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Age differences in online social networking – A study of user profiles and the social capital divide among teenagers and older users in MySpace

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ABSTRACT

The aim of this research was to investigate age differences and similarities in the use of the social networking website MySpace, to explore potential differences in social capital among older people (users over 60 years of age) compared to teenagers (users between 13 and 19 years of age). We used locally developed web crawlers to collect data from MySpace's user profile pages, and to quantify any differences that exist in the networks of friends of older people and teenagers. Content analysis was applied to investigate differences in social activities between the two age groups on MySpace, and the way they represent themselves on their profile pages. Our findings show a social capital divide: teenagers have larger networks of friends compared to older users of MySpace. On the other hand, we found that the majority of teenage users' friends are in their own age range (age ± 2 years), whilst older people's networks of friends tend to have a more diverse age distribution. In addition, our results show that teenagers tend to make more use of different media (e.g. video, music) within MySpace and use more self-references and negative emotions when describing themselves on their profile compared to older people.

1. Introduction

Social networking sites (SNS), like MySpace, Facebook, Friendster and LinkedIn are the latest technologies and trends in online communication. They have become extremely popular in recent years (Lipsman, 2007) and continue to attract a large number of users (Bausch & Han, 2006). Such sites allow users to upload their own images, music and videos to make them available for public use. Additionally, they encourage users to connect to other users on the site, establishing and/or maintaining a group of friends. These activities allow members of SNS to engage in social activities and build and maintain social capital in these online settings, by sustain contact between friends and family (Ellison, Steinfeld, & Lampe, 2006). SNS are of increasing interest for researching group-building and community behaviour in online settings.

The growing popularity of SNS among a broader part of the population (Lipsman, 2006) has influenced the social interaction among people. Some scholars have therefore started to investigate the meaning of the communication and relationships between people in these sites. Recently, a special issue of the Journal of Computer-Mediated Communication (JCMC) collected publications into this relatively new area of research. However, most research into SNS sites focuses on the population of younger people, mainly on college students (e.g. Boyd, 2008; Ellison et al., 2006). It is widely acknowledged that young people use social software like blogs, SNS and online communities more often than older people, leading to an intergenerational "digital divide". Like it is the case with many other Information and Communication Technologies (ICT), SNS are often targeted at and more widely used by young people.

While MySpace perhaps is one of the best known social networking sites (besides Facebook) and has a strong appeal to young adults, other social networking sites such as Eons (www.eons.com) and SagaZone (www2.saga.co.uk) are targeting people over the age of 50.

To avoid a social capital divide it is crucial to ensure that SNS are universally accessible and people of all ages can benefit from them. The importance of social capital lies in the benefit of social support and integration and social cohesion among people (Requena, 2003). So far there is little research on how older people use and adopt these new arenas for social interaction in general and social capital in particular. Investigating the age differences in the usage and user behaviour on SNS sites can help us understand how older people form their social network and social capital on SNS sites compared to young people. Do older people build a network of friends in different ways than young people? What are the similarities and differences concerning the use of different media on the site? Do older people have different preferences and habits when representing themselves in SNS online? Answers to these questions can help us to identify similarities and differences in the way older people and teenagers represent themselves in SNS and use this setting to build and maintain social capital.

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Studies in other CMC environments, for example usenet online communities found that there is a distinction in the network structure and behaviour between teenagers and older people (Zaphiris & Sarwar, 2006). It is thus likely, that there exist differences or even a social capital divide between these age groups also in SNS. Finding answers to these questions can provide us with a twofold benefit: (1) knowing the preferences and behaviour of a specific target group (e.g. older people) can inform successful design of SNS for this population and (2) investigating the way older people and teenagers act and interact in SNS can inform our theoretical understanding about how these target populations maintain and build social capital in online environments. Our study addresses these issues by investigating in detail the differences and similarities of older people and teenagers participating in the social networking site MySpace.

1.1. Aims and objectives

The aim of this research is to investigate age differences and similarities in the use of the social networking website MySpace, to explore potential differences in social capital among young people compared to older people. We aim to better understand these differences by looking at how different age groups represent themselves and how they connect to other members of the online networking site. In particular, we are interested in:

1. Identifying any age differences in the type and number of friends MySpace users have.
2. Identifying and analysing age differences in the facilities and media that users use on MySpace (e.g. blog, video).
3. Identifying and analysing any age differences in the way people represent themselves on MySpace.

In order to investigate these issues, we collected a large number of profile pages from MySpace.com with the use of web crawlers we built. To identify age differences, we compared the behaviour and representation of two user groups in MySpace: teenagers (aged 13–19) and older people (aged 60+). In investigating these two groups, we can identify the unique behaviours of each of the two target populations as well as identify and analyse any age differences in their behaviour and in the way that they expand and maintain social capital in this setting.

The following sections present the literature review of research in the area of SNS, social capital and age differences in CMC. Following this, we describe the methodology that we applied. We also explain the web crawlers we developed in order to collect our data. We discuss our findings in Section 4. The paper concludes with a summary of our findings and recommendations for future research activities.

2. Related work

With the advent of social software, the internet is increasingly used for the distribution of User Generated Content (UGC). Instead of the user being a passive consumer of information, he is increasingly getting a more and more active role, creating as well as consuming information on the World Wide Web. This can be seen by an increasing number of blogs, customer forums, online communities, SNS, podcasts, wikis and other web 2.0 technologies. Djajadiningrat and Kyffin (2007) state that users increasingly create, share and react to web content. This leads to a need for visualising and mapping shared community knowledge (Novak & Wurst, 2004). In their overview over the rapid growth of UGC, Wunsch-Vincent (2007) define UGC based on three criteria: (i) the content has to be available online, (ii) the user engages in some form of creative process to produce the content and (iii) this is done in the user's work or professional environment. SNS falls under the category of UGC, as members create and publish content to an audience. Among other topics, Wunsch-Vincent and Vickery (2007) promote the possibility of UGC to contribute to social processes and to build relationships online, but also state that at the moment, UGC is mostly adopted by young people, bearing the danger of increasing the gap between digitally literate young users and users who do not adopt new technology that quickly (e.g. older people). In the following sections, we will especially address these two issues in relation to SNS.

2.1. SNS and social capital

Various studies have looked at the content of communication in different forms of online/mobile communication settings, for example blogs (Herring, Scheidt, Bonus, & Wright, 2004a, 2005; Herring, Kouper, Scheidt, & Wright, 2004b), UseNet groups (Harmon, 1997) and also text messaging (Bryant, Sanders-Jackson, & Smallwood, 2006).

When it comes to SNS, researchers are currently very interested in how these settings can be used to build and maintain one's social capital. Especially SNS are interesting in this aspect as they offer a new way of handling relationships in an offline and online environment. Whereas online social technologies before were mainly used to find new contacts in the online setting and then eventually transfer these contacts into offline contacts, SNS are mainly used the other way round. As a study of Ellison et al. (2006) shows, only very few people use SNS to find new contacts, but rather use the sites to strengthen already existing offline contacts.

In order to investigate the way users use SNS, researchers have frequently made a connection to social capital theory (e.g. Ellison et al., 2006). Social capital is described as the resources that are created in social networks and relationships between people and that have a certain value or benefit for individuals participating in this network/relationships. Social capital is created through interactions with others, thus it belongs to a group of people and not to individuals (Coleman, 1988).

