texts. This suggested that, sometimes lack of access to non-verbal cues in face-to-face setting, could make it particularly difficult for visually impaired individuals to draw assumptions about what was said, especially if an accent that they were unaccustomed to, obscured comprehension. Vivian also stated that in the first few years of her vision impairment, there were tendencies for her to leave out chunks of information which might be necessary for her to understand what was being said and respond appropriately but that in online platforms, all users are consciously aware of the absence of visual cues and therefore, endeavour to make information as explicit and comprehensive as possible so that it is less likely to be misinterpreted.

## 3.3 Forming impressions of others

Many participants’ narratives emphasised how non-verbal behaviours and facial expressions often augment the content of face-to-face interaction and help to form impressions of others. They stated that although non-verbal cues were more likely to elude them in face-to-face environments, they devised ways to evaluate the social behaviour of others. Some participants reported that in forming impressions of others online, they relied only on textual cues to make inferences about the social characteristics or identity of others. Kelvin, a participant with ARMD, illustrated this point in his comment:

*You try and analyse the way they write you, what they say when you are writing and I think you can pick it up from there and say...’I don’t like this guy and I’ll try and avoid him if I can’ but if I like what they are saying and what they are writing, I’ll say yes, I would like to meet this guy offline someday’’ (Kelvin).*

Kelvin explained that the inability to form impressions of others based on their physical appearance, made him resort to exploring alternative ways of forming such impressions of other communicators online, such as interpreting their online comments. Doris also noted that, as one of the vital social skills to decipher whether one has had an encounter with someone before and if so whether they are friends or foe, is being able to recognize faces but that it was common for some visually impaired people to feel isolated when unable to speak to an intended person. She however stated that her motivation to make adjustments for a more effective communication through internet use:

*As a visually impaired person with advanced glaucoma, I can’t see the persons face, so I’m not often sure about whom I’m speaking with. It’s quite different online because I’m almost always sure to be sending my email to the intended receiver that I have picked from my address book.*

Larry, another participant with macular degeneration, also pointed out that the inability to recognize faces could make newly visually impaired persons feel isolated and reluctant to pursue friendships. Larry believed that, in many occasions, the consequence of such difficulty is that the visually impaired person may be misconceived as unfriendly, aloof or deliberately avoiding contacts. According to Alice, a participant with glaucoma, opportunities for social interaction could be reduced due to inability respond to non-verbal gestures and facial expression of others. She described how opportunities to build on social networks were often lost during the onset of her vision impairment:

*Sometimes you meet someone, have an interesting conversation with the person, and then not recognize that person when you meet again. Email is different. It doesn’t happen.*

Alice's comment highlighted the contrast between email and face-to-face communication from the perspective of a visually impaired user. She contrasted this difficulty to the relative ease she experienced online and highlighted how participants constantly sought to find a way around communication obstacles as well the need for training on adjustment and adaptation to vision impairment for stress-free communication.

# Discussion

This study set out to investigate the role of technology in the lives of older people who are blind and the potential of tbCMC to support them with their daily communication. Findings show that although blind people are able to enter into meaningful conversation with sighted peers and with one another without significant problem, some issues can arise for blind people in large groups such as determining addressee or identifying the speaker. Such intermittent problematic occurrences that characterized the discourses of participants were aspects of communication that highlighted areas of the need for attentive rehabilitation among participants.

Findings show issues of communication for attentive rehabilitation with potential to enable older adults with vision impairment perform day-to-day communication tasks, to cope with routine social interaction and to open up possibilities for successful adaptation to sight loss. The traditional practice of vision rehabilitation that does seek to resolve complexities of communication among older adults with vision impairment may not adequately address communication needs of this group (Heine & Browning, 2002). Thus, a broader and more comprehensive systemic approach is required which is not just about independent living skills but also about learning new skills to compensate for challenges with communication and social interaction e.g. skills to enable people to use adaptive technology, to have access to information, and learning compensatory strategies for processing social information.

For newly visually impaired older adults, the findings suggested critical need for diligent rehabilitation supporting them to embrace coping methods through technology use. The great majority of non-verbal cues such as facial expression, and gestures were redundantly marked by participants through intonation, word choice and intelligent analysis of context. On the one hand, findings suggest that, the absence of visual cues in tbCMC holds meanings that could be regarded as different when compared with the perspectives of sighted users of tbCMC. While the absence of visual cues in tbCMC is perceived as communication disadvantage by many sighted users (Byron, 2008; Friedman & Currall, 2003; Hwang & Sungbok, 2007), visually impaired older people in this study did not perceive it as communication disadvantage because they were already used to building and maintaining social ties without visual cues.

