Building collective memories on the web: the Nostalgia Bits project

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Abstract: The Nostalgia Bits (NoBits) project aims at fostering interaction between elderly and children through collecting memories. A web-based platform will be developed to allow tangible artefacts of an elderly person's life experience to become a resource to other generations and to connect the elderly users with members of their own generation. Here, we describe the results of a user needs analysis conducted by focus groups and questionnaires with end-users. The sample comprised 23 elderly (M = 65.83 SD = 6.32) and 310 children (M = 11.29 SD = 2.28). The findings were expanded through other two focus groups – one with ten elderly (M = 67.30 SD = 4.30) and one with 11 children (M = 12.45 SD = 1.21) – to obtain specific data for the development of a website based upon the suggestions collected through this user needs analysis. Results showed that both samples accepted the NoBits concept and that supporting collaborative reminiscing with social media is a promising approach to increase cross-generational interactions and mentoring.

Keywords: reminiscing system; ambient assisted living; cross-generational communication; social networks; web communities; collective memories.

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1   Introduction

Reminiscing can improve the well-being of the elderly by providing rich opportunities for communication with peers and family. Information technology may support this activity developing easier ways to collect memories and interact with the possible addressees of elderly tales. In particular, sharing memories can be considered as the first step to the transmission of knowledge: elderly memories are a precious social resource and identifying better ways of transmitting them to younger generations (not only within the family) is an important research goal (Caprani et al., 2011). Starting from these premises, our study had two main objectives:

a   to investigate elderly and children attitudes towards reminiscing behaviour and the sharing of memories between these different generations

b   to identify specific design guidelines for the development of an internet service to connect seniors' reminiscences and share them with younger generations.

The data collected allowed us to create the Italian prototype of the future platform: a brief description is proposed, highlighting the main correspondences between the requirements gathered and the main technological features implemented.

1.1 Reminiscence: personal functions and social activity

Reminiscence has been defined as

> "the volitional or non-volitional act or process of recollecting memories of one's self in the past. It may involve the recall of particular or generic episodes that may or may not have been previously forgotten. This recollection from autobiographical memory may be private or shared with others" [Bluck and Levine, (1998), p.188].

Memories are important sources of identity and self-continuity helping the projection of a meaningful future at all ages (Giddens, 1991). There are no strong scientific evidences in the total amount of reminiscing at different ages: researches show that with age reminiscence increases mainly with the specific purpose of maintaining intimacy; on the contrary, reminiscing as a bitterness revival shows a linear decrease (Webster, 1995).

Many studies have been conducted to investigate the effects of reminiscence with the purpose of finding whether any aspect of psychological well-being could be enhanced through a structured reminiscence activity: the main effect is decreasing depression. In a review by Hsieh and Wang (2003), the main effect size reported (0.84) corresponds to the efficacy of reminiscence on depressive symptoms.

Although most studies focus on the effects on elderly with a specific clinical disease, Bohlmeijer (2003) conducted a meta-analysis on studies with healthy subjects, assessing the effectiveness of reminiscence on psychological well-being: he shows a statistically significant effect on life satisfaction and emotional well-being. The most recent review is the one carried out by Westerhof et al. (2010): all kinds of reminiscing– simple reminiscence as well as a structured life-review therapy – are all effective, although their specific characteristics and objectives. A common background of all these approaches is the evidence of the added value of group reminiscence in comparison with the personal recollection of private memories. The last part of Bluck and Levine's (1998) definition emphasises the public side of reminiscing, which is also tied to the teaching value that each memory can have, i.e., the possibility of communicate meaning (Coleman, 2005): memories become historical books full of real life events, guides to understand past traditions and how people lived many decades ago. Even in less structured social contexts, reminiscence serves a purpose that is not only the simple recall of events but it deals with the achievement of psychosocial goals. As Webster says "remembering our pasts for a specific reason (i.e., function) produces an outcome, such as bolstering a person's sense of mastery or self-esteem" (Webster et al., 2010). Thus, reminiscence can offer 'pro-social reminiscence functions': they seem to indirectly influence the personal well-being through the self-positive functions such as fixing identity and death preparation (O'Rourke et al., 2011). "Through shared reminiscing, we re-interpret and re-evaluate our past experiences in ways that create new meaning" [Fivush, (2007), p.44]: a deeper meaning for the self and new, interesting teachings for the audience. In conclusion, reminiscence is useful not only for the self and memories can also be vehicles of knowledge.

Table 1   RS: benchmarking table

Name	Creator	Typology	Reminiscence area	Brief description
Pensieve	Dan Cosley, Interaction Design Lab, Cornell University, Ithaca, NY	Online service, free, available at http://pensieve.cornellhci.org/	Private reminiscence	Pensieve (Peesepati et al., 2010) has two main functions: to remind people to reminisce, and to allow people to write about their reactions to these reminders. These reminders, or 'memory triggers', are sent by the Pensieve server.
Serendipitous Family Stories System	Frank Bentley, Motorola Mobility Applied Research Center in Libertyville, IL	Online storage and mobile service	Family reminiscence	Observing a person's current location can trigger conversations over the phone about past family stories that occurred in that place.
Making memories	Behzod Sirjani, Human Centered Design and Engineering University of Washington	Mobile phone application for a web-accessible service	Geo-local reminiscence	The application suggests activities within certain proximity of the user, based on: 1 interests the user has input 2 geo-tags activities and waymarks the user has recorded 3 notifies users of memories that were created nearby.
MemoryLane	Sheila McCarthy, Intelligent Systems Research Centre, University of Ulster, Northern Ireland	Personal digital assistant (PDA) based application	Private and social reminiscence	MemoryLane (Mc Carthy et al., 2004) is an intelligently generating dynamic 'memory stories'; interface is set on the basis of user's preferences and abilities, thus, tailoring to individual needs, e.g., a visually impaired user would be compensated with an audio enriched interface.
CIRCA	Arlene Astell, School of Psychology, University of St. Andrews, Fife, Scotland	Touch-screen movie player for computer interactive reminiscence	Clinical reminiscence	CIRCA is an interactive, multimedia touch screen system that contains stimuli to prompt reminiscing. The intention is that people with dementia and caregivers will explore CIRCA together, using the recollections sparked by the media as the basis for conversations.
Sensecam Lifelogging	Niamh Caprani, Centre for Sensor Web Technologies, Dublin City University, Ireland	Digital recording system for reminiscing	Private and familiar reminiscence	SenseCam (commercially available as the Vicon Revue) is a small digital camera designed to be worn around the wearer's neck: it passively takes photographs without any intervention from the wearer. It helps elderly exploration of reminiscence and storytelling.

