

# Online Social Networks for the Elderly – Acceptable Interfaces for People with Serious Impairments

David ZEJDA<sup>a</sup>

<sup>a</sup>*Faculty of Informatics and Management, UHK, Czech Republic*

**Abstract.** Today's Web 2.0 is a place, where people express themselves, interact share their lives, socialize. Thousands of elderly people join various social networking sites or use the Net to keep in touch with their families. But, as we show in the paper, today's social software does not target their needs sufficiently. While there are usable solutions, usability itself does not imply acceptability. Acceptable interfaces should reflect user's habits, follow understandable metaphors, and above all, target their deep needs as precisely as possible. Further, the elderly can not be taken as a homogeneous group characterized by the impairments, but rather as a set of individual human beings, with specific wishes, desires, habits, and with some disabilities, of course. In the paper we formulated qualities which should social software meet to be widely perceived as beneficial and in result accepted by the elderly and by people with serious impairments.

**Keywords.** Social networks, elderly, acceptability, interfaces, deep design

## Introduction

Web irreversibly transforms into Web 2.0. Gravity axis moves from corporations to communities. Users themselves are no more consumers only, but they are those who shape the web of future, called as 'prosumers' by Klamka et al. [1] Variety of sites float on the wave of interest – community portals, co-authoring wikis, dating sites, social networking sites, such as Facebook or microblogging services, such as Twitter. Web 2.0 rather than bringing new technologies, redefines its own meaning and sense. Users perceive web as a place to socialize, to interact, to share, to live. Obviously, it brings good and bad simultaneously. The technologies allow to find and meet friends from the other side of the globe or to keep in touch with close despite long distance, which is good. But on the other hand, serious incidents discredited trustfulness of social software, young people of today are losing real-life social abilities and healthy habits, and the technologies widen a gap of misunderstanding between old and young.

Those who could benefit by outcomes of the current web most, the elderly, are greatly sidetracked. Our aim is to reveal the cause, the deeply rooted limitations in current social software design, in user interfaces in particular. Based on the analysis we formulated requirements on social software to make it more conform to the needs of people with serious cognitive, sensoric or motive impairments, the elderly in particular. Hopefully, our findings will help to overcome lack of interest, anxiety, fears and other barriers and allow more people to join and take advantage of social software.

## 1. Where the Elderly Socialize on the Net Nowadays

Some sites with certain social value for elderly people emerged on the Net already.

First, there are some special purpose, niche sites, such as:

- *enurgi.com* – Site designed to match up elderlies with qualified caregivers. The site is to be used by family of elderlies more than by elderlies themselves.
- *snappforseniors.com* – Site build around database of senior living options, aimed primarily on Seattle and nearby areas.

Second, there is a group of social sites specifically designed for retired people:

- *mywayvillage.com* – Connected Living project by MyWay Village connects elderly people living in retirement homes with their families. It allows to share photos, remember appointments, and document life stories. Further, moderated group sessions encourage discussions among members in order to help them to reminisce and share their lives. Simple interface has been designed specifically for people with memory or cognitive losses. [2]
- *jive.benarent.co.uk* – Jive is not a site, but rather range of innovative devices aimed to keep the elderly in touch with their friends through Internet. System is simple as possible, highly abstracting from computery at the background.

Last, there are networking sites for older adults and also general purpose sites:

- *eons.com* – General social networking site, targeting 50+ generation. Resembles general purpose social networking sites in a great degree. Provides photo and video sharing, user groups, how-to lists, interviews, links, games and similar functions.
- *facebook.com* – According to Facebook Demographics and Statistics 2010 [3] US audience of age 55+ has grown by 922.7% in 2009 from 954.680 to 9.763.900, which is in comparison with 144.9% overall growth including all ages a really high figure. Apparently, elderly people are increasingly interested in general online social networking too.

## 2. Deep Design Approach

In the centre of our ‘deep design’ [4] there are humans and their inner feelings. The idea of human-centric and even emotion-driven design is not entirely new, of course. E.g. Norman [5] examined role of emotions in our ability to understand the world and to learn new things. Callejas et al. [6] suggested to take users more seriously into account even in early phases of design. Vogiazou et al. [7] introduced a ‘design for emergence’, where users are being observed in their daily activities to reveal unpredicted behaviours. Also technology probes as a source of serendipity promoted e.g. by Hutchinson et al. [8] may get close to users. Jordan [9] pointed out, that common task-centric design may be dehumanizing. We have hopes and dreams, sorrows and fears, desires and aspirations and actually, that make us human. With deep design we primarily target innermost sources of affinity which people feel to certain object or service. As humans, we do not like old grey photos in themselves, but for those who are depicted there [10], we do not like souvenirs for their monetary value, but for the memories captured, we usually do not have strong emotional feelings toward communication devices, but we may like the one on the other end of the line.