Social capital theory distinguishes between two types of social capital: bridging social capital and bonding social capital (Putnam, 2000). Bridging social capital refers to loose connections between individuals. Often, people can provide each other with new information and input via these connections; however, they are not described as being very personal or emotional. They can be related to Granovetter's (1982) term of "weak ties" – connections that often exist in large quantities for a person but do not describe a very close relationship. Bonding social capital, on the contrast, describes close relationships in which emotional support is exchanged. It describes the relationships we might have with very close friends or family members. Bonding social capital can be compared to Granovetter's (1982) term of "strong ties".

As Donath and Boyd (2004) state, SNS might not increase the number of strong ties that people have, but the SNS technology rather supports the formation and maintenance of weak ties, increasing the bridging social capital of its users (Donath & Boyd, 2004). For example, SNS users can use their large number of friends to help them to get a job or information about issues that they and their immediate friends do not possess.

Ellison et al. (2006) investigated the role of Facebook to build and maintain social capital. They conducted a survey with over 250 undergraduate students at the Michigan State University, investigating the relationship between Facebook usage, social capital and psychological well-being. Their findings show that students who use Facebook more intensely report higher bridging social capital as well as higher bonding social capital. This shows

that Facebook was used to maintain both loose acquaintances and close friends. In addition, findings showed that Facebook usage was especially beneficial for students reporting a low satisfaction and low self-esteem, as those who reported low self-esteem also reported higher bridging social capital if they used Facebook more intensely. The authors conclude with the statement that "Facebook does appear to play an important role in the process by which students form and maintain social capital".

These studies show the benefits of SNS to build and maintain social capital. However, they mostly focus on the population of college students. Further research is necessary in order to investigate similarities and differences between different user groups in the behaviour and usage of SNS like Facebook or MySpace. Our study aims to address this gap by focusing on age differences. The following section will give a brief overview over current findings and research activities into computer-mediated communication for teenagers and older people, focusing on the differences in ICT usage of these two target populations.

2.2. Age differences in SNS

Research up to now has shown that offline characteristics of users have an impact on their online identity and behaviour. For example, Herring (1993) argues that gender differences can also be found in online communication. Similar work (Louis, 2004; Verhaagen, 2005) has found that females, more than males, tend to participate in online chat rooms. Studies also showed that differences between user characteristics are often transferred into the SNS. Kim and Yun (2007) investigated a Korean SNS named Cyworld. They showed how cultural differences between community members are also integrated into the communication and activities within the online social network. Similarly, cultural differences in CMC have also been found by Pfeil, Zaphiris, and Ang (2006) in their study of Wikipedia. These findings suggest that individual differences have an impact on their behaviour in SNSs (Kim & Yun, 2007). Various other background characteristics like the level of experience with the web in general and age are have been found to have an impact on the communication and behaviour in online settings, too (Zaphiris & Sarwar, 2006).

Concerning the population of teenagers, a study undertaking by Lenhart (2005) observed that over 21 million young adults had access to and actively used the internet on a regular basis. Teenagers routinely interact with one another via instant messaging and chat sites, 85% of teenagers are reported to do this on a daily basis (Hughes, 2006). Though MySpace was originally targeted at a user group aged 20+, it has immense popularity amongst teenagers (Lipsman, 2006; Odum, 2006). According to Nielson/Netratings, MySpace traffic grew by 367% between 2005 and 2006, making it the number one social networking website. Furthermore, it boasts the highest retention rate with 67% of visitors returning (Howe, 2006).

Boyd (2008) has applied an ethnographic approach and investigated teenagers' use of MySpace over a period of 2 years. She was especially interested in how teenagers engage in online SNS in order to from identity, socialise with peers and negotiate status. She found that teens mainly participate in MySpace in order to connect to already existing offline friends. Also, having a profile was often regarded as a "must" to be part of MySpace as everybody else was there, too. Often, teenagers go through a lot of effort to personalise their profile, building an identity online that they hope is going to be approved by their peers. As in offline settings, teenagers strive to be "cool" on MySpace by adhering to specific social codes. For example, Boyd (2008) found that the number of friends teenagers have indicates their "coolness".

Though studying the behaviour of teenagers in online social settings gives valuable insight into the usage of SNS, the focus on a biased user population might lead to biased conclusions, as the focus lies on a narrow target population. Researchers in the area of inclusive design stress the importance of particularly taking into account the special needs and characteristics of older people when designing technology. As they explain, older people might have distinct characteristics, for example physical or cognitive impairments that might make the participation in ICT more difficult (e.g. Gregor, Newell, & Zajicek, 2002; Kurniawan & Zaphiris, 2005; Zaphiris, Kurniawan, & Ghiawadwala, 2007; Zaphiris & Sarwar, 2006). In addition Gregor et al. (2002) also state that older people often have distinct attitudes and expectations towards technologies, making it sometimes difficult for them to see the possible benefits. This can easily lead to a rejection of these technologies by older people. To prevent this from happening, they suggest including older users early in the design process to make sure that the design is sensitive and inclusive of older people.

Despite the fact that technology is often designed for the young male user, looking at current research activities, it is often older people who can benefit most of new technologies and possibilities to socially interact in online communities and SNS. Online research also suggests that older people spend most of their online time communicating with others via email (Seniors Online, 2004), indicating that social interaction is a prevalent activity of this target population in online environments. Investigating further the impact of computer usage for older people, studies have found that the increased social interaction of older people in online environments has a positive effect on their perceived quality of life and well-being (Xie, 2007). The fact that older people can connect to like-minded people online (McMellon & Schiffman, 2002) provides them with the possibility to both receive, but also give information and support to other people. Morris, Lundell, and Dishman (2004) investigated older people's needs concerning the design of ICT that catalyses social interactions. They found that older people value having diverse relationships (with people from a variety of ages, locations, cultures, etc.) and reciprocate relationships in which the support is exchanged in both ways. They conclude that "computing should help elders strengthen their existing relationships and establish new lines of communication".

In addition, surveys have found that popular activities of older people are also to search for health information on the web and stay current with news and events (Pew Internet Institute., 2004). Online communities provide users with a possibility to combine both, the social interaction with others and the chance to reach out to information and news otherwise difficult to obtain (Preece, 2000). Older people are increasingly using these online settings to exchange information and emotional support. For instance, a year-long study of SeniorNet (www.seniornet.org) highlighted a growing trend of older users interacting with one another online (Mynatt, Adler, Ito, Linde, & O'Day, 1999). Unlike common stereotype towards older people, the findings suggested that many participants of SeniorNet were keen to learn about internet technology and enjoying the possibility to interact with others online.

In addition, studies investigating the behaviour of older people in these online setting in more detail have found that older people often engage in personal and supportive interaction online. Wright (2000) conducted a survey and investigated the content of a discussion board of older people and found that they perceive the exchange of experiences and support in online communities as very beneficial and valuable. Similarly, Pfeil and Zaphiris (2007) investigated the content of an online support community for older people, finding that older people enjoy building a sense of community in this online setting where they exchange all levels of supportive communication. Often, the nature of online interaction naturally suits the needs and preferences of older people. For example, Kanayama (2003) states that older people like the fact

that the communication is in a written form as it gives them more time to construct and think about what they want to write more thoroughly.