1.2 Technological applications and reminiscing systems

Reminiscence systems (RS) is a growing research and development area that concerns the use of information and communication technologies to support, facilitate and improve the reminiscing process.

Applications mainly aim at improving the quality of social reminiscing activities thanks to the communicative possibilities offered by new media. Researches focus on the different possibilities of new technological devices, for example services offering graphic or textual cues to stimulate reminiscence (triggering). The following table shows the main projects dealing with RS. Different areas of the reminiscing process are stressed: in particular, the two main theoretical issues are private/social reminiscing and healthy/clinical context.

An overview is proposed by Mulvenna et al. (2009), who intended to define the main technologies used and their applicative scenarios. His suggestions are similar to Pak et al. (2002), who identified three main modalities of RS use: the first is individual, the second involves reminiscing with different people (not necessarily elderly), and the third involves reminiscing with people who are physically remote from each other but connected via the internet.

1.3 Theoretical approaches

One of the main challenges for the development of technological services is dealing with people with functional diversity, i.e., physical or mental impairments. The aim is to identify the requirements which will be key factors for the creation of a web-based community for these special kinds of users (Santos and Boticario, 2008). Working with elderly it is necessary to find new devices facilitating their way of acting, which has become difficult because of different age-related impairments. As previously highlighted, social reminiscing is a promising approach to improve elderly quality of life and well-being: the potential advantages offered by RS can be applied to elderly reminiscing together with peers or younger generations. Social interaction between elderly and their family can be fostered through capturing their memories as well as personal, family and local histories embodied by letters, newspapers, postcards, photos and other documents.

Considering the potential advantages of computer-supported reminiscing, a very important issue is to identify the user needs and expectations towards reminiscing in general and technological issues that must be developed to create an online RS. Following a user centred design (UCD), we directly collected suggestions from future users. Our user-needs analysis involves two phases:

a   a first phase aimed at collecting users' needs, wants and attitudes concerning the theme of the project, i.e. intergenerational reminiscence

b   the second phase was dedicated to technical features, trying to understand the easiest and most useful features aiming at the development of a web service.

Questionnaires and focus groups were used in the first phase to assess the general attitudes of primary (elderly) and secondary (children) users towards reminiscence, in order to understand which needs and wants our technological service would have to meet. A questionnaire for each sample was created for the second phase to collect guidelines for the design of the website.

2   Methods

2.1   Methods

2.1.1   First phase

The elderly sample taking part in the focus groups about reminiscing habits and contents composed of 12 elderly males (mean age = 66.58, SD = 5.3) and 11 elderly females (mean age 65.91, SD = 7.5) for a total sample of 23 people (mean age = 65.83, SD = 6.32).

A specific enquiry was made through a questionnaire in order to collect demographic data and to focus on elderly attitudes towards technology: 27 subjects (14 male, 13 female) took part in this additional task. Participants ranged from 55 to 85 years (55 to 65 years, 44.4%; 65 to 75 years, 37%; 75 to 85 years, 18.6%). All participants lived in Milan urban area.

The children were investigated about reminiscence, relationship with grandparents and Web use through a questionnaire to collect many feedbacks. The sample for the first phase consisted of 160 female children (mean age = 11.83, SD = 2.63) and 150 male children (mean age = 10.72, SD = 1.67; total sample mean age = 11.29, SD = 2.28) from different classes and educational institutions in the Milan urban area.

2.1.2   Second phase

Smaller samples were involved: 10 elderly (6 male and 4 female, mean age = 67.30, SD = 4.30) and 11 children (8 male and 3 female, mean age = 12.45, SD = 1.21) participated separately in four focus groups, two designed for elderly and two for children. During focus groups, participants also filled in a questionnaire while discussing the various items together.

Participants were recruited from senior centres and educational institutes undertaking the project. Each participant – elderly, children, senior centres and educational institutions – took part voluntarily and signed a consent form. Nobody received monetary or other forms of compensation for their involvement.

2.2   Materials

2.2.1   First phase

A set of 18 questions was created for the focus groups with elderly to help the psychologist lead the discussion. Elderly were asked about:

a   the meaning of reminiscence (three questions)

b   their ways of reminiscing (13 questions)

c   their general attitudes towards technology (two questions).

Furthermore, a 20-items closed-ended questionnaire was created

a   to collect demographic data from elderly (seven items, e.g., gender, education, senior centre attendance)

b   to focus on their main attitudes and habits towards computer and internet (13 items).

As concerns children, a 25-items questionnaire was created to investigate three main areas:

a   web use (eight items)

b   relationship with grandparents (eight items)

c   interest in a website concerning elderly memories (five items).

The first four items collected demographic data. Some questions were open-ended to allow children to write detailed suggestions.