Deep design approach recommends to follow the real needs, wishes, desires or passions as sources of affinity at first, as the most important target.

Various emotions and strengths take their role in the process of technology evaluation and successive appropriation. Successful products have to pass all the phases – attract attention first, show rewards soon, and gradually break into habitual usage. Failure in any of the steps effectively means refusal of the product. [11] In early phases some shallow emotions such as visual appeal, curiosity or euphoria drive the process. But finally and above all, deep needs are the forces which may turn into high order reinforcers and keep the product in use in the long-term. [12] If we wish to overcome anxiety of the elderly and motivate them to learn new things, it is even more important to target their needs as precisely as possible. Talking about user interfaces, even subtle details matters in the process of evaluation and appropriation.

Swan et al. [10] studied usage of photos in home setting. The study showed that each photo in home captures something - an idea, emotion, place, or event. The virtue of idea highly influences connotations which people feel towards each photo. The emotional charge further influences where people tend to place it, how they frame it, how they combine it with other photos. Placing, framing, glazing, combining reflect what do people feel to photos, such as perceived formality or importance. Framed photo usually captures something persistent; different kinds of photos hang on walls, lie on bedside or stand on mantelpiece. Photos are being used also for photo-sessions with relatives [13], for story-telling, or as a way to keep close emotionally at hand [14]. Swan's study resulted in findings useful for design, e.g. that cycling function of photo frames distorts a perception of photo persistence, or that remote control distorts a positive feeling of closeness. Interesting concepts, unisonant with the inner feelings, have been introduced as a result, such as photo-cube and photo-matrix.

### **3. On Needs of the Elderly**

Our lives in the age of unprecedented prosperity are fast and hurried. It brings barriers for people who are not able or willing to adhere the speedy and shallow way of life. While typical social network of a youngster is broad, with maybe hundreds of so called 'friends', matured people usually select more precisely which relation they wish to keep. Elderly people appreciate depth of relations much more than breadth of their social network. These dissonances in values, thinking and living, different opinions and abilities widen generation barrier between elderlies and youngsters. Children often live far or pace of their life makes their visits less frequent and the generation barrier causes, that even if people meet, they do not have much in common to talk about. [13] Pettigrew [15] identified five categories of most severe obstacles for socialization of the elderly – they are not physically accessible, they keep to themselves, the fact of moving, changes in a community and isolation of illness. So, although relations are highly important for elderly, their social network as well as frequency and quality of their social activities diminish rapidly with age, resulting in feelings of loneliness and needlessness. The elderly in general do not wish to be monitored, but they wish to keep their independence, they wish to live in their home, to stay in touch with their close, to feel competent and helpful and dignified. In [4] we classified the needs into four interrelated clusters – a social touch, autonomy with anticipated support, feeling of being competent and feeling of helpfulness and self-worth. The analysis suggests, that

if older people join sites open for users of all ages, they will probably do their best to behave similarly to younger users (they do not wish to become outsiders). On the other hand, the differences, such as their preference of deep relations, will probably affect their interaction schemes. We performed some basic tests with data from our experimental social network. Our users may fill their profile (describe themselves), share some content (such as photos, blogs, other media) and interact in various ways (send messages, chat, comment content of each other).

Table 1. Dependence of profile info, shared content and interaction occurrence on age

		Sum of Squares	df	Mean Square	F	Sig.
profile_info	Between groups	3168421.946	5	633684.389	2.481	0.031
	Within groups	1.29E+008	503	255386.849		
content_shared	Between groups	10.145	5	2.029	1.156	0.330
	Within groups	882.873	503	1.755		
interactions	Between groups	62.058	5	12.412	3.494	<b>0.004</b>
	Within groups	1786.582	503	3.552		

As shown in Tab. 1, age significantly influences interaction occurrence. Further analysis showed that the dependence on age is greater than on sex. As shown on Fig. 1, older users interact less often. It may be caused by both difficulties in using interaction functions and in their preference in deep relations. Further analysis will be necessary.