In addition to studies focusing on either solely teenagers or solely older people, research has also focused on a comparison of these two groups in CMC settings. Zaphiris and Sarwar (2006) investigated differences in the network structures of teenage-newsgroups and newsgroups for older people. They applied social network analysis to investigate differences in the characteristics of messages and differences in the overall network structures between the two newsgroups. Findings showed that the teenage-newsgroup was more active as it had a higher number of messages sent per person, and on average longer messages than the newsgroup for older people. However, the newsgroup for older people had higher numbers of replies to messages and therefore showed a higher degree of responsiveness and reciprocity. Overall, the newsgroup for older people was found to show more consistencies and stability in activity and behaviours of its participants compared to the newsgroup for teenagers.

As the mentioned studies show, investigating needs and preferences of these two target groups can give valuable insight into how they use ICT technologies and how they can benefit from this usage. Identifying age differences in these settings can give valuable insight for the design of such sites. Given the increasing popularity of online social networks, it is of growing interest to investigate whether there are age differences in the use of SNS and if yes, what these differences are. In our study, we aim to address this issue by comparing the friends' network and behaviour on MySpace of teenagers and older people. In the following, we will describe our process of collecting and analysing our data.

3. Method

3.1. Development of automated web crawlers

We decided to automate our data collection of user profiles in MySpace, since data collection manually would have been very time consuming. A number of automatic tools already exist but the focus of those programs is more on social network visualisation and not on data collection. For that reason we decided to develop our own crawler using the Ruby programming language (http://www.ruby-lang.org/en/). The crawler visits profile pages based on a randomly generated list of ID numbers created using the RAND function of Microsoft Excel. On visiting a profile page, the crawler uses regular expressions to collect the requested data for a given user and then moves on until the list of ID numbers is complete. Before running the crawler, two additional design issues were taken into account:

MySpace music. MySpace allows music artists to use the site as a marketing and promotional tool. Any MySpace user can potentially add a music artist to their friends list. We decided to exclude music artists from the sample as there could be situations where a user may have no 'real' friends but many music artists with whom no communication is occurring.

Private profiles. For security and preferential reasons, MySpace allows users to set their profiles as 'private', this means that only the friends of a private user are able to view their detailed personal data. Fortunately, private profiles still include all the data which was required for our study (see Table 1).

Overall, we investigated around 6000 MySpace user profiles. We started with collecting profile IDs of 50 teenage users and 50 older users. In this study, we specify as teenagers those who are aged from 13 to 19 and older people those who are 60 years old and above. This is in line with other similar studies, for example Zaphiris and Sarwar (2006). To allow for some analysis based upon gender, we restricted the sample to 25 teenage girls and 25 teenage boys, likewise for the group of older people to 25 older women and 25 older men. Then, our crawler collected the profile data of these 50 users and the profile data of all their friends, resulting in around 6000 MySpace user profiles being crawled. Adding the data of the friends' network of these 100 profiles, we ended up with a large (around 6000) data set of user profiles. All these data helped us analyse the network structures of the two age groups and answer our research questions that we stated in the introduction. Special care was also put on interpreting our findings in relation to social capital theory, discussing how our data shows how older people and teenagers use MySpace in order to build and maintain social capital.

Table 1
Summary of collected data

Age	Age of the user
Gender	Gender of the user
Number of friends	Total number of friends each user has (excluding MySpace music artists)
Friends' age	Ages of all friends of the user
Friends' gender	Gender of all the friends of the user
Profile comments	Number of profile comments received by the user
Music posted?	Indicates if music has been posted by user on profile page
Video posted?	Indicates if video has been posted by user on profile page
Blog posted?	Indicates if blogs have been posted by user
Last login	Date of user's last login

3.2. Content analysis

As pointed out in Section 1 of our aims was to identify and analyse any age differences in the way people represent themselves on MySpace and build and maintain social capital in this setting. To do this we had to focus on the actual content participants use to describe themselves on their pages.

For that reason, we investigated the actual content which was presented on the profile pages of the MySpace users. A second sample of 70 older people and 70 teenagers (half male/female) was randomly selected (using the same MS Excel process described earlier) and the textual content of the "About Me" sections on their pages was collected using the developed crawler. The "About Me" section is the profile page used by users to describe themselves in approximately 100 words. We then conducted a content analysis on the "About Me" section of each MySpace page in our sample.

The actual quantitative analysis was done using the LIWC (Linguistic Inquiry Word Count) tool developed by Pennebaker, Francis, and Booth (2001). "LIWC is a contextual analysis tool which calculates the degree to which people use different categories of words across a wide array of texts" (LIWC Inc., 2006). This online application allows the user to insert text and investigates this text in respect to associated words for seven dimensions, namely *self-reference*, *social words*, *positive emotions*, *negative emotions*, *overall cognitive words*, *articles* and *big words*. Each dimension is linked to by some target words from a pre-defined dictionary. Table 2

Table 2
Examples for words in the LIWC groups

Dimension	Examples of linked words	No. of linked words
Self-references	I, we, me	20
Social words	Talk, us, friend	314
Positive emotions	Happy, pretty, good	261
Negative emotions	Hate, worthless, enemy	345
Overall cognitive words	Cause, know, ought	312
Articles	An, a, the	3
Big words	Words with more than six letters	–

gives some examples of target words for each of the seven dimensions used in this study (derived from LIWC Inc., 2006).

This online application analyses text units word by word and compares the content with words from the dictionary. If one word matches a word in the dictionary, the respective word category is incremented. Overall, the application measures how often words that indicate a specific category of the text are used within a whole corpus of text. The data from this output is presented in the form of an attribute of the text and a score for that attribute. There are seven different LIWC attributes for any given piece of text. LIWC (LIWC Inc., 2006) describes the attributes as follows (see Table 3):

4. Findings and discussion

In the following sections, we will discuss the results of our analysis. This is done by addressing each of the three issues under investigation separately. In the first part we elaborate on identifying any age differences in the type and numbers of friends MySpace users have. In the second part we investigate age differences in the kind and frequency of activities that the two user groups perform on their profile (e.g. blogging, use of media, etc.). The third part presents results about the way people represent themselves on MySpace. We discuss our findings in the context of other studies in this area and interpret them in relation to the social capital theory.

5.1. Age differences of friend networks

5.1.1. Number and age distribution of friends

In order to investigate age differences in the friend networks of teenagers and older people, we studied the number of friends and the age of friends in the sample's friend networks. Fig. 1 shows the average number of friends for all ages within the group of teenagers. It illustrates the age compositions of an average teenager on MySpace. The median age of our teenage sample is depicted as a dashed line.