2.2.2 Second phase

The questionnaire for elderly (29 items) was slightly different from children's one (27 items). Both questionnaires assessed five areas:

a   kind of artefacts and ways of working

b   memory labels

c   social network features

d   privacy

e   new devices.

The differences mainly concern the last part, because some technical issues were specific only for a category of users (e.g., elderly were asked about the use of a digital pen to write texts, children were asked about the possible connection between NoBits website and their private social network accounts). Each question asked the participant to evaluate the 'perceived usefulness' of a specific feature explained by the researcher one at time. Participants evaluated each item on a seven-point Likert scale. Each statement was then followed by a blank space to allow users to write an example of using the features they just rated.

2.3 Procedure

2.3.1 First phase

Focus groups with elderly were scheduled in order to gain insights about general needs, basic requirements, and barriers for this target group. A psychologist with previous experience conducted each focus group utilising the qualitative research method by recording focus groups with a digital audio recorder. The questionnaire was distributed after a preliminary user forum where the NoBits project was explained to elderly users and local authorities.

Meetings with children were scheduled in school classes to explain the pillars of the NoBits project: children were asked to think about the words 'nostalgia' and 'bits' and to reflect about the concept of an 'electronic book of memories'. Then, a group discussion was conducted in order to allow children to express their ideas freely, comment on peers' suggestions and ask questions. At the end of each meeting, teachers distributed the questionnaires among children who completed and subsequently returned the questionnaires back to the researchers.

The main methodological difference between the two samples – elderly and children – is the structure of the questionnaire used in the first phase. Children could write their answers to almost every item, whereas elderly questionnaire had only closed-ended questions, choosing among fixed alternatives. The aim was to help them express their views on topics that are probably not so relevant to them, like technology.

2.3.2 Second phase

Two more focus groups were scheduled in order to specify the relative importance of each product feature considered and to gain a deeper insight about more specific end-user expectations. Participants, elderly and children participating in different focus groups, had to complete a questionnaire regarding specific features of the future website. The aim of this technical investigation was to collect subjective and specific suggestions towards what future users will be glad to find in NoBits website. In order to make them aware of the investigated topics, every single item of the questionnaire was explained through simple visual examples of the key functionalities of the future website, collected in a PowerPoint presentation. Possible screenshots of future artefacts were shown and animations helped us show technical features such as adding a comment, rating a text and having different accesses to separate areas of the website for example. Following the evaluation, participants provided their comments and suggestions in an open discussion.

3   Results

3.1   First phase: preliminary analysis of users' needs and wants

3.1.1   Elderly sample results: focus groups on reminiscence and questionnaire about internet use

3.1.1.1 Focus groups

At first, the results concerning the first two areas are shown. The findings related to the third area – general attitudes towards technology – have been integrated with questionnaire data and thus reported in that section.

Meaning of reminiscence

Most participants define reminiscence as either 'awareness' or 'intentional recall' of past events. Participants emphasise that reminiscing does not include only positive events, but also memories of negative events: they feel that both types of memories are important, as reflected in a quotation from focus group, "Reminiscing refers to both positive and negative events, they are of equal importance".

All participants feel that reminiscing has a positive value and can improve well-being in several ways, for example, reminiscing allows one to re-experience positive events and emotions. Furthermore, reminiscing often involves the memory of beloved people (friends, relatives, etc.) and thus can reduce the feeling of loneliness. Another simple but interesting quotation told by an old woman is, "Reminiscing helps me stay alive".

Participants are aware of the importance of sharing memories. Most of them report that it is a pleasurable activity that they enjoy doing with both peers and younger generations. Reminiscing with peers can improve the quality and richness of memories because they can integrate new information and details. On the other hand, reminiscing with younger generations can create a bridge between generations and enhance the sense of respect towards older people.

Quite interestingly, most seniors bring out the idea that negative memories have a positive value for several reasons. Some participants highlight that negative memories can help them avoid pitfalls and take the right decisions in challenging situations while others highlight the constructive role of negative memories, which allows them to create a richer picture of one's life that always includes both shadows and lights.

Ways of reminiscing

Most respondents, especially men, prefer to share 'memories of travels'. Several participants share memories from 'youth and own childhood events' and few female participants suggest 'romantic moments and events' (i.e., marriage). Some interviewees like to share historical memories (i.e., Second World War events), especially local history. In general, reminiscence preferences by gender quite closely reflect the classification proposed by McCarthy et al. (2004) in their seminal work on computer-supported reminiscing. Most participants report that they mostly like sharing memories with family members. Respondents report that they usually share reminiscences at festivities, especially at Christmas, but also on Sundays when they gather with relatives for lunch.

Almost all participants feel that sharing reminiscences is a spontaneous activity that should not be planned or scheduled, as reflected in a precise quotation, "I do not want to share my memories more often than I do, if I did it more frequently it would be no longer spontaneous and authentic".

Most respondents indicate they store memories in form of photos. Participants with computer skills report using computers to create photo-albums and digital archives, whereas non-technologically skilled participants use hard cover photo albums. Participants agree that the best way to share reminiscences is through spoken, face-to-face storytelling, which is considered the most effective and engaging form of communication. While most respondents (with particular reference to those more skilled with computer and the internet) emphasise the usefulness of photos and written documents to support the narrative, such memory artefacts are not perceived as indispensable.

Almost all respondents express high interest in reading/listening to memories of peers; however, half of respondents say that they would not share memories that contain personal information with strangers. These participants point out that it is still possible to share these memories by omitting intimate or personal details. Other interviewees do not express concerns about the idea of sharing reminiscences with strangers, providing that they are trustable. According to one participant, "It is important to distinguish between private and public sharing. In private contexts, it is better to use spoken narratives; in public or group reminiscing events, it is useful to support the narrative with written documents and photos".