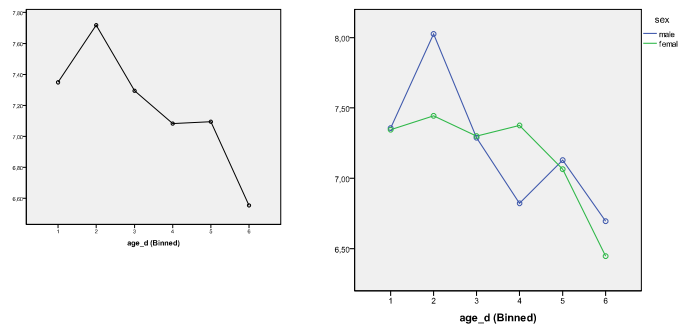


Figure 1. Influence of user's age and sex on occurrence of his interactions in the social networking site

#### 4. Social Software Welcomed by the Elderly?

The feelings described above sound quite obvious. But, alongside with current pace of life and its shallowness, current social networks often promote only shallow relations or even widen social barriers. Social networking system acceptable by the elderly does not mean bigger buttons. People are economy beings, they wish to receive utility for their efforts, perceive feedback (reward) for their actions. [16] In general, acceptable user interfaces should be well-arranged, easily understandable, pleasurable. Interfaces for the elderly should be also non-intrusive, proactive, adaptive, customizable, friendly, easy, joyful and useful. [6] From concepts behind aforementioned clusters of needs [4] we selected those applicable for social networking:

- **The Family.** One of the most inner desires of the elderly is to *keep in touch with their family*. They do not wish to be monitored, but they wish to monitor their close and also happenings on their side. Local information sources, such as current weather, local news, web cams from city street may bring the feeling of connectedness and raise topics for discussion. [13]
- **Folks.** Though in general they prefer deeper relations, the interest is not limited on the family only. They wish to extend themselves to meet others. They wish to meet *contemporaries*, but also meet people of *all ages to not feel as to die soon*.
- **Dignity.** It may happen that the elderly will use a system specifically designed to go about their disabilities. But it is not likely that they will *like* to use it. They indeed *do not wish to be stigmatized*.
- **Competence.** Studies proved, that ability to control raises interest. [17] Elderly people wish to be masters of their own lives and to keep their environment under control – to feel competent, empowered, *no more dependent*. They wish to use their stuff without having to ask for support. [18]
- **Self-fulfilment.** The elderly would appreciate a space to *express themselves*, maybe organize memoirs, reuse experiences into advices, prove themselves as dignified, valuable and to be recognized.
- **A dare.** The elderly may be highly willing to *take dare*. As shown in experiments such as [19] with microlearning, they *wish to learn* if they may keep the feeling of competence in the process. It applies both to the system itself (appropriate learning curve of system mastering) and to opportunities to learn new things *through* the system.

## 5. Usability and Users with Impairments

Social software may help the elderly to overcome disabilities and enrich their social relations, but the same disabilities make the task difficult. We have to consider impairments [20], such as *visual losses* (reduced visual acuity, loss in colour perception, increased sensitivity to glare), *cognitive losses* (declining performance of working memory and learning) or *motor skill impairments* (slower movements, poorer coordination, difficulties with fine motor actions). Related usability questions have been examined by other researchers. E.g. Becker [21] targeted usability of web by older adults, Lopez [16] examined suitability of interfaces for severely handicapped. Newell et al. [22] described different viewpoints and misunderstanding between prospective users, experts from web industry, and researchers during design of portal for older users. Based on the research, we may identify key usability-related properties:

*Selected functionality.* While gradual ‘upgrading’ is a trend, ‘downgrading’ may be more appropriate for users with impairments. [11] Not only the elderly appreciate simplicity, but it is generally welcomed by most users, as shown e.g. in experiment with photo sharing system. [14] Overwhelming of any kind should be avoided. E.g. [13] showed, that people like to see short videos of their close, not the whole party. Users also welcome if they may act immediately, without waiting and remembering.

*Coherence.* Interaction patterns should follow uniform scheme through the whole system. [23] Further, the interface should be coherent with established living patterns. To support the feeling of coherence, designers may use known metaphors. E.g. Yousef

[24] introduced model for evaluation of metaphors from the perspective of their cognitive and memory load and for their comparison.

*Reliability.* In the case of technology failure, especially inexperienced users doubt their own skills, which raises negative feelings, such as their anxiety [11]. System should be reliable to be acceptable.

## 6. Current Solutions Critically Evaluated

In the begining we mentioned three categories of social software. First group of systems target relatives of old people instead of the elderly themselves, which is out of scope of our interest. Systems from the second category primarily help the elderly to keep their family relations, which is good. Designers also did a great job on usability – the systems are easy to learn and easy to use. On the other hand, users may feel stigmatized by something intentionally designed as an old-age appliance or service and the elderly with mild impairments may feel underrated. Opportunities for creative self-expression, for social network enhancement, or for self-education have been sacrificed to keep the system as simple as possible. Finally, general purpose social networks do not bear the mentioned drawbacks, but on the other hand usually lack of usability, thus possibly bring anxiety, confusion, disillusion, feeling of incompetence. Further, the systems follow youngsters' patterns of thinking, such as the preference in shallow relations.