The results indicate that of all teenagers in the sample, most have friends aged 16–18. The graph peaks at this age and then begins to fall, with fewer teenagers having friends older than 20 years old. The median age of teenagers in the sample is 16 ($N = 50$). As the graph also peaks at this age range, we can deduce that teenagers tend to have the majority of their friends in the same age group as themselves. This supports the finding of other studies (e.g. Donath & Boyd, 2004) that stated that teenagers mainly use SNS to connect and interact with their offline peers, often friends from school, clubs, etc. who in the case of teenagers are likely to be of similar age. Our results support these findings and also suggest that teenagers' social capital is transferred from offline relationships to the SNS. Ellison et al. (2006) showed that the teenage years might be a very crucial time for forming social capital. They found that undergraduate students who use Facebook reported a significantly higher high school social capital than students who did not use Facebook and thus showed that the SNS is used to connect to friends from high school. Our findings support this suggestion that the teenage years might be a time when people connect to their peers within the same age group in order to build social capital and this activity is also represented in the SNS, showing mainly friends of the same age group. It seems that MySpace is therefore mainly used to maintain and nurture social capital that stems from their offline relationships and acquaintances.

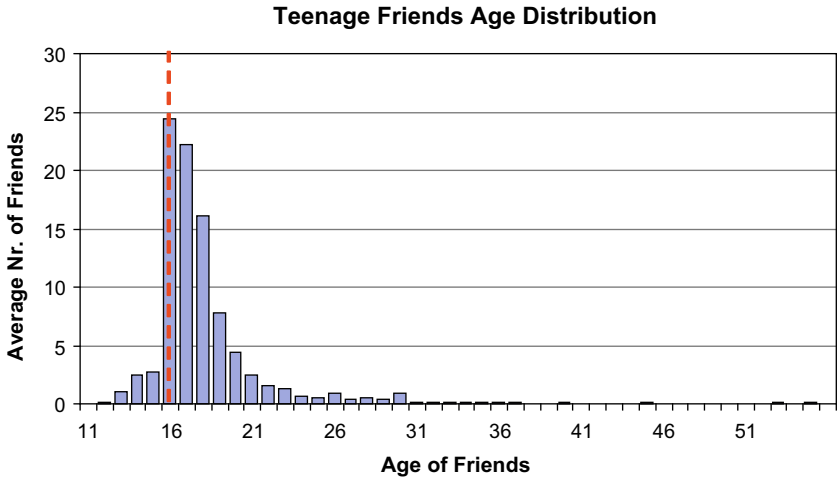

Fig. 1. Teenage friends age distribution.

Table 3
Description of the categories (source: LIWC, 2006)

Self-references	People who use a high rate of self-references tend to be more insecure, nervous and possibly depressed. They also tend to be more honest
Social words	Social words are words that make reference to other people (e.g. they, she, us, talk, friends). Generally, people who use a high number of social words are more outgoing and more socially connected with others
Positive emotion words	The more that people use positive emotion words (e.g. happy, love, good), the more optimistic they tend to be. If you feel good about yourself, your more likely to see the world in a positive way
Negative emotion words	Use of negative emotion words (e.g. sad, kill, afraid) is weakly linked to people's ratings of anxiety. People who have had a bad day are more likely to see the world through negatively tinted glasses
Overall cognitive words	These are words that reflect how much people are actively thinking about their writing topic. Examples include: thinking, wonder, because, knowledge
Articles	The three article words – a, an and the – account for a large percentage of the words we use. People who use articles at a high rate tend to be more concrete and impersonal in their thinking
Big words (words with more than six letters)	Use of big words is weakly related to higher grades and standardised test scores. People who use a high rate of big words also tend to be less emotional and oftentimes psychologically distant or detached

Further analysis shows that the median number of MySpace friends a teenager has is 60 ($N = 50$). The median number of MySpace friends of teenage girls and boys is 103 ($N = 25$; girls) and 43 ($N = 25$; boys), respectively. Our findings also show that teenage girls have more MySpace friends than teenage boys. A Mann–Whitney non-parametric test ($U = 176.5$, $p < 0.05$) confirmed that this difference is significant. Again, this can be related to previous findings that suggest that female users tend to be more active in the socialising aspects of online participation (Herring et al., 2004a). A high number of friends suggest that teenage girls use MySpace in order to connect to friends to a greater extent than teenage boys.

Fig. 2 shows the equivalent graph for the group of older people. Again the dashed line indicates the median age of the sample.

Compared to the teenagers (Fig. 1), the investigation of MySpace friends from our sample of older people (Fig. 2) presents very different results. The median age of older people in our sample is 63 ($N = 50$). Our sample of older users tend not to have many MySpace friends, as the median number of friends for older people is 12.5 with many older people having none or only one friend. Also, the distribution of the friends' ages is a lot more spread out. This shows that older people tend to have MySpace friends from various age groups, compared to teenagers whose friends tend to be within their own age group. The age distribution for older people's friends shows also a peak in the teenage age group, which could represent grandchildren which older users have added to their friends list. Previous research has shown that one motivation to use ICT of older people is the possibility to connect to their grandchildren (Quadrello, 2005). Our findings indicate that older people might use MySpace also as a means to communicate and interact with their grandchildren.

Our findings show that the social capital of older people on MySpace is smaller in size but more heterogeneous concerning the age distribution of friends. Donath and Boyd (2004) stated that the strength of weak ties (bridging social capital) lies both in the large number of available weak ties and in the diversity of other people that can be reached through these ties. The fact that older people have a much smaller size of friends suggests that they miss out on the benefits of a great social capital. On the other hand, the diversity of older people's relationships on the site suggests that their social capital is more heterogeneous and that they might benefit more from the variety of their friends.

Unlike the teenage sample, the Mann–Whitney test for the sample of older people showed that there were no significant differences in the number of MySpace friends older women and men have ($U = 280.5$; $p > 0.05$).

Teenagers tend to have a lot more MySpace friends in comparison to older people. To investigate whether teenagers have more friends than older people, we calculated the number of friends of teenagers and older people. Results show that teenagers do have more friends than older people on MySpace and a Mann–Whitney test showed that this difference is significant ($U = 330$; $p < 0.05$). Again, this was also found to be true when looking at age differences for the two genders separately. A Mann–Whitney test verified that teenage girls have more friends than older women ($U = 57.5$; $p \leqslant 0.05$). The second test was concerned with whether teenage boys have more friends than older men in the sample. This was also found to be statistically viable ($U = 107.5$; $p < 0.05$). In summary, this shows that compared to teenagers, older people seem to use MySpace to build friend networks to a lesser extent than teenagers do. The different numbers of friends indicate that older people might be more selective in choosing who their friends are than teenagers. As Boyd (2008) noted, the number of friends is quite an important assessment of one's profile for teenagers. Thus, it is likely that having many friends is a sign for high status among one's peers for teenagers. However, this does not seem to be the case for older people.

Donath and Boyd (2004) state that the fact that the social capital of SNS users is visible to others is very different from traditional CMC technologies and could influence user's behaviour on these sites. Our findings show a distinct difference in size and composition between the social capital of teenagers and older people. However, there might be different reasons for this finding. One explanation could be that teenagers are more concerned with presenting a large social capital on the SNS to others as this also implies a high social status among their peers. Older people might not have this motivation and thus might not be as concerned about the size of their social capital on the site as teenagers are. Older people, on the contrast might be more concerned with the "quality" instead of the "quantity" of their social capital and thus have less but maybe stronger relationships with others.