3.1.1.2 Questionnaire

More than half of the elderly participants are married (55.6%), the percentages of single and widowed elderly are the same (22.2%). Almost every older person think that technology could help him/her solve problems (96.2%). Most of them use computers (76%). Notwithstanding, elderly state they use computer more at home (38.9%) than outside (5.5%), although most participants indicate they use it both at home and outside (55.6%).

Elderly use computer mostly for writing (23.1%), especially for e-mails (20%). In general, 16.9% of them surf the net, mainly to find information related to their specific interest and to read news (both 31.6%), followed by planning travels (13.2%) and booking tickets (10.5%).

The strongest need is simplicity (31.6%). In fact, elderly point out that both menus/controls and new software are too complex (26.3%). To deepen our knowledge about the difficulties elderly meet while using computer, four five-point Likert (ranging from 1 – totally disagree to 5 – completely agree) scales were provided:

1   "Technology is too complex, I'm not able to use it."

2   "Surfing the Net or sending emails sounds dangerous, especially for my privacy."

3   "Computer and other technological devices are too expensive."

4   "Internet is too expensive, especially if a fast connection (ADSL) is required"

Table 2   Elderly difficulties towards internet

|	Mean	SD
Complexity	2.65	1.43
Privacy	2.64	1.49
Software cost	3.05	1.17
Internet cost	3.18	1.14

The elderly mostly agree with statements 3 and 4, although no sentence showed strong agreement. The results show that technology does not scare elderly too much and that they are not as afraid of losing privacy or being cheated on internet as we may think.

3.1.2 Children sample results: questionnaire about internet use and attitudes towards reminiscence

3.1.2.1 Web use

The percentage of children surfing the net is 86.1%. Overall, 69% of them surf alone, without anyone looking after them. The main activity is playing games, performed online by 25.3% of participants. Watching videos (23.3%) – especially music ones – chatting with friends (21.6%) and web searching for info (21.1%, mainly with Google) are other main activities performed. The results indicate some gender differences (see Figure 1). The most common activity of female participants is video watching (26%) followed by chatting (24%) and web searching (22%). On the other hand, the most common activity of male participants is playing games (34%) followed by video watching (21%) and web searching (20%).

Figure 1 Internet activities
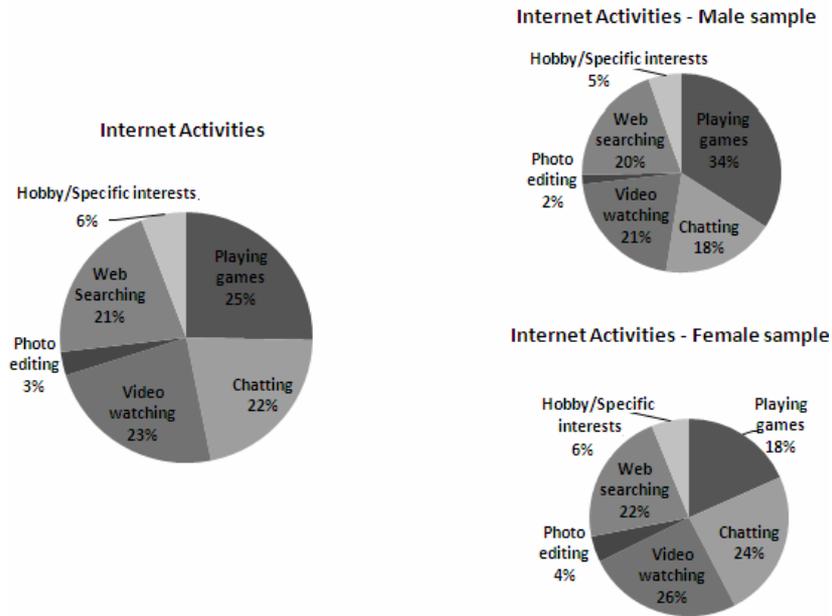
The results concerning age differences (see Figure 2) are interesting. Splitting our data into tertiles, we identify three age ranges that showed completely different response patterns. First, older children provide fewer answers compared to the younger ones. They write fewer words and sometimes they do not write anything at all.

Figure 2 Internet activities – age differences
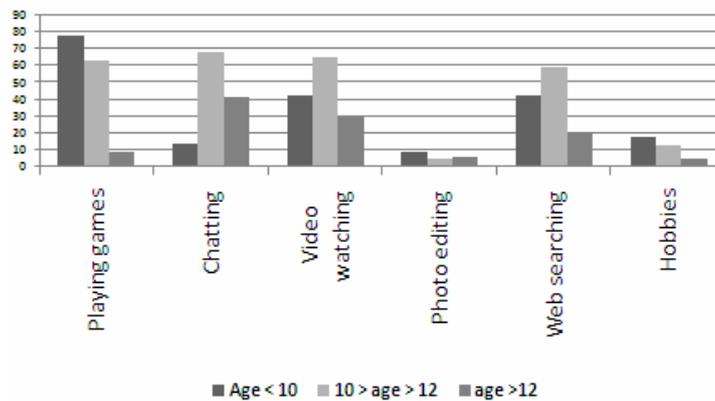
As children grow, they spend less time on the net playing games and more time chatting. It seems that children learn to use internet as a tool, in fact, they do not link its usage to a hobby/specific interest (category that almost disappears among older children); instead, they use the internet to gain access to a wide world of knowledge where they can search what they are looking for and meet other people.

Children were also asked to write their favourite website. The responses are summarised in the table below.