**Table 2.** Requirements on social software by the elderly. Weaknesses of current solutions are emphasized.

The deep need or property of system	Importance or desired level	Retiree online social systems	General purpose social systems
the family	very important	supported	supported
folks	important	<b>weakly supported</b>	greatly supported
dignity	very important	<b>stigmatized</b>	being kept
competence	very important	high	<b>low</b>
self-fulfilment, a dare	important	<b>low</b>	high
functionality level	suitable	<b>too low</b>	too high
usability	very important	high	<b>low</b>
relation depth	deep	deep	<b>shallow</b>

## 7. Personalized Interfaces

To exclude bad while keeping the good we should merge the two worlds – the world of speedy Facebook generation with the world of their mature grandparents. The desired social networking system should allow them to meet in a shared space, but respecting their differences. Further the elderly can't be viewed as a homogeneous groups. Each person is a human being, with his very own needs, values, opinions, abilities, habits. While it is desirable to *allow people of all ages to meet* each other in a shared web

space, one system with one interface will never match needs of all, which means that a *much deeper personalization* will be necessary to reach the goal outlined.

We may personalize interfaces for existing social software, implement a new social software with deep personalization on mind, prepare a personalization facade or integrate more social software projects, keeping their personalized interfaces. We may also consider wide range of interface modalities, from tactile devices [16], touch screens in particular, proved as suitable for people with impairments e.g. in [20] or [25], through mobile and desktop integration [14], IPTV [19], ambient appliances, such as screen at the kitchen wall [13], or audio-based interfaces (which may promote feeling of closeness more than written word), from highly discrete, up to open audio zone [13]. In the future more multimodal interfaces [26] probably emerge too. Well designed system may awaken great enthusiasm, such as when users of bulletin board prototype revealed personal items shared by their valued family members. [11]

## 8. Conclusions

According to statistical figures, elderly people are highly interested in social software. Many appreciate the social benefit so high to strive to overcome impairments or negative feelings. The technologies in reward allow them to keep in touch with their families, to extend their social networks, to socialize despite lowered abilities. In the paper we used deep design approach to examine needs of the elderly to reveal fundamental weaknesses in current social software. Simply, the systems either do not provide enough functionality and stigmatize, or are too complicated and aimed on shallow relations and on young generation. It is desirable to have a common meeting place for people of all generations, but offer them different perspectives, reflecting their needs, wishes, abilities etc. Much greater level of personalization is necessary. Novel interface modalities may come to help to bring social software leap further.

## Acknowledgment

Author wishes to thank Josef Zelenka and Peter Mikulecký for their valuable advices. The research was supported by UHK FIM specific research no. 2110 – “Intelligent Social Technologies for Quality Life of Elderlies”

## References

- [1] R. Klamma, M.A. Chatti, E. Duval, H. Hummel, E. Thora, M. Kravcik, E. Law, A. Naeve, a P. Scott, “Social Software for Life-long Learning.”
- [2] “Connected Living - A Secure, Safe Online environment for seniors..”
- [3] “Facebook Demographics and Statistics 2010,” <http://www.scribd.com/doc/24763128/Facebook-Demographics-and-Statistics-2010>.
- [4] D. Zejda, “Deep Design for Ambient Intelligence - Toward Acceptable Appliances for Higher Quality of Life of the Elderly,” *Proceedings of the International Conference on Intelligent Environments (in press)*, 2010.
- [5] D.A. Norman, *Emotional Design: Why We Love (or Hate) Everyday Things*, Basic Books, 2003.
- [6] Z. Callejas a R. López-Cózar, “Designing smart home interfaces for the elderly,” *SIGACCESS Access. Comput.*, 2009, s. 10-16.