Also, findings from previous studies (e.g. Ellison et al., 2006) showed that SNS are mostly used to transfer offline connections into the SNS and then maintain and expand their social capital in this virtual setting. They also showed, SNS are rarely used to meet new people and that the reason to use the SNS to "meet new people" has a negative association with the level of social capital. The fact that older people have a smaller set of friends than teenagers on MySpace might be due to the fact that the number of offline relationships that could be transferred to MySpace is limited as the people they know offline are mostly not on MySpace. Thus,

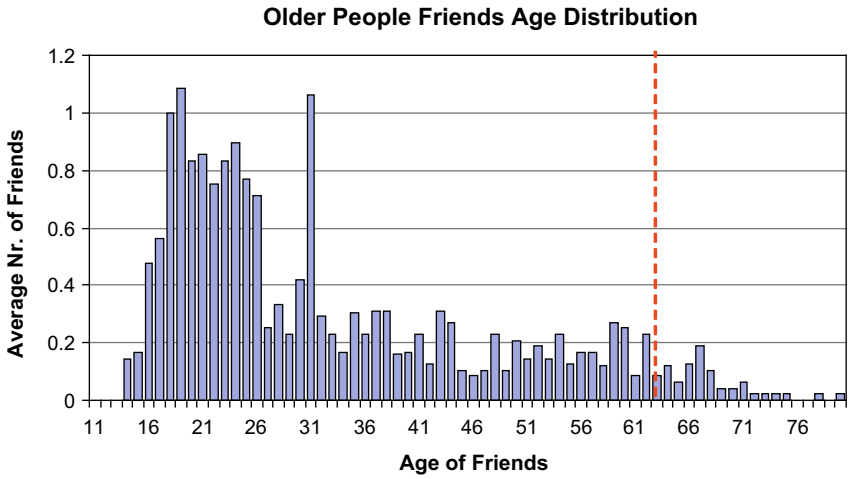

Fig. 2. Older people's friends age distribution.

their social capital on MySpace represents only a fraction of their offline social capital, whereas teenagers' offline friends are mostly on MySpace also and it is easier for this target population to transfer the offline social capital into the SNS.

Comparing the age distribution, our results show that 61.9% of teenager's friends are in their immediate age range (±2 years). This is the case for only 2.4% of older people, with 26% of older people in the sample having no friends in their immediate age range (±2 years). This finding could be due to the fact that although the number of older users of MySpace may be increasing, there are still proportionately more users in the lower age ranges as the above analysis suggests (Odum, 2006). This age difference was also found when comparing older women with teenage girls and older men with teenage boys. Further Mann–Whitney tests also concluded that teenage girls have proportionately more friends who are in their age group (±2 years) when compared with older women ($U = 2$; $p < 0.05$). Similar results were found for teenage boys when compared to older men ($U = 50$, $p < 0.05$). This finding can be discussed in relation to a study by Morris et al. (2004) that showed that older people prefer to use communication technology in order to connect to other people who are from different age groups than themselves. Whereas teenagers seem to use MySpace to connect to people of a similar age to theirs, older people seem to take the opportunity to connect to a variety of people of different ages.

In summary, older people and teenagers' social capital on MySpace seems to be very different, as teenagers show a much higher quantity of social capital whereas older people's social capital seems to be more diverse. Our findings show clearly that teenagers connect to friends that they already know from their offline lives and the social capital therefore consists of relationships to friends of similar age. The case is different for older people, as they seem to select their friends more carefully which leads to a smaller but more diverse social capital on MySpace.

5.1.2. Gender of friends

The median number of female friends a teenage boy had on MySpace was 22, compared to 18 male friends ($N = 25$). Similarly, teenage girls have a median of 53 male friends compared to 39 female friends ($N = 25$). This indicates that teenagers use MySpace as a way to connect to more friends and acquaintances of the opposite sex. Fig. 3 shows the median number of friends each of the samples has relative to their gender.

To test if these differences are mirrored in the sample of older people, we show a similar graphical representation of the gender distributions of the older people's MySpace networks (see Fig. 4).

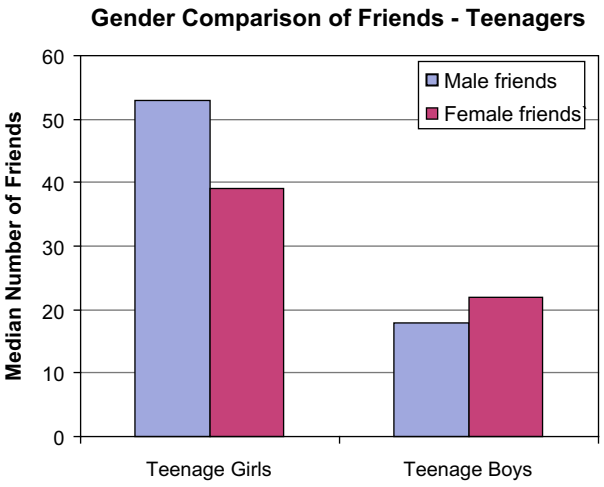

Fig. 3. Teenager's gender composition of friends.

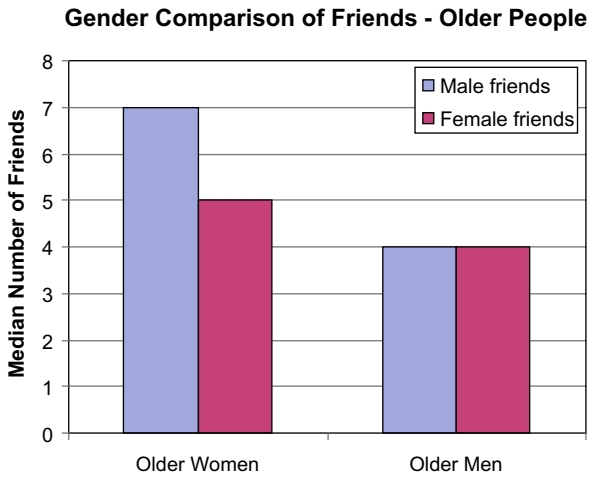

Fig. 4. Older people's gender composition of friends.

Results show that older women have a median of 7 male friends compared to 5 female friends ($N = 25$). Also, calculations show that older men have a median of 4 male friends and 4 female friends. The graphs suggest that older people do only vaguely follow the trend of teenagers having more friends of the opposite sex.

Thus, we were interested whether teenagers tend to have proportionately more friends of the opposite sex than older people. Teenage boys were found to have more female friends than senior males, as a proportion of their total friends ($U = 143$, $p < 0.05$). However, this result is not mirrored when testing whether teenage girls possessed proportionately more male friends than older women ($U = 248$, $p > 0.05$) ('proportionately' in this sense refers to the amount of male friends a female has as a proportion of her total friends).