Table 3   Children's favourite websites

Favourite website	
YouTube	33.5%
Facebook	27.6%
Google	14.5%
Gioco.it	10.2%
Messenger	7.1%
Wikipedia	4.3%
Picnik	2.8%

YouTube is surely the preferred website, even though Facebook and Messenger (often indicated together by the same subject) have a cumulative percentage of 34.7%. In some cases, children indicated more than one website. Children were also asked to say why they like the specific website they listed. Most of them simply state that those websites are funny (19.6%) or allow them to connect with other people (10.9%). Answers like informative (4.5%) and interesting (4.2%) receive the lowest percentages.

Half of children (46.3%) point out some websites they really dislike mainly because of bad, creepy, or violent contents (12.5%). Children also do not like websites that ask too many personal questions or where advertisings pop suddenly and continuously out (4.5%).

3.1.2.2 Relationship with grandparents

Half of children (52.7%) indicate that they speak with their grandparents daily. This percentage increases to 87.7% when considering a weekly rate. The results show a general satisfaction, as 68.8% of children reported that they enjoy and only 3.2% of children state they do not enjoy talking with grandparents. Cross-tabulation with age ranges show a significant chi-square value ($\chi^2 = 10.533$, p <.05), underlining that satisfaction decreases while the age grows.

Furthermore, we asked children to state what do they usually talk with their grandparents about, allowing them to provide multiple answers. Some children, notably the younger ones, simply write they talk about "everything" (10.9%); however, the most frequent conversational topic deal with school life (28.6%). Grandparents and grandsons also chat on daily activities (15.9%) and health (10.5%) while often referring to the past (13%). In fact, 74.6% of children state that their grandparents speak about their childhood.

Figure 3 Topics of conversation with grandparents
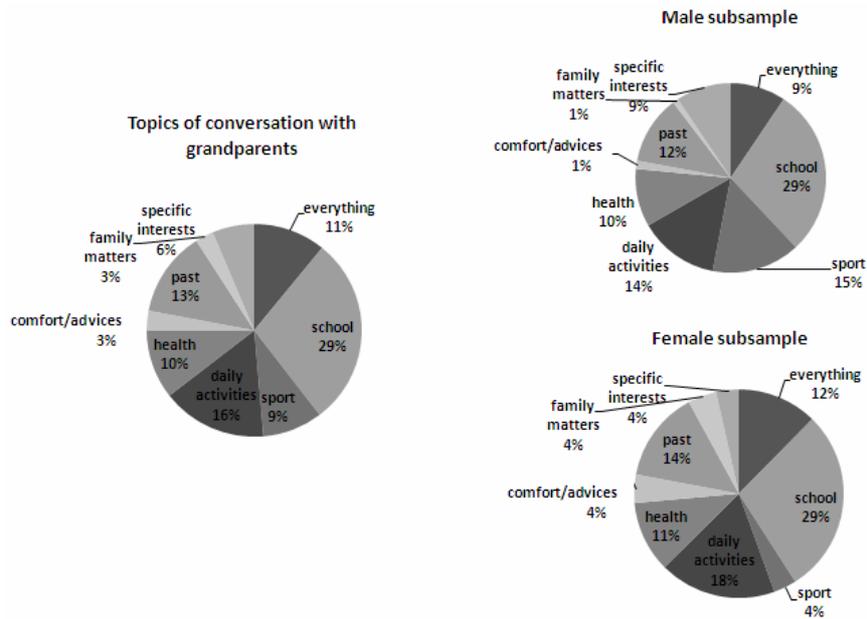
The main difference between the genders is talking about 'family matters'. Females are significantly more likely to talk about family topics than are males. Girls also tend to value the comfort and advices that grandparents provide. On the other hand, the male subsample place a higher value on sport topics.

The category 'family matters' differs also across age ranges. Its value increases with the age until it becomes the most common topic. As previously seen, topics linked to specific interests decrease, probably because younger children use to speak to anyone about various topics they like; while growing, children learn to speak with grandparents about topics about which they both can share a point of view, i.e., the family matters seems to be the most common one.

**Figure 4** Topics of conversation – age differences
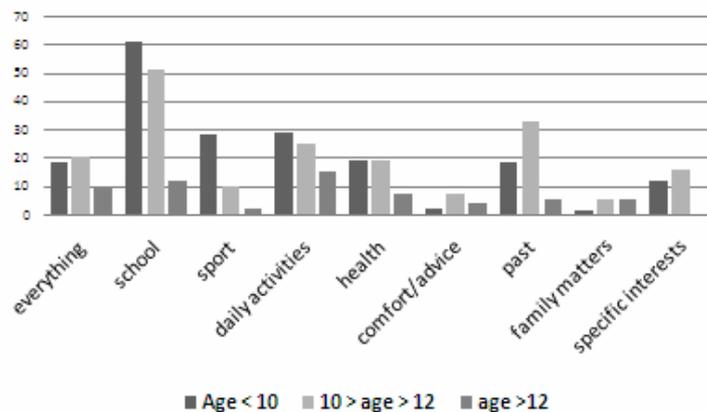
Investigating elderly tales about childhood, grandparents like to tell facts that underline their past living condition also by comparing memories of past and current life in the society. Some children simply write elderly speak about 'childhood', probably since childish behaviour today may have the same features as childhood behaviour in the past. Therefore, it is not as important to examine the topics that grandparents specifically talk about; instead, it is more important to assess particular parts of their lives associated with those memories.

Figure 5 Childhood tales
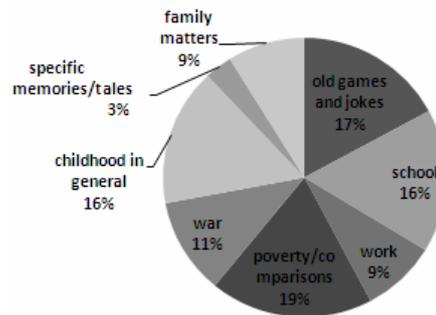
Subsequently, children were asked to underline which topics they like the most and which ones they dislike. It is interesting that the analysis share the same categories for both questions. This means that the identified topics are liked by some children but disliked by other children at the same time.