- [7] Y. Vogiazou, J. Reid, B. Raijmakers, a M. Eisenstadt, "A research process for designing ubiquitous social experiences," *Proceedings of the 4th Nordic conference on Human-computer interaction: changing roles*, Oslo, Norway: ACM, 2006, s. 86-95.
- [8] H. Hutchinson, W. Mackay, B. Westerlund, B.B. Bederson, A. Druin, C. Plaisant, M. Beaudouin-Lafon, S. Conversy, H. Evans, H. Hansen, N. Roussel, a B. Eiderbäck, "Technology probes: inspiring design for and with families," *Proceedings of the SIGCHI conference on Human factors in computing systems*, Ft. Lauderdale, Florida, USA: ACM, 2003, s. 17-24.
- [9] P.W. Jordan, *Designing Pleasurable Products*, CRC Press, 2002.
- [10] L. Swan a A.S. Taylor, "Photo displays in the home," *Proceedings of the 7th ACM conference on Designing interactive systems*, Cape Town, South Africa: ACM, 2008, s. 261-270.
- [11] E.R. Veldhoven, M.H. Vastenburg, a D.V. Keyson, "Designing an Interactive Messaging and Reminder Display for Elderly," *Proceedings of the European Conference on Ambient Intelligence*, Nuremberg, Germany: Springer-Verlag, 2008, s. 126-140.
- [12] J. Carroll, S. Howard, F. Vetere, J. Peck, a J. Murphy, "Just What Do the Youth of Today Want? Technology Appropriation by Young People," *Proceedings of the 35th Annual Hawaii International Conference on System Sciences (HICSS'02)-Volume 5 - Volume 5*, IEEE Computer Society, 2002, s. 131.2.
- [13] B. Evjemo, G.B. Svendsen, E. Rinde, a J.K. Johnsen, "Supporting the distributed family: the need for a conversational context," *Proceedings of the third Nordic conference on Human-computer interaction*, Tampere, Finland: ACM, 2004, s. 309-312.
- [14] S. Counts a E. Fellheimer, "Supporting social presence through lightweight photo sharing on and off the desktop," *Proceedings of the SIGCHI conference on Human factors in computing systems*, Vienna, Austria: ACM, 2004, s. 599-606.
- [15] K. Pettigrew, *The Role of Community Health Nurses in Providing Information and Referral to the Elderly: A Study Based on Social Network Theory.*, 1997.
- [16] J.B. Lopes, "Designing user interfaces for severely handicapped persons," *Proceedings of the 2001 EC/NSF workshop on Universal accessibility of ubiquitous computing: providing for the elderly*, Alentejo, Portugal: ACM, 2001, s. 100-106.
- [17] L. Zaad a S.B. Allouch, "The Influence of Control on the Acceptance of Ambient Intelligence by Elderly People: An Explorative Study," *Proceedings of the European Conference on Ambient Intelligence*, Nuremberg, Germany: Springer-Verlag, 2008, s. 58-74.
- [18] A. Bambina, *Online social support*, Cambria Press, 2007.
- [19] V. Fuchsberger, "Ambient assisted living: elderly people's needs and how to face them," *Proceeding of the 1st ACM international workshop on Semantic ambient media experiences*, Vancouver, British Columbia, Canada: ACM, 2008, s. 21-24.
- [20] T. Apter, J. Kay, a A. Quigley, "Tabletop sharing of digital photographs for the elderly," *Proceedings of the SIGCHI conference on Human Factors in computing systems*, Montréal, Québec, Canada: ACM, 2006, s. 781-790.
- [21] S.A. Becker, "A study of web usability for older adults seeking online health resources," *ACM Trans. Comput.-Hum. Interact.*, vol. 11, 2004, s. 387-406.
- [22] A.F. Newell, A. Dickinson, M.J. Smith, a P. Gregor, "Designing a portal for older users: A case study of an industrial/academic collaboration," *ACM Trans. Comput.-Hum. Interact.*, vol. 13, 2006, s. 347-375.
- [23] M.H. Vastenburg, T. Visser, M. Vermaas, a D.V. Keyson, "Designing Acceptable Assisted Living Services for Elderly Users," *Proceedings of the European Conference on Ambient Intelligence*, Nuremberg, Germany: Springer-Verlag, 2008, s. 1-12.
- [24] M.K. Yousef, "Assessment of metaphor efficacy in user interfaces for the elderly: a tentative model for enhancing accessibility," *Proceedings of the 2001 EC/NSF workshop on Universal accessibility of ubiquitous computing: providing for the elderly*, Alentejo, Portugal: ACM, 2001, s. 120-124.
- [25] D.A. Torres, "Evaluating a pen-based computer interface for novice older users," *Proceedings of the 8th international ACM SIGACCESS conference on Computers and accessibility*, Portland, Oregon, USA: ACM, 2006, s. 249-250.
- [26] F.J.S.D. Salces, D. England, a D. Llewellyn-Jones, "Designing for all in the house," *Proceedings of the 2005 Latin American conference on Human-computer interaction*, Cuernavaca, Mexico: ACM, 2005, s. 283-288.