5.2. Age differences of activities within MySpace

5.2.1. Age differences in blog postings

Concerning the usage of blogs, our results show that over half of the teenagers had posted blogs on their profile (26 out of 50: 52%) whereas just under a quarter of older people had done so (12 out of 50: 24%) (see Fig. 5). The popularity amongst teenagers in using MySpace blogs mirrors studies in this field which have identified a large teenage population in the development and maintenance of blogs on the internet (Herring et al., 2004a). As blogs are also part of the self-representation and identity building in MySpace, this finding is in line with previous findings (Boyd, 2008) that teenagers take great care and spend a lot of effort to build an appropriate identity in MySpace. It indicates that older people in

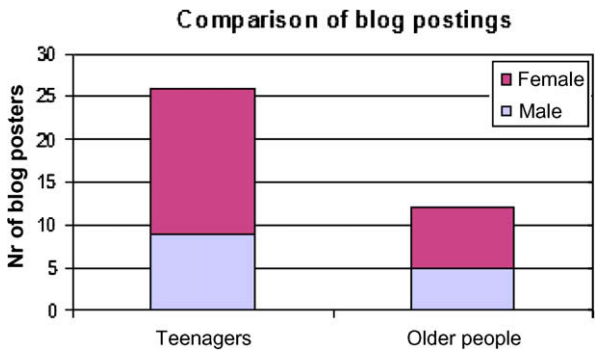

Fig. 5. Comparison of blog posting.

comparison to teenagers are less concerned with working on their presence or image online.

Again, this findings shows that teenagers' seem to be more concerned with displaying a large and active social capital on their profile page by having lots of friends and engaging in activities to promote themselves and nurture their social capital. Older people, on the other hand, seem to be less concerned about this and seem more reserved concerning the activity of blogging.

We were interested to find out the gender breakdown of the bloggers. Female teenagers seem to be more involved with this aspect of social interaction, with 17 of the 25 girls (68%) in the sample posting blogs compared to just 9 boys (36%). This finding coincides with work undertaken by Herring et al. (2004a), which showed that teenage girls had posted and maintained more blogs than adolescent males on the World Wide Web. Looking at the sample of older people, the difference between the two values is less compared to the teenage sample. The data showed that 7 of 25 older women had posted blogs (28%), compared to 5 of 25 (20%) of older men. As with the number of friends, this finding shows that gender-related differences are stronger for the teenage group than for the group of older people.

5.2.2. Age differences in media usage

Fig. 6 summarises the media usage of our sample of older people and teenagers.

The results show that more teenagers use music and video on their profile pages compared to older people. Again, this could be due to the fact that older people tend to use ICT to a less extent than younger people (Eisma et al., 2004). The fact that MySpace video is a relatively new feature on the site could explain why most profiles have posted music more than video content.

Ellison et al. (2006) found that the higher the intensity of the SNS usage among undergraduate students, the higher their level of social capital. Our findings show a similar tendency as they show that older people are less active on MySpace and also have fewer friends in the SNS suggesting a diminished social capital on MySpace. In contrast to that, teenagers engage in a variety of different activities on MySpace (posting blogs, using different media, etc.) and have a higher number of friends suggesting a greater social capital in comparison with older people. The level of usage of different facilities on MySpace seems thus to be related to people's social capital in this setting. The fact that older people do not seem to use the different media facilities on MySpace might be due to the fact that they are less familiar with this kind of technology and thus are inhibited to use it. This barrier for older people to use different media seems to be related to the social capital that this target population builds and maintains in MySpace.

Comparing the media posting figures between teenagers and older people, we found that whilst the teenage boys in the sample posted more music than teenage girls, older women posted more music and video on their profile pages than older men.

5.2.3. Age differences in number of comments received

We looked at the number of comments each user receives on his/her profile page. 'Comments' are short messages left by other MySpace users on a particular user's profile. Teenagers received a median of 181.5 comments whilst older people only received a median of 8 comments. A Mann–Whitney test showed that this difference is significant ($U = 416.5$; $p < 0.05$). This is in line with Boyd (2008) finding that teenagers often use the "comments" in order to engage in social interactions online – this means that the comments-section is used as a public forum for message exchange. Our data suggests that older people are not taking on this habit and thus have fewer comments on their profiles than teenagers.

Leaving comments on each others profile pages can also be seen as a way of nurturing and maintaining one's social capital in this setting and intensify the relationships with their friends on MySpace. Teenagers seem to connect to a large number of acquaintances and solidify these relationships on MySpace whereas older people seem to lack the basis of a large pool of friends and also do not engage much in further activities in order to maintain their social capital.

Taking the gender into account, results show that teenage girls receive more comments compared to all of the other groups. Mann–Whitney tests confirmed that teenage girls receive more profile comments than older women ($U = 126.5$, $p < 0.05$) and teenage boys receive more profile comments than older men ($U = 77$, $p < 0.05$).

Figs. 7 and 8 show the number of comments received for each individual within the group of teenagers (Fig. 7) and older people (Fig. 8). These figures indicate that there is a wide spread for both older people and teenagers concerning the number of comment received. This shows that not all teenagers receive a high number of comments, and not all older people receive that few comments.

Previous studies have shown that women utilise the internet more for communication and socialisation than their male counterparts (Herring, 2004a; Kirkup & von Plummer, 1990). The median number of comments received by teenage girls and boys is 261 for girls and 137 for boys. The findings suggest that teenage girls tend to receive more MySpace comments than teenage boys. However, a Mann–Whitney test rejected this claim ($U = 265$, $p > 0.05$). A similar investigation was then conducted with the sample of older

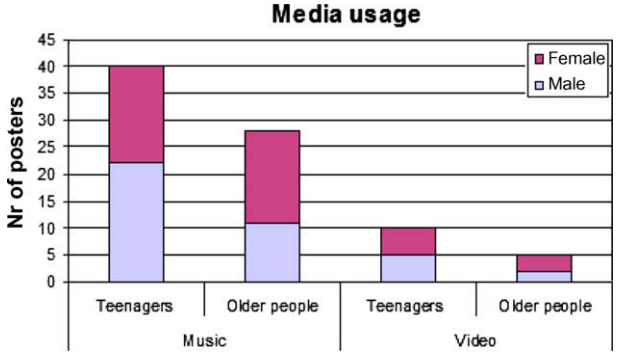

Fig. 6. Comparisons of media used.

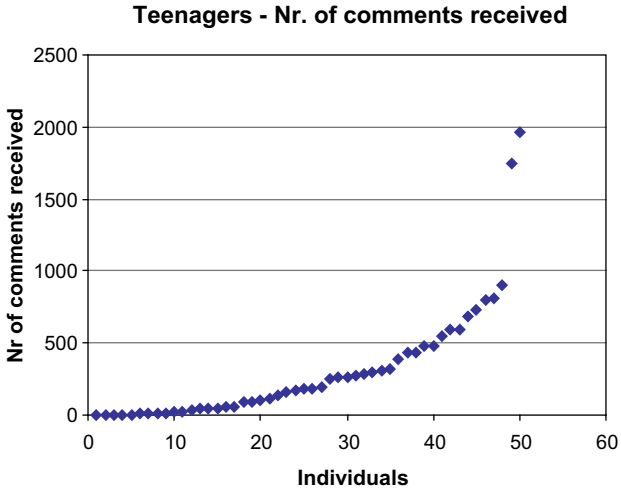

Fig. 7. Number of received comment for teenagers shown by individual user.

people. Older females receive a median of 16 comments, whilst older men receive a median of 1 comment. A Mann–Whitney test ($U = 187$, $p < 0.05$) proved the claim that older women receive significantly more comments than older men. We can therefore conclude that older females receive significantly more comments than their male counterpart, which is consistent with findings of previous studies (e.g. Herring, 2004a; Kirkup & von Prummer, 1990).