Figure 6 Favourite and upsetting topics of conversation
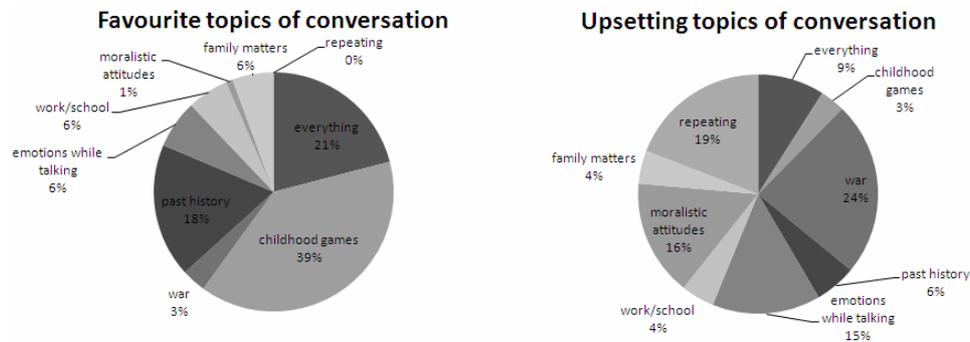
The results indicate that topic involving childhood games is the preferred topic of conversation, followed by history. Label 'everything' suggests that many children simply like talking with their grandparents regardless of the content. Evaluating carefully the topics children dislike, we find that war has the highest value. Actually, war is a topic some children really like to talk about; however, this topic must be dealt with care. With the exception of 'war', a 'moralistic attitude' and 'repetition' make a memory unbearable. The first represents the way of discussing the topics, as sometimes grandparents seem to like making their grandsons feel guilty because of the society they live in, which is surely more comfortable compared to their childhood society. The variable labelled 'emotions while talking' refers to situations in which children notice

that grandparents are very involved in their conversation. Some children like that – even if grandparents become nostalgic – whereas others do not like it, especially when elderly get upset and sometimes even cry.

Deeper analysis examined gender and age differences. Crosstabs show a significant (χ^2 = 36.185 p < .01) difference between age ranges and upsetting topics. The results clearly show that older children dislike talking with grandparents. More than half 'upsetting topics' answers (54.65%)are written by children older than 12 years of age: upsetting topics like 'repeating' and 'emotions while listening' are suggested the most by older children. We can state that younger children love grandparents' tales more compared to older children who seem more irritated while listening.

3.2 Second phase: insight into technical features

The findings from both elderly and children focus groups and related questionnaires are reported together in order to make comparisons and highlight the main common suggestions.

3.2.1 Kind of artefacts and ways of working

No specific preferences are shown: text, photos and videos are all considered very useful. It is notable that children suggest using videos "to explain memories to people – especially elderly – who can't understand the written text". Maybe children believe that videos can provide support for the elderly rather providing additional information. Concerning the ways of working, three possible scenarios are highlighted:

- The highest ranked value corresponds to item 'create photo album and/or slideshow of artefacts together' (M = 6.60, SD = .669) in elderly questionnaire. Children score a bit lower on this item (M = 5.64, SD = 1.027) but still value this item. We can state that both elderly and children in our sample would like to work together on artefacts. During the discussion, elderly state mainly that they want to collaborate in order to be helped by children.

- Working together with peers is highly appreciated by the elderly (item 'create slideshows of specific past events based on artefacts with involvement of peers' had a mean rating of 5.60, SD = 1.58). Therefore, a scenario could be hypothesised where elderly build together some reminiscence's artefacts (maybe during senior centre meetings): children could find them later on NoBits website.

- Children also like working with peers (M = 6.45, SD = .52), so a working scenario is suggested where groups of children listen to elderly reminiscences and later, they work together (based on notes, photos) to upload artefacts to NoBits website.

3.2.2 Memory labels

Five categories were suggested to label memories: value (positive or negative), date of upload, period they refer to, place they refer to, and author. Elderly consider 'place' and 'period' the most useful categories, following by the author and value (positive or negative) categories. The results reveal no agreement on 'author' category. Some people consider it very useful while others rate it totally useless (minimum = 1). Discussion regarding these items was long: they agree that categories are necessary for future

researches among memories. On the other hand, they only show the need of grouping memories with regards to the date they are uploaded: they want to identify the memories already read and this may be achieved simply through changing the colour of links leading to memories already read(as suggested by an old male participant).

Figure 7   Memory labels
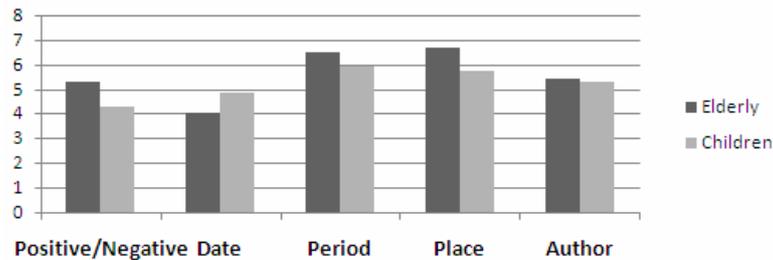
Children score generally lower compared to the elderly, although the values are somewhat similar. Period and place are considered the most useful categories when considering group memories. Reminiscence quality (positive/negative) receives the lowest rating, which suggests that children think that this variable is not as useful as are other categories.