Although the study demonstrates that tbCMC affords this user group the opportunity to interact and socialise with others in ways that were not readily possible in face-to-face contexts, participants comments did not imply that they did not like to see members of their social network face-to-face from time to time, rather, it suggests that opportunities for effective offline interactions are sometimes limited due to inability to perceive non-verbal communication without vision as commonly experienced by newly visually impaired persons (Wang & Boener, 2008; Ryan, 2002). These findings highlight some points of attention for practice as it emphasises the importance of careful and sensitive rehabilitation programs rather than the need for circumventing face-to-face interaction. The findings also echo previous advocacies for the use of Information Communication Technologies (ICTs) among visually impaired older people in more pro-social directions – such as for the enhancement of their ability to communicate effectively and to cope with the communication challenges associated with being blind (Nimrod, 2010; Smeadema & McKenzie, 2010; Stephens et al., 2011). However, as communication technology can be useful in tackling isolation (Doyle et al. 2010; Nef et al. 2013), ICT practitioners are better placed to use these findings as a resource to inform strategies that could foster use of text based CMC for rehabilitation and adaptation to vision impairment. Findings suggest that older people with vision impairment are keen on using technology to augment opportunities for maintaining and/or establishing new relationships and rebuilding their personal and social identity (Okonji & Aryal, 2016). Participants comments showed that visually impaired older people want to be active users of evolving technologies for mediated communication, able to access the internet and to connect with family via email, and be part of their chosen social network, social connections and activities. Thus, where ICT is promoted to combat social exclusion, efforts should be directed at ensuring accessible technologies for this group.

Recent advances in social media focus on replicating the face-to-face experience in communication systems (Corti & Gillespie, 2015). The designs of Android devices (such as tablet computers or, smartphones) reflect that visually impaired people are not given sufficient consideration because the operation of such devices is visually tasking (Chiti & Leporini, 2012). The findings have implications for inclusive designs as usability for visually impaired people seems largely neglected since sighted users are the dominant market (Hakobyan, Lumsden, O’Sullivan, & Bartlett, 2013). As an example, some previous studies have established that sharing photos on social network sites are as effective for building social relationships as sharing visual information in face-to-face (Postmes, 2003; Wu et al., 2011). Many participants, however, argued that such interpersonal processes of socialization in CMC were yet to be accessible to them because assistive technology for blind people that provide access to such applications have not been developed. The findings can be utilized by gerontologists working with visually impaired older adults enabling them apply the essence of digital connections to the adjustment process. In addition, the findings should be useful for recreation/adult education workers and practitioners in providing support for visually impaired older people to learn and adapt to low vision while using computer mediated communications as a means of staying connected to others.

***Limitations of study and recommendations***

The current study has several limitations which have to be acknowledged. Firstly, it did not explore how the different types of vision impairment could have played a role in participants’ views. It is possible that the severity of vision impairment could influence perceived importance of visual cues. Secondly, the qualitative nature of the study makes it impossible to make generalisations based on findings. Lastly, the cohort selected was a convenience sampling of older people with vision impairment and might not be a true representative sample of this group. The findings in this study show that, although the internet accommodated the communication needs of visually impaired older adults, to many of them, it was a tool that enabled them to build and maintain social contacts. Participants valued the absence of visual cues on the internet because it afforded them many communicative advantages which made it easier for them to maintain social ties. They regarded the text-based CMC as one where visual cues do not necessarily gain such exaggerated importance because they were not needed to ascertain the identity of the communicating partner or other nuances of interaction. However, it could be argued that by opting out of the vision dominated environment (offline), the social skills once used spontaneously to initiate communication and develop meaningful relationships in this way could become atrophied. This requires further research.

# 5. Conclusion

In the light of these findings, the study demonstrated that text-based CMC afforded this user group the opportunity to interact and socialise with others in ways that were not readily possible in face-to-face contexts. The ‘inequality’ in perception of visual cues that exists offline was largely redundant online. According to visually impaired older people in this study, the absence of visual cues in tbCMC is not necessarily the absence of sociability. Aspects of non-verbal communication that introduced complications to communication suggested the facets of face-to-face interaction needing attentive rehabilitation for this group.

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