5.3. Age differences in the self-representation

5.3.1. Age-related comparison of LIWC scores

Fig. 9 represents the LIWC scores for older people's and teenagers' profiles. It implies that some differences exist between the scores of older people's and teenagers' profile content. The calculated values of the standard deviations also suggested that the spread of the data was rather small and histograms showed that the values for each word category are normally distributed. Hence, we report mean values and applied *t*-test for testing significant differences.

Fig. 9 illustrates that there are some differences between the content of older people's and teenagers' profiles. The significance of these differences was statistically verified using *t*-tests. The results indicated that teenagers use more self-references ($t(69) = 4.68$, $p < 0.05$), negative emotions ($t(69) = 3.41$, $p < 0.05$) and cognitive words ($t(69) = 3.20$, $p < 0.05$) than do older people. The fact that teenagers tend to include a lot of words referring to themselves and to negative emotions could be an indicator of teenagers experiencing emotions associated with puberty. Also, especially the high number of self-references support Boyd's (2008) finding that teenagers often use their MySpace profile mainly to build a representation of themselves online, putting in a lot of effort to build an appropriate online identity. The *t*-tests also showed that our sample of older people use more articles ($t(69) = -4.22$, $p < 0.05$) and big words ($t(69) = -6.22$, $p < 0.05$), to describe themselves on their MySpace page, than teenagers do. A high number of big words indicate that older people do use a more sophisticated writing style. Similarly, a high number of articles indicate that older people tend to describe themselves in a more formal way than teenagers do.

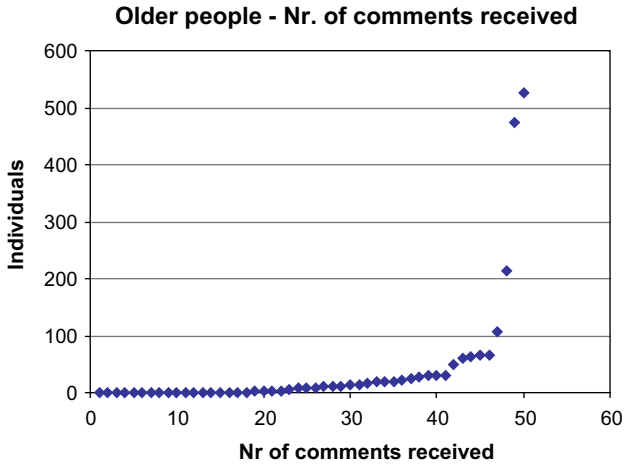

Fig. 8. Number of received comment for older people shown by individual user.

The representation of the self in MySpace shows the way users see themselves or want to be seen by others in the SNS. The clear differences between the way older people and teenagers represent themselves on MySpace show that they might have different motivations and aims concerning the use of MySpace. Whereas teenagers seem to write more about themselves and do not shy away from naming negative emotions, older people seem to adapt a more formal way of representing themselves. In respect to forming and maintaining social capital in MySpace, the teenager's way of revealing lots of personal and also emotional information seems to be more successful than the older people's more formal self-representation.

5.3.2. Gender comparison of LIWC scores

Looking at teenage boys and girls separately, we also found gender-related differences in the content of the profile pages. Fig. 10 presents the LIWC scores for teenage boys and girls separately.

T-tests confirmed that teenage girls use more self-references ($t(34) = 2.44$, $p < 0.05$), social words ($t(34) = 2.59$, $p < 0.05$) and negative emotions ($t(34) = 2.55$, $p < 0.05$) in their profile pages than teenage boys. According to LIWC, people using more social words in their self-descriptions tend to be more outgoing and socially connected with others, supporting previous findings that females, to a greater extent than males, tend to use ICT in order to socially engage with others (Herring, 2004a).

Fig. 11 shows the differences in the LIWC scores between older women and older men.

The *t*-tests verified that older women write more self-references than older men in their MySpace profile pages ($t(34) = -2.06$, $p < 0.05$). This trend was similar to that of the

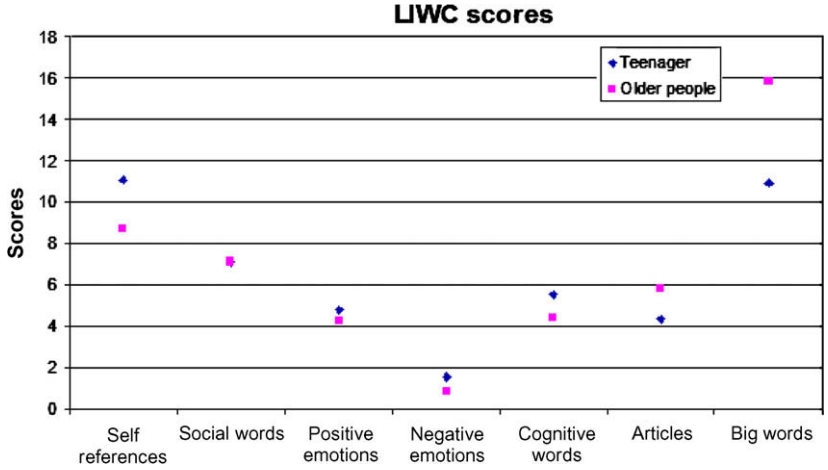

Fig. 9. Age comparisons of LIWC scores.

teenager sample. It shows that females tend to include more words referring to the self in the description of themselves on the profile page. We were expecting the *t*-tests to also reveal women as using more social words than men, indicating that females also make more references to friends and other members of the community. However, the *t*-test did not support this hypothesis, ($t(34) = -0.70$, $p > 0.05$). This was a rather interesting finding as it demonstrated some similarities between the sexes of different aged participants. Again, gender differences seemed to be much stronger for the group of teenagers than for older people. Nonetheless, the findings show that both older and teenage women tend to be more expressive than older and teenage males in their self-descriptions on MySpace.

t-Tests on this data revealed that teenage girls use more self-references ($t(34) = -3.70$, $p < 0.05$) and negative emotions ($t(34) = -3.69$, $p < 0.05$) than older women use. Older women are statistically proven to use more articles ($t(34) = 2.18$, $p < 0.05$) and big words ($t(34) = 4.09$, $p < 0.05$) than teenage girls. These findings indicate that teenage girls include a lot of words referring to themselves in an emotional way (often including words that refer to negative emotions). In contrast, older women tend to represent themselves in more formal writing (including more articles and big words) than teenage girls. Similarly, teenage boys, like teenage girls, use more self-references than older men ($t(34) = -2.87$, $p < 0.05$). They were also found to use more overall cognitive words than the older men ($t(34) = -2.60$, $p < 0.05$) which indicates a more thoughtful and reflective writing. Similarly to older women, older men are found to use more articles ($t(34) = 3.47$, $p < 0.05$) and big words ($t(34) = 4.44$, $p < 0.05$) than teenage boys do. Again, this suggests that older men describe themselves in a more formal way than teenage boys do. In summary, these findings show that older people in general seem to stick to a writing style that is closer to a letter writing style. In contrast to that, teenagers tend to write in an informal style (e.g. incomplete sentences, using fashionable abbreviations) when describing themselves on their profile.