3.2.3 Social network features

Different useful features to create a virtual community (i.e., comments and ratings) were investigated. The elderly totally disagree with the item 'Allow rating of others' artefacts' (M = 2.10, SD = 1.44) while they agree on its uselessness because they believe that memories just cannot be judged. A symbolic sentence comes from the discussion: "If someone should rate me low, I would say, "Who gave you permission?". The lowest ranked item among the elderly is, 'allow the creation and editing of memory content by family and/or close friends' with mean rating of 1.75 (SD = 2.12). In the discussion, older people notice that by allowing editing of others' memories 'an endless process of mutual changes' would start. They also state, "if I knew that someone can edit what I write, I would think better whether to write or not" and then they add, "if someone has something to add, he/she just writes his/her own memory".

Although these items are rated low, the elderly like the idea of getting in touch with people who share similar memories. Item 'Allow establishing a connection to/network with owners of similar memories (based on time, location, event etc.)' has a mean rating of 5.70 (SD = .94), which interestingly shows the elderly will to collaborate and create networks with people sharing similar memories.

Children values on items regarding social network issues are not as high as we could expect ('Enable comments on postings' had M = 5.36, SD = 1.03; 'Allow rating of others' artefacts' had M = 5.18, SD = 1.94). Children could have appreciated these issues more, as they are strictly related to their way of surfing the net. The high score (M = 6.18, SD = 1.4) on the item, 'Connect to popular social networking sites to allow transfer of notification and comments, and to extend interaction and contact base (i.e.,

Facebook; what is happening to me and my shared memories in NoBits, let me invite friends from these sites to useNoBits etc.)' is worth noting. We see that children would really like to connect their NoBits activities to their social networks' accounts and share them with friends. We could then hypothesise that the preferred scenario – for children but also for elderly (and maybe even for website administrators) – should be the one through which comments and ratings of artefacts would be allowed only on the social networks where children decide to share NoBits contents.

3.2.4 Privacy

An easy access to the website is needed by both elderly and children who do not want to share too much personal information (elderly M = 6.4, SD = 1.58; children M = 5.73, SD = 1.27). Different access rights for website areas are appreciated but users do not seem to have a specific need towards this issue, as suggested by questionnaire's item 'Create different access rights, separate areas (family vs. community – who can see what)': elderly score low on these items (elderly M = 3.3, SD = 2.63), children score higher (children M = 5.64, SD = 1.69) but both samples do not show agreement regarding this issue (minimum = 1 and maximum = 7).

3.2.5 New devices

New marketing devices were also explored, e.g., creating website's mobile version or using a digital pen that would allow elderly to write their memories easier. There is wide scepticism ('Allow the creation of artefacts via mobile phone' M = 2.44, SD = 2.6) among elderly towards the mobile version of NoBits website. Most of them use mobile phone only to make phone calls. We should notice high standard deviation for this item. In fact, some elderly rate these innovations as useful, although they are not able to use them. Even children do not seem too enthusiastic about the mobile version of NoBits website (M = 5.55, SD = 1.63). Some even say that it would make them feel uncomfortable. In Italy, children do not seem to surf the Net through mobile phones yet. In the discussion, children state that they would like to take pictures via mobile camera and upload them instantly to the related memories on NoBits website.

The results show a general agreement with item, 'Allow downloading (CD), book-, or diary-like structuring and printing of memory compilations' (elderly M = 6.2, SD = 1,47; children M = 6.00, SD = 1.34). This feature seems to represent the link between our project and a typical memory collections through giving user the permission to simply create a concrete object that they could manage offline. Discussion of the data revealed different beliefs. An elderly person warns, "One could create books or CD's thanks to his/her memories without asking his/herself" and "this option strengthens the need of a committee supervising the upload of memories." A child suggests 'printing and sharing some copies in local libraries' in order to reach a wider audience and create a sort of marketing for NoBits service all around the neighbourhood.

Concerning the digital pen, mean rating is 5.00 (only elderly, SD = 1.05): the brief discussion that followed highlight that the use of digital pen is interesting, useful and helpful, although not currently a real need.

3.3 NoBits website

The data collected allowed us to create the Italian prototype of Nostalgia Project website. The website is public (available at http://www.nobits.it) so that everyone can read the memories collected.

Following the main requirements expressed by users and their habits towards new technologies, corresponding technical features have been developed as depicted in Table 4.

Table 4   NoBits website main features

User need	Technical specification	Description
Easy access	Simple account	Only username and password are required. A more detailed profile is optional.
Scared of possible manipulation of artefacts by unknown people	Private area	Only elderly centres and classes involved have private accounts: they can write and upload photos without showing them until asking for publication.
Parental control	Reviser account	Every article has to be approved by a reviser before being published. Revisers are the responsible of the senior centres and the school teachers.
Working together more than individually	Account for senior centres and school classes	The name of the working group is shown: single authors may be added at the end of the article.
Identify the place contents refer to (and other categories)	Town division and categorisation	Different areas are created for the towns involved. At the end of every article, related towns and themes are asked.
Loathing for ratings and comments	Comments and ratings disabled	Communication among different authors is achievable only through two template's boxes called 'author comments' and 'further investigations'. The author can express his/her subjective ideas towards the related topic and ask other users to deeper investigate it from different points of view.
Possibility of creating various texts, e.g., dialectal sentences, in a simple way	Fixed template	Easy way to create articles through a structured template. This standardise all the visual final outputs regardless of the various contents.
Add photos, audio or video files to memories	Photo gallery and document repository	Possibility to store photos, videos and audio file in the gallery or in the repository and then attach them to the text. For big files, the possibility of embedding videos from a web-based service (Vimeo) is ensured.