6. Conclusion

This study brings to light interesting findings of the characteristics and age-related differences of MySpace users and the different ways these two user groups build and maintain social capital in this setting. We identified differences between samples of teenage and older users and found some significant findings when comparing the two groups. The fact that this process was automated enabled us to collect data from a large sample of user profiles.

Our findings show that teenagers tend to have more friends than older people on MySpace. In addition, most of the friends of teenage MySpace users were of a similar age (±2 years), whereas older MySpace users tend to have friends from age groups outside their own age. This indicates clearly that teenagers seem to have a different way of connecting to friends on MySpace compared to older people. Our findings imply a social capital divide, where

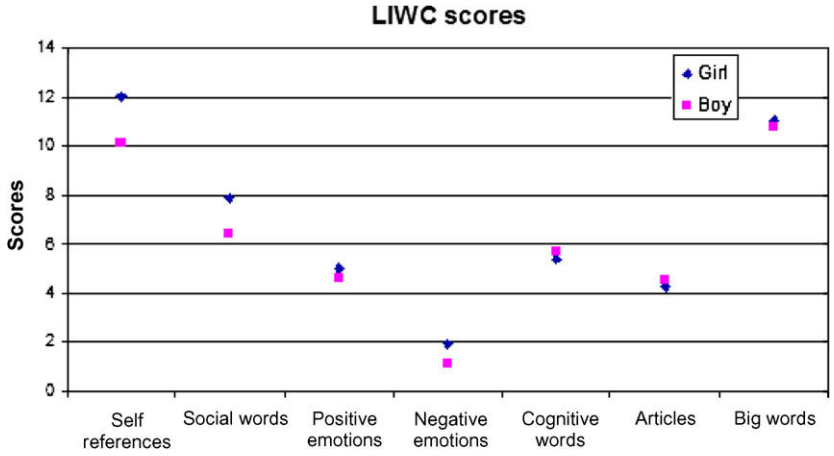

Fig. 10. Teenage gender comparison of LIWC scores.

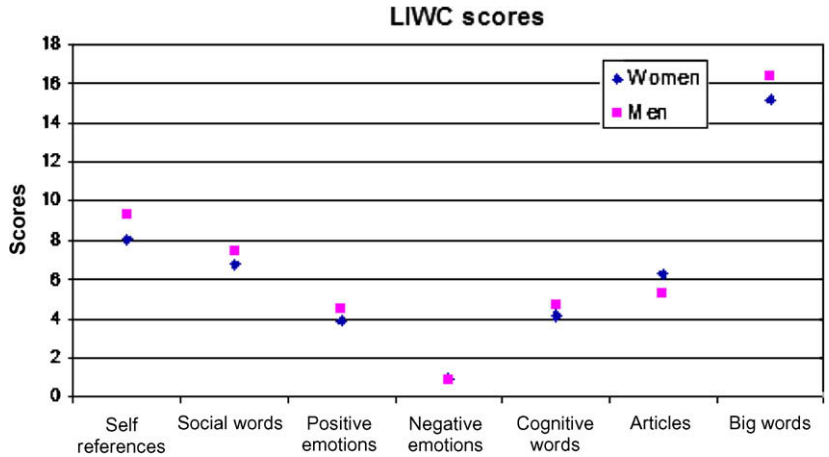

Fig. 11. Older people's gender comparison of LIWC scores.

younger people have larger social networks. However, our findings also show that older people have access to a more diverse network compared to teenagers, suggesting different types of social capital for these target populations. Our findings indicate that teenagers' social capital on MySpace consists of many weak and strong ties to peers that they know from offline activities. Older peoples' social capital, in contrast consists of less relations to a more diverse group of people. The high number of friends of teenagers indicates that the quantity of friends is quite important for teenagers. As it is impossible to maintain strong relationships with a high number of people, our findings indicate that teenagers connect to both close friends as well as loose acquaintances in MySpace. In contrast to that, the low number of older people showed a different pattern of behaviour. This could have several reasons. Firstly, it could be that older people do not know as many other people on MySpace as teenagers do. Secondly, it could also be an indication that older people tend to be more careful and selective when choosing their friends on MySpace and only want to add to their friends list people that they know very well. This could have implications for the design of SNS as older people might require more information about the other person in order to decide whether to have this person as their friend or not.

When it comes to MySpace features that older people and teenagers use, we showed that teenagers make more use of different media (e.g. music and videos) on their profile pages when compared to older MySpace users. Age differences were also found concerning the number of comments users receive on their profile page, as teenagers receive on average almost ten times as many comments as do older people. Again, a gender difference was also found as both female teenagers and older women receive more comments than the male counterpart of their age group. The same tendency could be found for the usage of blogs on MySpace. This facility is much more used by teenagers compared to older people, and females are more likely to use blogs than males for both of the groups. This finding showed again different patterns of behaviour between the two investigated age groups. Whereas teenagers tend to use the full capacity of available media, older people are more reluctant to make use of additional features, like music, videos and the exchange of comments. This might be due to different preferences and motivations to use MySpace. Whereas teenagers seem to be engaged in the usage of different media, older people seem to have a much more narrow focus on MySpace usage. Findings from previous research (e.g. Ellison et al., 2006) showed that the intensity of SNS usage is positively associated with the social capital of users. Thus, our finding indicates that the smaller social capital of older people might be related to the reluctance of this target population to make full use of the available features on MySpace. Further research needs to elicit the reason for such behaviour in order to provide valuable design implications.

In order to find out whether teenagers represent themselves on their personal profile on MySpace in a different way than older people do, we conducted a content analysis of the profile pages. We applied the LIWC categories and found that teenagers use more negative words than older people in their profile descriptions. Also, our results showed that teenagers use more self-references in their self-descriptions than older people. In addition, we found that older people use more articles and big words than teenagers. The findings also showed that teens use more self-references, negative emotions and overall cognitive words than do older people. In summary, this indicates that older people tend to represent themselves in a more formal and official way compared to teenagers. In addition, findings showed that teenagers tend to not only write in a more informal way, but also focus more on themselves and their emotions when representing themselves. Differences in self-presentations indicate that the different age groups might have different motivations and aims when creating their profiles. Whereas teenagers seem to be centred around themselves, older people seem to strive for a more informative and official version of self-description. Given the fact that teenager's social capital seems to be larger than older people's social capital on MySpace, our findings indicate that revealing personal and emotional information about oneself on MySpace is a better strategy to build and maintain social capital than representing oneself in a more formal and informative way.

6.1. Further research

As MySpace is just one of a few hundred social networking websites, similar crawlers can be created for other SNSs. It would also be interesting to replicate this study using several social networking sites, or even looking at list servers or newsgroups (Zaphiris & Sarwar, 2006).

In addition, we also encourage researchers to apply query-based research (e.g. interviews with MySpace users) in order to investigate how older people perceive MySpace compared to teenagers and further investigate the differences and similarities of social capital of these two target populations. It would be interesting to see whether user's opinion of using MySpace match our findings about age differences in the usage of MySpace.

Practitioners could use our findings to help understand what interests the different types of users of MySpace, and how they can stimulate this interest to incite existing members to revisit the site and new members to join up.

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