The website offers areas concerning various themes, around which elderly from senior centres and children from educational institutes will create artefacts. Tangible artefacts of elderly life experience can be uploaded. The purpose is creating a significant resource for other generations and for connecting the elderly users with members of their own generation. A template is offered to help elderly and children creating artefacts. It is composed of different textual boxes to fill: title, introduction, summary and paragraphs

are mandatory; the boxes 'author comments' and 'further investigations' are optional. Before asking for publication, it is asked to indicate themes and the towns the artefact deals with, choosing from a list. In the end, further key words can be added to better explain the topic and guide future web searches. The website allows the upload of documents until 15 megabyte that are at first stored in specific folder and can be easily attached to the article. Hypertexts can be written and also photo slideshows or any other media clip can be attached to the articles published on specific web pages. With the term 'artefacts' we refer to all the web pages created by users: some of them are simple texts, others have attachments like images and video-clips for example.

Different scenarios will be scheduled and encouraged by the Nostalgia Bits project:

- group of elderly reminiscing in their senior centres and later working together to publish common articles on specific themes

- single old users creating autonomously their own memories to share on the website

- group of elderly reminiscing in educational institute with children, helped by teachers if needed: primary and secondary users can decide to work simultaneously on the article while listening to the memories; otherwise, children listen, take notes and later create articles thinking back to the memories.

The website allows the users to write their own articles whenever they want, so there will be many unpredictable ways of working with the platform. The third scenario will be tested through further scientific researches: once created the platform, the aim is to assess whether the web platform can be a useful tool to empower, organise and negotiate cross-generational reminiscence. Children may gain an active role in the process, from simple listeners to memory writers: once specifically trained, elderly users too may be interested in working together directly on the future artefacts. The purpose is, as already demonstrated (Blanchard and Markus, 2004), that virtual communities can foster social relationships.

4 Discussion

Reminiscence is an activity elderly really like: they think it is useful, and they are aware that they can help future generations through their memories. Developing a website to create a network where both users can meet and share memories is a fascinating challenge.

Focus groups with elderly underline their mature way of reminiscing. They do not share memories simply because they wish to talk with peers, they are fully aware of the power of the memories in giving meaning to their entire life and helping other people by providing concrete life examples. The elderly understand and explain the power of the entire reminiscing activity without the habit of focusing particular events. They also take particular care of bad memories that are often more useful compared to beautiful memories although they often deal with crucial and difficult times of their life. The elderly share memories spontaneously with peers, family, or even strangers, although in the latter case, they choose to avoid personal details, especially at the beginning of the sharing activity. They want their reminiscence to remain spontaneous, they do not like scheduled meetings to share memories but they appreciate the idea of getting in touch

with others' memories. A website would allow them to pursue reminiscence sharing on the web spontaneously, whenever they want or need that.

On the other hand, the secondary users, i.e., children, are interested in sharing memories with the elderly because of the experience they already have with grandparents. This trend decreases with age because adolescents seem to feel the familiar bond as less strong. They reinforce their opinion by underlining that the memories of the elderly should be kept safe and private. Significant values are shown by crossing children age both with the satisfaction while talking with grandparents and the topics they like to talk about together: younger children feel more satisfaction than older ones. These data clearly suggest that the focus would be placed on younger children, for example, junior and junior high school students 12 years of age and younger. The data show that younger children already have the habits of browsing websites, so they will be able to work on the platform.

The second round of focus groups helped identify website features that are shared between elderly and children. Based on the findings, such website could face certain difficulties because of the structure of a social network. Both elderly and children do not want memories to be rated and they would like to avoid comments on such a website. Probably the best way of acting is the one suggested and appreciated by children, that is connecting the website to popular social networks to allow transfer of notification and comments and to extend interaction and contact base. Such an application would create a platform where elderly can write, store, and read memories without being disturbed by comments or other features unrelated to the memory. At the same time, children could share their NoBits activities with their friends through the link to their social networks' personal accounts. Memories would be safely stored and people could browse them easily. The service would still be 'social' thanks to external social networks, for example, children could invite friends to use NoBits from their accounts or simply share their memories to entice people to join the website. Moreover, it would allow individuals to contact the authors of the memories, especially the elderly who would agree to be contacted. This contact can be managed simply through e-mail communication, which is one of the most common activities of the elderly with basic technological skills. Our enquiry aimed at identifying how our users use the web more than assessing their technological skills: this approach may be not so deep as a specific analysis (e.g., Desjardins, 2001) but it is functional to the purpose of developing a service that both kinds of user will be able to manage to foster social interaction.

Future studies could also investigate gender differences between grandparents and similarity between the two generations in terms of gender: we might expect that boys and girls speak about different topics with respect to grandfathers or grandmothers. As concern methods, when the website will be used during the interaction between elderly and children (together or remote), additional researches will be able to provide interesting data through a social network analysis: this method represents a promising way to evaluate the computer-supported cooperative work (Pratt et al., 2004, Neale et al., 2004) of the real community that NoBits project will create for the trial phase.

5   Conclusions

The preliminary analysis offered useful suggestions to develop a web service. Through the two phases the role of reminiscence was highlighted directly from the subjective

perspective of our users; moreover, guidelines were collected for the development of the Italian website, now available at http://www.nobits.it. The aim of fostering social cross-generational interactions has taken advantage from this preliminary work with both kinds of users: from the very beginning they feel part of the project in a UCD, aimed at engaging users in the developmental phase to ensure the creation of a usable service. In the following part of the project, the real collaboration with elderly and children will be the most interesting scenario. Future researches will be carried out to test if our Reminiscing System works as easy as expected by users and if NoBits website is good and trustworthy to support reminiscence. The challenge is to improve elderly well-being through supporting the sharing of memories: working on the website will be also a way to get children in contact with past tales and the teaching value of elderly past experiences. Thanks to NoBits platform the two different generations will be able to create a sort of reminiscing community sharing knowledge of the past, like the ones reviewed by Kosonen (2009).

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